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sustainability

Trust Management

Key Factor of the Sustainable Organizations Embedded in Network

Edited by

Barbara Kożuch and Adam Jabłoński

Printed Edition of the Special Issue Published in *Sustainability*

Trust Management

Trust Management: Key Factor of the Sustainable Organizations Embedded in Network

Special Issue Editors

Barbara Kożuch

Adam Jabłoński

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Special Issue Editors

Barbara Kożuch
Jagiellonian University
Poland

Adam Jabłoński
WSB University in Poznań
Poland

Editorial Office

MDPI
St. Alban-Anlage 66
4052 Basel, Switzerland

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About the Special Issue Editors

Barbara Kożuch, Institute of Economics, Finance and Management, Jagiellonian University Kraków, 31-007 Kraków, Poland. Interests: foundations of management sciences; systems and methods of management; project management and human resource management; multicultural management; conditions of efficient functioning of the public sector, particularly in regard to change management in healthcare, education, culture, and public safety.

Adam Jabłoński, Scientific Institute of Management, Faculty in Chorzów, WSB University in Poznań, Poland. Interests: digital economy; business model; digital business model; network management; sustainability.

Preface to "Trust Management: Key Factor of the Sustainable Organizations Embedded in Network"

Nowadays, trust is an important determinant in the development of modern organizations. Not only is it becoming an increasingly important element of relationships between entities, but, above all, it positively influences the building of an organization's intellectual capital. This capital can be defined in different ways, but its definition always references elements that determine the potential of sustainable organizations, often in human, social, relational, organizational, and innovation dimensions. Trust is increasingly becoming the key determinant of this capital (Kožuch, Lenart-Gansiniec, 2017). Trust also has a number of different definitions. However, the basis of many of these definitions is the building of relationships focused on developing some kind of individual or inter-organizational link. Organizational trust is a complicated concept, and it is the basis of all organized activities performed by people in the organization, largely because trust is needed to develop relationships with integrity and commitment. Thus, it is interesting to study the relationship between trust and the building of the intellectual capital of sustainable organizations. Indeed, intellectual capital plays a special role here. It is a guide and a platform for achieving not only a competitive advantage for the sustainable organization, but also a source of value creation in the short and long term. Thus, this strategic hybrid, composed of a business model, strategy, and business processes, is favorable to the development of intellectual capital (Jabłoński 2017). Trust is an element that ties this capital to relationships in business. Moreover, it has an integrated character (R.C. Mayer, J. H. Davis, F. D. Schoorman 1995). Assuming that, nowadays, the network paradigm is becoming increasingly important, it is worth asking how the mechanism of building trust-based intellectual capital in a sustainable organization functions as its key asset in the network environment.

Barbara Kożuch, Adam Jabłoński

Special Issue Editors

Article

(Dis)Trust, Control, and Project Success: From a Chinese Project Owner's Perspective

Weiping Jiang ^{1,*}, Xianbo Zhao ² and Jian Zuo ³¹ School of Civil Engineering, Shenzhen University, Shenzhen 518060, China² School of Engineering and Technology, Central Queensland University, Sydney 2000, Australia; b.zhao@cqu.edu.au³ School of Architecture and Built Environment; Entrepreneurship, Commercialisation and Innovation Centre (ECIC), The University of Adelaide, Adelaide 5005, Australia; jian.zuo@adelaide.edu.au

* Correspondence: swingopen@szu.edu.cn; Tel.: +86-0755-3601-3879

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Abstract: This research aims to investigate the relationship between interorganizational trust and control and their effects on the project success from the perspective of project owners. Based on relevant literature and the actual situation in the Chinese construction industry, trust was classified as calculative trust and relational trust, and control was classified as outcome control, behavior control, and social control. Results show that project owners' distrust of contractors is independent of project owners' trust of contractors. Calculative trust has a positive influence on all kinds of control. Relational trust has negative impacts on outcome control and behavior control and positive impacts on social control. Of the three kinds of control, outcome and behavior control have negative impacts on social control. All constructs have positive impacts on project success. Project managers should be aware that distrust has a positive influence on project success through the mediation effects of control. Similarly, social control is the most influential type of control, influencing the controller to internalize norms to complete project tasks.

Keywords: trust; distrust; control; project success; structural equation modeling (SEM)

1. Introduction

Trust has drawn wide attention in the field of management research, including construction-project management [1–3]. Trust is defined by Rousseau et al. [4] as a psychological state comprising the intention to accept vulnerability, based on positive expectations of intentions or behaviors of another. Previous studies reported that higher levels of trust contribute to exceptional project performance and promote cooperation among stakeholders [5]. For example, Black et al. [6] suggested that “mutual trust” is one of the most critical factors in maintaining partnerships.

Although trust has a significant influence on project cooperation, trust cannot resolve all problems during the cooperation process [7]. Indeed, interorganizational control is another important factor in achieving project success [8]. Control is traditionally regarded as the backbone of organizational performance, focused on mechanisms such as organizational structure, formalization, and hierarchy. Control is “a regulatory process by which the elements of a system are made more predictable through the establishment of standards in the pursuit of some desired objective or state” [9]. No consensus exists on the relationship between trust and control in interorganizational relationships.

Moreover, it is well recognized that complete trust does not exist [10]. Trust and distrust coexist, as one may trust another in some ways and distrust another in other ways, affecting the ability to cooperate [11]. Often, trust is operationalized on a continuum bounded by the diametric poles of trust and distrust [12]. However, a growing number of studies suggested that trust and distrust are separate but related constructs [10,13,14], so that low trust does not necessarily mean high distrust. Sitkin and

Roth [15] defined distrust as “a belief that a person’s values or motives will lead them to approach all situations in an unacceptable manner.” Most trust theorists agree that trust and distrust are separate and opposite constructs [16].

In construction projects, the relationship between project owners and contractors is generally temporary. In this temporary cooperation, trust and distrust from the owners coexist and influence owners’ control measures. Generally, project owners themselves have no ability to control project progress and must rely on contractors. As a result, owners take control measures and contractors can complete project targets. This study examines owners’ control measures of contractors, discerning the relationship among trust, distrust, and control by project owners with contractors, and their influence on project success.

This study has implications for theory and practice. First, by combining trust, distrust, and control in the same frame, one can observe their collective effect on project success. The vast majority of extant studies examined the relationship between trust and distrust or between trust and control separately [17,18]. This study develops a framework integrating trust, distrust, and control into a single framework and explores the relationships among them. Its findings enrich the body of knowledge on project management. Second, this study provides useful references for owners’ project managers to collaborate with contractors toward achieving project success.

2. Background and Conceptual Framework

2.1. Interorganization Control

Control is a term widely used in the disciplines of manufacturing and management. Organizations have paid attention to the capability of planning, resource allocation, and control functions to ensure project objectives are achieved [19–22]. This approach to project management assumes all the organizations work as a whole and has neglected the interorganizational relationship of participants in overall project success.

Three kinds of control strategy in management are outcome control, behavior control, and social control [23–25]. Outcome control and behavior control are forms of formal control [26]. Formal control emphasizes the establishment and use of formal rules, procedures, processes, and policies to monitor and reach desirable objectives [24]. Social control, also called informal control, relies on establishing organizational norms and values [27].

While measuring outcomes relies on accurate assessment of participant performance, measuring behavior aims to ensure the process is appropriate [24]. Social control is also called clan control [28]. Clan control is suitable in an environment with no specifying task-related behaviors and outputs. Clan control focuses on developing shared values, beliefs, and goals to reinforce appropriate behavior. Participants are motivated to achieve goals if project organizational goals are internalized. In short, outcome control is suitable in organizations with high outcome measurability: the ability to measure output in a precise and objective manner. Behavior control is suitable in those project organizations with high task programmability, which references the degree to which managers understand the processes in which appropriate behaviors take place. Social control is suitable in project organizations with tasks that can hardly be monitored by output standard or processes.

Therefore, in terms of functions, formal control and informal control supplement each other. Generally, the owner and contractor initially cooperate at the early stages of a project. The contract describes project targets and project rules include work processes [29–31]. In other words, outcome control and behavior control are prominent in the early stages of a project. However, social control develops with relationship development between the two partners, according to the strength of formal control. Therefore, the following are hypothesized

Hypothesis 1a (H1a): *The owner’s outcome control negatively influences the contractor’s social control.*

Hypothesis 1b (H1b): *The owner’s behavior control negatively influences the contractor’s social control.*

2.2. Relationship between Trust/Distrust and Control

2.2.1. Relationship between Trust and Control

First impressions are very important for cooperation between partners. According to path-dependency theory, first impressions lay the foundation for cooperation. In construction-project organizations, the owner and contractor generally cooperate initially, owing to the temporary nature of construction projects. Although the owner and contractor may have cooperated previously, the members of the two organizations need to rebuild trust.

Trust has significant impacts on project partners' relationship. First, calculative trust has a certain influence on project control. Calculative trust is the rational component of trust [32]. Calculative trust is also called rational trust or deterrence-based trust [33]. In construction projects, calculative trust does not mean clients relax their vigilance against contractors. In project-organization relationships, calculative trust results from thorough consideration of the other partner's competency and one's own profit. Greater calculative trust accompanies more rationality, expressed in greater control, such as stricter contracts and procedures, or value and cultural influence. Thus, the following are hypothesized:

Hypothesis 2a (H2a): *Calculative trust positively influences outcome control.*

Hypothesis 2b (H2b): *Calculative trust positively influences behavior control.*

Hypothesis 2c (H2c): *Calculative trust positively influences social control.*

Unlike calculative trust, relational trust is the emotional aspect of trust [32]. Relational trust has been labeled affect-based or identification-based [34,35]. Rousseau and colleagues [4] referred to trust motivated by these social-psychological bonds as relational trust. Relational trust is a kind of real trust, with no calculation [36].

Emphasizing mutual respect and shared interests, relational trust provides an effective tool beyond those organizational controls [37,38]. Das and Teng [38] indicated that trust and control are "two completely different kinds of approaches. When it is possible to fully trust a partner, there is no need to control its behavior. Control comes into play only when adequate trust is not present." Thus, the following are hypothesized:

Hypothesis 2d (H2d): *Relational trust negatively influences outcome control.*

Hypothesis 2e (H2e): *Relational trust negatively influences behavior control.*

Hypothesis 2f (H2f): *Relational trust negatively influences social control.*

2.2.2. Relationship between Distrust and Control

Distrust is a negative expectation about another's intention or conduct [10,14,39]. It is well recognized that distrust inevitably leads to more control measures [40–42]. When distrust exists, it is more likely someone will be maliciously treated [41]. Maliciously treatment may lead to preventive actions against the effects of the other's behavior, especially guiding or restricting the other's conduct through contract agreement, behavior control, or cultural influence.

In construction projects, the relationship between distrust and control is prominent. When distrust level of the other partner rises, it is more likely the distrusting person will seek contract documents. Zaghoul and Hartman [43] investigated the construction industry in Canada; they pointed out that current contractual relationships mainly rest on confrontational situations that reflect the level of distrust in contract documents. Owing to distrust about the other partner, contracts are always written with numerous clauses. Thus, the following is hypothesized:

Hypothesis 3a (H3a): *Distrust positively influences outcome control.*

Beyond contract control measures, the owner may also employ behavior management to control the behavior of the contractor owing to the existence of distrust. Due to the information asymmetry between the owner and contractor, the owner may strengthen behavior control to ensure the project is in the controlled state. In the Chinese construction industry, owners always employ supervision engineers to monitor the construction process on site [44]. Thus, the following is hypothesized:

Hypothesis 3b (H3b): *Distrust positively influences behavior control.*

In addition, the owner may use social control measures when experiencing distrust. Social control is an alternative to formal control [23]. Social control uses culture and value to influence the other partner. When the other internalizes the value, the aim of social control is fulfilled [24]. Thus, the following is hypothesized:

Hypothesis 3c (H3c): *Distrust positively influences social control.*

2.3. Project Success

Project success has been extensively examined in the project-management literature [45–47]. Project success means different things to different project stakeholders [48,49]. In this paper, project success is examined from the perspective of the owners. Project success is the degree to which project goals and expectations are met [50,51].

It is well recognized that trust has important influences on project success [3,52–56]. Thus, the following are hypothesized:

Hypothesis 4a (H4a): *Calculative trust positively influences project success.*

Hypothesis 4b (H4b): *Relationship trust positively influences project success.*

Distrust also has a notable influence on cooperation performance resulting from the two partners' work. Very few studies directly concern the relationship between distrust and project performance in the project-management literature. However, abundant relevant research in E-commerce is referenced in this research.

Carol and Choon [57] conducted an empirical study on consumers' trust and distrust of websites. Their study suggested that trust and distrust are two distinct constructs, whereas distrust prevents a consumer from buying on a website and requires greater attention. Benamati and Serva [58] recommended that online banks build trust but not ignore the powerful synergy of consumer distrust. McKnight and Choudhury [59] argued that trust and distrust are distinct concepts, suggesting distrust is an important predictor for business-to-consumer actions such as willingness to share information and willingness to purchase. Thus, the following is hypothesized:

Hypothesis 5 (H5): *Distrust negatively influences project success.*

Control is an important function of management [60] and is critical to project performance [61]. Referring to interorganizational control, different types of control have specific implications. According to Das and Teng [24], behavior control focuses on the process that can turn appropriate behavior into desirable outcomes. Behavior control is suitable when opportunistic behavior and relational conflict are difficult to measure precisely and objectively. Behavior-control mechanisms are used to regulate the other partner's conduct to prevent major surprises, thereby reducing relational risk. In contrast, outcome control is not associated with relational-risk management [24].

Outcome control is more relevant to performance risk, which can be measured in a precise way [24]. Performance risk relates to organization performance or the outcome of the other partner's activities. Therefore, outcome control is an effective way to reduce performance risk.

Social control aims to align organizational goals by establishing a common culture and values [62]. The value of social control is more significant in cases of low-output measurability and process programmatically. Social control is capable of addressing relational risk and performance risk simultaneously [24].

In construction projects, outcome control mainly manifests in contract clauses to define project outcomes. The owner generally describes the desirable outcome of the project in the contract with the contractor, such as cost and schedule. Outcome control cannot effectively address opportunistic behavior, which occurs in construction projects because of asymmetric information between the owner and the contractor. Thus, the owner may set up a series of process regulations to monitor the contractor's behavior; hence, behavior control. Beyond outcome control and behavior control, social control exists to influence the partner's culture and value in construction projects. Though the utility of social control is not as impactful as outcome control and social control, it can be used to internalize the cultural influence for the contractor and makes it beneficial for the contractor to execute orders more aligned with the aim of the owner. Therefore, the following are hypothesized:

Hypothesis 6a (H6a): *Outcome control positively influences project success.*

Hypothesis 6b (H6b): *Behavior control positively influences project success.*

Hypothesis 6c (H6c): *Social control positively influences project success.*

All these hypotheses form the conceptual framework of this study (see Figure 1). This conceptual framework was tested with empirical data.

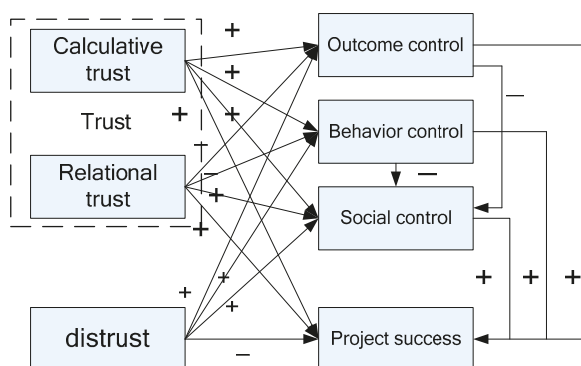


Figure 1. Conceptual framework of this research.

3. Research Methodology

3.1. SEM and Linear Regression

Structural equation modeling (SEM) was adopted for this study to test the proposed conceptual model and the proposed links among the constructs. SEM was employed to test all hypotheses. SEM has advantages when conducting empirical research in construction-project management: (1) SEM can explain an entire set of relationships of the constructs in the conceptual model, (2) SEM can estimate

multiple and interrelated dependence in the relationships of the constructs, and (3) SEM considers measurement errors in estimation [63].

The SEM method consists of six steps [5,52]: (1) questionnaire design, (2) pilot testing, (3) large-sample data collection, (4) running of the model, (5) model validation and revision, and (6) analysis of the final results. This method has been widely used in construction management studies [64,65]. The first three steps are described in this section, and the other steps are in the following sections.

3.2. Questionnaire Design

The research model covers seven factors measured by multiple items. All items were identified from the literature to improve content validity. Questionnaire items were translated into Chinese. Six experts and scholars were asked to modify the Chinese version of the questionnaire. Subsequently, three lecturers in language studies were asked to translate the questionnaire back into English to ensure the accuracy of the translation. All items were measured on a seven-point Likert-type scale ranging from strongly disagree (1) to strongly agree (7).

Items of calculative trust were adapted from Handfield and Bechtel [66], Zaheer et al. [67] and Yang [68]. All seven terms of relational trust were adapted from McAllister [34]. Items of distrust were adapted from Chen [69]. All four items consider negative attitude about the other's attention or behavior.

Items of outcome control were adapted from three sources. One item was adapted from Jap and Ganesan [70], two from Zhang [71], and two from Cheung [72]. Items of behavior control were adapted from Cheung et al. [73]. All items of social control were adapted from Zhang [71].

Items of project success were adapted from Jeffrey et al. [74] and Jugdev and Muller [75]. Nine items were adapted from Jeffrey et al. [74] and have high reliability. One item was adapted from Jugdev and Muller [75].

3.3. Pilot Test

The preliminary questionnaire was pilot tested by four experts. Two were university professors in construction-project management with more than 15 years of research experience. The other two were construction-project managers with more than 20 years of experience in construction-project management for owners. The experts were asked to critically review the design and structure of the questionnaire. Comments about the questionnaire were positive, and no changes were made.

3.4. Data Collection

The survey was carried out between July 2012 and December 2013. The targeted respondents were drawn from owners' project managers. Of the 600 questionnaires sent out, 366 responses were received, with a response rate of 61%. This is comparable to previous SEM studies, such as that by Shan et al. [76], with 188 cases, and by Anvuur and Kumaraswamy [77], with 153 cases (18% response rate). The responses exceeded the minimum of 100 cases necessary for SEM suggested by Gorsuch [78] and Bagozzi and Yi [79]. Of respondents, 17% have been the owner's project manager for 1–5 years, 27% for 6–10 years, 20.8% for 11–15 years, 15.0% for 16–20 years, and 21.2% for more than 20 years. Initial screening showed that 28 returned questionnaires were incomplete. As a result, 338 responses were further analyzed.

4. Results

4.1. The Results of the Measurement Model

Exploratory factor analysis was conducted. Results showed a seven-factor structure of all 37 items (see Table 1).

Table 1. Factor analysis results.

Constructs	Number of Items	Accumulation Percentage
Calculative trust	6	65.328
Relational trust	7	61.940
Distrust	4	66.198
Outcome control	5	58.962
Behavior control	4	65.081
Social control	3	69.098
Project success	8	66.310

Furthermore, the reliability and validity of the constructs were tested. As shown in Table 2, the loadings of all items of the seven constructs were significant. Cronbach's alpha (α), another measure of the reliability [80], were above 0.7 (see Table 2). Therefore, the measurement model of this research was acceptable in reliability [63,81,82]. Moreover, for internal consistency reliability, the composite reliability (CR) score should be above 0.70 [83], as shown in Table 2.

Table 2. The items' loadings (λ) and the constructs' Cronbach's α coefficients and composite reliability (CR).

Constructs	Items	λ	Cronbach's α	CR
Calculative trust	CAL2	0.810	0.883	0.894
	CAL3	0.778		
	CAL4	0.731		
	CAL5	0.790		
	CAL6	0.734		
	CAL7	0.741		
Relative trust	REL1	0.723	0.904	0.898
	REL2	0.789		
	REL3	0.79		
	REL4	0.748		
	REL5	0.705		
	REL7	0.758		
Distrust	REL8	0.703	0.830	0.830
	DT1	0.729		
	DT2	0.764		
	DT3	0.735		
Outcome control	DT4	0.737	0.816	0.895
	OC1	0.690		
	OC2	0.732		
	OC3	0.702		
	OC4	0.666		
Behavior control	OC5	0.698	0.843	0.879
	PC1	0.694		
	PC2	0.734		
	PC3	0.724		
Social control	PC4	0.770	0.843	0.856
	SC1	0.800		
	SC2	0.710		
Project success	SC3	0.689	0.938	0.939
	SUC1	0.792		
	SUC2	0.814		
	SUC3	0.607		
	SUC4	0.793		
	SUC5	0.788		
	SUC7	0.843		
	SUC8	0.789		
	SUC9	0.835		

4.2. Results of the Structural Model

SEM provides a useful tool to examine the causal relationship between construct variables. Several indices evaluate the goodness of fit of the model. First, basic indices such as χ^2/df were less than 3 [84]; root mean square error of approximation was less than 0.1 [85]. Other goodness indices include a goodness-of-fit index greater than 0.85, an adjusted goodness-of-fit index greater than 0.85, an incremental-fit index (IFI) greater than 0.85, and a comparative-fit index (CFI) greater than 0.85 [86]. After setting all the rules, the covariance-based SEM calculation was carried out using Lisrel 8.50, which is a professional software program designed for SEM analysis.

The running result demonstrates that $\chi^2/df = 1.76$, which is less than 3; $0.048 < 0.1$; 0.960 ; 0.985 ; IFI = 0.986 ; CFI = 0.999 . From the goodness-of-fit indices, the model is acceptable. In the measurement model, all load values of observed variables are above zero and are significant. In the structural model, all standardized values of the paths are under 1. Therefore, no change is required to this model.

The entire SEM is shown in Figure 2. All standardized path values are shown in Table 3. Results show that trust, distrust, and control have direct impact on project success. Similarly, trust and distrust also have indirect impact on project success through the mediation of control. In addition, outcome control and behavior control have direct influence on social control. In conclusion, all hypotheses are supported, except H3f.

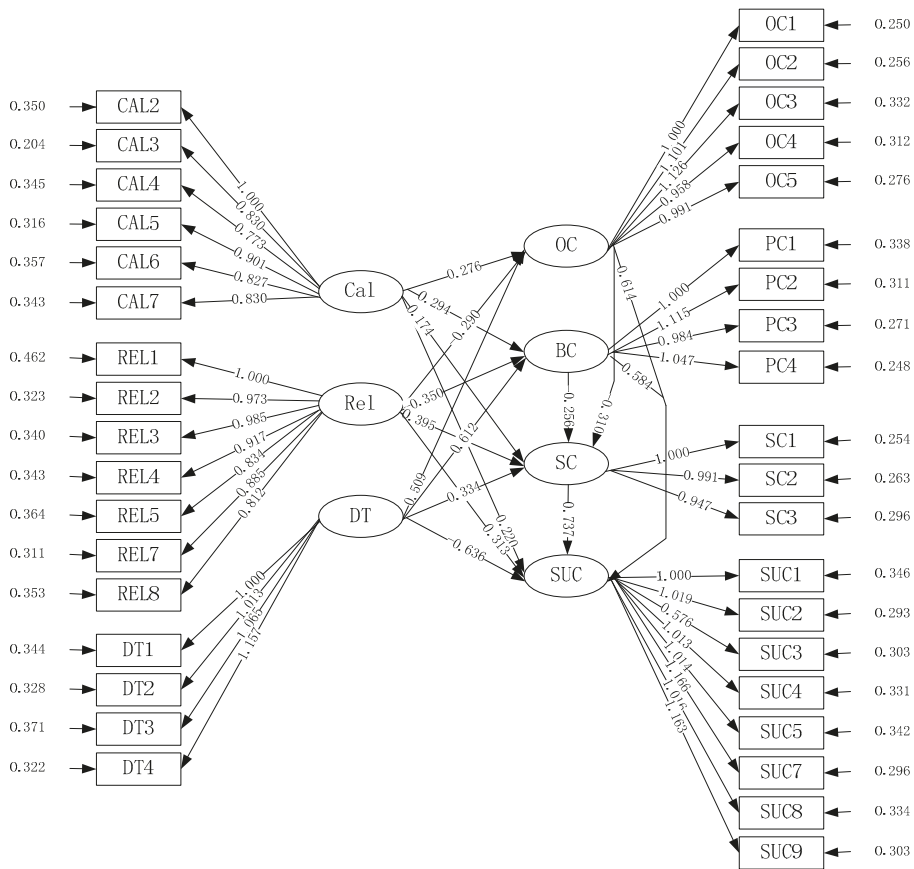


Figure 2. The calculation results of the structural equation model.

In addition, calculation of the direct and indirect influence of various factors (calculative trust, relational trust, and distrust) on project success (see Table 4) indicate that both trust and distrust have a positive influence on project success on the whole. From this point of view, the influence of trust is far more important than that of distrust. Thus, trust and distrust are independent and have different functions. Generally, the function of distrust is to prevent risk [87].

Table 3. All the standardized path values of the structure equation model.

Relation of Variables		Path Value	Hypotheses
Intermediate impact	Outcome control→project success	0.614 *	H4d: supported
	Behavior control→project success	0.584 *	H4e: supported
	Social control→project success	0.737 *	H4f: supported
Influence between intermediate variables	Outcome control→social control	−0.310 *	H1a: supported
	Behavior control→social control	−0.256 *	H1b: supported
Influence from independent variables on intermediate variables	Calculative trust→outcome control	0.276 *	H2a: supported
	Calculative trust→Behavior control	0.294 *	H2b: supported
	Calculative trust→social control	0.174 *	H2c: supported
	Relational trust→outcome control	−0.290 *	H2d: supported
	Relational trust→Behavior control	−0.350 *	H2e: supported
	Relational trust→social control	0.395 *	H2f: not supported
	distrust→outcomecontrol	0.509 *	H3a: supported
	distrust→Behavior control	0.612 *	H3b: supported
Influence from independent variables on dependent variable	distrust→social control	0.334 *	H3c: supported
	Calculative trust→project success	0.220 *	H4a: supported
	Relationaltrust→project success	0.313 *	H4b: supported
	distrust→project success	−0.636 *	H4c: supported

* Significance level is less than 0.05.

Table 4. Impacts of independent variables on project success.

Independent Variable	Project Success		
	Direct Effect	Indirect Effect	Total Effect
Calculative trust	0.220	0.351	0.571
Relational trust	0.313	0.041	0.354
distrust	−0.636	0.684	0.048

5. Discussion

5.1. The Effect of Distrust on Project Success

Distrust has a directly negative influence on project success in accordance with the hypothesis. In contrast, greater attention should be paid to the positive and indirect influence of distrust. Outcome control, behavior control, and social control mediate this kind of positive and indirect influence. The internal logic is that the increase of distrust may contribute to more strength of control, and control is the measure to realize project targets. Therefore, distrust has an indirect and positive influence on project success by mediating the three control measures.

The positive influence of distrust should also be seen in project interorganizational relationship management. This kind of positive influence is weak compared with the effect of trust. However, this outcome conflicts with common understandings that distrust is harmful and has a negative influence on the project success [88,89]. Both trust and distrust provide healthy and positive mechanism for project cooperation. However, “over trust” and “distrust with bias” are detrimental to project success. Excessive trust may lead to opportunistic behavior, which is harmful to the success of cooperation.

Similarly, distrust with biases can lead to irrational control, which is not beneficial to smooth progress of cooperation.

5.2. The Relationship Between Trust and Control

All hypotheses about the relationship between trust and control were supported, except the relationship between relational trust and social control. It was hypothesized that calculative trust has a positive influence on the three kinds of control, and relational trust has a negative influence on control. Das and Teng [24] pointed out that “the implementation of control in business organizations requires a certain level of trust.” Similarly, in construction projects, it is necessary to sustain a certain level of trust to effectively control a partner.

However, the relationship between relational trust and social control is an exception. The empirical data from this study demonstrated that relational trust could increase social control. Relational trust contains affect-based and cognition-based trust, which are foundations for interpersonal and interorganizational cooperation [34]. Trust is cognition based in that “we choose whom we will trust in which respects and under what circumstances, and we base the choice on what we take to be ‘good reasons,’ constituting evidence of trust-worthiness” [34]. This kind of trust is cognition-based trust.

Social control relies on organizational norms, values, and the internalization of goals to encourage desirable outcomes and behaviors [90]. As a result, relational trust and social control have a natural intrinsic connection. Relational trust means the two partners have mutual recognition and the same value orientation. Two partners with same value orientation would communicate through norms and organizational culture, leading to greater strength of social control. Therefore, in construction projects, the owner and the contractor with high identification of value and culture would naturally interact with each other with a high level of spirit.

This result aligns with some studies concerning the relationship between relational trust and social control. The Aulakh et al. [91] study revealed social control positively correlates with goodwill trust in alliances. In fact, goodwill trust relates to relational trust. Saporito et al. [92] suggested relational trust is goodwill oriented.

5.3. The Effect of Trust and Control

5.3.1. The Influence of Trust and Control on Project Success

Calculative trust and relational trust have positive influence on project success. Previous studies showed that the direct influence of calculative trust on project success is less than that of relational trust, similar to this study [52]. However, this study also revealed that the indirect influence of calculative trust is far greater than that of relational trust. For calculative trust, indirect influence is also greater than direct influence.

Calculative trust and relational trust are supplementary in influencing the three kinds of control. The direct influence of relational trust on project success is high whereas the indirect influence of calculative trust on project success is high. In conclusion, calculative trust and relational trust play a joint critical role in achieving the project success.

Study results showed that all three kinds of control have a significant and positive influence on project success because the aim of control measures is to realize the targets set at the beginning of the project [20,93]. However, the influence of social control is the most important, followed by outcome control and behavior control. Previous studies have paid more attention to formal control (i.e., outcome control and behavior control [94]). Therefore, owners’ project managers should be aware of the critical role of social control.

The impact of the three kinds of control can be understood from the outlook of philosophy. Social control is the highest level of management control because the controller exerts culture, value, and norm influence, influencing the controller to execute project tasks automatically. Outcome control is similar to management by objectives. The controller pays most attention to the result, and exerts pressure on

the controller if the result does not meet the requirements. Behavior control attends to the process or procedure of projects wherein the controller may lose original project targets. This philosophy is in accord with Confucius: You will get secondary outcomes when setting goals high and low results when goals are set secondarily [95].

In summary, the effect of control on spiritual level (social control) is higher than that of control on objective management (outcome control). The effect of control in objective management is greater than that of control in process or procedure (behavior control).

5.3.2. Mixed Impacts on Project Success (Most Influencing Factors/Paths)

The SEM showed that all independent variables have a positive influence on project success. All three kinds of control have strong effects on project success. Calculative trust, relational trust, and distrust direct and indirect influence on project success. Calculative trust and relational trust have complementary effects on the three kinds of control. In addition, the overall effect (containing direct and indirect) of calculative trust is stronger than that of relational trust. Distrust has strong direct and indirect effects on project success. However, the whole effect of distrust on project success is relatively low.

6. Conclusions

This research made a theoretical contribution to trust in construction projects. A theoretical model containing trust (calculative trust and relational trust), distrust, control, and project success was proposed in this study. This model was tested by empirical data through SEM. The main contribution of this research was to develop a framework combining trust, distrust, and control and exploring relationships among them. In contrast, the majority of extant studies examined the relationship between trust and distrust or between trust and control separately [17,18].

Results revealed a complex relationship between trust and control. Calculative trust has a positive influence on the three kinds of control. Relational trust has a negative impact on outcome control and behavior control, and a positive impact on social control. Relational trust and social control have a natural connection. Relational trust means a high level of recognition and identification, which is beneficial when exerting social control. Results also showed that all independent variables (trust, distrust, and control) have a positive influence on project success. Calculative trust and relational trust influence project success with direct and indirect effects. Among the three kinds of control, social control is of greatest importance in achieving project success, though outcome control and behavior control have influence on project success by partly mediating social control. Distrust has strong direct and indirect effects on achieving project success. However, the overall effect of distrust on project success is relatively low.

This study has practical implications:

First, project managers should be aware that trust and distrust provide mechanisms to promote cooperation among stakeholders. Although distrust has a direct and negative effect on project success, it can play a positive role in mediating control. In construction projects, distrust is a normal and prevalent state for owners. Project managers should acknowledge the existence of distrust and use control measures to ensure project success. Indeed, trust and distrust relate positively and jointly have a significant impact on project success. However, “over trust” and “distrust with bias” are detrimental to project management. Therefore, project managers should assess the relationships with owners and provide suitable trust and distrust for the other partner. Appropriate control measures, based on the assessment of trust and distrust, would increase the likelihood of project success.

Second, it is valuable for project managers and owners to evaluate the trust on contractors and take proper control strategies, because the main function of distrust is to avoid risks but not on project success. If there is a high level of trust, it would be wise for project owners to exploit control measures for contractors at a low level, which is necessary for avoiding betrayal risks of contractors. If there

is a low level of trust, it would be wise for project owners to exploit control measures at a high level, which mainly aims at achieving project success.

Third, of the three kinds of control measures, social control has the strongest impact on project success, with outcome control second and behavior control last. Project managers should pay attention to social control, taking full advantage of organizational culture and values to influence contractors to complete project tasks. Moreover, project managers should ensure all project objectives are realistic.

Finally, trust and control both affect project success. This should draw the attention of project managers. As shown in Table 3, project success will be in doubt without either of these two factors in place. In particular, among the three kinds of control, social control has the most significant impact on project success. Relational trust is the most important factor to influence social control. Therefore, special attention should be paid to nurturing relational trust of the owners toward the contractors. All the findings and suggestions are concluded in Table 5.

Table 5. Findings and suggestions.

	Findings	Suggestions
1	Distrust has an indirect and positive influence on project success	Project managers and owners should acknowledge the existence of distrust and use control measures to ensure project success
2	Trust has certain effect on control	Project managers and owners should evaluate trust and take proper control strategy
3	Of all the three kinds of control, social control has the strongest effect on project success	Project managers and owners should pay attentions to social control
4	Trust and control both affect project success	Both trust and control should be paid attention

This research had some limitations. This research examined the effect of trust on control, yielding a complex relationship. Control influences trust [24]. Therefore, future research opportunities exist to examine the dynamic relationship between trust and control. For example, longitude data could be used to explore the relationship between trust and control. Also, the single source data tend to bring about common method biases [96,97]. Moreover, some control variables were not considered in this research, such as the competence of the contractor and the attitude or propensity of the owner. Similarly, other stakeholders of construction projects could be considered in future research.

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Article

The Role Played by Trust and Its Effect on the Competitiveness of Logistics Service Providers in Hungary

Judit Oláh ^{1,*}, Attila Bai ², György Karmazin ³, Péter Balogh ⁴ and József Popp ⁴

¹ Faculty of Economics and Business, Institute of Applied Informatics and Logistics, University of Debrecen, 4032 Debrecen, Hungary

² Faculty of Economics and Business, Institute of Applied Economics Sciences, University of Debrecen, 4032 Debrecen, Hungary; bai.attila@econ.unideb.hu

³ Faculty of Business Management, Pallas Athéné University, 5000 Szolnok, Hungary; gyorgy.karmazin@gmail.com

⁴ Faculty of Economics and Business, Institute of Sectoral Economics and Methodology, University of Debrecen, 4032 Debrecen, Hungary; balogh.peter@econ.unideb.hu (P.B.); popp.jozsef@econ.unideb.hu (J.P.)

* Correspondence: olah.judit@econ.unideb.hu; Tel.: +36-20-286-9085

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Abstract: This research focuses on the role of trust and the impact of its level on the revenue, earnings before tax and the degree of flexibility of logistics service providers (LSPs). More specifically, the role of the executive manager is examined in relation to the impact of business relationships (trust levels) within and between organizations. In addition, the analysis covers the development of revenue, earnings before tax and degree of flexibility of logistics service providers in the context of the role of the head manager. The data were collected from 51 logistics service providers in Hungary. The results show that the level of trust established in the organization (with the employees, co-workers etc.) has a positive impact on the earnings before tax. Furthermore, this paper confirms that the trust executive managers establish around them is an important performance factor which even consumers perceive and that it has major significance in terms of degree of flexibility. This research further increases our understanding of the role and importance of trust as a strategic success factor for LSPs.

Keywords: trust; trust management; logistics service providers; supply chain management; collaboration

1. Introduction

Companies generally outsource their logistics to external service providers in order to improve the efficiency of their core functions. How to manage their relationships with service providers is critical to the success of these outsourcing activities due to the loosely coupled nature of outsourcing relationships. In order to achieve these objectives, it is necessary to identify the management success factors which support the fundamental abilities of logistics enterprises and it is also a necessary step for the development of companies in the target group.

The emergence of logistics service providers (LSPs) started with the outsourcing phenomenon of the early 1980s. In order to concentrate on their core competences, many manufacturers or retailers have opted to outsource to specialty firms or LSPs all or part of the logistics activities previously performed in-house [1–3]. The logistics services industry demonstrated tremendous growth for decades, alongside which there has been an increasing academic interest in LSPs, especially since the 1990s [4]. According to Lukassen and Wallenburg [5] the work of LSPs has been increasingly recognized during the last few years, as has the significance of functioning supply relationships [6,7].

The main factors accounting for the failure in securing partnership between parties during outsourcing process are poor communication, lack of top-management support, lack of trust, lack of a total quality management program of the provider company and inadequate upfront planning [8–10]. Trust plays a major role in improving the relationships between parties, as trust between LSPs and logistics service buyers is a key factor in the success of logistics outsourcing relationships [11–14]. Furthermore, trust is a powerful precedent of effective collaboration and a forecaster of positive performance outcomes and competitive advantage in supply chain inter-organizational relationships [15,16].

Nowadays, trust is an important determinant of the development of modern organizations. Not only does it become an increasingly important element of the relationship between entities but, above all, it positively influences the building of the organization's intellectual capital. This capital is differently classified but always contains components that determine the potential of sustainable organizations, often in the human, social, relational, organizational and innovation dimensions. Trust is more often the key determinant of this capital [17]. Trust is an element that ties this capital with relationships in business. This has an integrated character [18]. The reason for the lack of trust is related to differing interests of supply chain partners [19]. Yet, trust was found to be a crucial factor that affects supply chain collaboration [20]. Three aspects of a supply chain network influence network-level trust in supply chains: the number of uninfluenced partners, the number of uninfluential partners and the degree of interdependence [21].

Research papers analyzing and evaluating the examination, competition and integration of LSP companies highlight the significance of trust in the success of LSP and collaborating companies. Owing to the role and weight of trust, the authors of this paper consider trust to be important in two aspects. The first is the appearance and factors of trust as a concept, as well as its impact on the establishment of enterprises as trust-based communities and their success. The second is the examination of the impact of trust-based leadership as a management tool and its factors on the success of collaborative relationships within and between enterprises.

The role and importance of trust is strongly supported by statements made by leading economists in recent years, in which the main cause of social and economic crises is the loss of trust in modern societies. Thus, following the crisis in the financial and economic world of 2008, research into confidence-building has acquired a significant role in the academic field, since, taking account of the results of studies of trust can provide preventive tools for avoiding, mitigating and managing the negative effects of cyclically-changing economic processes. An essential prerequisite for the success of logistics service providers is to build trust and to provide the necessary information for operation which can be shared among participants. Building trust requires the comprehension and acceptance of the need for transparency, openness and proactive knowledge exchange [22]. This is a primary factor in that trust also increases innovation and supply chain performance [23]. Comer et al. [24] studied how to develop a multidimensional measure of trust specifically for the sales context and found support for their division into salesperson trust, product trust and company trust. Young-Ybarra and Wiersema [25] analyzed flexibility in strategic alliances, utilizing a model drawn from transaction cost economics and social exchange theory. They found that economic constraints, the quality of communication and the existence of shared values were positively related to trust and dependence was negatively related.

The economic processes and the effectiveness of companies is determined on the basis of the organization of these companies as formed by individuals, in the same way that families made up of individuals determine the functioning of society and its norms. In the two approaches, the individual is the same, at once a social and an economic building block; the behavior, the culture and the level of trust of the economy and society are the individual values and attributes that permeate families, companies and societies and so national beliefs about trust can flow right down to the individuals that belong to the community and make up the nation and the same is true in the other direction, in that statements about trust in smaller communities can also be true of the narrower society surrounding them.

Logistics service companies are integrated companies in the supply chain, service providers offering diverse and wide-ranging value-added activities, which have gained significant roles in the competition in the supply chains in recent years. The shift in the competition of goods and services to competition in supply chains has revalued the role of logistics service providers in analyses of company activities and relationships. Economic impacts, such as globalization and natural risks, including the extraordinary effects of unexpected natural disasters, have further raised the importance of the role mentioned above and the generalization of the results obtained and thanks to their integration, the conclusions reached during the analysis of logistic service providers have also been broadly extended to the relationships between companies in the supply network.

An online survey was developed in order to collect data in the research field among Hungarian LSPs. Our online survey research revealed the social and economic impacts, changes and trends which can be observed in the Hungarian and international business environment. In addition, strategic factor correlation was established between trust, success and flexibility (trust, as in the examination of the fundamental factor of relationships within and between enterprises, while looking at the role of the manager in creating a trustful atmosphere).

The data were analyzed with the SPSS 14.0 software using different examination methods (Levene's test, Analysis of variance, Cramer's V, Phi, Eta, Eta squared index and Principal Component Analysis). As a next step, the paper describes the research methodology applied, presents the results of our empirical analyses and discusses the most significant findings. The latter effectively support LSPs in finding their management success factors which enable them to satisfy fully the demands of their customers in the supply chain. The further development of the research methodology applied is a new direction of research which enables comparison analysis of LSPs all around the world to be made, thereby exploring new findings through the examination of the target group in order to gain a clearer understanding of this field of science.

2. Literature Review

2.1. The Role of Trust in Establishing Enterprises

There are many definitions of trust in the literature but these are rooted in two entirely different approaches: belief [26,27] and risk [18,28]. Several terms have been used synonymously with trust and this has obfuscated the nature of trust. Among these are cooperation, confidence and predictability. The sections that follow differentiate trust from these constructs [18].

Trust exists when a firm believes its partner is being honest and benign [29]. Furthermore, trust can contribute significantly to the long-term stability of a supply chain [30,31]. In a logistics outsourcing context, a customer's trust in a third-party logistics provider refers to the customer's belief that the third-party logistics provider is knowledgeable about the services it provides and that the third-party logistics provider has intentions and motives beneficial to the customer when new conditions arise, conditions to which a commitment has not been made [32].

Fukuyama [33] examined three societies, Japan, the United States and Germany, describing trust as a regular, honorable and expected behavior ready for collaboration. A community can expect this behavior from its members based on mutual standards. Ha et al. [34] referred to the need for research that examines trust in different cultures, assessing the constructs of different cultures that can provide an additional insight into trust in supply chain management. One of the aspects highlighted by [35] in relation to trust in inter-organizational relationships is the essential element of organizational culture which is necessary for individuals to interact and share knowledge. Overall, the findings indicate that cultural similarity, effective communication, knowledge and experience, opportunism and environmental uncertainty are vital antecedents of trust and commitment [36]. Lopez-de-Silanes et al. [37] highlighted that trust should be more essential for ensuring cooperation between strangers.

Ariely [38] highlighted that in societies where the level of trust is low, business is also more difficult to run. Furthermore, that lack of honesty quickly leads to distrust and acts to the detriment of the economy. Covey et al. [39] emphasized that there is a direct and significant correlation between low levels of trust and high costs and there is a significant, direct and measurable correlation between high level of trust, high speed, low costs and higher added value.

Logistics services are often measured by business/financial performance. The literature does not agree on the nature of the features to be measured. Some analyze market share [40], others include multi-dimensional indicators such as asset-to-income ratio, equity return, revenue-to-income ratio, gross profit ratio, operating profit ratio, liquidity indicator and the indebtedness index [41], as well as the investment return ratio, revenue growth [42] and sales/sales volume [43]. The examination of trust as one of the possible success factors can be given priority, although at the same time the correlation between the two financial indicators (companies' turnover and their pre-tax profits) can be demonstrated in this context, as well. The literature describes trust as a significant factor in the establishment of enterprises with an indisputable role and effect on success.

2.2. *The Role of Trust in the Collaboration OF Enterprises*

Ganesan and Hess [44] reinforced the idea that the most frequently examined consequence of trust is commitment to a relationship. Owing to the role of trust in enhancing relationships [45], a research paper focusing on the collaboration between enterprises should analyze the multilateral aspects of trust in depth. It is impossible to imagine a properly working business corporation and relationship without trust, as it would lead to constant organizational dysfunction in the daily life of collaborating enterprises.

Several international research projects focused on the correlation between trust and the behavior of collaborating enterprises. Sahay [45] deals with the nature of the role and key significance of trust in long-term business relationships. Two statements should be emphasized in the case of business trust, as a concept. The first highlights the impact on success and competitiveness, as stable relationships could lead to lower transaction costs. Barratt [46] considers the elements of trust and collaboration are key factors to maintain a close relationship between the participants of the supply chain and improve their performance as well as customer satisfaction. When trust is built into a business partnership, the performance of both parties can be enhanced [47].

Collaboration among partners of a supply chain strengthens long-term relationships based on personal trust, bringing benefits such as the joint creation of knowledge, sharing expertise and understanding the intentions of the partner, reducing logistics costs and creating values for a supply chain [48–52]. Kersten et al. [53] examines the advantages and disadvantages of contractual cooperation from both sides, including both companies and logistics service providers. Concentration on core activity, cost reduction and flexibility have been considered almost equally important by both companies and logistics service providers, although the most frequently mentioned cost reduction factor is not the most important factor for companies, who consider increased flexibility more important. Depending on the outcome states and prior expectations, partners may maintain trust or distrust in the network in which they are involved [54].

Flexibility has a significant impact on market profitability and a positive impact on financial profitability. Operating flexibility is the most notable factor [55]. The link between companies and logistics service providers leads to operational flexibility and increases competition orientation and market performance through the influence of logistics.

2.3. *The Role of Logistics Providers in the Flexibility of the Supply Chain*

As a result of [56] research into the role of trust in the supply chain, timeliness emerges as one of the most important performance indicators evaluated by clients in the modern economy. The timeliness of logistics service providers is determined by the time needed to respond and offer solutions in response to customer needs, i.e., by the flexibility of the business as an organization. Golden and

Powell [57] defined flexibility as the ability to adapt along four dimensions: time, choice, purpose and focus. In their article, they also referred to the measurement of flexibility, which can be carried out in its own dimensions: efficiency, ability to react, variability and robustness. A similar definition and categorization also appear in the work of [58], where adaptability is handled as an element of flexibility and it is pointed out that in practice adaptability is used as a synonym for flexibility. The flexibility of the supply chain is the ability of companies to respond to unexpected changes in customer needs and the activities of competitors [59].

As a summary, when considering the expectations of logistics service providers, we can say that of the various sources of competitive advantage flexibility will also have an impact on the efficiency of the entire supply chain. When supply chains (not companies) compete with one another, we must create the opportunity to manage chains (or chain sections) across a company boundary.

It can be concluded that the level of trust in the society has an impact on the culture of enterprises and indirectly on the structure of the organization, institutions and the flexibility of collaboration of independent organizations.

2.4. Partner Selection and Its Impact on the Success of Collaboration

Entering a community raises the problem of the admission of individuals, while business networks established as a result of the collaboration of enterprises raise the problem of selection. Sahay [45] stated that it is important because it allows the given participant to understand the objectives of the other. Moreover, Sahay [45] found that if partner companies are not compatible with each other and there is a lack of common objectives, conflicts and compromising attitude are the inevitable consequences. A successful collaboration, however, depends on certain trustworthy behaviors partner exhibit. To that end, understanding the aspects which constitute behavioral uncertainty and mechanisms by which such aspects affect partner trust is a necessity [60].

The dynamics of globalization and business networks increasingly re-evaluate the significance of partner selection and the analysis of its impact on business networks. Tsamenyi et al. [61] concluded that cause and effect relationships can be observed between the selection of partners, the behavior of partners and network performance. The global size and location of companies have changed the national economy and the dynamics of businesses [62].

According to the relational view, collaborative strategies require trust-based mutual commitments to co-create value [63]. The relationship between value creation and inter-organizational relationships has been explored in transaction cost economics [64], resource-dependence theory [65], marketing channel theory [66–69] and relational governance [70,71]. Spekman et al. [72] estimated the failure rate of relationships to be more than 50%. Sherman [73] reports that one-third of strategic alliances failed due to lack of trust among trading partners.

It can be concluded that the selection of a business partner is an important task of the manager, since proper selection is a fundamental requirement of successful business networks. As a next step, this research focus on which factors should be taken into consideration to analyze the trust level of collaborating (business) organizations.

2.5. The Factors of Trust Levels in Inter-Organizational Relationships

Another point of divergence in trust studies is the distinction between interpersonal and inter-organizational trust. While rooted in the study of interpersonal trust, most studies of inter-firm trust have examined trust between organizations rather than between individuals. There are real problems in separating the two concepts; however, most studies have opted to use individuals' reports to assess inter-organizational trust levels [74]. Trust, which is supported by good inter-firm relationships, was found to be an important antecedent for confidence underlying the outsourcing decision [75]. As already noted, trust amongst partners is of paramount importance in establishing successful cooperation [76]. A few studies have looked at both interpersonal and inter-organizational trust in buyer-supplier relationships [77]. Trust shapes inter-firm relational embeddedness, which is

characterized as a range of integration activities reflecting close working practices between buyers and suppliers [78]. Based upon a widespread belief from the viewpoint of business people, holding positive trust relationships would potentially support and promote further business collaboration between business partners [79–81]. Trust refers to the extent to which relationship partners perceive each other as credible and benevolent. Credibility reflects the extent to which a firm in a relationship believes that the other party has the required expertise to perform the expected task effectively, while benevolence occurs when one relationship partner believes that the other party has intentions and motives that will benefit the relationship [82].

Morgan and Hunt [83] emphasizes the importance of meeting commitments, since it is the pre-requisite of trust for partners in the supply chain to meet their commitments. In addition, Hurley [84] confirms that the personality, culture and previous experience of the head manager of the enterprise has a significant impact both on the establishment of the work environment and the development of enterprise relationships and partner behaviors.

2.6. Trust-Based Management

Nowadays, trust-based management plays an increasingly important role in the life of enterprises. Head managers start to realize sooner that empowerment, inclusion and endowment of trust of selected co-workers is a valuable management tool in times of crisis. Hurley [84] concludes that adopting trust means that the chief executive officer is less automatic—he/she must consider such things as his/her intentions and his/her integrity.

Management must be able to adapt with flexibility to varied situations and when necessary, to change between different styles of leadership. The rapid development of the European Community and the economic integration of the member states produces a strong need for managers who can understand and adapt to cultural differences in work-related values and leadership [85]. The work of Bass and Stogdill [86] is remarkable from the perspective of the correlations between enterprise success and managerial behaviors, concluding that there is no clear-cut pattern in order to become an effective manager. They found a close correlation between intelligence and effective management activities. According to the cognitive resource theory of Fiedler and Garcia [87], it is possible to conclude on the extent of the final performance in the case of determined managers who are able to enforce their will in stress-free environments. According to several meta-analyses, the positive effect of trust in leaders on a variety of work attitudes is substantial [88–90]. Trust has significant effects on technical exchange and technology transfer [91]. Managers should focus on developing trust and formulating detailed contractual provisions [13].

Fawcett, Jones and Fawcett [49] refers to trust as the core of collaborative innovation skills. His research was based on the fact that managers do not understand the nature of trust and the dynamics of building trust. Based on these deficiencies, managers look for the concept of collaborative trust, the structure of trust-centered maturity and the competition-focused strength of trust. Covey, Link and Merrill [39] summarized the thoughts described above, i.e., the ability to establish, increase, provide and restore trust is a key managerial skill in the new, global economy, regardless of whether one is a client, business partner, investor or co-worker.

2.7. Synthesis and Implications

There are many definitions of trust in the literature. The six most important divisions of trust—establishing enterprises, collaboration of enterprises, flexibility of the supply chain, partner selection, inter-organizational relationships, trust-based management—and their corresponding subdivisions (*characteristics*) across different levels of trust are presented in the literature review map. The literature map can be used for further research and practice. The literature review highlights a distinct connection across the six areas—establishing enterprises, collaboration of enterprises, flexibility of the supply chain, partner selection, inter-organizational relationships and trust-based management—with plentiful research spanning the six distinct, yet inter-related blocks of trust (Figure 1).

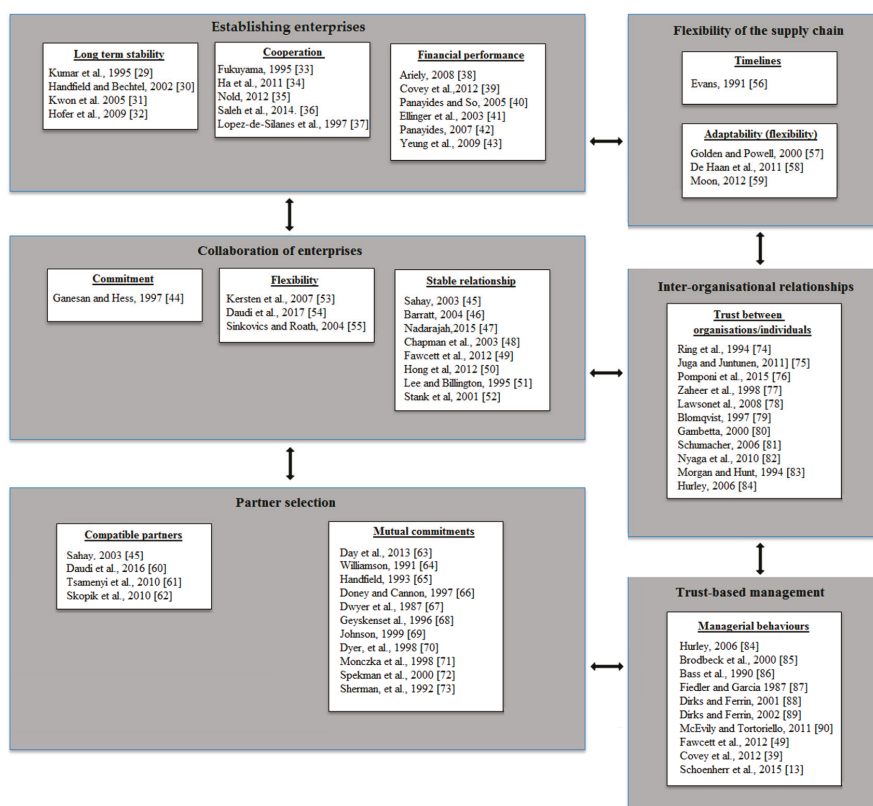


Figure 1. The impact of trust on LSPs. Source: Authors' own construction based on Roehrich et al. [92].

3. Materials and Methods

3.1. Problem Description

Our research revealed the social and economic impacts, changes and trends which can be observed in the Hungarian and international business environment. In addition, strategic factor correlation was established between trust, success and flexibility (trust, as in the examination of the fundamental factor of relationships within and between enterprises, while looking at the role of the manager in creating a trustful atmosphere). When formulating our hypotheses, it was important to consider the key success factors which develop management (trust, success and flexibility), as well as their impact and correlation on the competitiveness of LSP. Specifically, our study addressed three hypotheses:

- **Hypothesis 1.** *The trust level of LSP within the enterprise influences the revenue and earnings before tax.*
- **Hypothesis 2.** *The internal trust level established by an LSP influences the flexibility of the examined logistics enterprises.*
- **Hypothesis 3.** *The trust level of the business environment created by the head manager of logistics enterprises influences the revenue and earnings before tax, as well as the flexibility of the examined enterprises.*

Hypothesis 3 examines the extent Hypothesis 1 and Hypothesis 2 can be extended beyond the boundary of the firm and the trust level of the company's external relationships in the light of the three success factors (revenue, pre-tax profit, flexibility). An analysis of the basic data processed during the

research can be carried out both on the relationship between the two financial indicators, as well as in the context of flexibility. This was made possible by the reliability of the data extracted from the sample available, so that the expansion of the first and second hypotheses in terms of their relationship and content could be realized in setting up Hypothesis 3.

3.2. Description of the Questionnaire and the Applied Statistical Methods

A list of around 300 Hungarian LSPs was compiled from information provided by the professional organizations contacted by us before starting the research, as well as official sources which can be accessed in the trade press. From this list, the target group was selected including enterprises with revenue (net sales) of at least EUR 100 thousand but not higher than EUR 100 million per year. This group consists of 284 LSP enterprises (Figure 2).

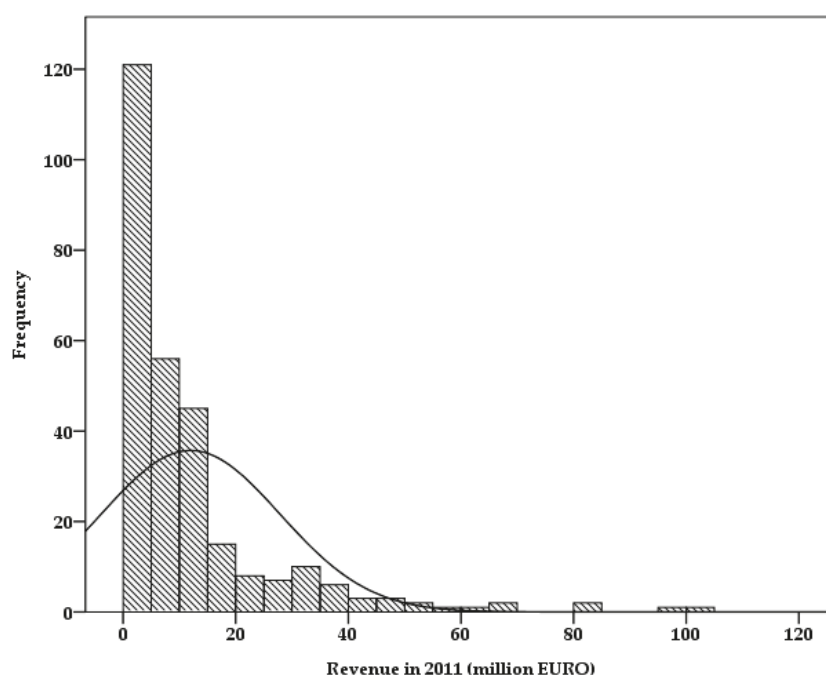


Figure 2. Histogram of the net revenue of companies among the Hungarian LSPs. Source: Authors' own construction.

The list of target group companies was collected from the HBI database (www.hbi.hu), followed by the Világgazdaság Logistics TOP 100, the Navigator Fuvarozó (Carriers) TOP 100, the Navigator Speditőr (Deliverer) TOP 100, the members of the Association of Hungarian Shipping and Logistics Providers, the member companies of the Association of Hungarian Logistics Service Centers, the member companies of the Hungarian Road Transport Association and the members of the International Carriers' Industrial Body (Figure 3). Duplications have been filtered out. The financial data has been provided by Bisnode Magyarország Kft.

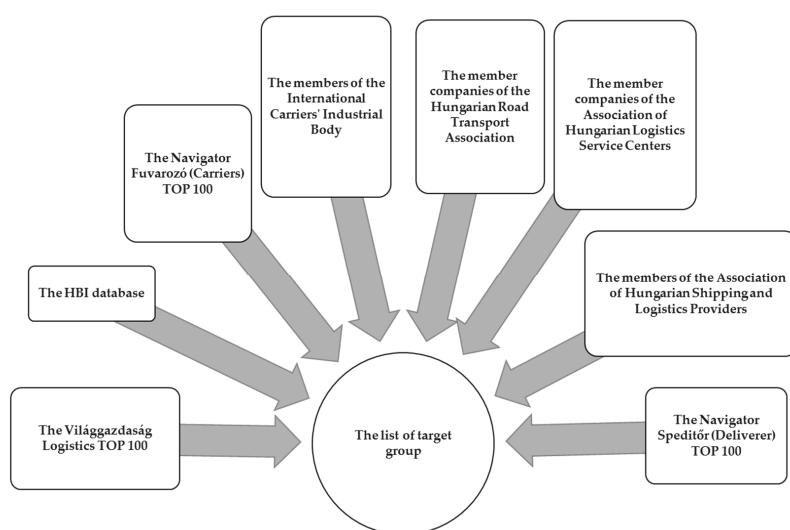


Figure 3. The main sources of the list of target group of companies. Source: Authors' own construction.

Thirteen per cent of the interviewed LSP were established in 1990, when several entrepreneurs decided to set up their own companies due to the political and economic restructuring. 36 of 56 enterprises examined were founded with international road transport activity. More than 50% of the examined LSPs were engaged in domestic road and international road transport of goods or road forwarding services directly after their establishment.

The geographical distribution was drawn up to illustrate the basic and sample population of the research data, showing the regional location of the Hungarian logistics enterprises based on the available data for the purpose of providing geographical representativeness (Figures 4 and 5). The regional locations categorized into two NUTS 3 counties properly show the ‘identity’ of distributions and verify representativeness.



Figure 4. Spatial distribution of company headquarters among Hungarian LSPs, by county (%). Source: Authors' own construction, based on Koltai [93].

The final sample contains 51 different companies. The spatial distributions of the companies is presented in Figure 5.

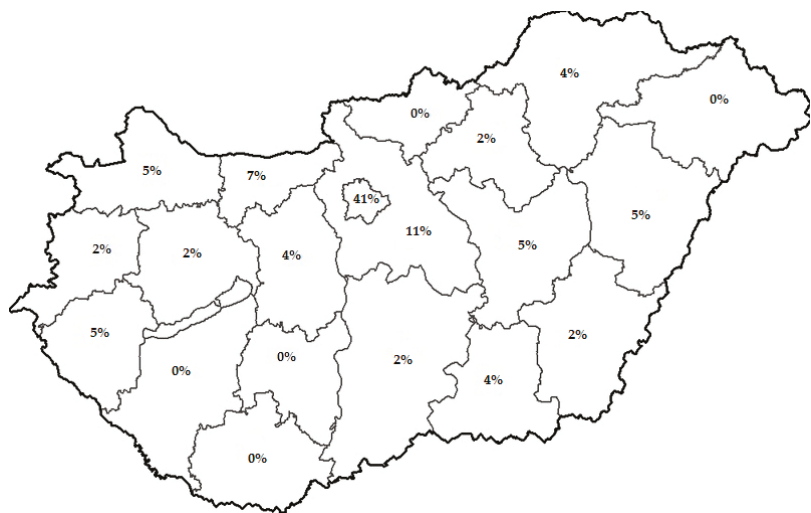


Figure 5. Spatial distribution of company headquarters in the sample, by county (%). Source: Authors’ own construction, based on Koltai [93].

Furthermore, neither the sample-based, nor the population-based distribution can be regarded as normal (their parameters differ) but the graphic draft shows that the pointedness of both distributions are similar, bending to the left and stretching to the right (Figure 6).

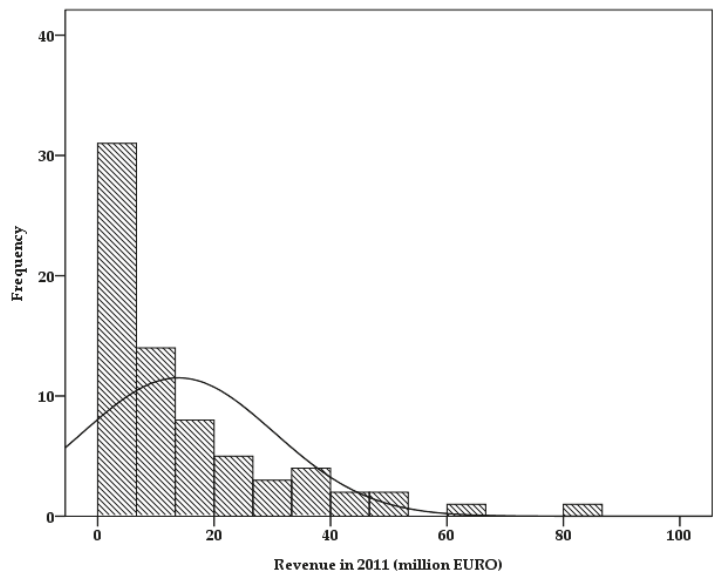


Figure 6. Histogram of the net revenue of the companies among the sample LSPs. Source: Authors’ own construction.

Accordingly, the conclusion can be drawn that the curves of both the examined population and the sample are similar to each other (even though they deviate from the normal curve). *F* test statistics further verify similarity, since the variance of the two variables can be regarded as similar ($F = 2.213$; $p = 0.138$).

During the compilation of the questionnaire, we considered the need to extract the answers to the questions posed by the hypotheses. GfK Hungary Market Research Institute contributed significantly to the structure of the questionnaire, we created the professional content and the possible response forms and types were greatly influenced by the data quality and type that can be managed and expected by the evaluation SPSS software (V22.0, IBM Corporation, Armonk, NY, USA). Questionnaires were completed using the Computer Assisted Web Interviewing (CAWI) method. The internet-based questionnaire technique provided an effective research background for this target group by allowing respondents to answer questions on delicate corporate issues (financial issues, role of suppliers, etc.) more honestly, as the interviewee's response was not affected by the presence of the interviewer. In addition, it was an advantage that more precise answers could be given, as the questions were read by the interviewees themselves and they could check the accuracy of their responses. There was no time limit for answering the questions and the respondents were able to look at the precise data and to think about the questions.

A 51-question questionnaire was put together for the target group to confirm or reject our research questions. The first 14 questionnaires were related to the characteristics of the company. The following 30 questions included trust issues (business confidence 1–2, within the industrial sector 3–11, within the company 12–19, membership(s) of organizational bodies 20–23, strategy 24–30). The penultimate part dealt with the service portfolio (1–6), while the last 6 questions asked about the characteristics of the leader of the company. From the questions presented above, we would like to highlight B14 (leadership), which measures the trust level created by the main leader/manager in the business environment and B15 (management style). Two variables were used in the questionnaire to measure the trust level of the business environment established by the head manager (B14—managerial role, B15—managerial style). In question B14, the statements were numbered with Likert scales ranging from 1 to 10, where 1 indicated that the respondent had a minimal role in forming the corporate culture and the atmosphere of trust, while 10 indicated he/she played a dominant role in this process. In question B15, the respondent had to select the company leadership style which was closest to his/her style from seven predefined options (expressions).

The authors of this research pre-tested the questionnaire in ten companies representative of the different environments present in the sampled population. The main objective of this pre-test was to verify the appropriateness of the questionnaire. Hence, this analysis assessed the difficulties faced by the respondent in understanding the questions, in retrieving the required quantitative information and eventual ambiguities in the questions.

The net revenue and earnings before tax of all 51 responding LSPs for the period between 2004 and 2011 were used to examine our research hypotheses. The total revenue of the respondents was 456 million EUR in 2011, a year for which reliable statistical data were available. This value is more than 50% of the cumulated annual revenue of all Hungarian logistics enterprises in 2012. Revenue and profitability is calculated the following way: Revenue: The annual net income from services of the companies examined (income deriving from services, which does not include, for example, income from financial activities). Profitability of the enterprise: the pre-tax profit of the companies under examination divided by the annual net revenue. Profitability of each service: the pre-tax profit of the given service divided by the net revenue generated by the net income from the service provided (method: aggregated relative profitability level derived from expert estimates and data provided by leading professional organizations).

Of the 284 domestic logistics service providers, 56 responded, of which 51 were evaluated. This shows a response rate of almost 20%, which can be regarded as representative when viewed in terms of general beliefs and academic acceptance. Representativeness is further strengthened by

the market share of the respondents (50%) and the test results of the general and sample population in terms of their geographical location and distribution. Our sample represents the opinions of big companies of the sector, because of their relatively low response rate and large share of revenue in the industrial sector. At the same time, as shown above, the geographical distribution of the sample corresponded to the distribution of the population. Considering the 20% response rate and the revenue data exceeding 50%, the representativeness of our research can be confirmed.

The data were analyzed with the SPSS 14.0 software using different examination methods (Levene’s test, Analysis of variance, Cramer’s V, Phi, Eta, Eta squared index, Principal Component Analysis). The chi-square test is used to investigate statistical association between variables. This is done primarily by testing the null hypothesis of no association between a set of groups and outcomes for a response. For large values of χ^2 , this test rejects the null hypothesis in favor of the alternative hypothesis of general association. We use the standard 5% or 0.05 cut-off for defining what is a statistically significant difference. Therefore, an associated p -value < 0.05 , means that there is significant evidence of an association between variables. The correlation ratio, η (eta), measures the degree of association between the two variables, the independent variable X (categorical) and the dependent variable Y (scale). The square of the correlation ratio, η^2 (eta squared) is the differentiation ratio. It measures the proportion of the variation in Y that is associated with membership of the different groups defined by X. Eta squared measures the proportion of the total variance in a dependent variable that is associated with the membership of different groups defined by an independent variable.

4. Results and Discussion

Hypothesis 1. *The trust level of logistics enterprises within the enterprise influences the revenue and earnings before tax.*

The first step is to examine whether there is any significant difference in terms of trust level in the categories of revenue and earnings before tax. In order to do that, the variance of each category has to be analyzed. In the case of a significant difference, it is possible to determine the existence of correlations between trust and revenue/earnings before tax. The closeness of correlations can be examined with the Eta index. The variables measuring financial indexes are the categorical variables of the change of revenue compared to the previous year (A4) and the change of earnings before tax compared to the previous year (A5). Internal trust is described with the variables of the judgement of the general trust atmosphere within the enterprise (B12) and its aspects (B13 group of variables). Since these trust variables are partially redundant and partially uncorrelated, it is necessary to group them with factor analysis. In addition, Principal Component Analysis is used with Varimax Rotation Method (KMO: 0.537; Bartlett’s test $p < 0.001$; total variance explained: 82.7%). The resulting two factors are shown in Table 1.

Table 1. Interpretation of factors.

F1: General Internal Trust	F2: Trust in Subordinates
B12: judgement of general trust	B13_1: trust in direct subordinates
B13_2: trust in the rest of co-workers	B13_3: trust of direct subordinates in the manager
B13_4: trust of direct subordinates in the rest of co-workers	

Source: Authors’ own construction.

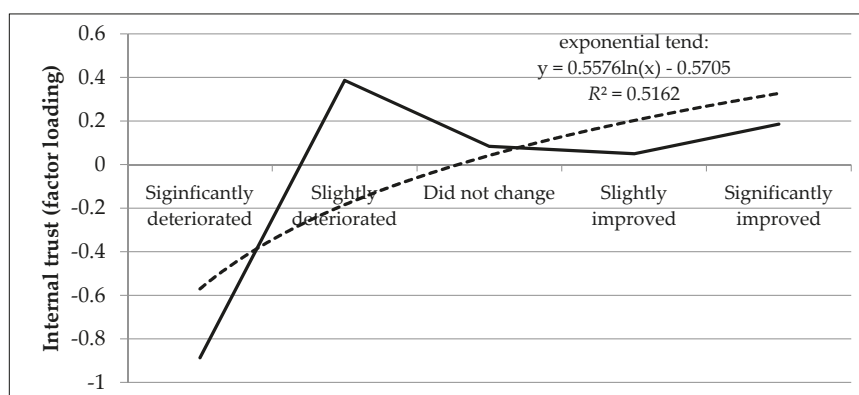
As a next step, it is necessary to see how the standard deviation of F1 (general internal trust) and F2 (trust in subordinates) changes in each category of A4 (change of revenue compared to the previous year) and A5 (the change of earnings before tax compared to the previous year). In order to that, Levene’s test is performed to examine the homogeneity of factor variances in variables A4 and A5 (df1, df2—degrees of freedom) (Table 2).

Table 2. Results of Levene's test.

Homogeneity Analysis of F1 and F2 in A4				
	Levene's test	df1	df2	Significance
F1: general internal trust	1.581	6	49	0.173
F2: trust in subordinates	2.079	6	49	0.073
Homogeneity Analysis of F1 and F2 in A5				
	Levene's test	df1	df2	Significance
F1: general internal trust	2.281	4	51	0.073
F2: trust in subordinates	4.350	4	51	0.004

Source: Authors' own construction.

The standard deviation values of F2 (trust in subordinates) are non-homogeneous in each category. To measure the closeness of correlation between variables, the Eta index and Eta-squared index are calculated in reference to mixed correlation (correlation between nominal and scale variables). However, since the only difference in variance was observed in the case of F2 (trust in subordinates) at the intersection with A5 (the change of earnings before tax compared to the previous year), Eta is calculated also in relation to this case. The obtained value of Eta was 0.903 and that of Eta-squared was 0.816 regarding the closeness of success and the internal trust in subordinates. The Eta index shows a strong correlation between the two variables, while its square demonstrates that the change of earnings before tax compared to the previous year (A5) explains 81.6% of the variance of internal trust in subordinates (F2). Since the variance of the internal trust factor of F2 is non-homogeneous in the categories of the change of earnings before tax (A5), it is possible to analyze and demonstrate the closeness of the relationship (Figure 7).

**Figure 7.** Correlation between the change of earnings before tax (F5) and the internal trust in subordinates (F2). Source: Authors' own construction.

Based on the performed tests and calculations, the hypothesis is partially correct and the thesis can be formulated which can also be demonstrated with (Figure 7). The logarithmic trend is marked with a dashed curve and its fitting is shown by R^2 .

Thesis 1. A higher level of trust in employees on behalf of Hungarian LSPs results in an increase in earnings before tax of these enterprises.

Hypothesis 2. The internal trust level established by LSP influences the flexibility of the examined logistics enterprises.

As a first step, it is necessary to observe whether there is any correlation between the level of internal trust and the flexibility of enterprises. If there is, its closeness needs to be measured and its nature observed. In order to do that, the variance of internal trust has to be examined in each flexibility category. If there is a significant difference, a correlation between trust and flexibility can be concluded to exist. The Eta index has to be calculated to measure the closeness of correlation. In order to describe internal trust, the trust factors examined in Hypothesis 1 (F1—general internal trust, F2—trust in subordinates) are used. Flexibility can be described with the variable B9 (What is the typical reaction on behalf of your enterprise if an existing client requires a new (non-routine) and unexpected order? How quickly does your enterprise react to clients' requests?). Since trust expressed with factors is measured on a metric scale and flexibility is measured on a nominal scale, the methodology used in mixed correlations is applied: the variances of trust variables have to be tested in each category of nominal variables and it has to be determined whether or not these variances are homogeneous. If they are not homogeneous, it can be concluded that there is a correlation between flexibility and trust (since variance is not the same in each category; therefore, this variance depends on the given category). In this case, the closeness of correlation can be measured easily with the Eta index used in such correlations (df1, df2—degrees of freedom) (Table 3).

Table 3. The results of Levene's test.

Homogeneity Analysis of the Variance of Factors F1 and F2				
	Levene's test	df1	df2	Significance
F1: general internal trust	4.699	3	52	0.006
F2: trust in subordinates	0.938	3	52	0.429

Source: Authors' own construction.

The obtained test results show that general internal trust has different variance in each flexibility category. This means that there is a significant correlation between the two variables ($p = 0.006$) (Figure 8). The mean values of the index of trust in subordinates do not show any significant difference in each flexibility category (ranging in the interval of ± 0.2), while the general internal trust shows a significant difference between each (mainly extreme) category. The parabolic trend curve is very well fitted (98.5%) which shows that the correlation is non-linear.

Consequently, it is possible to calculate the Eta and Eta squared indexes related to the closeness of the already mentioned mixed correlation (between flexibility and general internal trust). These indexes show a strong correlation (Eta: 0.882, Eta squared: 0.777), i.e., 77.7% of the variance of the general trust factor within the enterprise is explained by the given flexibility category which the enterprise belongs to. These results show that there is a significant, strong correlation between the general internal trust established by logistics enterprises and the flexibility of enterprises. However, as was already observed, this correlation is not linear but polynomial, more specifically a parabolic correlation. Consequently, the level of general internal trust is significantly lower in extreme flexibility categories (extremely flexible and extremely inflexible) than in the case of medium-level flexibility.

Thesis 2. *The extreme values of flexibility (very low and very high) of Hungarian LSPs are associated with a lower level of general trust within the enterprise, while this general internal trust is higher in the case of enterprises with average level of flexibility (Figure 8).*

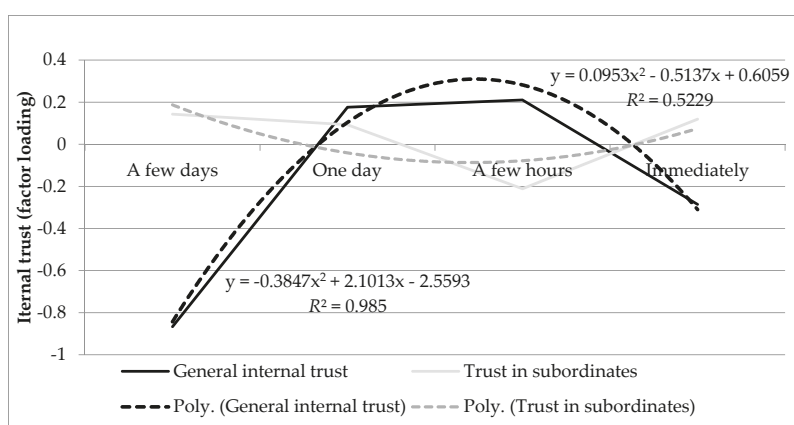


Figure 8. Trust level in each flexibility category. Source: Authors' own construction.

Hypothesis 3. *The trust level of the business environment created by the head manager of logistics enterprises influences the revenue and earnings before tax, as well as the flexibility of the examined enterprises.*

As a first step, it is necessary to examine whether there is any correlation between the trust level of the business environment and the financial and flexibility indexes of enterprises. If there is, their closeness and nature should be analyzed. Two variables were used in the questionnaire to measure the trust level of the business environment established by the head manager (B14—managerial role, B15—managerial style). The variables measured on the nominal scale cannot be cumulated in any way, since they do not change together; therefore, there is no correlation between them. For this reason, these variables have to be handled independently of each other. The same refers to the variables measuring the change of revenue (A4) and the change of earnings before tax (A5) and they also have to be handled separately (Table 4). Although the correlation between these variables is significant ($p = 0.005$) and moderately strong (Cramer's V: 0.452), it is still not enough for reduction, as they are not metric variables. As with the previous hypothesis, flexibility is measured with the variable B9 (flexibility).

Table 4. The closeness of association.

		B14 (Managerial Role)	B15 (Managerial Style)
A4 (change of revenue)	Phi significance	0.450	0.920
	Cramer's V significance	0.450	0.920
A5 (change of earnings before tax)	Phi significance	0.342	0.742
	Cramer's V significance	0.342	0.742

Source: Authors' own construction.

Consequently, the statement in the hypothesis has to be tested in four different aspects between A4 (change of revenue) and A5 (change of earnings before tax), as well as B14 (managerial role) and B15 (managerial style). Since all variables are measured on the nominal scale, the index numbers of the classic association closeness can be used to verify the correlation between them. The closeness indexes are not significant in any of the examined cases (Table 4); therefore, based on the responses to the questionnaire, there is no correlation between the analyzed variables.

As a conclusion, there is clearly no correlation between the indexes of earnings before tax and the level of environmental trust. As regards the correlation between flexibility and environmental

trust indexes, since the indexes measured on a metric scale were transformed into nominal ones, the existence of correlation can be examined between quality criteria (those measured on a nominal scale). As a consequence, the classic association closeness index numbers are used as a basis again. There is a close correlation between the trust level of a business environment and flexibility (Table 5). The Phi index shows a strong correlation, while Cramer's V shows a moderately strong correlation.

Table 5. The closeness of association between managerial style and flexibility.

		Value	Estimated Significance
Closeness of association correlation	Phi	0.847	0.048
	Cramer's V	0.489	0.048
Number of cases to be analyzed		51	

Source: Authors' own construction.

None of the indexes show significant correlation between managerial style (B15) and flexibility (B9) ($p = 0.496$), (Table 6).

Table 6. The closeness of association between managerial style and flexibility.

		Value	Estimated Significance
Closeness of association correlation	Phi	0.584	0.496
	Cramer's V	0.337	0.496
Number of cases to be analyzed		51	

Source: Authors' own construction.

It can be concluded that there is no significant correlation between the trust level of the business environment established by the head manager of Hungarian logistics enterprises and the revenue and earnings before tax of the examined logistics enterprises; therefore, the first part of the hypothesis cannot be confirmed. On the contrary, a moderately strong positive correlation was found between the trust level of the business environment established by the head manager of the examined logistics enterprises and the flexibility of these enterprises. This means that the more significant the role of the head manager is in establishing a trustful atmosphere, the more flexible is the given organization (Figure 9).

Thesis 3. *Higher level of environmental trust results in a higher level of flexibility in the case of logistics enterprises.*

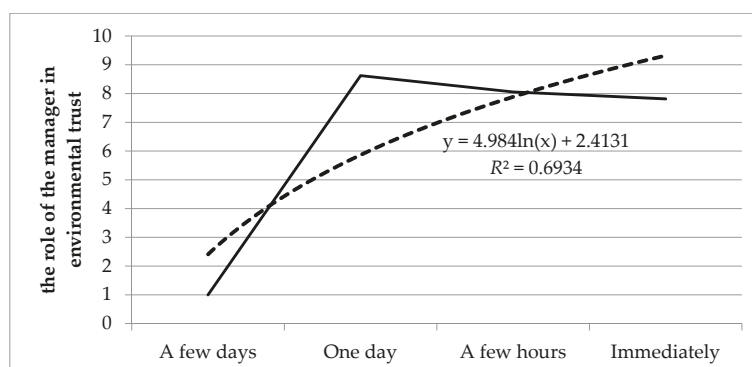


Figure 9. The role of the manager in establishing a trustful atmosphere and relationship with flexibility. Source: Authors' own construction.

Results can be summarized with the following findings. The increase in levels of trust among the employees of LSPs can contribute to an increase in the earnings before tax of the companies. The level of general trust within the enterprise has an effect on flexibility: the lower and higher categories of flexibility are related to low levels of general trust, as opposed to the mean categories of flexibility which are related to high levels of general trust. In logistics, a higher level of flexibility is associated with a higher level of environmental trust.

As a result, LSPs are expected to establish business solutions which could help them find the proper way forward in order to maintain their competitiveness and increase their market share. New findings can be achieved from the existing dataset by further developing the research methodology in order to make comparison analyses of LSPs in neighboring countries. In this way, new findings may lead to a more detailed understanding of LSPs. Nevertheless, the study is limited to respondents from Hungary, which makes it difficult to generalize findings to other countries. Replication of this study in other countries would improve the generalizability of the results. Another limitation of this research is the low response rate among LSPs. As regards the more distant future, this research, the previous research findings and the trends to be drawn lead to the conclusion that, potentially, the future of LSPs lies not only in dismantling the borders between LSPs and those using these services but even in the transformation of LSPs into 'organizations sans frontiers', to form a so-called LSP supply chain.

5. Conclusions

The representative, primary and empirical research conducted among the LSPs registered in Hungary confirmed that the examination of level of trust as a success factor is necessary. It can be assumed that the examined Hungarian logistics enterprises have a significant mediatory role in international logistics activities and provide vertically integrated logistics services to their partners, taking into consideration their scale and the wide spectrum of their services. As a result of the wide-ranging research on trust and the results of the literature review and the empirical research conducted among Hungarian LSPs, it was shown that the general trust level positively influences not only the relationships and collaboration of individuals in society and the management of enterprises in general but also the earnings before tax of the logistics service providers who answered the questionnaire. Moreover, of the major factors of performance perceived by the buyer [56], environmental trust also has a significant impact on flexibility. It is indisputable that the role of trust increased in importance following the global financial and economic crisis in 2008.

Higher levels of trust in employees in the examined Hungarian LSPs results in an increase in earnings before tax. As a consequence, it is important to focus on how to increase the level of trust of co-workers in the logistics enterprises, as the trust level has a direct positive influence on the earnings before tax. Based on these findings it is practical to choose the proper managerial tools (inclusion, deputation, advertising an open door program etc.) in order to increase the level of trust of employees). One possible suggestion is that, bearing in mind the appropriate company size, by measuring and maintaining (and possibly increasing) the internal level of confidence (i.e., related to staff), corporate executives can provide more efficient continuous development and growth, in accordance with the size of the client company in the market.

The extreme values of flexibility (very low and very high) of Hungarian LSP enterprises are associated with a lower level of trust within the enterprise, while this trust level is higher in enterprises with an average level of flexibility. The extreme values of flexibility (very low and very high) can probably be associated with the scale of enterprise, i.e., a small change in the staff numbers shows a higher degree of flexibility thanks to the owners engaged in the enterprise operation and the small number of enthusiastic employees. On the contrary, a very low degree of flexibility is assumed to be associated with enterprises with a large number of employees. Medium-sized enterprises have higher trust levels. Managers of service provider enterprises can establish economies of scale more effectively by measuring and increasing the level of trust within the organization.

A higher level of environmental trust results in a higher level of flexibility in the case of logistics enterprises. Striving for partnership in the relationship between a client and a logistics service provider results in more communication and closer collaboration, which usually yields win-win situations. The extent of communication, good performance, availability of LSPs and the compliance with payment conditions increase the level of trust between partners. During the establishment of a high level of trust, partners acquire comprehensive knowledge about each other's activities and procedures. The detailed knowledge of each other and the timeliness of information results in a high level of flexibility in their relationship. When making efforts to establish a partnership between clients and subcontractors, logistics enterprises should strive for detailed knowledge of each other (while they also achieve a higher level of trust), leading to a higher level of flexibility.

The results of the methods used in the underlying investigations following the hypotheses show clear and concise conclusions in the scientific publication. The results of the research carried out by the companies in the examined service sector are instructive and some of the results can be extended to the members of the supply chain, thanks to the fact that the number of enterprises in the supply chain is typical for the size of companies included in the sample and is general for both the SME sector and also for logistics service providers. Hungary is already witnessing competition between international logistics service providers.

The outcomes of the research emphasize and justify the importance of trust—in general terms, too—in the life of companies. Trust in employees (see, for example, Employer Branding, which has emerged as a new trend in recent years) and pre-tax profit, as well as trust between companies and flexibility as a success factor, have also shown positive evidence for the key role played by trust. As a suggestion in relation to the search for the appropriate size of the firm, by measuring the level of trust within the firm (related to staff) and maintaining its level (or increasing it further), the leading management of the firm can, by ensuring effective, continuous development and growth, increase the economic size of service firms.

Existing datasets can be used for the further development of the research methodology, in order to make comparison analyses of LSPs in other countries in Europe or outside Europe, leading to a more detailed understanding of LSPs. The study is limited to respondents from Hungary, which makes it difficult to generalize findings to other countries. Replication of this study in other countries would improve the generalizability of the results, preferably in a country outside Europe. Another limitation of this research is the low response rate among LSPs. As regards the more distant future, this research, the previous research findings and the trends to be drawn lead to the conclusion that, potentially, the future of LSPs lies not only in dismantling the borders between LSPs and those using these services but even in the transformation of LSPs to form a so-called LSP supply chain. The future of the LSPs will be determined by the interaction of the service provider and those using these services.

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Conflicts of Interest: The authors declare no conflict of interest.

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Article

Managing Sustainable Use of Antibiotics—The Role of Trust

Felicia Robertson ^{1,*}, Sverker C. Jagers ¹ and Björn Rönnerstrand ²

¹ Department of Political Science, University of Gothenburg, P.O. Box 711, SE 405 30 Gothenburg, Sweden; sverker.jagers@pol.gu.se

² Department of Social and Behavioural Studies, University West, SE 461 32 Trollhättan, Sweden; bjorn.ronnerstrand@hv.se or bjorn.ronnerstrand@pol.gu.se

* Correspondence: Felicia.robertson@gu.se; Tel.: +46-31-786-1845

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Abstract: Human overuse of antibiotics is the main driver of antibiotic resistance. Thus, more knowledge about factors that promote sustainable antibiotic use is urgently needed. Based upon findings from the management of other sustainability and collective action dilemmas, we hypothesize that interpersonal trust is crucial for people's propensity to cooperate for the common objective. The aim of this article is to further our understanding of people's antibiotic consumption by investigating if individuals' willingness to voluntarily abstain from antibiotic use is linked to interpersonal trust. To fulfill the aim, we implement two empirical investigations. In the first part, we use cross-section survey data to investigate the link between interpersonal trust and willingness to abstain from using antibiotics. The second part is based on a survey experiment in which we study the indirect effect of trust on willingness to abstain from using antibiotics by experimentally manipulating the proclaimed trustworthiness of other people to abstain from antibiotics. We find that interpersonal trust is linked to abstemiousness, also when controlling for potential confounders. The survey experiment demonstrates that trustworthiness stimulates individuals to abstain from using antibiotics. In conclusion, trust is an important asset for preserving effective antibiotics for future generations, as well as for reaching many of the United Nations' Sustainable Development Goals.

Keywords: trust; antibiotic resistance; antibiotics; cooperation; large-scale collective action; Sweden

1. Introduction

The growth of resistance to remedies against infections is one of the world's utmost challenges. In fact, antimicrobial resistance is estimated by the World Health Organization to already cause more than 700,000 yearly deaths from infections with resistant microbes and the number will increase dramatically in the future, if this problem is left unchecked. The unsustainable behavior of human overconsumption has been identified as a major driver of this growth [1–3].

Limiting antibiotic resistance is a matter of sustainable development because today's overconsumption of antibiotics compromises the ability of future generations to treat bacterial infections. However, already, antibiotic resistance dampens the potential to attain several of the United Nations' Sustainable Development Goals (SDGs). The goals to end poverty, ensure food security, ensure access to water and sanitation, install sustainable economic growth as well as sustainable consumption and production are all likely to be impaired by the presence of untreatable infections [4,5].

However, like many other sustainability issues, promoting prudent human use of antibiotics has the ingredients of a collective action problem. Despite the fact that overconsumption breeds resistance, there are very limited incentives for patients or health-care providers to consider the effect of their decision about antibiotic use on the overall levels of resistance [6–8].

This paper builds on lessons drawn from the study of other sustainability collective action dilemmas. In particular, we hypothesize that interpersonal trust, known to promote collective action in relation to climate change, fisheries and water management, also makes individuals more willing to cooperate to fight antibiotic resistance by limiting their own use of antibiotics. The aim of this article is to further our understanding of people's antibiotic consumption by investigating if individuals' willingness to voluntarily abstain from antibiotic use is linked to interpersonal trust.

To fulfill the aim, we implement two separate empirical investigations. In the first part, we use cross-section survey data to investigate the link between interpersonal trust—the belief that most people can be trusted—and willingness to abstain from using antibiotics. The second part is based on a between-subject survey experiment where we study the role of interpersonal trust indirectly by experimentally manipulating the trustworthiness of other people. As such, we study the causal contribution of public willingness to limit antibiotic use on respondents' own willingness to limit their use of antibiotics.

The results from the analysis of the cross-section data show that interpersonal trust is linked to willingness to limit antibiotic use, also when controlling for potential confounders. The survey experiment demonstrates that the general willingness to abstain from using antibiotics among the general public—our indicator of trustworthiness—stimulates individuals to abstain from using antibiotics themselves. In doing so, this study contributes to the understanding of the role of interpersonal trust for individual voluntary behavior in large-scale collective action dilemmas, such as antibiotic use. In addition, the paper shows that insights from other sustainability issues may also be useful when it comes to the struggle to limit unsustainable use of antibiotics.

The structure of the paper is as follows: Section 2 depicts previous research on antibiotics use and resistance, and we argue that when it comes to antibiotic overuse, more attention should be paid to the behavior of patients. In Section 3 we build on findings from other sustainability issues, account for the theoretical model of collective action and present the hypotheses about the link between trust and collective action to limit antibiotic use. Section 4 is dedicated to methods and materials, where the case of Sweden and subsequently the survey and survey experiment methods are presented. Section 5 reports the results from the survey and the survey experiment. Lastly, Section 6 is a concluding discussion on voluntary cooperation and proposes future studies and upcoming proposals for examining and attaining behavioral change.

2. Previous Research

Apart from variation in antibiotics use linked to different types of infections, there is also a variation related to non-medical factors [9]. For example, in a study by Bjerrum et al. [10] it was discovered that national differences in prescription rates do not tend to mirror the prevalence of bacterial infections, but are related to national recommendations, treatment traditions and pharmaceutical marketing. Other contextual factors found to be important in the previous literature are type of health-care system [9], corruption [11,12] and a number of cultural factors [13,14], for example, risk aversion [15,16].

Antibiotic use also varies by individual factors, such as knowledge [17], gender [18], education [17,19], age [20], trust in institutions [6] and interpersonal trust [6,21].

Around the world, initiatives are now taken to ensure that antibiotics are only attainable through prescription, in addition to various attempts to limit the amount of prescribed antibiotics. These efforts have been directed towards medical practitioners (e.g., by creating guidelines), which in many countries has had the intended effect of lowering overall consumption. A prominent example here is that medical practitioners can be educated in order to diminish the prescription rates [22]. This is the case for Sweden, which has managed to diminish the use of antibiotics, even if overconsumption still is a problem [23,24].

While much attention has been directed towards changing the behavior of prescribers, relatively little attention has been given to the behavior of patients. This is of interest since previous studies have

shown that medical practitioners are confronted with demands for antibiotics from patients [25–28]. Time restrictions and high demand from patients jointly influence prescribers to prescribe antibiotics, even in cases where this might not be necessary in order to treat the infection. In a study in the UK, it was found that about 96% of all patients who request antibiotics also receive it, indicating that antibiotic consumption might involve a *shared* decision-making between doctors and patients [25].

This has led scholars to argue that in order to reduce prescription rates, programs intended to change behavior must be put in place for patients, which is crucial in the struggle to promote sustainable antibiotic use [29]. The importance of the patient perspective is further underscored by recent increases in awareness campaigns in Europe, intended to inform patients about when antibiotics are redundant [15].

However, it is known from many other sustainability issues that an understanding of the salience of the issue is a necessary, yet insufficient, condition for cooperation to occur. In solving sustainability issues such as climate change, fisheries management and clean water, trust is a key component in creating behavioral change towards sustainable use of resources. The more people believe that others will cooperate, the more likely that they will adopt cooperative behavior [30,31].

Interestingly, in a study by Blommaert, Marais, Hens, Coenen, Muller, Goossens and Beutels [21], the authors also discovered a relationship between country levels of interpersonal trust and levels of antibiotics use. This study was reinforced by individual-level evidence in a study by Rönnerstrand and Andersson Sundell [6], who found a link between interpersonal trust and the willingness to postpone antibiotic treatment.

The aim of this article is to further our understanding of people's antibiotic consumption by investigating if individuals' willingness to voluntarily abstain from antibiotic use is linked to interpersonal trust.

Many other sustainability issues—such as fisheries management, climate change and access to clean water—are examples of collective action problems. The next section describes why antibiotic resistance can also be understood as such a challenge, and, based on theory and previous research, hypothesize a link between interpersonal trust and willingness to limit personal use of antibiotics.

3. Theoretical Framework and Hypotheses

A collective action problem typically occurs when a group of people share a resource but where the gain for each individual is highest if he or she disregards the group benefit and acts in self-interest, no matter what other group members do. This is valid, while the profit for everyone is nonetheless higher if all were to cooperate, since the joint resource will otherwise gradually be impoverished or depleted [32]. Simultaneously, if a person understands the potential negative outcome, and thus chooses to cooperate (i.e., reduce his or her resource usage), he or she may easily end up in a position of a “sucker” [33]. That means that the person is losing twofold: not receiving the individual profit and also suffering from the collective damage.

With the example of antibiotics, the key driver of resistance is overuse, but there are limited incentives for each patient or health-care provider to consider the overall consequences of antibiotic use [7,8]. Over time, overconsumption or lack of cooperation can turn into a tragedy of the commons, where the resource is depleted, or in the case of antibiotic resistance, when the healing properties of antibiotics are exhausted. To illustrate, it is often perceived as a sacrifice both by the patient and the treating doctor not to rely on antibiotics when the patient has an infection, even when there is no or weak evidence that such treatment would in fact cure the infection. The benefits of such a sacrifice are, on the other hand, dispersed and remote.

When it comes to resource collective action dilemmas in general, the level of worry that individuals experience and/or express is connected to whether these individuals are willing to act in favor of group concerns and resources, or not [34–36]. Furthermore, the main focus of this paper is that we know that interpersonal trust is positively related to cooperation in collective action dilemmas [37]. For example, there is a well-studied relationship between interpersonal trust and cooperation in

small-scale dilemmas involving a limited number of actors [31,38–41]. However, we know less about if and how interpersonal trust works in relation to cooperation in large-scale dilemmas, such as antibiotics use.

In fact, there are several differences between small-scale and large-scale collective action situations. Importantly, Olson's argument is that—without an external enforcer—collective action in small groups may come about but is destined to fail in large groups. In a small group setting, social pressure and the quest for reputation and social prestige may stimulate cooperation, as long as members of the group can interact face-to-face. In large groups, Olson argues, collective action is impossible without external enforcement [42].

However, despite Olson's prediction, a few studies have found that interpersonal trust may also stimulate voluntary cooperation also in a large-scale setting [43–45]. Based upon findings from the study of collective action dilemmas, we theorize that interpersonal trust is crucial for people's propensity to cooperate to fight antibiotic resistance by limiting their own use of antibiotics. Hypothetically, people who have higher levels of interpersonal trust (the belief that most people can be trusted), will be more willing to decrease their own use of antibiotics.

Hypothesis 1 (H1). *Higher levels of interpersonal trust are positively correlated with a higher propensity to take voluntary action to decrease one's own use of antibiotics.*

Previous studies of collective action show that trustworthy behavior of others elicits pro-social behavior in other collective action problems [30,31]. People who trust that peers will contribute or cooperate are more compelled to cooperate themselves [30,46–48]. However, this can also have the opposite effect, if it is believed that others are not acting pro-socially [49]. Based on these findings, a second hypothesis concerns whether people who receive information about the trustworthiness of other people (i.e., there is a high willingness among others to limit their own antibiotic use) will have a higher propensity to abstain from using antibiotics:

Hypothesis 2 (H2). *Higher belief in the trustworthiness of others has a positive effect on the propensity to take voluntary action to decrease one's own use of antibiotics.*

4. Materials and Methods

In order to test our two hypotheses, the study is separated into two parts. Making use of cross-section survey data, the first part examines the link between interpersonal trust and individual willingness to limit antibiotic use. The second part utilizes a survey experimental approach to allow for causal inference and to study the causal contribution of the proclaimed trustworthiness of other people on individuals' willingness to limit antibiotic use.

By combining both survey data and survey experiment, we utilize the major strengths of the two methods: compensating external validity with survey data and addressing causality through the survey experiment [50]. Furthermore, this combination also makes it possible to control for common confounders of trust and trustworthiness. [51].

The choice of Sweden as the case was motivated by the fact that Sweden has among the highest levels of interpersonal trust in the world [52,53]. This is thus a so-called *tough* test for our theory, because interpersonal trust will likely have a stronger relationship with cooperative behavior either by the lower the general levels of trust and/or the larger the relative differences in levels of trust. This means that if we even find support for the relationship between interpersonal trust and cooperation in Sweden, where the general level of interpersonal trust is high and the relative differences among individuals is presumably rather low, then this connection is likely to be even stronger in other countries where the level of interpersonal trust is generally lower.

Another reason for the focus on Sweden is that knowledge about antibiotic treatment and antibiotic resistance is high in this country [15,54]. This means that in the experiment, extensive

information on the issue did not have to be provided for the experiment to materialize successfully, but was instead assumed to be endogenous.

4.1. Design of the Cross-Section Survey Study

To test our first hypothesis, we used an annual survey conducted by the Society, Opinion and Media Institute (the SOM Institute) at the University of Gothenburg. This survey captures both our main independent and dependent variables, including many other variables associated with antibiotic consumption. The survey is well established in Sweden and is based on a probability sample of the Swedish population, drawn from the public register. The sample was slightly skewed towards more educated and male participants, which motivated us to systematically control for level of education and gender in our studies. The total number of respondents in the SOM survey was 9828. However, all respondents were not asked all questions, and 3400 is the number of people who were invited to answer questions about antibiotics, thus, the number of survey respondents who answered all the questions required to be included in the analysis was 1293. The AAPOR response rate was 47%.

The question that is the dependent variable was “to what extent would you say that you are willing to abstain from using antibiotics, even if you risk additional sick days?” The four options are 1 = would certainly not abstain, 2 = would not abstain, 3 = would abstain and 4 = would certainly abstain. A majority of the respondents answered that they are willing to abstain from using antibiotics and hence this variable was skewed. We argue that the group that would *certainly* abstain from using antibiotics is more likely to behave this way than all others and we therefore dichotomized the four response alternatives into 1 = would certainly abstain and 0 = all other groups.

Since the dependent variable was dichotomous, a binary logistic regression, and more specifically, an odds ratio, was used [55]. We did this in order to assess whether higher levels of interpersonal trust are associated with a higher propensity to abstain from using antibiotics.

There are several factors that can potentially affect the relationship between interpersonal trust and willingness to abstain from using antibiotics. The first is *age*, since older patients have been found to consume more antibiotics [20], while this group also tends to report higher levels of interpersonal trust [56,57]. A second aspect is that *gender* has been related to cooperation in some collective action dilemmas [58], while women consume more antibiotics [18]. Furthermore, *subjective health* is linked to higher levels of interpersonal trust [59], and positive health decisions [60], while people with higher stated well-being are more willing to wait to consume antibiotics [6]. Lastly, *education* can influence the focal relationship through higher levels of education being associated with more knowledge on appropriate use [17,19], while people who are more educated also tend to be more worried about the growth of resistance [6]. Controlling for education is also important since it could be related to levels of interpersonal trust [61].

4.2. Design of the Survey Experiment

For the survey experiment, we make use of a web survey called The Citizen Panel, accessible through the Laboratory of Opinion Research at the University of Gothenburg, where 5000 participants in the panel received the survey and 3605 responded, resulting in a participation rate of 72.1%. The recruitment of participants in the Citizen Panel is mostly comprised of self-selection yet some are recruited using random probability sampling [62].

We manipulate the mechanism hypothesized to be the link between interpersonal trust and cooperation, that is, the belief about the trustworthiness of others. Group means are assumed to be equal and this null hypothesis is rejected if differences are larger than would be expected to occur in repeated trials on a 95% confidence level. ANOVA is used to compare group means and a post-hoc test, Tukey's HSD, is used to discern if and which group means are different from one another. The effect size of the manipulation is measured in eta squared.

A between-subject design is used and respondents are randomly assigned to one out of four treatment groups and receive a vignette with a hypothetical scenario. In Table 1 the information given

to the different groups is displayed. Groups 1 and 2 are the main experiment groups who receive information on the cooperation of others (see Appendix A for vignettes). Group 1 receives information that 80% of people with a similar infection and situation tend to cooperate and choose to abstain from using antibiotics whereas Group 2 receives information that only 20% tend to cooperate. Both groups receive information on the salience of the issue, such as the problem of growing resistance dampening the effectiveness of modern medicine (e.g., in treating severe infections) [5]. They also receive information that a physician has prescribed antibiotics and that it is not always necessary to consume antibiotics to treat this illness. Lastly, Groups 1 and 2 are told to imagine that they have a minor infection and are asked how likely they are to abstain from using antibiotics, even if they risk additional sick days. Group 3 is then installed to disentangle if there is an independent effect of the said cooperation of others on the cooperativeness that does not depend on the salience of the issue. Group 4 is a pure control group that only receives the question about their willingness to abstain from using antibiotics. Control variables are used to ensure random selection to the treatment groups (see Supplementary Materials for proof of random selection).

The dependent variable is measured through the question “Imagine that you have a respiratory tract infection. How likely are you to abstain from using antibiotics, even if you risk additional sick days?” The options are numbered from 1 to 5 where 1 = not at all likely, 2 = not likely, 3 = neither likely nor unlikely, 4 = likely and 5 = very likely.

Table 1. Design—Experimental groups and treatments.

	Group 1	Group 2	Group 3	Group 4
Information about resistance	x	x	x	
Physician prescribes antibiotics	x	x		
Trustworthiness of others	x	x		
Question to abstain antibiotics	x	x	x	x

4.3. Ethics

Those responsible for the SOM survey and the Citizen Panel at the University of Gothenburg conducted internal ethical reviews of the protocols before the studies were approved and underway. The participants of the survey experiment were informed that the vignettes were hypothetical.

5. Results

5.1. Results from the Analysis of Cross-Section Data

A logistic regression model is created to analyze the relationship between interpersonal trust and stated willingness to abstain from using antibiotics. The results from the logistic regression models are presented in Table 2. Model 1 is a significant improvement from Model 0 to estimate the odds of a respondent being willing to abstain from antibiotics. Interpersonal trust is a significant predictor of odds to abstain from using antibiotics on a p -level = 0.01. This is interpreted as for each increase in level of interpersonal trust the odds of abstaining from using antibiotics increases with 11%.

In Model 2, potential confounders and control variables are introduced. These are how worried people are for increasing antibiotic resistance in the future, the number of antibiotic courses people have taken in the last year and a measure of self-estimated health. We expect that higher values of worry, consumption and health are correlated with an increased propensity to limit one's consumption of antibiotics. When these variables are added, the individual contribution of interpersonal trust still remains, where the odds of certainly wanting to abstain from taking antibiotics increases by 8% for every one-step increase in interpersonal trust on the p -level = 0.01. In general, the added variables follow the prediction, a person who consumes the highest number of antibiotics courses has lower odds to answer that they most certainly would abstain from using antibiotics ($p = 0.1$). The group that only consumed one course of antibiotics has higher odds to abstain from using antibiotics than

any other category ($p = 0.01$). These results are curved and indicate that the number of antibiotics courses does not contribute a lot to explaining abstention decisions. Worry about increased resistance in the future sometimes contributes to explain abstention decisions. For example, if you are not worried at all, you have lower odds of abstaining from using antibiotics and are significantly different than other categories. The group that is most worried is four times more likely to abstain from using antibiotics than the other categories. However, only the lowest and highest levels of worry are statistically significant. Higher levels of self-estimated health increase the odds of certainly abstaining from using antibiotics. A one-step increase in self-estimated health results in 43% increased odds of certainly abstaining from using antibiotics. Most of the model fit estimates show an increase in model fit, however not all of them, indicating that Model 2 only offers a slightly better prediction of abstention decisions.

Table 2. Logistic probability models of willingness to abstain from using antibiotics by the variables interpersonal trust, antibiotics use, self-estimated health, worry about increased resistance, level of education, institutional trust, gender, and age.

	Model 0	Model 1	Model 2	Model 3	Model 4
Interpersonal trust		1.11 *** (0.03)	1.08 *** (0.03)	1.06 ** (0.03)	1.07 ** (0.03)
Antibiotics use (1)			**	**	**
2–5 times (2)			1.48 (0.38)	1.35 (0.39)	1.36 (0.29)
Once (3)			1.20 (0.35)	1.13 (0.35)	1.06 (0.36)
Never (4)			1.80 * (0.33)	1.66 (0.34)	1.56 (0.34)
Worry low (1)			***	***	***
Worry (2)			0.97 (0.57)	0.92 (.57)	1.01 (0.58)
Worry (3)			1.93 (0.54)	1.78 (0.54)	1.99 (0.55)
Worry high (4)			4.02 *** (0.53)	3.74 ** (0.54)	4.40 *** (0.55)
Health (well)			1.43 ** (0.14)	1.33 * (0.15)	1.28 * (0.15)
Education low (1)				***	**
Education (2)				1.87 *** (0.22)	1.53 * (0.23)
Education (3)				2.42 *** (0.23)	1.95 *** (0.24)
Education high (4)				2.39 *** (0.22)	1.86 *** (0.23)
Institutional trust low (1)					
Institutional trust (2)				0.99 (0.35)	1.00 (0.35)
Institutional trust (3)				1.04 (0.34)	1.10 (0.35)
Institutional trust high (4)				1.16 (0.37)	1.24 (0.37)
Gender (f)					0.94 (0.12)
Age (1)					***
30–49 years (2)					1.14 (0.21)
50–64 years (3)					0.95 (0.21)
65–85 years (4)					0.64 ** (0.22)
Intercept	0.82 *** (0.06)	0.42 *** (0.18)	0.09 *** (0.66)	0.06 *** (0.73)	0.07 *** (0.76)
Cases	1293	1293	1293	1293	1293
–2 LL	1779.99	1763.94	1674.07	1653.84	1640.79
Nagelkerke's R ²		0.016	0.105	0.124	0.137
Model Chi ²		16.05 ***	105.92 ***	126.140 ***	139.20 ***
Hosmer & Lemeshow		8.25	13.61 *	6.18	4.36
Classification	54.9%	57.3%	62.1%	63.9%	63.9%

Notes: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ for Wald's Z, Standard Error in brackets, Method = enter, Variables entered: "Are you willing to abstain from using antibiotics, if possible, even when you risk additional sick days." The options are 1 = no, absolutely not, 2 = no, most likely not, 3 = yes, most likely, and 4 = yes, absolutely, and is dichotomized to 1 = yes, absolutely and 0 = other. Interpersonal trust was posed as "to what extent can you say that other people can be trusted?" Where 0 = one cannot trust other people and 10 = you can trust other people. See Supplementary Materials for coding and full models including Wald's Z. Source: The national SOM survey 2016.

In Model 3, level of education and institutional trust are added to the model. We expect that higher levels of institutional trust and education are linked to a higher likelihood of abstaining from using antibiotics. This holds true for education since respondents with the highest level of education have almost two and a half times higher odds of abstaining from using antibiotics. Interestingly, institutional trust does not explain any of the variation in likelihood to abstain from using antibiotics.

When these variables are introduced, the relationship between interpersonal trust and willingness to certainly abstain from using antibiotics diminishes (from $\text{Exp}(B) = 1.08$ to $\text{Exp}(B) = 1.06$). While education contributes most to explaining abstemiousness, interpersonal trust remains significant on the p -level = 0.05. The individual relationship between self-estimated health and antibiotics use on the willingness to abstain from using antibiotics diminish when education and institutional trust are in the model. All model fit estimates indicate a model improvement when education and institutional trust are introduced.

In Model 4, age and gender are added as explanatory variables of abstemiousness. Women are 6% less likely than men to abstain from using antibiotics, yet this difference is not statistically significant. The oldest age category is 36% less likely to abstain from using antibiotics (p -level = 0.05). The two oldest age groups are less likely to abstain from using antibiotics than the youngest groups, however, not all of these differences are significant. When age and gender are added to the model, the individual contribution from the independent variable interpersonal trust remains at 6% and is still significant on the p -level = 0.05. Education continues to have an individual contribution. Level of worry contributes to predict the outcome in the lowest and highest categories. Self-estimated health does not contribute to explain the outcome in Model 4 on the p -level = 0.1. Lastly, only the most frequent users of antibiotics predict the outcome on the p -level = 0.05.

Model 4 has a lower—2 Log Likelihood (−2 LL) and a high, as well as significant, model χ^2 indicating a better model fit compared to the other models. Nagelkerke's R^2 has increased while the Hosmer and Lemeshow statistic remains insignificant, which indicates a good fit. While the number of correct classifications remain at 63.9%, we argue that this model best explains the variation in the data.

5.2. Results from the Analysis of Survey Experimental Data

To attain causality of our findings, we conducted a survey experiment. First, we perform an ANOVA (between group Sum of Squares = 313.54, $F = 52.87$, $df = 3$, $p = 0.00$), where at least one experiment group is found to have a significantly different mean than other experiment groups (within groups SSQ = 7135.77, $df = 3610$).

Figure 1 presents the group means. As in the logistic regression model, Swedes have a generally high level of cooperation. The groups do not seem to have significantly different group means since some of the confidence intervals overlap. Group 1 estimated the likelihood to abstain from using antibiotics to a mean of 3.75 ($N = 885$, std. dev = 1.36, std. err = 0.05, 95% CI = 3.66–3.84). Group 2 estimated the likelihood of abstention to be slightly lower with a mean of 3.65 ($N = 958$, std. dev = 1.33, std. err = 0.04, 95% CI = 3.57–3.74). Group 3 does not differ as much from group 2 with a mean of 3.57 ($N = 877$, std. dev = 1.39, std. err = 0.05, 95% CI = 3.47–3.66) Yet the control group has a significantly lower group mean of 2.99 ($N = 894$, std. dev = 1.54, std. err = 0.05, 95% CI = 2.89–3.09).

To discern which group means are significantly different from each other, we conducted a post-hoc test. With this test, it is possible to observe how successful the manipulations were. Groups 1 and 2 do not have group means that show a significant difference on the p -level = 0.05 (mean diff. = 0.10, std. err. = 0.06). This means that people who receive information that 80% cooperate compared to 20% do not necessarily estimate a higher likelihood to abstain from using antibiotics. Notably, the group means differ significantly between Group 1 and Group 3 (mean diff. = 0.19, std. err. = 0.06, $p = 0.05$), meaning that if you also receive information that a lot of people cooperate you state you are more likely to abstain compared to the groups that only received information on the salience of the issue. It is also interesting to note that there is no difference in means between the group that only received information on the salience of the issue and the group that received information that 20% cooperate (mean diff. = −0.09, std. err. = 0.07, $p = 0.56$). The control group is significantly different from all other groups on the p -level = 0.00 (mean diff. from Group 1 = −0.76, std. err. = 0.07, mean diff. from Group 2 = −0.66, std. err. = 0.07, mean diff. from Group 3 = −0.57, std. err. = 0.07).

The effect size estimate, eta squared, tests how much of the variance can be related to group differences, or in other words how much of the variance is affected by the experimental condition. It was calculated to be 0.21 which entails that 21% of the variance is explained by the stimuli.

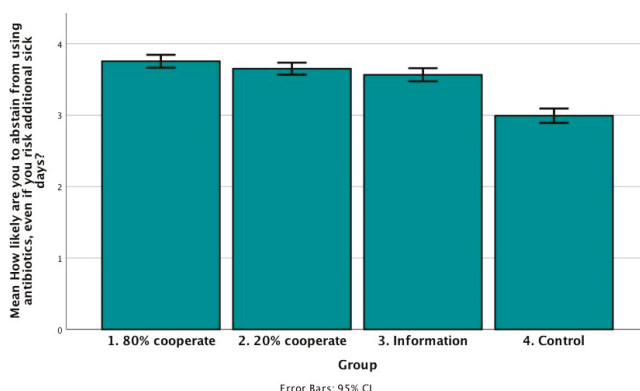


Figure 1. Mean levels of likelihood to abstain from using antibiotics divided by experiment groups.
Source: The Citizen Panel 26 2017.

6. Discussion

Making use of unique cross-section data, we find that interpersonal trust, the belief that most people can be trusted, is associated with a willingness to limit personal use of antibiotics, also when controlling for a number of potential confounders. We thus find support for the first hypothesis of this paper and add to the emerging literature about the link between interpersonal trust and large-scale collective action.

The survey experiment demonstrates that respondents in the stimuli group who received information that 80% of other people cooperate were significantly more willing to limit their own use of antibiotics, as compared to respondents in the group who did not get any information about other people's cooperativeness. However, contrary to the theoretical expectations, there was no significant difference in the willingness to limit antibiotic use between the "20%" and the "80%" treatment groups. Thus, while not finding unanimous support for our hypothesis, there is still an interesting relation between the trustworthiness of others and respondents' own decisions to cooperate.

Thus, similar to many other sustainability and collective action resource dilemmas, the results of this study signify that trust and trustworthiness may be important for individuals' willingness to reduce their personal use of antibiotics in order to prevent antibiotic resistance. However, contrasting the theoretical prediction, the experiment did not show any significant difference in the willingness to abstain from using antibiotics between the groups that received information that 20% cooperate or 80% cooperate. What could be the reason for this? This could possibly be due to the fact that 20% cooperation in large-scale collective action situations in fact shows that many people are ready to bear the cost of cooperation for the common good. To illustrate, 20% of Sweden's population would entail that as many as 2 million people cooperate. However, if this occurred in a small-scale interaction, it would signify that the actual number of people cooperating is quite small. Further research may study the potential difference in the cut-off point for what is considered trustworthy behavior among other people in large-scale and small-scale collective action.

Antibiotics overuse and the development of antibiotic resistance is a transboundary and global problem. Hence, it is important to know *who* is being trusted in studies like this one. Future studies could replicate the current study but also compare the results with local and global framings.

Indeed, the results from this study are unique and an important contribution to the existing knowledge about factors that influence citizens' willingness to limit antibiotic consumption for the sake of preventing resistance. In doing so, the study also adds to what is known about the role of interpersonal trust in stimulating large-scale collective action. Even so, the study has several limitations. Firstly, social desirability might make people more disposed to answer that they would be willing to limit their use of antibiotics to prevent resistance, and this bias may be more pronounced among high-trusting individuals. Secondly, the evidence found in the survey experiment could be an effect of "bandwagoning" rather than being about the trustworthiness of other people. Thirdly, the survey experiment is hypothetical and it can be brought into question to what extent the findings travel to a real-world setting.

In conclusion, using a mixed-methods approach, this paper demonstrates a link between interpersonal trust and willingness to limit personal use of antibiotics in order to prevent antibiotic resistance. Thus, interpersonal trust seems to be an invaluable asset for preserving the therapeutic capacity of antibiotics for future generations, as well as for successful realization of many of the Sustainable Development Goals.

Supplementary Materials: The following are available online at www.mdpi.com/2071-1050/10/1/143/s1, Complete models 0–4 including Wald's Z. Randomization check for age, sex and level of education.

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Author Contributions: Felicia Robertson (F.R.) conceived and designed the study; F.R., Sverker C. Jagers (S.C.J.) and Björn Rönnerstrand (B.R.) contributed to the data collection. F.R. analyzed the data; F.R. wrote the first draft of the article, F.R. coordinated subsequent work. F.R., S.C.J. and B.R. contributed to the writing of the manuscript. F.R., S.C.J. and B.R. contributed to critical revisions and approved the final version of the article.

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Appendix A

Appendix A.1 Coding of Control Variables

To what extent people worry about increased antibiotic resistance is measured with the question "how worried would you say you are about increased antibiotic resistance in the future?" The four response options are 1 = not at all worried, 2 = not very worried, 3 = worried, and 4 = very worried. Trust in institutions is asked as "how much confidence do you have that the health-care institution is performing in line with its objective?" The four alternatives are 1 = no confidence at all, 2 = not much confidence, 3 = confidence and 4 = very much confidence. Self-estimated health is measured by "how would you describe your general health?" where 0 = very bad and 10 = very good, and the responses are dichotomized into 0–6 = bad and 7–10 = good. Antibiotics consumption is measured from "how many times have you used antibiotics during the last 12 months?" The options are 1 = more than 5 times, 2 = 2–5 times, 3 = once, and 4 = never. Level of education is coded into four categories: low, middle low, middle high and high. Low education is primary school, middle low is up until high school, middle high is post high school but not a university degree and high is a university degree. Gender is measured with the categories man, woman or other. Due to few responses, other was excluded. Age was recoded into four different categories: 16–29 years, 30–49 years, 50–64 years, 65–85 years.

Appendix A.2 Vignette

One reason to avoid antibiotics is that a high level of overuse of antibiotics increases the growth of antibiotic resistant bacteria.

Imagine the following: You suffer from a respiratory infection with cough, fever and chest pain. You have visited a medical practitioner who assesses that the infection will heal by itself in a few days, yet prescribed antibiotics (penicillin) to accelerate the recovery by a few days.

[Research has shown that four out of five people (80%) tend to regard the interests of society when making decisions for themselves and choose to abstain from using antibiotics/Research has shown that one out of five people (20%) tend to regard the interests of society when making decisions for themselves and choose to abstain from using antibiotics.]

Imagine that you have a respiratory infection, how likely are you to abstain from using antibiotics, when possible, even when you risk additional sick days? 1 = No, probably not, 5 = Yes, probably.

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Article

The Explanatory Power of Reciprocal Behavior for the Inter-Organizational Exchange Context

Martina Pieperhoff

Research Institute for Cooperation and Cooperatives, Institute for SME-Management, Vienna University of Economics and Business, 1020 Vienna, Austria; martina.pieperhoff@wu.ac.at; Tel.: +43-01-31336-4332

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Abstract: In order to create sustainable competitive advantages, organizations are embedded in dyadic exchange relationships, which depend on the coordination of the behavior of the actors involved. Often, coordinated behavior is explained by trust. Since trust develops in a process of reciprocal responses to presumed trustworthy behavior, it is a reciprocity-based concept. While inter-organizational exchange relationships can appear in different stages (forming, establishing, broken), different reciprocity types (direct, indirect, negative) can be distinguished. The study links reciprocal behavior to different stages of inter-organizational exchange relationships in order to investigate reciprocity as a possible coordination mechanism of behavior and thus explore the basis of coordination of trust-based behavior. Qualitative Comparative Analysis as a set-theoretic approach is applied to analyze the empirical data consisting of 78 qualitative semi-structured interviews with managers of small-, medium- and large-sized companies. The results show that different reciprocity types become effective in different stages of an inter-organizational exchange relationship: For forming inter-organizational exchange relationships indirect reciprocal behavior, besides direct reciprocity, becomes effective while in establishing inter-organizational exchange relationships, direct reciprocal behavior is evident. Negative reciprocal behavior leads to a break up of relationships. Using these results, on the one hand, the concept of trust can be sharpened by deepening the understanding of the trust-building mechanisms and on the other hand, reciprocity can be seen as coordination mechanism in exchange relationships of different stages. In doing so, with this knowledge, relationships can be coordinated towards a long-term orientation in order to create sustainable advantages.

Keywords: coordinating behavior; trust management; reciprocity types; reciprocity-based trust; inter-organizational exchange relationships; sustainable relationships

1. Introduction

Organizations are relied on the access to resources to be competitive and thus it is necessary for them to enter into inter-organizational relationships in order to obtain these resources [1]. A sustainable competitive advantage can be created by partners seeking long-term relationships [1,2]. Since dyadic, inter-organizational exchange relationships involve two actors to achieve the objectives, the behavior of the actors involved must be coordinated [3]. Coordinated behavior is often explained by trust, which is a crucial factor for the relational dimensions of an organization [4]. While three types of trust (instrumental, maxim-based, norm-based) can be distinguished (e.g., [5–7]), the explanation of the emergence of trust is essentially eliminated. In general, trust and (exchange) relationships are reciprocal. Reciprocity is a mechanism that underlies the concept of trust. Thus, reciprocity is seen as a condition for the emergence of trust. To understand the effectiveness of reciprocity-based trust in inter-organizational exchange relationships, the underlying principle of reciprocity needs to be investigated. Reciprocity as a social preference [8,9] strives for symmetry in a relationship, thereby pursuing a balance between actors involved. Reciprocity as a universal principle formulates exchange

theoretical considerations [10–12] and has a stabilizing effect in systems [13,14]. It can be distinguished in many different types, which can be reduced to three main reciprocity types: direct, indirect and negative [15,16]. While direct and indirect reciprocity indicate a positive exchange of values, negative reciprocity is a one-sided and therefore negative exchange in which one actor takes a benefit without returning an equal gift [17–19].

Regarding the coordination of behavior in inter-organizational exchange relationships, it seems necessary to distinguish between different stages of the relationship [18]. It can be assumed that for different stages of an inter-organizational exchange relationship different coordination mechanisms become effective (e.g., [18]). By regarding different stages, a focused consideration can be made of individual phases in which the coordination of the behavior of the actors involved is relevant through the influence of reciprocal actions. Mainly three stages are distinguished in this study [18]: The formative stage, the established stage and the broken stage of an inter-organizational exchange relationship between two organizations. While the formative stage is about building a relationship and actors involved approaching each other, the established stage indicates an (long-term) existing relationship in which the actors involved interact on a regularly basis. The broken stage displays the end where one of the actors has broken up the relationship.

Regarding the coordination of the behavior in inter-organizational exchange relationships, a contextualization is needed: So far, a particular contextualization of behavioral coordination by reciprocity, respectively of reciprocity-based trust with a specific exchange context does not exist in the literature. Taking these two empirical and theoretical ideas (inter-organizational exchange relationships and reciprocity) into account regarding coordination of behavior, the following research questions are addressed: Which reciprocity types can be causal conditions in different dyadic, inter-organizational exchange relationship stages? Which reciprocity types as a condition lead to which inter-organizational exchange relationship as an outcome?

To answer the research questions, a crisp qualitative comparative analysis (QCA) following Ragin is conducted because QCA as a set-theoretic approach regards empirical cases as outcomes and (combinations of) conditions that lead to an outcome in order to examine the relationship between an outcome and the possible causal conditions. Implementing a set-theoretic approach allows for analyzing a large amount of qualitative data. In doing so, QCA is a way to combine quantitative, variable-oriented elements with qualitative, case-oriented elements. By using this approach, diversity-orientated research is enabled. QCA offers the advantage of finding different combinations of causal conditions.

By answering the research questions, it is expected that the understanding of reciprocal behavior in specific exchange contexts may help in sharpening the concept of trust. Since trust can be a determining aspect of long-term relationships which advantage partners to be sustainable competitive, the understanding of reciprocity can possibly help to coordinate consciously established (long-term) relationships. Furthermore, a theoretical and empirical justification of the special value of reciprocity, for a specific exchange context is expected. It can be assumed that the study contributes to the theoretical concept being empirically relevant and thus it is expected that practitioners can act according to the results in managing their inter-organizational relationships.

The paper is organized as follows: Firstly, reciprocity-based trust is viewed according to the potential of coordinating dyadic, inter-organizational exchange relationships. Reciprocity as a basis for trust is discussed and different types of reciprocity besides different stages of inter-organizational relationships are analyzed. Secondly, the method and the used materials are introduced and explained. Subsequently, the results of the QCA are presented and discussed showing limitations, contributions and possibilities for future research.

2. Coordinating Behavior in Inter-Organizational Exchange Relations by Reciprocity-Based Trust

So as to operate sustainably in the market, organizations depend on certain resources. Access to these resources is crucial for organizations since they represent a sustainable competitive advantage. One way to obtain resources that cannot be produced by the organization itself is to engage

inter-organizational exchange relationships [20]. The actors involved agree to coordinate their behavior by entering into an inter-organizational exchange relationship and therefore coordinated behavior leads to a restriction of one's own behavior. In addition, by entering into an inter-organizational exchange relationship, the future of one's own organization depends on the future of the partner organization. Thus, inter-organizational relationships and coordinated behavior can be risky if the partner forgoes the sustainable, long-term nature of a relationship in favor of short-term benefits [21]. To reduce such opportunistic behavior trust can be seen as a coordination mechanism [5,22] (in addition to market mechanism [5] and hierarchical governance [5,23]). Relationships can be largely sustainable when the relationship is based on trust because these relationships are established over a long period of time with the expectation of continuity [1]. As a consequence trust is a connection to relationships in business [24]. Furthermore, trust can be seen as basic component of social processes [25,26], which is based on reciprocal behavior [22]. Since trust is often seen as a crucial condition for establishing organizations [27] this view is transferable to exchange relationships between two organizations. Trust not only facilitates processes within an organization but also the functioning of relationships outside the organizations' own borders. Trust in an inter-organizational context enables and facilitates the implementation of long-term (an in this sense sustainable) exchange relationships between two organizations [27]. Since long-term, sustainable relationships are characterized by a certain stability, trust can be seen as promoting stability in this context. This stability allows the actors involved to assess the behavior of the partner through experience and makes the behavior to a certain extent predictable [28]. Mutual expectations indicate reciprocal behavior. Understanding reciprocity as the basis of trust is important for understanding trust itself. An action creates reciprocal expectations in the counterpart or in a group that is involved in some way. These reciprocal expectations can influence the behavior of the actors involved. Thus, reciprocity can be an opportunity to coordinate behavior and thereby produce trust.

Reciprocity in general is a theoretical concept that formulates exchange-theoretical considerations. The underlying motive of individual action is the maximization of rewards as well as the minimization of costs. Thus, reciprocal relationships seek to balance costs and benefits [11,13,29]. Many different reciprocity types are mentioned in the literature [16], which can subsequently be grouped into three basic types [15,16]: (positive) direct, (positive) indirect and negative. Direct reciprocity is the basic principle of positive, immediate exchange of equivalent values between two actors. By giving the first gift, a concrete expectation arises from the other actor [25,30]. Indirect reciprocity is the basic principle of positive, indefinite future exchange of non-equivalent values in an exchange network [17,31]. The first gift creates vague expectations [32]. Negative reciprocity indicates a negative, one-way exchange of values. There is no equivalent gift in return and values only go in one direction to an actor and the counterpart does not receive anything in return [19,33].

Inter-organizational exchange relationships can be viewed in a life circle through which the relationship goes through different stages [18,34,35]. Thereby three main phases can be distinguished: formation of a relationship, established relationships and broken relationships.

In the formation stage, the actors involved approach and express an interest of forming a long-term and thus sustainable inter-organizational exchange relationship. Initially, irregular exchanges take place. In this phase, commitment is negotiated. The relationship is initiated [18]. If the inter-organizational exchange relationship reaches an established stage, regular exchanges and cooperation takes place. Established inter-organizational exchange relationships represent a sustainable form of relationship between organizations. Exchanges within the relationship are established over a longer period of time. Relationships with long-term orientation and thus, with the expectation of continuity and future interactions aim to maximize profits over a period of time. The long-term orientation of a relationship is determined by the extent to which the partners trust each other [36]. During this phase, the relationship, as an alliance, can grow [18,35,37]. In the stage in which relationships are broken, actors are involved in conflicts thus, exchanges do not occur anymore [18]. Regardless of how long the relationship has lasted, the exchange relationship broke.

It can be assumed, since there are different stages of inter-organizational exchange relationships, that different reciprocity types become effective as coordinating mechanism in the different stages of exchange relationships. It is expected that direct reciprocal behavior is important in the forming process of an inter-organizational exchange relationship, since directly exchanging gifts and benefits promote the initiation of a relationship. Furthermore, it is expected that indirect reciprocal behavior establishes an inter-organizational relationship. Actors in an inter-organizational relationship have known each other for some time, work together constantly and can adjust their expectations according to their experience with the exchange partner. Finally, negative reciprocity is expected to lead to a breakup of the relationship, since the failure to return a previously given gift is considered to be uncooperative.

3. Qualitative Comparative Analysis—Research Method

To address the research gap and thus answering the research question, a crisp-set Qualitative Comparative Analyses (QCA) is conducted [38]. QCA, as a method that combines qualitative and quantitative logic, helps to answer the research question since a high number of qualitative data can be analyzed by implementing a set theoretic approach. QCA, developed by Charles C. Ragin, as a diversity-orientated research combines quantitative, variable-oriented elements with qualitative case-oriented elements and is based on set theory. The qualitative cases are considered as combinations that are specified by their characteristic values. The basis of QCA is built upon qualitative data that is iteratively analyzed. Data is examined regarding its membership in sets so the considered outcome can be explained as the event of different combinations of conditions. The goal of a QCA is to extract the conditions that are necessary and/or sufficient for an outcome. A necessary condition (X) occurs in each case in which the outcome (Y) is present, but the condition does not have to result in the outcome (see Figure 1a). A sufficient condition (X) leads to the outcome (Y) for every present case but it is not important whether the outcome can occur without the condition (see Figure 1b).

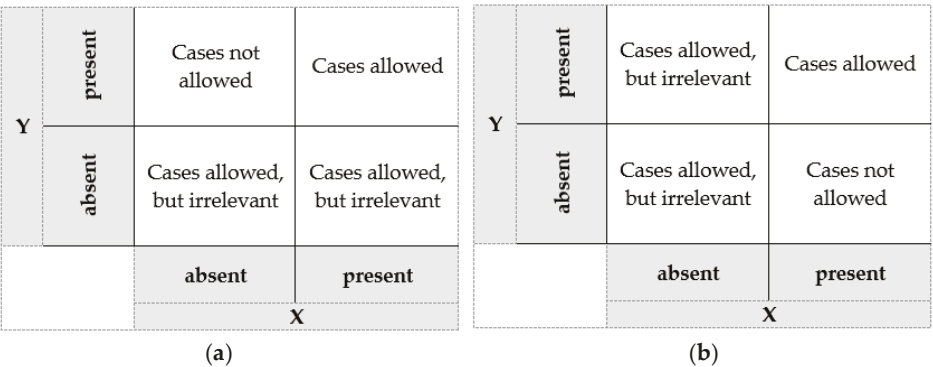


Figure 1. A 2 × 2 table for: (a) necessary conditions and (b) sufficient conditions [39].

In set theory, conditions and outcomes are seen as subsets and supersets. Regarding cases with necessary conditions, the outcome (Y) is a subset of the condition (X). Whenever Y is present, X is present, too (see Figure 2a). Regarding cases with sufficient conditions, the outcome (Y) is a superset of the condition (X). Whenever X is present, Y is present as well (see Figure 2b).

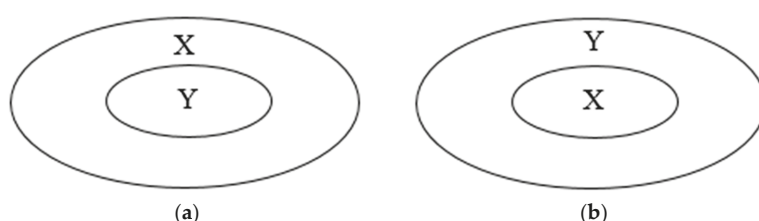


Figure 2. Venn diagram for: (a) necessary conditions and (b) sufficient conditions [39].

QCA is based on Boolean algebra, which is an approach allowing maximum causal complexity to avoid assuming in a simplifying manner about cases from the outset. The case-oriented approach addresses different causal combinations, which are relevant to outcomes and thus cases relative to different causal paths can be investigated [40]. Analyzing cases, conditions can be present/true (1) or absent/false (0). The data is represented as a truth table (as raw matrix), providing information about the absence and presence of outcomes and conditions. With that information, the data can be sorted into the different combinations. Thus, the different combinations of conditions and their corresponding outcome are summarized in the truth table [40]. By using the set theoretic approach shown, the reciprocity types (as conditions) can be combined with the inter-organizational exchange relationship context (as outcome). Thus, possible conditions are: direct reciprocity, indirect reciprocity, negative reciprocity. Investigated outcomes are: formation of inter-organizational exchange relationships, established inter-organizational exchange relationships, broken inter-organizational exchange relationships.

The data collection contains qualitative, semi-structured interviews with 78 enterprises (small-, medium- and large-sized organizations) from Germany and Austria. In the context of qualitative survey methods, this number is quite large. The number of interviews was chosen in order to cover the diverse and heterogenic business landscape. The 78 qualitative semi-structured interviews with responsible persons from each organization were analyzed in terms of reciprocity type and inter-organizational exchange relationship in which the reciprocal behavior occurs. The focus of the exchange context was on dyadic relationships.

Since the basis of a QCA is a truth table, the analyzed cases were then transferred into such a table. For each exchange context (formation, established, broken), as the outcome mentioned in the interviews one truth table was generated (see Appendix A: Table A1 for formation of inter-organizational exchange relationships, Table A2 for established inter-organizational exchange relationships, Table A3 for broken inter-organizational exchange relationships). The presence, or absence of the outcome and the conditions for each of the 78 cases was listed with “1” respectively “0”. Thus, the reciprocity types as conditions were linked to the exchange context as an outcome. Subsequently the three truth tables were analyzed regarding the combination of conditions that lead to the outcome. Each combination that led to an outcome was recorded as a Boolean expression (see Section 4). Thus, necessary and sufficient conditions for each outcome could be analyzed using *fsqca software* [41]. By analyzing necessary and sufficient conditions for an outcome, statements about the relevance of a condition for an outcome can be made.

4. Identifying Conditions for Inter-Organizational Exchange Relationships—Research Results

Since QCA is based on a truth table, the following section shows the three different truth tables transferred in this study. Each inter-organizational exchange relationship (formation, established, broken) is shown as one outcome of the different conditions combined (direct reciprocity, indirect reciprocity, negative reciprocity).

4.1. Truth Tables

The truth table below (Table 1) represents the empirical cases for the outcome formation of an inter-organizational exchange relationship. Conditions of this outcome can be: direct reciprocity, indirect reciprocity and negative reciprocity.

As shown in Table 1, there are three combinations of conditions that lead to the outcome (in the sense of the Quine McClusky algorithm):

$$Abc + aBc + ABC \rightarrow \text{Outcome (Y)}$$

A/B/C represent the conditions that are present. a/b/c represent the conditions that are absent. '+' is a Boolean operator for logical "or".

Table 1. Combination of condition for the outcome "formation" shown in the empirical data.

Exchange Relationship	Conditions: Types of Reciprocity			Number of Instances
Y (formation)	A (direct)	B (indirect)	C (negative)	
1	1	0	0	8
1	0	1	0	6
1	1	1	0	4
0	0	0	0	60

"1" indicates the presence, "0" the absence of a condition/outcome.

The equation above represents for which combinations of conditions the outcome is present: If direct reciprocity is present and indirect and negative reciprocity are absent, the outcome is present (Abc). 8 empirical cases out of 78 show this combination. If indirect reciprocity is present and direct and negative reciprocity are absent, the outcome is present (aBc). 6 empirical cases out of 78 indicate this combination. If direct and indirect reciprocity are present and negative reciprocity is absent, the outcome is present (ABC). 4 empirical cases show this combination. If all conditions are absent (abc), the outcome is also absent.

The Quine McClusky algorithm above shows the possible combination of conditions for the outcome being present. Thus, the empirical data did not indicate some combinations. These logical remainders are as follows:

$$AbC + abC + aBc + ABC + abc \rightarrow \text{Outcome (Y)}$$

In general, there are different causes for these logical remainders: (1) The combination does not appear in the empirical data and cannot logically appear. (2) The combination does not appear in the empirical data but could logically appear. (3) The combination appears empirically but was not recorded by the survey [42]. In the case of forming an inter-organizational exchange relationship, all combinations which have the condition *negative reciprocity* as being present (AbC, abC, aBc, ABC), are not logical as an outcome. In a theoretic logical sense, negative reciprocal behavior prevents the forming of a relationship because an unbalanced exchange does not show cooperative behavior. The combination direct reciprocity, indirect reciprocity and negative reciprocity being absent (abc) is a logical remainder because it cannot logically appear. If no reciprocal behavior is present, there is no exchange relationship, which cannot lead to the forming of a relationship.

Table 2 shows the truth table for the outcome *established inter-organizational exchange relationship*. Conditions for this outcome can be: direct reciprocity, indirect reciprocity and negative reciprocity.

Table 2. Combination of condition for the outcome “established” shown in the empirical data.

Exchange Relationship	Conditions: Types of Reciprocity			Number of Instances
Y (established)	A (direct)	B (indirect)	C (negative)	
1	1	0	0	27
1	0	1	0	24
1	1	1	0	17
1	1	1	1	2
0	0	0	0	8

“1” indicates the presence, “0” the absence of a condition/outcome.

Four combinations of conditions lead to this outcome (in the sense of the Quine McClusky algorithm):

$$Abc + aBc + ABc + ABC \rightarrow \text{Outcome (Y)}$$

Direct reciprocity being present while indirect and negative reciprocity are absent (Abc) lead to the outcome being present. 27 empirical cases out of 78 indicate this combination. The same applies for indirect reciprocity: indirect reciprocity being present while direct and negative reciprocity are absent (aBc) lead to the outcome being present. 24 empirical cases of 78 show this combination. If direct reciprocity and indirect reciprocity are present, while negative reciprocity is absent, the outcome is present (ABc). 17 empirical cases of 78 show this combination. All three conditions (direct, indirect and negative reciprocity) being present can lead to this outcome as well (ABC). In 2 out of 78 empirical cases, that combination of conditions was identified. If all conditions are absent (abc), the outcome is absent as well, which was identified in 8 empirical cases.

The logical remainders for the above shown outcome of established exchange relations are as follows:

$$abc + abC + AbC + aBC \rightarrow \text{Outcome (Y)}$$

Combinations with neither direct nor indirect reciprocity being present (abc, abC) cannot be a logical outcome for *established exchange relationship*. It can be assumed that some kind of positive reciprocal behavior is needed in established exchange relationships for them to be permanent. Negative reciprocity being present while direct or indirect reciprocity are present (AbC, aBC) could logically appear but does not appear in the empirical data.

Table 3 shows the truth table for the outcome *broken inter-organizational exchange relationship*. Analyzed conditions for this outcome are: direct reciprocity, indirect reciprocity and negative reciprocity.

Table 3. Combination of condition for the outcome “broken” shown in the empirical data.

Exchange Relationship	Conditions: Types of Reciprocity			Number of Instances
Y (broken)	A (direct)	B (indirect)	C (negative)	
1	0	0	1	57
1	1	0	1	3
0	0	0	0	18

“1” indicates the presence, “0” the absence of a condition/outcome.

Two combinations of conditions lead to this outcome (in the sense of the Quine McClusky algorithm):

$$abC + AbC \rightarrow \text{Outcome (Y)}$$

If direct and indirect reciprocity are absent and negative reciprocity is present, the outcome is present (abC). 57 empirical cases out of 78 show this combination. Direct reciprocity being present while negative reciprocity is present and indirect reciprocity is absent leads to this outcome as well (AbC). In 3 out of 78 empirical cases this combination of conditions was identified. If all conditions are absent (abc), the outcome is absent, too.

The logical remainders for the outcome *broken inter-organizational exchange relationship* are as follows:

$$Abc + ABC + aBC + aBc + abc + ABc \rightarrow \text{Outcome (Y)}$$

All combinations with negative reciprocity not being present (Abc, aBc, abc, ABc) cannot appear logically, since negative reciprocal behavior is needed for the breakup of a relation. For the left logical remainders, which are combinations with indirect reciprocity being present (ABC, aBC), it is not possible to appear in a logical sense. Indirect reciprocal behavior that is established over a time period contradicts the breakup of a relationship regarding the time aspect.

4.2. Analysis of Conditions

As shown in Section 3, the focus of the QCA is on the analysis of necessary and sufficient conditions that lead to an outcome. If a condition occurs in each empirical case in which the outcome is present, this condition is necessary. It is not permitted for necessary conditions that the outcome is present without the condition being present. Otherwise, the condition does not have to result in the outcome. A condition is sufficient if it leads to the outcome for every present case. If the condition is present but does not result in the outcome it cannot be sufficient [42].

The following sections show the analysis of the conditions for each inter-organizational exchange context.

4.2.1. Conditions for Outcome Formation of an Inter-Organizational Exchange Relationship

Direct, indirect and negative reciprocity (A, B, C) are not necessary conditions for the outcome since the outcome is present when A or B or C are absent. Direct or indirect reciprocity (A, B) are sufficient conditions for the formation process of an inter-organizational exchange relationship. If A and/or B occur the outcome is present. The results of the analyses with *fsqca* [41] emphasize the first analysis of the truth table:

The subset/superset analysis shown in Table 4 provides scores of consistency and coverage for (combinations of) conditions. Consistency and coverage of a condition provide a way to examine whether a condition is sufficient.

Table 4. Subset/superset analysis for outcome formation (Consistency indicates how many empirical cases are correctly described by the (combinations) of conditions. Coverage measures the degree to which an outcome is covered (or explained) by each (combination) of condition.).

	Consistency	Raw Coverage
direct * indirect * ~negative (Abc)	1.000000	0.210526
Indirect * ~negative (Bc)	1.000000	0.526316
direct * ~negative (Ac)	1.000000	0.631579
direct * indirect (AB)	1.000000	0.210526
~negative (c)	0.243590	1.000000
indirect (B)	1.000000	0.526316
direct (A)	1.000000	0.631579

* is logically for 'and', ~stands for 'absent'.

The value of 1.0 regarding consistency indicates that all empirical cases are correctly described by the condition A or B (direct or indirect reciprocity). The conditions are each a subset to the outcome (formation of inter-organizational exchange relationship) since whenever the outcome is present, the conditions A or B are also present and thus direct respectively indirect reciprocity are sufficient conditions for the outcome (se Figure 2b). The coverage shows the empirical relevance, what means the extent to which the findings are valid to the empirical data. Direct reciprocity (A) has a coverage value of 0.631579. Hence, 63% of the empirical data can be explained by that condition consistently with the truth table. Summarized, the data are consistent with the argument that the outcome is a superset of A

(direct reciprocity which is according to this a subset of the outcome) and its coverage of the outcome is 63%. That is, the condition A accounts for 63% of the sum of the membership in the outcome and thus A is a sufficient condition for the outcome. The empirical data are also consistent with the argument that B (indirect reciprocity) is a sufficient condition for the outcome. Indirect reciprocity (B) with a coverage value of 0.526316 explains 53% of the outcome in the empirical data. That is, the condition B accounts for 53% of the sum of the membership in the outcome indicating that the outcome is a superset of B, respectively B is a subset of the outcome (see Figure 2b). The combination of A or B present (A + B) is a necessary condition for the outcome, this means that the outcome is a subset of the combination of the conditions. The truth table shows that it is necessary that either direct or indirect reciprocity are present for the outcome being present meaning that there is no empirical case with the outcome present without A or B being present. In 100% of the empirical cases negative reciprocity (C) was absent while the outcome was present. Thus, empirical data do not indicate negative reciprocity as a condition for the formation of inter-organizational exchange relationships.

4.2.2. Conditions for Outcome Established Inter-Organizational Exchange Relationship

The conditions A, B and C are not necessary for the outcome *established inter-organizational exchange relationship*. The outcome is present even if A or B or C are absent. A (direct reciprocity) and B (indirect reciprocity) are sufficient conditions for established inter-organizational exchange relationships. When A and/or B are present, the outcome is present as well. Table 5 shows the results of *fsqca*:

Table 5. Subset/superset analysis for outcome established.

	Consistency	Raw Coverage
direct * indirect * negative (ABC)	1.000000	0.028571
indirect * negative (BC)	1.000000	0.028571
direct * negative (AC)	1.000000	0.028571
direct * indirect (AB)	1.000000	0.271429
indirect (B)	1.000000	0.614286
negative (C)	1.000000	0.028571
direct (A)	1.000000	0.657143

* is logically for 'and'.

Regarding consistency, the value of 1.0 indicates that all empirical cases in the truth table are correctly described by the conditions A or B (direct or indirect reciprocity). The conditions are each a subset to the outcome (established inter-organizational exchange relationship) and thus sufficient conditions for the outcome meaning that whenever the outcome is present, the conditions A or B are present as well (see Figure 2b). The extent to which condition A (direct reciprocity) is valid to the empirical data is indicated by the coverage value of 0.657143. Condition A accounts for 66% of the sum of the membership in the outcome indicating that A is a subset of the outcome (see Figure 2b). Hence, 66% of the empirical data are described as consistent in the truth table. Summarized, the data are consistent with the argument that the outcome is a superset and thus, condition A is a sufficient condition for the outcome. Moreover, the empirical data are also consistent with the argument that condition B (indirect reciprocity) is a sufficient condition for the outcome and thus a subset of the outcome (see Figure 2b). Indirect reciprocity (condition B) with a coverage value of 0.614286 explains 61% of the outcome in the empirical data. B (as a subset) accounts for 61% of the sum of the membership in the outcome. Thus, condition B is a sufficient condition for the outcome. Negative reciprocity was barely found in the empirical data.

4.2.3. Conditions for Outcome Broken Inter-Organizational Exchange Relationship

The condition C (negative reciprocity) is a necessary condition for the outcome *broken inter-organizational exchange relationship*. For each case in which the outcome is present, condition

C is also present. In addition, condition C is sufficient for the outcome. Whenever C is present, the outcome is present. The conditions A and B are neither necessary nor sufficient for the outcome. Table 6 shows the results of *fsqca*:

Table 6. Subset/superset analysis for outcome broken.

	Consistency	Raw Coverage
direct * ~indirect * negative (AbC)	1.000000	0.050000
~indirect * negative (bC)	1.000000	1.000000
direct * ~indirect (Ab)	1.000000	0.050000
direct * negative (AC)	1.000000	0.050000
~indirect (b)	0.769231	1.000000
negative (C)	1.000000	1.000000
direct (A)	1.000000	0.050000

* is logically for 'and', ~stands for 'absent'.

Regarding consistency, the value of 1.0 indicates that all empirical cases in the truth table are correctly described by the condition (negative reciprocity). Condition C is a superset of the outcome (broken inter-organizational exchange relationship) and thus a necessary condition for the outcome (see Figure 2a). Condition C has a consistency value of 1.0 which means it accounts for 100% of the sum of the membership in the outcome. Hence, 100% of the empirical data is described as consistent in the truth table which indicates that the data are consistent with the argument that the outcome is a subset of the condition and thus condition C is a necessary condition for the outcome. There is no empirical case with the condition present without the outcome being present. Moreover, C is a sufficient condition for the outcome: C leads to the outcome for every present case. Direct reciprocity was barely found in the empirical data.

5. Discussion and Conclusions

The results show that direct (A) and indirect (B) reciprocity are sufficient but not necessary conditions for the outcomes *formation of an inter-organizational exchange relationship* and *established inter-organizational exchange relationship*. Negative reciprocity (C) is a necessary and sufficient condition for the outcome *broken inter-organizational exchange relationship*.

Analyzing the results for inter-organizational exchange relationships that are in a formation process, it becomes clear that, since direct reciprocity is a sufficient condition for the formation of an inter-organizational exchange relationship, as expected, direct reciprocal behavior helps in forming a relationship between two organizations. Surprisingly, indirect reciprocal behavior also contributes to the formation process of a relationship. In summary, direct reciprocity, indirect reciprocity or a combination of both (A + B) is needed to form an inter-organizational exchange relationship. For organizations, it is therefore important that reciprocal action in form of an exchange takes place, regardless of whether it takes place at the same time (direct reciprocity) or with a time delay (indirect reciprocity) [17]. Furthermore, equivalence of gifts does not play a big role in the forming process of a relationship. It is rather fundamental that someday consideration is provided, in any form, in order to build a sustainable long-term relationship between the two actors [31]. The results also show that negative reciprocal behavior is not suitable to form a relationship. Since negative reciprocity means a one-way exchange in favor of one actor [19], this type of reciprocity has no meaning in forming relationships. Empirical data shows that relationships are not formed without direct or indirect reciprocal behavior: all empirical cases with formation of relationships as outcome being present have as conditions direct and/or indirect reciprocal behavior. This emphasizes the relevance of these two reciprocity types in this stage of a relationship.

The situation is similar for established inter-organizational exchange relationships. Direct and/or indirect reciprocal behavior (being sufficient conditions) help established relationships to function. In

established relationships, however, negative reciprocity tends to be overlooked. It can be assumed that long-term relationships are not broken up due to one-off negative behavior. Especially in established relationships, indirect reciprocal behavior becomes effective. Actors who are involved in a long-term relationship have known each other for a certain period of time and can therefore anticipate the behavior of the other actor. Their experience allows them to assess if their expectations are met. The empirical data shows no case of established inter-organizational exchange relationships without the conditions direct and/or indirect reciprocity. Again, this underlines the relevance of these two reciprocity types in this stage of a relationship.

Negative reciprocal behavior leads, in all empirical cases, to a broken inter-organizational exchange relationship. In an economic exchange context, negative behavior is punished [33]. Since organizations must act in the sense of their economic efficiency, they would be damaged by negative reciprocal behavior of the other actor. Since this behavior is incompatible with a cooperative attitude, in which an exchange relationship was entered, this leads to the break-up of the relationship.

Regarding the emergence of trust in an inter-organizational context, indirect reciprocity is of particular importance [32]. In the sense of indirect reciprocity, an actor acts in advance without knowing whether there will be a return. This act can be considered trustworthy by the other actor and thus paves the way for a long-term and thus sustainable (established) relationship this gives the partners sustainable competitive advantages. In addition, direct reciprocal behavior is crucial to build trust. If expectations are adhered to immediately and a balance is established in the exchange relationship, this serves as the basis for the behavioral assessment of the counterpart.

Empirical data also shows that organizations tend to pursue long-term relationships. Transforming single exchanges into a long-term exchange relationship, they can be viewed as sustainable relationships for the organization [37]. According to the empirical data, transformation reciprocal behavior is needed for this to occur.

The study presented and its results contribute to research and practice: By examining reciprocity in an inter-organizational exchange context, it is possible to gain insight into the different reciprocity types in different stages of inter-organizational relationships. Taking into account that reciprocity can be seen as the basis of trust building [22], the knowledge generated contributes to the fundamental sharpening of the concept of trust. In addition, the article provides a theoretical and empirical justification for the particular relevance of reciprocity for forming, establishing and breaking up inter-organizational relationships and thus, for building trust between actors involved. The results also show that the theoretical concept is empirically relevant. Respondents from practice articulate the theoretical construct, suggesting its presence in their thinking. Furthermore, practitioners can use the knowledge generated in this study to consciously navigate a phase of a relationship and thus use it as a coordination mechanism in relationship management [3]. Since long-term (established) relationships have advantages regarding the sustainable competitiveness of an enterprise, managers can use the knowledge offered in this study to consciously coordinate their inter-organizational exchange relationship towards a long-term orientation in order to benefit from these advantages.

The article is subject to the following limitations: Because of the method used, other mechanisms that might be effective in a stage of a relationship have been hidden. This can be justified by the fact that specifically reciprocity was examined in regard to coordinating stages of a relationship and thus building trust. The focus on reciprocity was chosen in order to gain insights into reciprocal behavior in inter-organizational exchange context and related trust building. Although for this study a relatively high number of qualitative observations was used, compared to other approaches the empirical data is limited. In addition, empirical cases were not randomly sampled which limits the results of the study but a randomization is not required for the application of the method. The scope of the results is thus limited. The explanatory power is therefore limited to the context (p.ex. culture) of the cases investigated (especially with regard to heterogeneous cultural areas [27], the transferability of the results may be limited, since reciprocal behavior is embedded in a cultural framework).

Future research can build on the results: in further studies exchange relationships could be examined with regard to size differences. For example, it could be investigated whether relationships between different organization sizes are based on other reciprocity types. In addition, further research may deal with the sharpening of the concept of trust: the emergence of trust can be further explored based on the results from an exchange theory perspective. Moreover, future research can build on existing work regarding methodological approach [43,44] regarding measurement of reciprocity of (different types of) relationships in order to make the findings more generalizable by conducting statistical survey studies.

Conflicts of Interest: The author declares no conflicts of interest.

Appendix A

Table A1. Truth table of outcome “formation of relationship”. (The background colors highlight the presence of the different exchange relations and reciprocity types.)

Case	Exchange Relation	Reciprocity		
		A	B	C
	formation	direct	indirect	negative
A01	0	0	0	0
A02	0	0	0	0
A03	1	1	0	0
A04	0	0	0	0
A05	0	0	0	0
A06	0	0	0	0
A07	1	1	0	0
A08	0	0	0	0
A09	1	1	0	0
A10	0	0	0	0
A11	0	0	0	0
A12	0	0	0	0
A13	1	1	0	0
A14	1	0	1	0
A15	0	0	0	0
A16	0	0	0	0
A17	0	0	0	0
A18	0	0	0	0
A19	0	0	0	0
A20	0	0	0	0
A21	1	1	1	0
A22	0	0	0	0
A23	0	0	0	0
B01	0	0	0	0
B02	0	0	0	0
B03	0	0	0	0
B04	1	1	0	0
B05	0	0	0	0
B06	0	0	0	0
B07	0	0	0	0
B08	0	0	0	0
B09	0	0	0	0
B10	0	0	0	0
B11	0	0	0	0
B12	1	1	1	0
B13	0	0	0	0

Table A1. Cont.

Case	Exchange Relation	Reciprocity		
		A	B	C
	formation	direct	indirect	negative
C01	0	0	0	0
C02	0	0	0	0
C03	1	1	0	0
C04	0	0	0	0
C05	0	0	0	0
C06	0	0	0	0
C07	0	0	0	0
C08	0	0	0	0
C09	0	0	0	0
C10	0	0	0	0
C11	1	0	1	0
C12	0	0	0	0
C13	0	0	0	0
C14	0	0	0	0
C15	0	0	0	0
C16	1	0	1	0
D01	1	0	1	0
D02	0	0	0	0
D03	0	0	0	0
D04	0	0	0	0
D05	0	0	0	0
D06	1	0	1	0
D07	1	1	1	0
D08	1	1	0	0
D09	0	0	0	0
D10	1	1	0	0
D11	0	0	0	0
D12	0	0	0	0
D13	1	0	1	0
E01	0	0	0	0
E02	0	0	0	0
E03	0	0	0	0
E04	0	0	0	0
E05	1	1	1	0
E06	0	0	0	0
E07	0	0	0	0
E08	0	0	0	0
E09	0	0	0	0
E10	0	0	0	0
E11	0	0	0	0
E12	0	0	0	0
E13	0	0	0	0
	18	12	10	0

"1" indicates the presence, "0" the absence of a condition/outcome.

Table A2. Truth table of outcome “established relationship”. (The background colors highlight the presence of the different exchange relations and reciprocity types.)

Case	Exchange Relation	Reciprocity		
		A	B	C
	established	direct	indirect	negative
A01	0	0	0	0
A02	1	1	0	0
A03	1	0	1	0
A04	1	0	1	0
A05	0	0	0	0
A06	1	1	0	0
A07	0	0	0	0
A08	1	1	0	0
A09	1	1	1	1
A10	1	1	0	0
A11	1	1	0	0
A12	0	0	0	0
A13	1	1	0	0
A14	1	0	1	0
A15	0	0	0	0
A16	1	1	0	0
A17	1	0	1	0
A18	1	1	0	0
A19	1	0	1	0
A20	1	0	1	0
A21	1	1	1	0
A22	1	1	0	0
A23	1	1	0	0
B01	1	1	0	0
B02	1	1	1	0
B03	1	1	1	0
B04	1	1	1	0
B05	1	1	0	0
B06	0	0	0	0
B07	1	1	0	0
B08	1	0	1	0
B09	1	0	1	0
B10	1	0	1	0
B11	1	1	0	0
B12	1	1	1	0
B13	0	0	0	0
C01	1	1	0	0
C02	1	1	0	0
C03	1	1	0	0
C04	1	1	1	0
C05	1	0	1	0
C06	1	0	1	0
C07	1	1	0	0
C08	1	1	1	0
C09	1	1	1	0
C10	1	1	1	0
C11	1	1	1	0
C12	1	1	1	0
C13	1	0	1	0
C14	1	1	1	0
C15	1	1	0	0
C16	1	0	1	0

Table A2. Cont.

Case	Exchange Relation	Reciprocity		
		A	B	C
		established	direct	indirect
D01	1	0	1	0
D02	1	1	0	0
D03	1	0	1	0
D04	1	1	1	0
D05	1	1	1	0
D06	1	0	1	0
D07	1	1	1	1
D08	1	1	0	0
D09	0	0	0	0
D10	1	0	1	0
D11	1	1	0	0
D12	1	0	1	0
D13	1	1	1	0
E01	1	1	1	0
E02	1	1	0	0
E03	1	0	1	0
E04	1	0	1	0
E05	1	1	0	0
E06	1	1	0	0
E07	1	0	1	0
E08	1	0	1	0
E09	1	0	1	0
E10	1	0	1	0
E11	1	1	0	0
E12	1	1	1	0
E13	1	1	0	0
70		46	43	2

"1" indicates the presence, "0" the absence of a condition/outcome.

Table A3. Truth table of outcome "broken relationship". (The background colors highlight the presence of the different exchange relations and reciprocity types.)

Case	Exchange Relation	Reciprocity		
		A	B	C
		broken	direct	indirect
A01	1	0	0	1
A02	1	1	0	1
A03	1	0	0	1
A04	1	0	0	1
A05	1	0	0	1
A06	1	0	0	1
A07	1	1	0	1
A08	0	0	0	0
A09	1	0	0	1
A10	1	1	0	1
A11	1	0	0	1
A12	0	0	0	0
A13	1	0	0	1
A14	1	0	0	1
A15	0	0	0	0
A16	1	0	0	1
A17	1	0	0	1
A18	1	0	0	1
A19	1	0	0	1
A20	1	0	0	1

Table A3. Cont.

Case	Exchange Relation	Reciprocity		
		A	B	C
	broken	direct	indirect	negative
A21	1	0	0	1
A22	1	0	0	1
A23	0	0	0	0
B01	1	0	0	1
B02	1	0	0	1
B03	0	0	0	0
B04	1	0	0	1
B05	1	0	0	1
B06	1	0	0	1
B07	0	0	0	0
B08	1	0	0	1
B09	0	0	0	0
B10	0	0	0	0
B11	1	0	0	1
B12	1	0	0	1
B13	1	0	0	1
C01	1	0	0	1
C02	1	0	0	1
C03	1	0	0	1
C04	1	0	0	1
C05	1	0	0	1
C06	1	0	0	1
C07	0	0	0	0
C08	1	0	0	1
C09	1	0	0	1
C10	0	0	0	0
C11	1	0	0	1
C12	1	0	0	1
C13	1	0	0	1
C14	1	0	0	1
C15	1	0	0	1
C16	1	0	0	1
D01	1	0	0	1
D02	1	0	0	1
D03	1	0	0	1
D04	0	0	0	0
D05	1	0	0	1
D06	1	0	0	1
D07	1	0	0	1
D08	1	0	0	1
D09	1	0	0	1
D10	0	0	0	0
D11	1	0	0	1
D12	0	0	0	0
D13	1	0	0	1
E01	1	0	0	1
E02	1	0	0	1
E03	1	0	0	1
E04	1	0	0	1
E05	1	0	0	1
E06	0	0	0	0
E07	0	0	0	0
E08	0	0	0	0
E09	1	0	0	1
E10	0	0	0	0
E11	1	0	0	1
E12	1	0	0	1
E13	0	0	0	0
	60	3	0	60

"1" indicates the presence, "0" the absence of a condition/outcome.

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Article

How to Build Consumer Trust: Socially Responsible or Controversial Advertising

Katarzyna Bachnik ^{1,*} and Robert Nowacki ²¹ Hult International Business School, 1355 Sansome St, San Francisco, CA 94111, USA² Faculty of Management and Finance, University of Finance and Management, 55 Pawia St, 01-030 Warsaw, Poland; nowacki@vizja.pl

* Correspondence: katarzyna.bachnik@faculty.hult.edu; Tel.: +1-510-674-3055

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Abstract: Developing trust in a product, brand or company is a significant part of building a successful consumer-company relationship. Two-way communication is one of the main factors weighing on the level of consumer trust. Advertising as a communication tool that elicits lots of attention and emotions is a big part of the trust building process. Its character—whether socially responsible or controversial sets a tone for the communication and influences the receptiveness of the message. Companies undertake various efforts to make their messages more attractive to recipients and seek new ways to attract customers’ attention. Many companies experiment with unconventional and controversial advertising designs and tones, as it seems that there is some level of social acceptance for original, emotional and shocking marketing messages. This paper aims to analyze this level of the social acceptance in more detail. The study focuses on the following marketing dilemma: Should companies continue to use socially responsible advertising or should they adopt more controversial or even unethical strategies? The managers of 626 enterprises were interviewed to find out the answer. The research compares controversial advertising efforts with consumers’ evaluations of the messages to which they are exposed.

Keywords: consumer trust; CSR; advertising; ethical advertising; shockvertising; consumer behavior

1. Introduction

Trust has long been identified as a significant factor of consumer-company relationships [1–3]. Morgan and Hunt [4] define trust as confidence in the reliability and integrity of an exchange partner. Reliability and integrity are associated with consistency, competency, honesty, fairness, responsibility, helpfulness and benevolence. This value-based approach is supplemented with Rousseau et al.’s psychological view of the importance of human interactions [5]. They believe that trust is about the intention to accept vulnerability, based on positive expectations of the intentions or behaviors of another. Trust has been regarded as a critical predictor for positive outcomes of marketing and branding such as loyalty, consumer retention, and purchase intention [6–9]. If we assume that trust is not given, but is earned, then how consumers develop trust becomes a vital concern for brands and companies.

Taking into account various studies on trust, we may conclude that a broad interplay exists between the level of trust and consumer behavior. Trust affects consumers’ perceptions with regard to values and information sources [10,11], it impacts consumers’ choices [12,13], and enhances brand commitment and loyalty [6]. Marketers make efforts to explore ways in which they can build and enhance trusting relationships with customers. Advertising appeals seem to constitute one of the main tools for fostering consumer trust. Li and Miniard [14] underline the potential for advertising to enhance a product’s perceived trustworthiness. Breaking this trust can also threaten the consumer-company relationship [15]. Alcaniz et al. [16] found that trustworthiness played a

mediating role in influencing consumers' opinions of a company's motives in their CSR (Corporate Social Responsibility) efforts, including ethical advertising.

The study focuses on the following marketing dilemma: Should companies continue to use socially responsible advertising or should they adopt more controversial or even unethical strategies? The answer to that research question fuels the discussion around trust building and successful relationship building processes in the light of values. It takes on the debate on whether companies should build ethical alliance with their stakeholders by addressing the right values and aligning with approved norms or whether they achieve higher awareness ratios by propagating controversial messages. As such this study has implications for theory and practice. First, it enriches the body of knowledge on trust in advertising, which, as Soh, Reid, King [17,18] argue, is still insufficient. Second, it provides useful references for companies to allocate their advertising budgets more effectively.

2. Background and Conceptual Framework

2.1. Advertising in the Modern World

Advertising has become a major element of the socioeconomic development of companies. It is one of the key strategic management tools which support the formation of a competitive position [19]. The continuous growth of advertising expenditures, at around 4–5% annually, proves its growing importance [20,21]. The increase in advertising expenditures may reflect the increased awareness of managers regarding the use of advertising as part of marketing strategies. When market competition is more intense, it becomes more important that the company is flexible and skillful at applying various tools to improve its competitiveness. As managers become more knowledgeable in this respect, they appear to reconsider their marketing strategies and the role of advertising.

We can see now that perceptions of advertising styles are shifting. Organizations have intensified their efforts to use more controversial and shocking elements, often walking a fine line between legal and illegal and teetering on the brink of unwritten yet commonly accepted ethical rules [22–28]. This trend raises the question of the extent to which these elements conflict with the ideals of CSR and trust building. The more a company commits to be perceived as responsible in terms of social involvement and environmental footprint, the more important it becomes how the ethics of its marketing activities is evaluated and the greater chances it will be perceived as trustworthy. Therefore, it seems worthwhile to study why enterprises care about the CSR concept, how it relates to advertising, and how customers perceive these actions [29].

2.2. Framing Corporate Social Responsibility

CSR is frequently discussed today, partly because the public demands that companies take responsibility for their actions and malpractices and partly because companies realize they need to manage their obligations to various groups of stakeholders more consciously and rigorously [30–39]. Furthermore, enterprises are getting more evidence that involvement in CSR initiatives may result in measurable and tangible benefits [40–42]. Companies experiment with different approaches and design different strategies to obtain the highest ROI (Return on Investment) from their CSR projects (in terms of cost savings, enhanced reputation, winning new business partners and retaining loyal customers). Although the motives to take responsible actions may vary and depend on a company's specific situation [43–45], the general idea remains the same.

Porter and Kramer's idea of shared value is another argument for taking CSR seriously and understanding it in business terms [46]. Their concept provides common ground for benchmarking companies, as it explains the logic that should support CSR-driven actions. According to them, "the concept of shared value can be defined as policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates. Shared value creation focuses on identifying and expanding the

connections between societal and economic progress” [46] (p. 6). The application of the idea is broad and not limited to any industry [47–50].

One benefit that a company may derive from CSR involvement is a reputational gain [51–54]. Although some certification systems (like ISO norms) do exist, to objectively confirm that an organization complies with certain standards, its activities are also evaluated by customers at particular elements of its value chain. If a company approaches CSR strategically and maintains focus on customers as its primary group of stakeholders, it may expect benefits in the form of a superior environmental and social reputation. In effect, the company may find it easier to target more socially- or environmentally-conscious market segments, and its CSR involvement will be perceived as value added to its offering, not to mention strengthening the image of being trustworthy [55]. If customers are sensitive to CSR ideals, then their relationship with a CSR-oriented company may strengthen. However, for this process to work, customers’ awareness of CSR activities must be improved. Research shows that in some markets, customers already prefer to make purchasing decisions based on self-professed personal, social, and environmental values, which may mean that they will exert pressure on companies to offer suitable products and services [56].

2.3. *How Advertising Fits into CSR*

According to Carroll, CSR involves the society’s expectations of business which take the form of economic, legal, ethical and philanthropic responsibilities [57,58]. Other dimensions of corporate performance are presented by Sethi [59,60] and Frederick [61]. CSR plays an important role in marketing activities. First, it relates back to the primary stakeholders—the members of society: Customers, and many researchers integrate the concept of stakeholders in CSR [62–64]. Second, we can view CSR as a continuous process of accommodating corporate behavior to society’s expectations—preferences and needs—as they evolve over time [65]. From marketers’ perspectives, the preferences and needs may translate (to varying degrees) into product choices and purchasing decisions as well as into brand stickiness and product life cycles. CSR also heavily influences marketing communications such as advertising, mainly due to two functions of marketing which relate to perception and motivation.

As an element of integrated marketing communication, we can define advertising as any paid and impersonal form of presenting and promoting goods, services or ideas by a definite sender [66] (p. 18), [67] (p. 9). The definition of the American Marketing Association underlines two main aspects of advertising. The first is connected to the informative function, and the second relates to the function of sales promotion [68,69]. These functions are linked to two key cognitive processes related to the effects of advertising: perception and motivation. In the marketing sense, perception relates to the cognitive processes which control the continuous exchange of information between an individual and their environment and which help the individual navigate in the surrounding world [70]. By contrast, motivation can be understood as a driving force that induces the individual to undertake specific actions to satisfy their needs [71].

Advertising plays the role of an information carrier for the two cognitive processes [72]. It provides consumers with knowledge regarding their needs and how to satisfy them, and it may potentially trigger rational, emotional or moral motivation. In this sense, advertising affects consumers’ behavior and decisions [73–75]. If we assume that today’s customers pay more attention to the CSR dimension of corporate operations and that a company’s involvement in CSR initiatives may result in purchasing decisions, then marketing communications should also reflect these assumptions. This puts the trend toward more controversial advertising in a new light.

2.4. *Developing Hypotheses: When Controversy Enters Advertising*

Advertising competition is intensifying, as evidenced by increased advertising expenses, increasing number of advertising messages, and stronger organizational focus on more attractive messages. Companies seek new ways of reaching their customers, including experimenting with

unconventional and controversial elements. Day [76] observed that advertising, in general, is evaluated by norms and becomes shocking when it breaches those norms. This trend is especially visible with regard to product advertisements in saturated and non-transparent markets. Many of these efforts prove successful, as we can observe a change in customer preferences about the nature of advertising messages. Attention-catching, intriguing, original messages based on emotions are often controversial and raise ethical issues, even though they might be effective [77]. In this context, companies seem to face a dilemma between ethical, socially responsible advertising and unethical, controversial advertising. Depending on customer perceptions, the concept of controversial advertising may align rather with the concept of distrust defined as a belief that a person's values or motives will lead them to approach all situations in an unacceptable manner [78]. Distrust in this sense constitutes an opposing construct to trust.

Based on the analysis of literature concerning controversial and ethical advertising [79–92] in the paper, we define socially responsible advertising as marketing activities which do not arouse negative emotions and do not breach ethical values or ideals shared by customers. The notion of socially responsible advertising comprises a set of standards and rules of conduct adopted in the advertising industry and it refers to relationships between an enterprise and its customers, partners, employees and competitors affected by advertising activities [93,94]. Every successful relationship is built on a strong sense of trust [13]. According to Preston [95], advertising ethics (social responsibility) increases in importance when legal regulations prove insufficient. This set of ethics supplements the existing system of legal regulations as a result of market phenomena and social needs which are not legally regulated but instead stem from community-based, voluntary codes of conduct. In this context, we also assume that ethical advertising is linked with CSR values and reflects the desire for trust, transparency, honesty and respect for stakeholders.

Unethical advertising breaks the rules of law or conflicts with the interests of other entrepreneurs or consumers [96]. Many companies aspire to distinguish themselves by implementing elements of controversial advertising (so-called shockvertising). Shockvertising is defined as a phenomenon related to deliberately inducing feelings of fear or even offending the audience by violating social norms or personal ideals, in order to draw attention [82,83,86,92,97]. Belch and Belch [66] (p. 7) define the phenomenon of shockvertising as “a genre whose pivotal role is to elicit attention for a brand name by jolting consumers”. The three main elements of controversy or provocation in advertising are distinctiveness, ambiguity and transgression of norms and taboos [85]. Such a practice carries the risk of undermining customer trust in brand values and of creating confusion that may lead to brand abandonment. Shockvertising aims for gaps in the legal system that would allow the company to circumvent marketing regulations and to realize its goals of advertising by introducing controversial elements. The existing regulations were designed primarily to counteract unfair competition and stop inappropriate messages from being released in the mass media rather than to provide a solid framework for the promotion of goods and services. In the absence of precise formal guidelines, it is easy to undertake actions which violate ethical principles and cause mental discomfort on the part of recipients of advertisements.

The term “controversy” describes a divergence of opinions that entails a number of discussions and disputes, particularly on moral issues. In the field of advertising, controversy must be used with extreme caution, as it may generate both positive and negative effects in the reception of an advertised brand [79,90]. Although the use of shocking advertisements is a growing phenomenon, the findings regarding the effectiveness of such advertisements remain mixed [88]. Attempting to shock consumers may generate a high level of awareness, but may also result in a low level of acceptance or even a high level of disapproval [92]. We can compare the use of controversy with gossip or negative public relations, which some enterprises use to gain the audience's attention and greater publicity in line with the saying: “It doesn't matter what people say, as long as they're talking about you”. Controversial advertisements are also frequently perceived as exceptionally creative.

The scope of controversy in advertising is pervasive, but we can identify four main dimensions of presenting controversial inputs: Unethical contents or pictures, improper or misused media, advertising controversial products, and targeting a controversially defined market [81]. Controversies in advertising boil down to the presentation of messages in a surprising way with regard to their content and form. Such controversies may be triggered by [79,89,91,98–112]:

- Motives and associations referring to eroticism (characters who are above-average in physical attractiveness, nude images, explicitly showing or implying kisses or sexual intercourse, referring to homosexual acts, implying erotic meaning through symbols, humor or word-play).
- Images of well-known, controversial persons or celebrities presented in a controversial manner.
- Content which is shocking in terms of graphics or sound (drastic scenes, violence, cruelty, death or rape motives).
- Associations of a religious, racial or ethnic nature.
- Human figures presented in a way which implies or maintains negative stereotyping of specific social groups (women, men, children, or elderly people).
- Information whose accuracy is clearly doubtful (misleading advertising).
- Addressing children in a way which exploits their simple-mindedness and lack of market experience.

Recipients assess the ethics of advertisements against the above criteria. Violating any of them constitutes a basis to file a complaint. Research [113] has found, for example, that higher perceived trustworthiness of advertising among more religious people leads to less advertisement avoidance. It is argued that a positive relationship between religiousness and perceived advertisement trustworthiness stems from religious people's general conformity to authority and from religion's emphasis on the goodness of fellow human beings. In effect, providing a more controversial message might motivate consumers to opposition.

Authorities which uphold social responsibility in advertising follow a similar approach to examine complaints on messages arousing strong controversy. From the advertisers' standpoint, standards are defined to indicate what should be avoided in advertising to prevent the allegation of unethical advertising practices. However, some advertisers view this issue through a different lens: elements that enhance the noticeability and attractiveness of their advertisements allow them to gain an advantage over the competition and cause media hype which encourages interest in their advertising campaigns.

The development of advanced forms and techniques for influencing audiences, including digital tools, has enabled the spread of advertisements which make use of controversy in its four dimensions, which were discussed earlier. Today's technology enables advertisers to manipulate visual materials and obtain unrealistic images. Modifications alter all elements of the message, including the background and scenery, the characters, and the visualization of the product itself. Thus, it becomes easy to mislead consumers [114].

To assess advertising against the ideals of corporate social responsibility, one must consider many factors, including the demographic traits of recipients. The age of target consumers is particularly important [115]. Younger consumers are less sensitive to unethical activities; in fact, they encourage companies to apply controversial solutions and they are more susceptible to their influence. With age, experience and market knowledge, consumers become more critical of marketing practices which are legally or ethically questionable, and they become more immune to effects of such practices. Gender also influences the perception of advertising. Women attach more importance to ethics than men do [116].

One factor which determines if an advertisement complies with the norms of corporate social responsibility or brings up controversy is its social reception. People's perception of advertising messages is subjective and depends on a recipient's personality, situational circumstances of the release and reception of advertising content, and the influence of public opinion, among other factors. It also matters how much consumers are aware that they can take certain steps in response to advertising practices which raise controversy and social objection and whether they know about formal mechanisms which may regulate advertising activities. In fact, most countries possess a self-regulation system for advertising.

Interestingly, there are no certification processes for companies which attempt to comply with CSR rules. ISO 26000:2010 provides guidance on how organizations can operate in a socially responsible manner [117], but the standard is completely voluntary. Consequently, it is difficult to compare the CSR performance of various organizations whose strategies may differ considerably. In Poland, the Union of Associations Advertising Council established a self-regulation system which allows consumers to request an intervention and raise concerns regarding a particular advertisement. The Advertising Ethics Commission receives complaints submitted by various entities (in practice, however, most complaints are filed by individual recipients of advertisements) and adjudicates based on the provisions of the Code of Ethics for Advertising. The Code defines the standards for marketing communications.

The aim of the paper is to analyze the level of the social acceptance for unconventional and controversial advertising designs and tones since companies undertake various efforts to make their messages more attractive to recipients and seek new ways to attract customers' attention. To meet this objective, and on the basis of the above-mentioned considerations, the following research hypotheses have been proposed:

Hypotheses (H1). *The characteristics of the enterprises such as the sector of business activity, size, the scope of activity, the source of the capital and its market position impact the perception of the controversy in advertising.*

Hypotheses (H2). *The perception of controversy in advertising depends on the enterprises' awareness and respecting of the Code of Ethics in Advertising.*

Hypotheses (H3). *The increase in the awareness of social responsibility of advertising among enterprises results in the decrease of the number of cases of controversial advertising.*

Hypotheses (H4). *Enterprises using controversial motives in advertising justify this with the high effectiveness of their impact on the recipients.*

3. Materials and Methods

In this work, the authors used the materials from empirical research concerning the management of advertising activity in enterprises and desk research analyses of the scale of complaints related to controversial advertising filed in Poland.

The research into various aspects of management of advertising activity, including the issue of controversial advertising, its use and impact was conducted in 2014/2015 and covered a nationwide sample of 626 enterprises. The selection of the sample was conducted with the application of the stratified quota sampling, with the consideration of three basic criteria of stratification: the area of activity, the size measured by the number of employees, the origin of the capital and location of its main seat. In order to describe the examined population, the authors also used variables related to the scope of activity, the number of markets being serviced, the year of establishment, its market position, economic situation and monthly turnover.

The examined sample was dominated by the manufacturing companies (52.2%), of medium size (38.8%), most frequently engaged in a nationwide activity (33.2%). Most of them (68.5%) operated based on strictly Polish capital, declaring at least average market position (69.1%) and a good or very good economic situation (68.4%).

The research was conducted with the application of direct face-to-face interviews with managers of enterprises, on the basis of the questionnaire created by the authors. It included six statements concerning controversial advertising, which the managers evaluated on a 1–5 Likert scale, and they were also asked about the scope of the application of principles of Code of Ethics in Advertising by enterprises. In this case, the authors used a nominal scale containing three responses.

The analysis of findings has been conducted with the application of the IBM SPSS Statistics 24.0 package, with the use of descriptive statistics and the measurement of the correlation between variables (in the case of response variables based on the ordinal scales non-parametric Mann-Whitney U tests in the case of descriptive data including two independent groups and Kruskal-Wallis in the case

of dependent variables covering two independent groups, as well as χ^2 test in the case of dependent variables expressed in the form of a nominal scale) and their strength (V-Cramer test in the case of discovering a statistically significant correlation). The authors have analyzed the correlations between the responses concerning the controversies in advertising, the application of the principles of the Code of Ethics in Advertising and the characteristics of the examined enterprises.

The second trend of the research into analyses of the complaints filed in the years 2006–2015 with the Commission of Ethics of the Union of Associations Advertising Council, which is the body supervising the fulfilment of the ethical standards of advertising activity in Poland. On the basis of the data published by the Commission, they carried out the analysis of the number of the complaints filed and their differentiation with regard to the medium where the advertisements were broadcast.

4. Results

4.1. Organizational Perspective

In a 2014/2015 survey conducted among 626 entrepreneurs, most (63.7%) were convinced that the scale of controversial content in advertisements was steadily increasing (Table 1). This trend was more visible to companies with international operations (78.7%) than those operating on a local (61.4%) or regional (61.2%) scale and to organizations which claimed to have a strong market position (71.6% relative to 53.9% of companies with a weak market position).

Companies quoted many reasons to employ controversial, shocking and negative emotion-evoking themes in advertising. First, 67.1% of entrepreneurs were convinced that such messages were more highly visible. This belief seemed especially prevalent among international (73.6%) and regional (70.4%) entities. Moreover, a company's market position influenced the degree to which it used controversy in its advertisements (72.7% relative to 61.5% companies with weak positions). Second, entrepreneurs strongly believed that controversial themes facilitated recall of advertisements; 67.1% shared this belief. Third, half of the entrepreneurs (53.3%) believed that controversial elements aroused consumer interest in products or services. However, the geographical scope of operations or the strength of a company's market position did not affect this belief. Fourth, 65.9% of the respondents reported that controversial advertising allowed companies to differentiate themselves from their competitors. Again, the benefits of differentiation appeared to be more important for international enterprises and those holding a strong market position.

Regardless of the potential benefits, companies were uncertain of the degree to which recipients approved of such messages. Participants of the study subscribed to conflicting beliefs as to whether consumers accepted and even liked controversy in advertising. Only 38.6% were convinced that consumers liked this type of advertising, 35.9% could not decide, and 25.4% assumed that consumers disliked controversial and unethical advertising.

The analysis of the correlations between the identified factors and the characteristic features of the examined enterprises have shown interesting results (Table 2). Above all, the characteristic fact is that among the thirty possible cases (six of the analyzed enterprises' responses concerning controversies in advertising being dependent variables multiplied by five characteristics describing enterprises treated as independent variables) the correlation could be observed in two cases. The three independent variables: The sector of business activity, the size measured with the number of people employed and the source of the capital do not impact the perception of the importance of particular factors. Most frequently (in four cases) the opinions concerning the controversies in advertising are determined by the position of the enterprise on the market, and in two cases the correlation occurs with regard to the scope of their activity. In the case of these eight relations, the application of Kruskal-Wallis test has shown that the critical significance level does not exceed the threshold of $p = 0.05$. Thus, there are no grounds to reject the hypotheses concerning the existence of correlations between the dependent and independent variables.

Table 1. Opinions on the use of controversial advertisements expressed by entrepreneurs in Poland (%).

		Sector		Enterprise Size				Range of Operations				Capital Structure		Market Position				
		Production	Trade	Services	Up to 9 Employees	10 to 49 Employees	50 to 249 Employees	Over 249 Employees	Local	Regional	National	International	Polish	Foreign/Mixed	Weak	Average	Strong	
TOTAL	I strongly disagree	2.2	2.8	2.1	1.3	1.0	3.8	2.5	1.7	1.2	2.0	3.4	1.9	1.9	3.0	0.0	2.7	1.5
	I disagree	8.1	7.0	9.0	9.7	11.1	8.6	9.9	3.9	9.3	10.2	10.6	2.5	9.3	5.6	11.5	8.9	6.2
	Neutral	25.9	28.7	26.2	19.5	24.2	26.7	25.1	27.4	28.0	26.5	29.3	18.9	26.1	25.4	34.6	27.8	20.6
	I agree	44.9	43.1	43.4	50.0	45.5	47.6	43.2	45.3	45.3	45.9	40.4	49.7	44.5	45.7	46.2	43.8	46.9
	I strongly agree	18.8	18.3	19.3	19.5	18.2	13.3	19.3	21.8	16.1	15.3	16.3	27.0	18.2	20.3	7.7	16.7	24.7
Consumers are more likely to notice advertisements with controversial elements																		
	I strongly disagree	1.3	2.1	0.0	0.6	0.0	1.9	2.1	0.6	0.6	0.0	1.9	1.9	0.9	2.0	0.0	1.2	1.5
	I disagree	9.4	8.9	9.7	10.4	10.1	12.4	9.9	6.7	11.2	10.2	11.5	4.4	9.3	9.6	0.0	11.1	7.2
	Neutral	22.2	23.5	20.0	21.4	20.2	22.9	22.2	22.9	25.5	19.4	22.6	20.1	22.4	21.8	38.5	22.9	18.6
	I agree	47.0	43.4	55.9	46.1	48.5	49.5	44.4	48.0	45.3	58.2	42.3	47.8	47.6	45.7	50.0	48.0	44.3
	I strongly agree	20.1	22.0	14.5	21.4	21.2	13.3	21.4	21.8	17.4	12.2	21.6	25.8	19.8	20.8	11.5	16.7	28.4
Controversial elements make advertisements better memorable																		
	I strongly disagree	1.3	2.1	0.0	0.6	0.0	2.9	1.6	0.6	0.6	1.0	1.9	1.3	1.2	1.5	0.0	1.5	1.0
	I disagree	6.9	5.2	6.9	10.4	8.1	10.5	7.0	3.9	8.7	10.2	7.2	2.5	7.2	6.1	3.8	7.9	5.2
	Neutral	24.8	26.3	25.5	20.8	27.3	21.9	23.5	26.8	24.8	27.6	29.8	16.4	25.4	23.4	34.6	26.1	20.6
	I agree	43.0	39.8	46.2	46.8	36.4	46.7	46.1	40.2	46.0	42.9	36.1	49.1	42.2	44.7	50.0	41.9	44.3
	I strongly agree	24.1	26.6	21.4	21.4	28.3	18.1	21.8	28.5	19.9	18.4	25.0	30.8	24.0	24.4	11.5	22.7	28.9
Controversial methods of advertising are widely accepted and consumers are fond of them																		
	I strongly disagree	6.5	7.6	5.5	5.2	4.0	2.9	8.2	7.8	5.0	8.2	6.3	7.5	6.3	7.1	3.8	5.9	8.2
	I disagree	18.8	16.2	20.7	22.7	13.1	21.0	23.0	15.1	18.0	14.3	20.2	20.8	19.3	17.8	11.5	17.2	23.2
	Neutral	35.9	37.3	34.5	34.4	40.4	42.9	31.3	35.8	46.0	28.6	34.1	32.7	35.9	36.0	50.0	36.9	32.0
	I agree	30.8	29.4	33.1	31.8	38.4	27.6	28.8	31.3	27.3	39.8	31.3	28.3	31.9	28.4	30.8	32.0	28.4
	I strongly agree	7.8	9.5	6.2	5.8	4.0	5.7	8.6	10.1	3.7	9.2	8.2	10.7	6.5	10.7	3.8	7.9	8.2

Table 1. Cont.

Sector		Enterprise Size				Range of Operations			Capital Structure		Market Position						
TOTAL	Production	Trade	Services	Up to 9 Employees	10 to 49 Employees	50 to 249 Employees	Over 249 Employees	Local	Regional	National	International	Polish	Foreign/Mixed	Weak	Average	Strong	
	Controversial methods of advertising stimulate interest in products																
	I strongly disagree	2.1	2.1	2.8	1.3	3.0	1.9	2.5	1.1	2.5	2.0	1.0	3.1	2.3	1.5	0.0	2.0
	I disagree	13.6	12.5	13.1	16.2	13.1	17.1	14.0	11.2	18.0	13.3	14.4	8.2	13.5	13.7	11.5	16.0
	Neutral	30.8	33.9	26.2	28.6	25.3	37.1	27.2	35.2	30.4	32.7	28.8	32.7	30.8	31.0	30.8	31.5
I agree	44.1	40.7	49.0	46.8	51.5	39.0	45.7	40.8	42.9	43.9	45.2	44.0	44.1	44.2	50.0	43.3	
I strongly agree	9.4	10.7	9.0	7.1	7.1	4.8	10.7	11.7	6.2	8.2	10.6	11.9	9.3	9.6	7.7	7.1	
Controversial methods increase the prominence of advertisements																	
I strongly disagree	1.3	1.5	0.7	1.3	1.0	2.9	0.8	1.1	1.2	1.0	1.0	1.9	1.4	1.0	0.0	1.7	
I disagree	6.9	5.8	6.9	9.1	2.0	8.6	9.1	5.6	6.8	9.2	8.2	3.8	6.5	7.6	7.7	7.1	
Neutral	25.9	29.4	25.5	18.8	25.3	30.5	23.5	26.8	26.7	24.5	30.8	19.5	25.4	26.9	26.9	27.3	
I agree	48.2	44.6	54.5	50.0	56.6	45.7	44.4	50.3	49.1	49.0	43.3	53.5	47.6	49.7	57.7	47.3	
I strongly agree	17.7	18.7	12.4	20.8	15.2	12.4	22.2	16.2	16.1	16.3	16.8	21.4	19.1	14.7	7.7	16.5	

(Local—operating in 1–2 voivodeships, National—operating in the whole country). Source: Authors' own research, 2014/2015.

Table 2. Correlation between the opinions on the use of controversial advertisements expressed by entrepreneurs in Poland and characteristics of enterprises.

	In Recent Years, Controversy Has Been Present in Advertising More Frequently			Consumers Are More Likely to Notice Advertisements with Controversial Elements			Controversial Elements Make Advertisements Better Memorable			Controversial Methods of Advertising Are Widely Accepted and Consumers Are Fond of Them			Controversial Methods of Advertising Stimulate Interest in Products			Controversial Methods Increase the Prominence of Advertisements		
	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
Sector (Kruskal-Wallis Test)																		
Production	307.94			313.31			317.74			317.66			311.95			309.97		
Trade	311.61	1.349	0.509	310.15	0.125	0.939	310.35	0.445	0.801	312.34	0.502	0.778	322.47	0.573	0.751	305.38	1.730	0.421
Services	327.08			317.06			307.45			305.77			308.34			328.64		
Enterprise size (Kruskal-Wallis Test)																		
Up to 9 employees	310.49			322.44			317.44			332.89			320.28			326.81		
10 to 49 employees	293.69			286.30			290.37			305.48			278.30			280.40		
50 to 249 employees	309.69	3.685	0.298	311.99	4.070	0.254	309.78	3.756	0.289	300.54	3.627	0.305	321.04	5.424	0.143	322.72	5.420	0.144
Over 249 employees	331.96			326.56			329.94			325.07			320.16			313.03		
Range of operations (Kruskal-Wallis Test)																		
Local	303.27			297.45			300.93			298.05			290.76			308.56		
Regional	298.94	20.303	0.000	305.05	7.034	0.071	285.99	15.749	0.001	340.49	3.677	0.299	308.43	4.777	0.189	307.01	7.507	0.057
National	288.83			306.90			301.41			313.97			321.64			297.06		
International	365.11			343.60			358.99			311.90			329.00			344.01		
Capital structure (Mann-Whitney Test)																		
Polish	309.14			313.99			311.16			311.30			312.62			318.16		
Foreign/mixed	322.99	−0.946	0.344	312.43	−0.107	0.915	318.60	−0.506	0.613	318.28	−0.468	0.640	315.42	−0.192	0.848	303.36	−1.023	0.306
Market position (Kruskal-Wallis Test)																		
Weak	268.83			294.46			279.88			319.56			327.13			292.19		
Average	300.91	11.019	0.004	299.81	9.567	0.008	303.75	6.461	0.040	320.52	2.257	0.324	299.41	8.108	0.017	305.05	4.338	0.114
Strong	345.83			344.70			338.41			297.99			341.16			334.04		

(A)—average rank. (B)—test value, (C)—critical significance level *p*. Source: Authors' own research, 2014/2015.

The stronger the market positions of enterprises, the more frequent managers' declarations of agreement with the responses "In recent years, controversy has been present in advertising more frequently", "Consumers are more likely to notice advertisements with controversial elements", "Controversial elements make advertisements better memorable" and "Controversial methods of advertising stimulate interest in products". Similarly, a positive correlation exists between the scope of the company's activity and responses such as "In recent years, controversy has been present in advertising more frequently" and "Controversial elements make advertisements more memorable". However, the strength of the correlations is weak—the V-Cramer coefficient does not exceed the value of 0.125 in any of the cases.

In an attempt to broaden the knowledge on the factors impacting the perception of the controversies in advertising, the authors examined the level of application of the Advertising Ethics Commission's policies and norms by the examined enterprises (Table 3). On average, only half of the entrepreneurs (51.3%) attempted to comply with the provisions of the Code of Ethics for Advertising and 22.7% were not even aware of the existence of the Code. 61% of the international enterprises followed the Code (compared with 38.5% of the local enterprises), 17.6% of them did not know its provisions (32.9%), and 21.4% saw no need to follow the Code (32.9%). Almost identical differences appear when we consider how companies with strong and weak market positions viewed the Code; here the numbers are 63.4%, 16.5%, and 20.1% for companies with a strong position and 26.9%, 53.8%, and 19.2% for those with a weak position, respectively.

The application of principles of the Code is positively correlated with the size of the enterprise, the geographic scope of its activity, its market position and the share of foreign capital. However, no influence was observed with regard to the sector of the enterprise's activity. This is confirmed by the results of the test χ^2 —only in the case of one variable, the critical significance level has exceeded the value of $p = 0.05$, which creates the basis to reject the hypothesis concerning the existence of the correlation between the application of the principles of the Code and the business sector. The statistically significant correlations found in the case of other variables are of limited strength. The V-Cramer coefficient ranges in this case from 0.113 (for the size of the enterprises) to 0.153 (for its market position).

The authors have also examined the correlation between a variable describing the application of the provisions of the Code of Ethics in Advertising (treated as an independent variable) and the responses concerning controversial advertising (Table 4).

Based on the Kruskal-Wallis test, the authors have observed a statistically significant correlation between an independent variable and four analyzed responses: "In recent years, controversy has been present in advertising more frequently", "Controversial elements make advertisements better memorable", "Controversial methods of advertising are widely accepted and consumers are fond of them" and "Controversial methods of advertising stimulate interest in products". In all these cases, the critical significance level was lower than the critical value $p = 0.05$, which means that the authors may not reject the hypothesis concerning the existence of a correlation between them.

The representatives of the enterprises which apply the principles of the Code of Ethics in Advertising more frequently than other groups have emphasized the increase in the frequency of the use of controversial content in advertising, and they have noticed a positive influence on the memorability of the message. They clearly negated the ability of such content to increase the visibility of the messages.

Table 3. The correlation between declarations concerning the application of the principles of the Code of Ethics in Advertising expressed by entrepreneurs in Poland and the characteristics of the examined enterprises.

	TOTAL	Sector			Enterprise Size				Range of Operations			Capital Structure		Market Position			
		Production	Trade	Services	Up to 9 Employees	10 to 9 Employees	50 to 249 Employees	Over 249 Employees	Local	Regional	National	International	Polish	Foreign/mixed	Weak	Average	Strong
Yes, we apply the principles of the Code of Ethics in Advertising in our advertising activity	51.3	52.3	51.7	48.7	35.4	48.6	53.5	58.7	38.5	46.9	55.8	61.0	46.6	61.4	26.9	47.0	63.4
No, we do not see the need to apply the principles of the Code of Ethics in Advertising in our advertising activity	26.0	26.3	21.4	29.9	31.1	26.7	25.9	22.9	28.6	33.7	24.0	21.4	28.0	21.8	19.2	29.3	20.1
No, we do not know the Code of Ethics in Advertising	22.7	21.4	26.9	21.4	33.3	24.8	20.6	18.4	32.9	19.4	20.2	17.6	25.4	16.8	53.8	23.6	16.5
Pearson's chi-square	Test value χ^2	3.833				15.981			23.744				12.185			29.317	
	Df	4				6			6				2			4	
	Critical significance level p	0.429				0.014			0.001				0.002			0.000	
	V-Cramer	-				0.113			0.138				0.140			0.153	

Source: Authors' own research, 2014/2015.

Table 4. The correlation between opinions on the use of controversial advertisements expressed by entrepreneurs in Poland and declarations concerning the applications of principles of the Code of Ethics in Advertising made by entrepreneurs in Poland.

	In Recent Years, Controversy Has Been Present in Advertising More Frequently			Consumers Are More Likely to Notice Advertisements with Controversial Elements			Controversial Elements Make Advertisements Better Memorable			Controversial Methods of Advertising Are Widely Accepted and Consumers Are Fond of Them			Controversial Methods of Advertising Stimulate Interest in Products			Controversial Methods Increase the Prominence of the Advertisements		
	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
Yes, we apply the principles of the Code of Ethics in Advertising in our advertising activity	332.02			232.38			331.86			303.50			313.81			321.75		
No, we do not see the need to apply the principles of the Code of Ethics in Advertising in our advertising activity	282.08	9.528	0.009	299.83	2.374	0.305	282.44	9.274	0.010	348.50	9.189	0.010	336.89	6.831	0.033	288.49	4.885	0.087
No, we do not know the Code of Ethics in Advertising	307.71			306.85			307.65			295.94			285.95			323.56		

(A)—average rank, (B)—test value, (C)—critical significance level *p*. Source: Authors' own research, 2014/2015.

Managers of the business entities who do not see the need to apply the principles of the Code justified their approach with the fact that recipients accept and even like the controversies and they are able to stimulate the general interest in the advertised products in this way. To a much lower degree, they agreed with the statement that controversial messages are more and more frequent, which—surprisingly in the context of their advertising activity—they less frequently supported the opinions on the positive impact of controversial content on the memorability of the messages.

In turn, the respondents who declared their unfamiliarity with the Code expressed the opinion on the positive influence of advertising controversy on the visibility of the messages; however, they evaluated the impact of the controversial motives on the interest in advertised products to be much lower than others.

4.2. Customer Perspective

To get the whole picture, it is necessary to study the perspective of the other party of the relationship: Advertising recipients and try to find out how consumers take advantage of the self-regulation of the advertising market. An assessment of the Polish system of self-regulation in advertising may be based on the number of complaints filed with the Advertising Ethics Commission and the number of its adjudications on unethical advertising activities. Over the period of 12 years (June 2006–December 2017), both numbers grew (Figure 1).

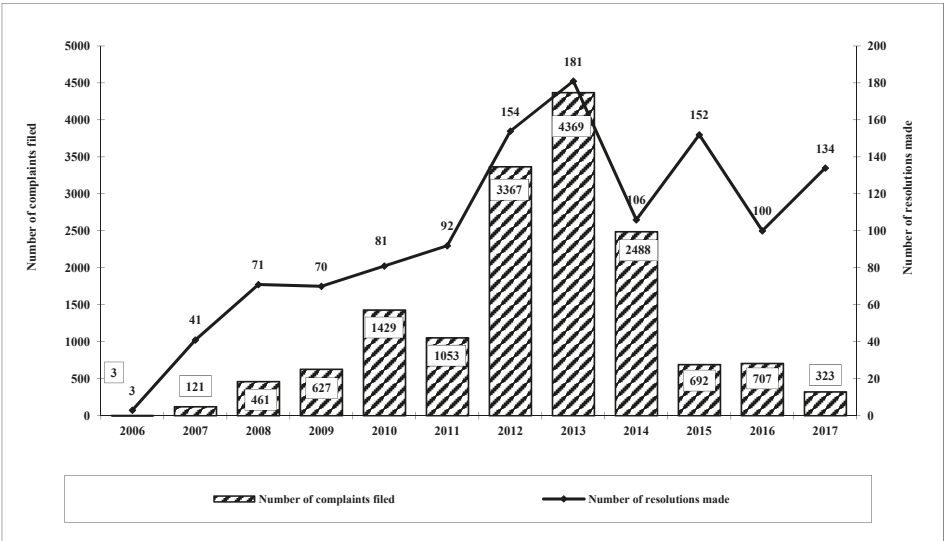


Figure 1. Complaints filed with the Advertising Ethics Commission. Source: Statistics of Advertising Ethics Commission from the years 2006–2017. Available online: <http://www.radareklamy.pl/dokumenty.html> (accessed on 20 May 2018).

In 2006, only 3 complaints were filed against advertisements violating the Code of Ethics for Advertising, rising fourfold to 461 in 2008, plummeting to 1429 in 2010, experiencing a slowdown in 2011 and then re-growth in 2012, just to return to a decreasing trend in 2014 and 2015. A similar irregular pattern relates to the changes of numbers of adjudications that were passed accordingly. The spread between the number of complaints and adjudications has a number of underlying reasons. Firstly, in some cases, multiple complaints concerned the same advertisements which were attributed to one adjudication (for example, in 2012 three campaigns: energy drinks Black, Egoo drinks, mBank, and in 2013 two campaigns: Grześki waffles and Heyah cellular telephony, accounted for 2/3 of

all complaints filed in respective years). Secondly, some submissions were dismissed as groundless (e.g., irrelevant to the Code). Thirdly, some complaints were rejected because they did not meet the formal requirements. Fourthly, the Commission did not undertake hearing procedures with respect to some complaints either because they did not contain information necessary to identify the advertisements (formal errors) or because they were settled by the Commission's earlier decisions. Fifthly, some complaints were passed on for consideration to organizations in other countries because of their trans-border nature, which again translated into a smaller number of adjudications.

2010 and 2011 were special in that 57% and 80% of the complaints were sustained as breaching the rules of the Code of Ethics for Advertising, requiring suspension of advertisement broadcasting or recommending alterations to the content of their advertising messages. The number of complaints connected with unethical advertising decreased markedly since 2014, which means that advertising is becoming more and more ethical. The probable reason was the lack of controversial advertising campaigns which would give rise to social controversy and the subsequent massive influx of complaints relative to a single campaign [118].

The channel of marketing communication seems to influence the intensity with which customers oppose controversial advertising. In the first two years covered by the analysis, complaints were most frequently filed against spots broadcast on TV (67% in 2006 and 73% in 2007). In the following years, the percentage of controversial TV spots which were complained about decreased, ranging from 8% to 34%. Outdoor advertising became the most controversial medium. The share of complaints against outdoor advertisements exceeded 50% (and reached the maximum of 78% in 2011). The dominance of these two traditional advertising media stems from their popularity and broad social reception. Nearly all recipients have access to these forms of advertising, including children, and these media also tend to have strong effects. In the case of outdoor advertising, the reach is determined by the location of ads in the public space (streets) and by the exaggeration of the message. The strength of TV is in the attractiveness of the message and the ability to shape behavioral models. Advertisements in other media raise significantly fewer controversies. Their range is considerably more limited, and the influence of their messages is weaker. This is also true about the Internet, which raises many objections as a channel for conveyance of advertising content but is rarely the object of complaints about unethical advertisements. Only in the last three years, we may observe an increase in controversy with regard to internet advertising. Social media—as a new platform where companies can form relationships with their stakeholders—appear to constitute a new channel for promoting and spreading CSR ideas. Some risks may be greater, as companies are unable to control the quality and quantity of information published by consumers, but social media also allows companies to obtain much more feedback and to engage their audience in selected initiatives [119,120]. The reach of online advertising is almost unlimited, but success also depends on word of mouth. Considering the popularity of social media, their interactive nature and usefulness in the dissemination of negative comments, posts and tweets, one may think that these new channels of communication will also become a channel for expressing dissatisfaction regarding less ethical advertisements. However, this assumption does not hold true, at least in Poland.

5. Discussion and Conclusions

Considerations regarding the nature of advertising are complex. The way people perceive advertising is not straightforward, yet trust is the factor worth considering in the first place for two main reasons. First, trust must be in place if advertising is to serve as an information source, which means that it fulfills its basic functions. Second, there is a consistent tendency for consumers to distrust advertising [121]. To close the gap, companies are testing various ways how to influence customer perceptions of advertisements and how to relate to their values. They try to decide whether ethical or controversial advertising would suit their agendas more. In effect, companies consider many variables before choosing whether to design ethical or controversial messages. A company that seeks to send an effective message must consider the values of the target audience. As the moral

standards of the target audience are difficult to grasp and to generalize, companies experiment with messages using different tones. Some enterprises attempt to comply with ethical norms, whereas others experiment with controversial elements to arouse harsh emotions, attract interest, and cause outrage or disgust. Which strategy proves more successful depends on the cultural factors of the market, public awareness of what is legitimate and the actions that are undertaken to protest against certain organizational messages.

According to Lutz [122], in order to ascertain advertising credibility, you need to take into account three factors: Advertisement claim discrepancy, advertiser credibility and advertising credibility. Menon et al. [123] argue that trust is a demonstrated correlate of information acceptance, liking, and other processing effects.

In the process of the conducted analyses, the authors positively verified the H1 hypothesis stating that “the perception of the controversy in advertising is influenced by the characteristics of an enterprise such as the sector of business activity, size, scope of activity, the source of the capital and market position” with regard to the variables related to the scope of activity and market position, as indicated by Kruskal-Wallis tests. However, there is no basis to claim that there exists a correlation in regards to the remaining three characteristics.

The results of the Kruskal-Wallis tests appear to support the H2 hypothesis concerning “the perception of controversy in advertising which is dependent on the enterprises’ awareness and respecting the principles of Code of Ethics in Advertising”. This was reflected in the case of five correlations among the six analyzed responses.

Analyses of statistical data concerning the number of the complaints filed and the resolutions on unethical advertising activity adopted on this basis also allow accepting the H3 hypothesis, which stated that “the increase in the awareness on the subject of social responsibility of advertising among the enterprises results in the decrease in the number of controversial advertising”. The dynamics of the coefficients within the last three years is negative.

Finally, in the case of the H4 hypothesis, which stated that “enterprises applying controversial motives in their advertising justify this with the high effectiveness of their impact on the recipients”, there are no grounds to reject it. This confirms greater conviction of these business entities, in comparison to the remaining ones, with regard to the positive influence of controversial motives on the interest in the advertised products and the belief that they are accepted and liked by the recipients.

Research conducted among Polish enterprises was complemented with the analysis of complaints filed by advertising recipients. While customers on a global scale appear to pay attention to the CSR involvement of companies in general, they put more emphasis on complying with social norms and environmentally friendly policies in other aspects of operations rather than in advertising. Teetering on the brink of good taste and law remains difficult, but consumers quite easily forgive flaws or small controversies that they perceive in advertising practices. Although extremely shocking messages evoke negative reactions, controversy as such does not rule out effectiveness and attractiveness of advertisements.

Notably, even though the number of complaints which regard unethical advertisements grows over time (which means that Polish consumers are becoming more aware of the tool they can use (complaints) to control advertising activities and to voice their concerns), it remains relatively small—especially in the context of rising expenses on advertising and the increasing number of advertisements broadcasted in various media. This finding might signal to entrepreneurs that making risky choices between social responsibility and controversy is still rewarding, as the risk of negative consequences remains low in comparison with the benefits arising from the fact that such advertisements are more likely to be noticed and remembered. The same observation follows from the policies of various advertisers who regularly choose controversial solutions and disregard protests against previous campaigns and from opinions on the effectiveness of such advertisements held by a wide group of entrepreneurs.

It seems that there is an increase in the awareness of consumers (advertising recipients) regarding their rights and the possibility of complaining about unethical advertising activities. However, consumers are sensitive to unethical advertising, but only after crossing a certain threshold of “unethical”. We can observe a slightly higher level of acceptance for advertisements that “slightly” violate ethical principles. To some extent, consumers accept such messages as creative, original, and arousing interest. They are also getting used to controversy in advertising and become indifferent. As a result, they file fewer complaints. On the advertisers’ side, more attention is paid to social responsibility in advertising as being more beneficial to the company image. Being convinced about the effectiveness of controversial messages, advertisers do not want to turn down the opportunity to obtain its benefits. As a result, they stick to mildly controversial advertising activities—because they arouse interest and are remembered yet they are not contested (they do not mobilize general public to protest).

The presented considerations do not exhaust the issue of trust with regard to social responsibility of advertising. They may constitute the basis to undertake further research and analyses carried out in these two areas. Among enterprises—advertisers, it is recommended to carry out research focusing on to what extent their advertisements are controversial, what controversial motives they use and how they evaluate the results of such activities. The studies covering the recipients of the advertising should provide knowledge on the awareness of the appearance of controversial motives in advertising, their kind, their influence on the noticeability and memorability of the message, purchasing motivations and market behavior, as well as the diagnoses of the knowledge on the subject of the possibilities to react to unethical advertising activity and actual behavior in this respect.

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Article

Trust Repair after Opportunistic Behaviors in the Chinese Construction Projects

Xiaodan Zheng ¹, Shuibo Zhang ^{2,*} and Conghan Wang ²

¹ Department of Construction Management, College of Civil Engineering, Nanjing Forestry University, Nanjing 210037, China; zhengxiaodan90@163.com

² College of Management and Economics, Tianjin University, Tianjin 300072, China; wangconghan@tju.edu.cn

* Correspondence: zhangshuibo@tju.edu.cn

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Abstract: Developing the trust of contractors is important for subcontractors since the trust can help subcontractors obtain a sound reputation and more chances of subcontracting. Nonetheless, the trust can be broken by opportunistic behaviors. Thus, subcontractors should utilize effective trust repair strategies to repair trust after it is violated, so as to maintain the role of trust. As a result, this study compares denial, apology, and penance as strategies for trust repair, after subcontractors demonstrate opportunistic behaviors to violate contractors' trust in construction projects. And this study also discusses the effect of the frequency of opportunistic behaviors on the three trust repair strategies in construction projects. Scenario-based experiments are utilized as a research methodology. According to the experimental results, when a subcontractor demonstrates a single opportunistic behavior to break a contractor's trust, the most effective strategy to repair trust is penance. The least effective strategy is denial. However, when a subcontractor has repeated opportunistic behaviors to break contractor's trust, denial, apology, or penance has only a very limited effectiveness in trust repair. In addition, the effectiveness of the three trust repair strategies does not have significant differences. This study benefits the development of a trust repair theory applicable to construction projects. Moreover, this study offers information to assist subcontractors in utilizing the most efficient strategy to repair the trust that has been violated by opportunistic behaviors in Chinese subcontractors.

Keywords: apology; denial; penance; opportunistic behaviors; trust repair; subcontracting; scenario-based experiments

1. Introduction

In the construction industry, construction companies play important roles. Construction companies include contractors and subcontractors. Generally, contractors are large-scale construction companies with strong comprehensive strength, whereas subcontractors are small-scale construction companies [1]. However, subcontractors usually have some specialties, such as some technological specialties and labor specialties [1]. Because of weaker comprehensive strength, subcontractors do not have enough capacities to compete with contractors for general contracting jobs. However, subcontractors can rely on their specialties to get subcontracting jobs from contractors [2]. As a result, subcontractors need to depend on contractors to provide subcontracting to maintain existence and development [3]. Thus, building contractors' trust is important for subcontractors. This trust can help subcontractors to earn a good reputation and have more subcontracting opportunities [4,5].

However, trust is vulnerable and fragile [6–8]. In construction projects, subcontractors' opportunistic behaviors (e.g., reduce normal material usage or use unqualified materials) can break contractors' trust in subcontractors and lead to the trust crisis [4,9]. Moreover, these opportunistic behaviors frequently occur in practice [4]. If subcontractors demonstrate opportunistic behaviors to break the trust, subcontractors may lose cooperative relationships with contractors [9,10]. This may

result in subcontractors being dismissed [11]. Moreover, subcontractors who have opportunistic behaviors may lose their reputation. This may result in negative effects in terms of subcontractors' future development [12]. Thus, if subcontractors have opportunistic behaviors to break contractors' trust, it is important and necessary for subcontractors to repair this trust in an effective manner.

Although many studies have discussed trust-building in the construction projects [4,13–15], few studies explore trust repair in the construction projects. Actually, trust repair is different than trust building. Trust repair is more difficult than trust-building because trust repair involves both establishing positive expectations and overcoming negative expectations from opportunistic behaviors [6,16]. Therefore, this study is aimed to help subcontractors to repair trust to deal with the trust crisis, after subcontractors have opportunistic behaviors to break contractors' trust in the Chinese construction projects.

To achieve the research goal, this study reviews the related literature. This is followed by building hypotheses, introducing research methodology, and presenting results. Finally, this study has the discussion and conclusion.

2. Literature Review

2.1. Trust Repair

Trust is “a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another” [8].

Trust is a dynamic process and includes multiple stages. Fulmer and Gelfand [17] showed that trust included a minimum of three stages: formation, dissolution, and restoration. Trust formation is when the trustor chooses to trust the trustee and the trust level increases with time. Trust dissolution is when the trustor decreases the trust level in the trustee after the trustee violates trust. Trust restoration is when the trust level stops decreasing, starts to improve, and then reaches relative stabilization after trust violation. However, trust restoration cannot happen automatically. The trustee needs to adopt trust repair strategies to rebuild positive expectations from the trustor about the trustee [16].

In the field of social psychology, organizational behavior, and marketing, many studies have discussed trust repair strategies. An apology is a common trust repair strategy. An apology refers to a statement that acknowledges both responsibility and regret for a trust violation and promises having good behaviors in the future, so as to provide a credible signal [18]. A denial is also a common trust repair strategy. But a denial is in contrast to an apology. A denial refers to a statement whereby an allegation is explicitly declared to be untrue, and an explanation to demonstrate that mistakes happen unintentionally rather than intentionally, in order to disengage the self from the event [18]. Kim et al. [18] found that a denial was more effective in response to opportunistic behaviors than an apology. However, Han and Ning [19] had a different finding from Kim et al. [18]. Han and Ning [19] found that an apology was more effective than a denial for trust repair after opportunistic behaviors were demonstrated.

Penance is also a common trust repair strategy. An apology and a denial are both verbal strategies, but penance is a substantive strategy. Ren and Gray [20] argued that the sincerity of any verbal strategies was difficult to discern, and penance may be necessary for trust repair, especially when the damaged party had suffered severe consequences. Penance is to pay a price to provide a credible signal for renewed trustworthiness [6]. Penance can be in the form of correction and having good behaviors in the future [21].

In addition, the effectiveness of trust repair strategies can be impacted by trust violation natures [21,22]. Additionally, the frequency of trust violation is important and can influence trust repair. Gunderson and Ferrari [23] and Ferguson and Peterson [24] found that more frequent transgressions resulted in more difficulty in forgiveness and trust repair from recipients.

2.2. Development and Destruction of Trust in Construction Projects

Cerić [25] built a dynamic model of trust among construction project parties. At the beginning of a construction project, trust was usually positive (above zero). As the project proceeded, trust gradually increased as project parties become better acquainted. However, if negative events occurred, these negative events could break trust, precipitously decreasing trust. Thus, trust violators were needed to re-establish trust for returning to a trustful relationship. The progress of rebuilding trust is likely to be slower than the progress of developing trust at the beginning.

Some studies find some factors to positively influence trust in the construction projects. For example, Wong et al. [26] found that competent performance and effective communication could initiate trust in construction projects. Maurer [14] found that a stable pool of project team members and objective project reward criteria facilitated the formation of trust in the construction projects. Chow et al. [27] found that networking and being calculating related positively to trust in the construction projects. Laan et al. [28] found that positive work history and more future prospects were beneficial to developing trust in the construction projects. Lu and Hao [29] found that the expert power of contracting parties had positive effects on building trust in the construction projects. Jiang et al. [30] found that better reputation, more integrity, and more reciprocity could lead to more trust in the construction projects.

On the other hand, some studies also found some factors to have negative effects on trust in the construction projects. For example, Kadefors [31] found that contractual incentives and close monitoring might induce opportunism and start vicious circles of trust in the construction projects. Lu et al. [9] found that external uncertainty could induce opportunism, and opportunism negatively affected trust in the construction projects. Manu et al. [4] found that subcontractors' opportunistic behaviors and poor performance could negatively impact contractors' trust in subcontractors. Wu et al. [32] found that conflicts had negative effects on trust in the construction projects.

2.3. Problem Statement

According to the literature review, studies about trust in the construction projects have discussed factors that can positively facilitate trust and factors that negatively influence trust. Opportunism is found as a main factor to break trust in construction projects. However, these studies did not discuss how to repair trust after trust is damaged by opportunistic behaviors in the construction projects.

In the field of social psychology, organizational behavior, and marketing, studies have compared denial, apology, and penance for trust repair, and discussed the effect of trust violation frequency. However, these studies have inconsistent findings. As well, these studies are not based on construction projects. Different research situations can influence research results to a great extent [33]. Thus, these studies do not necessarily help subcontractors to understand how to repair contractors' trust after subcontractors demonstrate opportunistic behaviors to break trust.

Therefore, it is still necessary and important to discuss trust repair in the construction industry. This study aims to compare denial, apology, and penance for trust repair, after subcontractors have demonstrated opportunistic behaviors in construction projects to violate contractors' trust. Moreover, this study also intends to discuss the effect of the frequency of opportunistic behaviors on the three trust repair strategies in construction projects. In addition, culture can influence trust [34]. Thus, this study focuses on Chinese construction projects.

3. Hypotheses

3.1. Denial, Apology, and Penance

When a contractor finds a subcontractor demonstrates a single opportunistic behavior, the contractor may consider the subcontractor as untrustworthy [1,4]. This is because people are sensitive to negative information about integrity and morality. People think reliable persons do not have opportunistic behaviors in any situation [35]. Thus, even if a person only has a single

opportunistic behavior, this person may be considered unreliable [36]. Moreover, in construction projects, different contracting parties may pursue different interests. It may result in the tendency for some contracting parties to suspect other contracting parties of harboring malicious intentions [26]. As a result, even though the subcontractor denies the opportunistic behavior and explains that the mistake happens unintentionally, rather than intentionally, the contractor is still less likely to believe in the subcontractor's denial. The contractor may tend to consider that the subcontractor uses denial to cover up opportunistic behavior and remove the responsibility for an offence [21,37]. Besides, a denial has a high possibility of resulting in the contractor considering the subcontractor as impenitent [19,38]. Therefore, in construction projects, after a subcontractor demonstrates a single opportunistic behavior to break trust, a denial may be difficult to repair trust. On the contrary, a denial may have the negative effect on trust repair.

Although only one single opportunistic behavior can break trust, it is still possible for the subcontractor to repair the contractor's trust, because it is an isolated incident [23,24]. For the subcontractor, penance may be necessary for trust repair after demonstrating the opportunistic behavior [20]. Penance means correcting the opportunistic behavior and presenting good behaviors in the future [21]. Penance is a substantive action for repentance. Thus, penance is more convincing [6]. After one opportunistic behavior occurs, if the subcontractor can positively correct and maintain honesty, the negative impression that the subcontractor is opportunistic may abate, and the positive impressions that the subcontractor is honest may be reinforced as time goes on [39]. It is beneficial to make the contractor consider the isolated opportunistic behavior as low consistency [40]. It is also beneficial to make the contractor consider that the subcontractor has changed moral traits into honesty and integrity. Thus, the contractor may expect the risk that the subcontractor has opportunistic behaviors again is low. Hence, the contractor may have trust in the subcontractor again [41].

An apology means that the subcontractor acknowledges both responsibility and regret for the opportunistic behavior, and promises to demonstrate good behaviors in the future [18]. An apology can illustrate the willingness of a subcontractor to have a positive correction [18,20], and can relieve the contractor's anger due to the opportunistic behavior [42–44]. However, the opportunistic behavior results in a significant decrease in the reliability of the subcontractor [45]. Thus, the subcontractor cannot prove the apology is sincere, and cannot prove the promise will be fulfilled [39]. Moreover, compared with penance, an apology is a verbal response rather than a substantive action. However, in construction projects, contracting parties always pay more attention to substantive actions rather than verbal responses [4,46,47]. Therefore, in a construction project, after a subcontractor demonstrates a single opportunistic behavior to break trust, an apology has lower effectiveness in trust repair than penance, but has higher effectiveness in trust repair than a denial.

Hypothesis 1. *In a construction project, after a subcontractor has a single opportunistic behavior to break contractor's trust, penance has higher effectiveness in trust repair than apology and denial; and an apology has higher effectiveness in trust repair than a denial. Figure 1 presents the prediction for Hypothesis 1.*

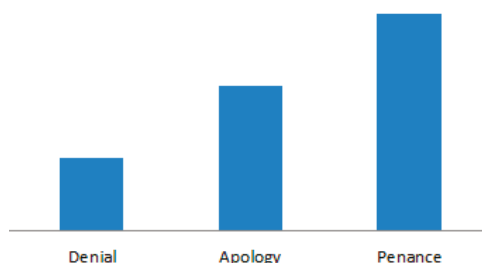


Figure 1. Hypothesis 1: Predicted effectiveness of three trust repair strategies after a subcontractor demonstrates a single opportunistic behavior to break trust.

3.2. The Effect of Repeated Opportunistic Behaviors

According to the above analysis, after a subcontractor shows a single opportunistic behavior, a contractor may consider the subcontractor as untrustworthy [1,4]. If a subcontractor has repeated opportunistic behaviors, a contractor can believe with confirmation that the subcontractor is a stable and unchangeable opportunist [48]. According to the attribution theory, if people consider the reason of a thing is stable and unchangeable, people will expect that this thing will occur again in the future [49]. Furthermore, Reeder and Brewer [36] argued that, even if a person who was opportunist had honest behaviors, this person still could not be considered as reliable. This was because this person may have to behave honestly due to the external pressure. However, this person may have opportunistic behaviors again in the context of lax regulation. Thus, if a subcontractor shows repeated opportunistic behaviors, a contractor can expect with high possibility that the subcontractor will continue opportunistic behaviors in the future. Hence, it is less possible for the contractor to trust the subcontractor again [41]. Moreover, after the contractor has suffered repeated opportunistic behaviors, the contractor learns self-protection and is unwilling to trust the subcontractor again [24,50]. Therefore, after a subcontractor has repeated opportunistic behaviors to break trust, it is very difficult for the subcontractor to repair trust. As a result, denial, apology, or penance has little effectiveness in trust repair. In other words, denial, apology, and penance do not significantly differ in effectiveness for trust repair.

Hypothesis 2. *In a construction project, after a subcontractor demonstrates repeated opportunistic behaviors to break contractor’s trust, denial, apology, and penance do not significantly differ in effectiveness for trust repair.*

Hypothesis 3. *In a construction project, the frequency of opportunistic behaviors has influence on the effectiveness of trust repair strategies.*

Figure 2 presents the prediction for Hypothesis 2.



Figure 2. Hypothesis 2: Predicted effectiveness of three trust repair strategies after a subcontractor has repeated opportunistic behaviors to break trust.

4. Methodology

This study used scenario-based experiments as the research method. This was because experiments could manipulate different trust repair strategies to observe the change in the trust level [33]. The scenario-based experiment method has been widely used in the studies about trust repair [6,16,41].

Research participants were asked to read a scenario in which a subcontractor has a single opportunistic behavior or repeated opportunistic behaviors in a construction project, and then repairs trust with apology, denial, or penance. After viewing the scenario, participants were asked to report their trust in the subcontractor. Thus, this study used a 2 (frequency: a single opportunistic behavior vs. repeated opportunistic behaviors) \times 3 (trust repair strategy: denial vs. apology vs. penance) between-subject design.

4.1. Experimental Procedure

All participants came to a big classroom. Before starting the experiment, all participants were randomly assigned to one of the six scenarios. In this way, potential impacts caused by personal

characteristics of participants could be ruled out [33]. Then experimenters explained the experimental procedure for participants. After that, the experiment began. All participants sat in a classroom, but each participant finished the experiment independently. There was no communication or discussion among participants. The experimental process was supervised. During the experimental process, experimenters could immediately answer any questions about the experimental procedure, but experimenters did not give any hints about the experimental result to participants.

The experiment was conducted following the 6 main steps showed in Figure 3.

- Step 1: Each participant read the first half of a scenario about a subcontractor in a construction project who presented a single opportunistic behavior or had repeated opportunistic behaviors.
- Step 2: Each participant answered one question about the first half of the scenario.
- Step 3: Each participant assessed the trust in the subcontractor.
- Step 4: Each participant then read the second half of the scenario, where the subcontractor offered apology, denial, or penance as the response.
- Step 5: Each participant answered one question about the second half of the scenario.
- Step 6: Each participant assessed the trust in the subcontractor again.

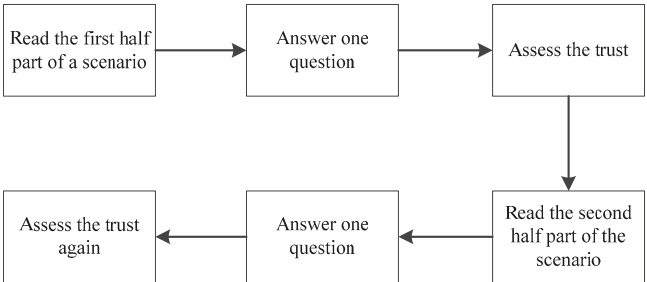


Figure 3. The experimental procedure.

4.2. Participants

This study discussed trust repair strategies, in order to help subcontractors repair contractors’ trust in subcontractors. Thus, contractors were needed to evaluate the effectiveness of trust repair strategies.

One-hundred-and-two participants were contractors from China. They participated in a project management workshop. Thus, they were invited to participate in this study.

4.3. Manipulations

4.3.1. Trust Violation

The first half part of a scenario was that in a construction project, a subcontractor had a single opportunistic behavior or had repeated opportunistic behaviors to break the contractor’s trust. The first half part of a scenario was designed according to Manu et al. [4].

In a single opportunistic behavior condition, a contractor found that a subcontractor reduced normal material usage, so as to harm the quality. However, it was the first time that this contractor found this subcontractor reduced normal material usage in the construction project.

In repeated opportunistic behaviors condition, a contractor found that a subcontractor reduced normal material usage, so as to harm the quality. Moreover, this contractor found this subcontractor repeatedly reduced normal material usage in the construction project.

4.3.2. Trust Repair

The second half part of a scenario was that the subcontractor took one trust repair strategy (denial, apology, or penance) for trust repair.

In the denial condition, the subcontractor denied intentionally reducing normal material usage. Additionally, the subcontractor explained that it was because new workers were not familiar with drawings and specifications so as to unintentionally reduce material usage.

In the apology condition, the subcontractor apologized for reducing normal material usage, and promised not to make similar mistakes in the subsequent work.

In the penance condition, the subcontractor corrected to fulfill the quality requirement. After correction, the subcontractor kept honest in the subsequent work.

4.4. Checks

In the experiment, after participants read the first half part of a scenario, participants needed to answer one check question. This question was designed to assess whether participants understood the first half part of a scenario [51]. More specifically, participants were asked, “How many times did the subcontractor reduce normal material usage in the construction project?” The available options included “the first time” and “several times.”

After participants read the second half part of a scenario, participants also needed to answer one check question. This question was designed to assess whether participants understood the second half part of a scenario [51]. More specifically, participants were asked, “Which behavior did the subcontractor have as a response for reducing normal material usage in the construction project?” The available options were “denial”, “apology”, and “correction and penance.”

4.5. Assessment of Trust

To evaluate the effectiveness of trust repair strategies properly, it was necessary to look at the relative increases in trust [52]. More specifically, trust was measured twice. After participants read the first half part of a scenario (only including the trust violation), participants needed to assess trust. After participants read the second half part of a scenario (including the trust violation and trust repair), participants needed to assess trust again.

The relative increases in trust (i.e., the effectiveness of trust repair strategies) = the trust level at the second time—the trust level at the first time.

Trust was measured using two items, according to Pinto et al. [53]. The measurement was based on a seven-point Likert scale, from 1 (strongly disagree) to 7 (strongly agree). The items were: (1) we believe that this subcontractor does not knowingly hurt the contractor in order to benefit themselves; (2) we believe that this subcontractor has high levels of honesty and integrity. The Cronbach’s alpha value at the first time was 0.91, and the Cronbach’s alpha value at the second time was 0.94.

4.6. Data Analysis

This study used a 2 (frequency: a single opportunistic behavior vs. repeated opportunistic behaviors) \times 3 (trust repair strategy: denial vs. apology vs. penance) between-subject design. Thus, a two-way analysis of variance was suitable for data analysis [54]. SPSS 18 software was used.

5. Results

5.1. Checks

This study only used the data from the participants who answered all two check questions correctly to test the hypotheses. This was because only data from the participants who fully understood the scenario were valid [55]. The number of valid participants was 90.

5.2. Experimental Results

According to the two-way analysis of variance (frequency \times trust repair strategy), the frequency of opportunistic behaviors had a significant effect on the effectiveness of trust repair strategies ($F(1,84) = 9.091, p = 0.003 < 0.050$). In other words, the effectiveness of trust repair strategies in a single opportunistic behavior condition was significantly different compared with the effectiveness of trust repair strategies in the repeated opportunistic behaviors condition. In addition, the interaction effect between the frequency of opportunistic behaviors and trust repair strategies was also significant ($F(2,84) = 3.671, p = 0.030 < 0.050$), showed in Figure 4. Therefore, Hypothesis 3 was supported. In a construction project, the frequency of opportunistic behaviors could influence the effectiveness of trust repair strategies.

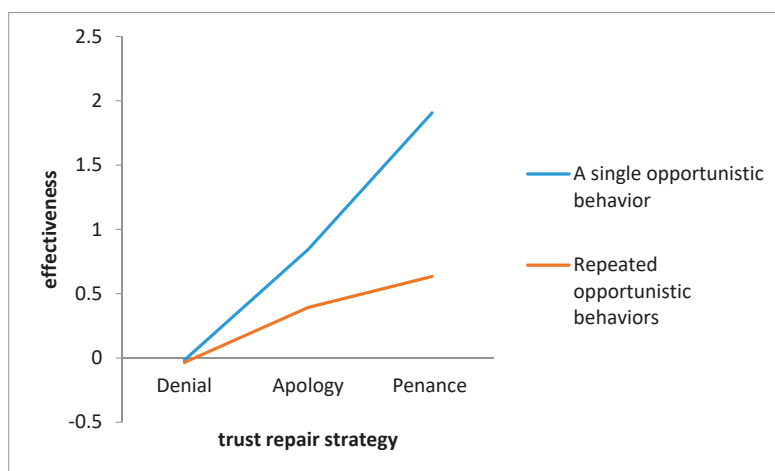


Figure 4. The interaction effect between the frequency of opportunistic behaviors and trust repair strategies.

When the interaction effect is significant, it is necessary to test the individual main effect [54]. All the data were segmented according to the frequency of opportunistic behaviors. A one-way analysis of variance was used to test the individual main effect [54].

In the single opportunistic behavior condition, different trust repair strategies had significantly different effectiveness in trust repair ($F(2,44) = 13.514, p = 0.000 < 0.050$). Specifically, in Tables 1 and 2, penance was the most effective in increasing trust level ($M = 1.906, SD = 1.217$), and its effectiveness was significantly better than the effectiveness of the denial (1.906 vs. -0.017 ; mean difference = $1.923, p = 0.000 < 0.050$), and the effectiveness of the apology (1.906 vs. 0.844 ; mean difference = $1.063, p = 0.006 < 0.050$). The effectiveness of the apology ranked second ($M = 0.844, SD = 1.004$), and its effectiveness was significantly better than the effectiveness of denial (0.844 vs. -0.017 ; mean difference = $0.860; p = 0.025 < 0.050$). The effectiveness of denial was the lowest ($M = -0.017, SD = 0.826$). Moreover, a denial had a negative effect on increasing trust level. Thus, Hypothesis 1 was supported. In a construction project, after a subcontractor demonstrated a single opportunistic behavior to break a contractor's trust, penance had higher effectiveness in trust repair than apology and denial; and apology had higher effectiveness in trust repair than denial.

Table 1. Descriptive statistics.

Frequency	Strategy	N	Effectiveness	
			M	SD
A single opportunistic behavior	Denial	15	−0.017	0.826
	Apology	16	0.844	1.004
	Penance	16	1.906	1.217
Repeated opportunistic behaviors	Denial	14	−0.036	0.603
	Apology	14	0.393	1.059
	Penance	15	0.633	0.516

Table 2. Multiple comparisons.

Frequency	(I) Strategy	(J) Strategy	Effectiveness	
			(I-J)	p
A single opportunistic behavior	Denial	Apology	−0.860 *	0.025
		Penance	−1.923 *	0.000
	Apology	Denial	0.860 *	0.025
		Penance	−1.063 *	0.006
	Penance	Denial	1.923 *	0.000
		Apology	1.063 *	0.006
Repeated opportunistic behaviors	Denial	Apology	−0.429	0.338
		Penance	−0.669	0.072
	Apology	Denial	0.429	0.338
		Penance	−0.240	0.698
	Penance	Denial	0.669	0.072
		Apology	0.240	0.698

Note: * $p < 0.050$.

However, in a repeated opportunistic behaviors condition, different trust repair strategies did not have significant differences in effectiveness ($F(2,40) = 2.868$, $p = 0.069$). Thus, Hypothesis 2 was supported. In a construction project, after a subcontractor had repeated opportunistic behaviors to break a contractor's trust, denial, apology, and penance did not significantly differ in effectiveness for trust repair.

6. Discussion

6.1. A Single Opportunistic Behavior

According to the experimental results, when a subcontractor only has a single opportunistic behavior to break a contractor's trust, the most effective trust repair strategy is penance. The level of trust has the most improvement after the subcontractor uses penance to repair trust. In other words, in a construction project, after a subcontractor has a single opportunistic behavior to break a contractor's trust, penance has higher effectiveness in trust repair than apology and denial. Penance is a substantive trust repair strategy. An apology and a denial are both verbal trust repair strategies. Thus, this finding illustrates that in the construction projects, substantive trust repair strategies have higher effectiveness in trust repair than verbal trust repair strategies. This is because in construction projects, contracting parties always pay more attention to substantive actions rather than verbal responses [4,46,47]. This finding supports Bottom et al. [21] and Ren and Gray [20].

An apology and a denial can be compared further. This study finds that an apology has higher effectiveness in trust repair than a denial, after a subcontractor only demonstrates a single opportunistic behavior to break a contractor's trust. This finding in this study is consistent with that of Han and Ning [19], who found that denials were less effective than apologies for repairing integrity-based trust in China. However, Kim et al. [18] and Ferrin et al. [51] argued that denials were more effective than

apologies when repairing integrity-based trust. Schweitzer et al. [39] and Desmet et al. [52] found that a trust violation with a bad intent was more difficult to repair than a trust violation without a bad intent. Thus, Kim et al. [18] and Ferrin et al. [51] thought that for repairing integrity-based trust, an apology illustrated a violator acknowledged a bad intent, but a denial illustrated the violator denied the bad intent. In other words, a denial could eliminate the suspicion that the violator had the bad intent [18,51]. However, Schlenker et al. [37] argued whether a denial could help repair trust depended on whether the trustor believed the denial. Kim et al. [18] and Ferrin et al. [51] were based on western culture. In western culture, most people are initially considered as trustworthy until dishonest behaviors occur to damage trust [56]. Thus, in Western culture, when a trustor cannot affirm a violator has a bad intent, the trustor may tend to believe the violator's denial. However, in the Chinese culture, most people are not considered trustworthy until they prove that they are trustworthy [56]. Thus, in China, although a trustor cannot affirm a violator has a bad intent, the trustor may tend not to believe the violator's denial. Moreover, in construction projects, interests of different contracting parties are not accordant so that contracting parties tend to suspect other contracting parties [26]. Thus, contractors are more prone not to believe subcontractors' denials. And contractors may think that subcontractors use denials to shirk their responsibilities. Hence, this study found that a denial had a negative influence on trust repair, after a subcontractor had an opportunistic behavior.

6.2. Repeated Opportunistic Behaviors

The finding also illustrates that the frequency of the opportunistic behavior has significant effect on the effectiveness of trust repair strategies. After a subcontractor has a single opportunistic behavior to break a contractor's trust, penance is the most effective strategy to repair trust. However, after a subcontractor has repeated opportunistic behaviors to break a contractor's trust, denial, apology, or penance has a very limited effectiveness in trust repair. Therefore, in the construction project, more frequent opportunistic behaviors can result in more difficulties to repair trust. This finding supports the opinion of Gunderson and Ferrari [23] and Ferguson and Peterson [24]. Thus, subcontractors should maintain honesty and avoid demonstrating the opportunistic behavior again after they repair the first trust violation.

7. Conclusions

This study compared denial, apology, and penance for trust repair after subcontractors demonstrated opportunistic behaviors to violate contractors' trust in construction projects. This study also discussed the effect of the frequency of opportunistic behaviors on the three trust repair strategies in construction projects.

This study found when a subcontractor had a single opportunistic behavior to break a contractor's trust, the most effective strategy to repair trust was penance. The least effective strategy to repair trust was denial. Moreover, denial had a negative influence on trust repair. The level of trust could continue decreasing after subcontractors used denial. However, when a subcontractor demonstrated repeated opportunistic behaviors to break contractor's trust, denial, apology, or penance only had a very limited effectiveness in trust repair. In addition, the effectiveness of the three trust repair strategies did not have significant differences.

In construction project management, existing literature lacks analyses of trust repair. This study can fill the research gap in existing literature and develops trust repair theory in construction project management. Furthermore, this study provides decision supports and theoretical guidance to subcontractors for repairing contractors' trust. In addition, this study helps subcontractors deal with trust violations caused by opportunistic behaviors, and helps subcontractors continue to sustain trust of contractors. In addition, this study also discussed the differences between western culture and Chinese culture on trust repair. Thus, this study can also help global construction companies who want to enter the Chinese construction market to better understand the culture of repairing and maintaining trust with Chinese construction companies.

There are some limitations in this study, and hence, recommendations for future research. Firstly, this study focuses on Chinese construction projects. All participants in the experiments are Chinese contractors. However, trust may be influenced by culture. Thus, for future research, it is interesting to investigate the effectiveness of trust repair strategies in global construction projects. Secondly, this study only discusses the influence of the frequency of opportunistic behaviors on trust repair. However, other factors, such as characteristics of construction projects and prior cooperation experience, may also impact trust repair. Thus, future studies can continue to discuss influences of more factors on the effectiveness of trust repair strategies. Finally, this study focuses on subcontractors repairing contractors' trust. This is because in relationships between contractors and subcontractors in China, contractors are more powerful and subcontractors are more dependent on contractors. However, future studies can explore trust repair after other contracting parties violate the trust.

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Article

Trust and Distress Prediction in Modal Shift Potential of Long-Distance Road Freight in Containers: Modeling Approach in Transport Services for Sustainability

Elżbieta Szaruga ¹, Elżbieta Skapska ^{2,*}, Elżbieta Załoga ³ and Wiesław Matwiejczuk ⁴

¹ Department of Quantitative Methods, Faculty of Management and Economics of Services, University of Szczecin, 8 Cukrowa Street, Szczecin 71-004, Poland; elzbieta.szaruga@usz.edu.pl

² Division of Managerial Economics, Faculty of Management Engineering, Białystok University of Technology, 45A Wiejska Street, Białystok 15-351, Poland

³ Department of Transport Systems and Policy, Faculty of Management and Economics of Services, University of Szczecin, 8 Cukrowa Street, Szczecin 71-004, Poland; elzbieta.zaloga@wzieu.pl

⁴ Department of Production Management, Faculty of Management Engineering, Białystok University of Technology, 45A Wiejska Street, Białystok 15-351, Poland; w.matwiejczuk@pb.edu.pl

* Correspondence: e.skapska@pb.edu.pl; Tel.: +48-(500)-227-183

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Abstract: Confidence in intermodal transport has not yet been defined. There are many different approaches to the concept of trust. However, the authors have integrated them with the paradigm shift in light of the challenges of sustainability. The objective of this article is to indicate the directions and criteria for that indicate the implementation of the paradigm shift, relative to the idea of sustainable transport. The auxiliary objective is to predict which countries in a given year will have the TRUST status, i.e., implement the paradigm shift, and which ones will not implement it (DISTRESS). The study used taxonomic techniques and built a model using General Discriminant Analysis. On these bases, the utility function was approximated, including the directions of implementation of the paradigm shift, depending on the scale of the environmental load of transport. Over the course of this research, an original and innovative econometric model was constructed, pointing to three variables which have the greatest impact on trust. Thanks to the cognitive value of the model, it is possible to identify individuals who deserve trust (i.e., it will implement the paradigm shift) with 93% probability. In the future, it is worth expanding the research by programming models for each country.

Keywords: sustainability; trust; distress; transport services; road freight transport; modal shift potential; paradigm shift; modeling; prediction; General Discriminant Analysis

1. Introduction

This article focuses on the extremely important subject of trust and distress prediction in the modal shift potential of long-distance road freight in containers. An attempt was made to define the concept of trust in the context of a modeling approach to transport services, including the concept of sustainability and the paradigm shift. The main hypothesis for this research is: Trust and distress in the implementation of the paradigm shift (based on cooperation) depends on the scale of the environmental burden of transport (production and consumption patterns). Expanding on this, it can be considered that quantitative predictors express the environmental burden of transport. The aim of the article is to indicate the directions and criteria for the implementation of the paradigm shift, relative to the idea of sustainable transport. The auxiliary goal is to predict which countries in a given year will have the

TRUST status, i.e., implement the paradigm shift, and which ones will not implement it (DISTRESS status). The structure of this work is aligned with these purposes and consists of six main parts: first—introduction; second—literature background, where previous work is described: the concept of trust is discussed, and interpretation of sustainable development and the paradigm shift are given. The third part describes the test methods used and presents the research stages. The fourth part presents an innovative, original, research-econometric model (General Discriminant Analysis, GDA), along with utility profiles. The article ends with a discussion and conclusions.

2. Literature Background

Every economic relationship is linked to trust, which is an essential link in services, especially transport. The complexity and dynamics of the real economic sphere, on the one hand, require cooperation and trust, and on the other, create economic distress. Therefore, the semantic delimitation of the term “trust” for classic and innovative approaches is necessary. The first approach is associated with a subjective measure, a repeating pattern. The second one takes into account new criteria. Selected literature items were used in terms of the economic environment. Traditionally, trust refers to a way of dealing with social uncertainty and complexity [1]. Confidence is of higher value and increases efficiency. This is a phenomenon that, in economics, is called external effects [2]. Thus, trust and confidence can be formulated as expectations that are formed in a community about the regular, honest, and cooperative behavior of other members of the community based on commonly recognized norms [3]. In addition, it is the expectation that the partner can be relied on, that he will keep his commitments in a predictable way, and that he will act honestly in the face of various possibilities [4]. It is difficult not to agree with Seligman’s approach. Trust imposes, on the person of trust, the obligation to keep promises. What counts is the attitude of keeping the promise, the oath of honoring your own declaration of will [5], thus convincing one party of the relationship that the other party will not act their interests. This is accepted without doubts and suspicions in the absence of detailed information about the other party’s actions [6], respecting the principles of many people in response to the need for a complex society. Trust is also the conviction that a business partner will take care not only of his or her interest to maintain the exchange relationship [7]. It is also a belief based on moral obligations [8]. Kramer dissociates himself from the recognition of trust as a belief, treating it as a compatible decision with ethical expectations [9]. It is an expression of free will.

The literature recognizes the contexts of the approach to trust, e.g., from the side of the consumer, manager, or the whole organization. On the one hand, it means there is a regulator of decisions made by consumers on the market [10], and the consumer has the expectation is that his weaknesses will not be used in a situation considered risky [11]. On the other hand, the manager has faith in the strength and capabilities of his subordinates [12]. Trust is also a factor enabling organizations to face the complexity and changeability of economic reality [13]. Trust, from a narrow perspective, is a component of customer relations in the logic of service dominance and in the concept of managing a promise [14]. This issue is also equated with a directed relation between two units: trusting and a trustee with risks [15], or the social aspect of the relations connecting participants of economic life [16]. So, trust could be considered the capital of credibility; it is the sum of the resources of economic and social benefits. It is worth noting that an organization is based on the uncertain future actions of people and is a key factor in the relationship [17]. Consumer confidence in the reliability and integrity of online resellers leads to a successful transaction (via the Internet) [18], with the belief that a trustworthy person is motivated by good intentions and that he is capable of fulfilling what is expected of him [19]. Trust is an organizational value which requires strong ethical foundations [20,21]. On the one hand (rational), this means the assessment of competence and credibility and the possibility of relying on the other person; on the other (affective), it is the result of emotional ties created between cooperating people [22]. These approaches to trust confirm its difficulty; however, it is possible to capture the concept of trust in a certain contextual framework. Common goals, despite the divergent transactional interests of the service provider and the service buyer, stiffen the soft approach to trust. This applies

mainly to the benefits of trust, for example, in transport: establishing long-term cooperation—sales of services and constant income for the service provider—and the utility of the service's consumer.

An innovative approach to trust captures it as a balance of strategic interaction (moral hazard and uncertainty in political activities) between agents and policy makers with incentives for deviations [23]. Trust is a key element of society, playing a crucial role in creating interaction and relationships in the context of a platform and peer-to-peer service [24]. It is further defined as a derivative of the personality of the individual and perceived object reliability [25], and faith in others to provide accurate assessments based on the preferences of the active user. Global trust is the average opinion of the whole community about the credibility of the user [26,27], relying on others not to be used. On the other hand, being trustworthy means that you do not use others for lack of satisfaction [28]. Confidence is influenced by intensively and dynamically diverse factors that appear in diverse environments, including the environment of the economic entity and the individual. For example, citizens' place trust in local government authorities. The level of attachment to tourist events affects perception and emotional reactions, creating support based on the theory of social exchange and cognitive theory of assessment [29,30]. The main difference in the perception of trust from traditional and modern perspectives is the distinction of relationships. It should also be noted that these relations are primarily differentiated by the nature of contact—i.e., direct and online, which are associated with different degrees of risk and uncertainty. There is a need to provide the consumer with services; not only full information about the service offer is provided, but also a data set and company credentials. Such is the case when providing, for example, transport services.

Modern global trust models include user reputation calculations, and almost all traditional local trust models define trust between two users based on their previous interactions. Confidence in the classical interpretation usually means expectation and conviction. In turn, in the novel approach—a promise. A common element in the various definitions of trust is the intention to accept support based on positive expectations. A look at trust in transport services requires taking into consideration at least two points of view: the client's perspective and the perspective of a carrier. Further, the type of transport and the content of transport, i.e., passengers or freight, must also be considered. Taking into account the definitions of trust for the purposes of this article, the authors created a definition referring to the specificity of transport as close to Di Maggio [31] and Bachmann, Zaheer [13] treating trust as a factor enabling enterprises to better use the opportunities created by a variable security-based environment. So, the flow of goods and people is therefore a condition enabling organizations to face the complexity and volatility of economic reality. Furthermore, trust is based on the honoring of commitments and is a factor in facilitating the use of new opportunities provided by the changing environment [31].

Trust-related values are characteristics of service providers in relation to rational action, in accordance with the order of relations assigned to human-focused services. Among these traits, there should be a distinction between compulsiveness, accountability, credibility and a sense of mission. The desired direction, based on the idea of *Ordo*, is to shape the order corresponding to human nature, without which it is difficult or impossible to provide services [21].

In the framework of the presented positions, it is particularly important to place the issue of trust in transport. The problem of transport trust was raised in the studies by Ivuts and Matwiejczuk, who paid special attention to the contemporary complexity and multidimensionality of the transport process, as well as delivery time, which is considered one of the key factors determining the quality of transport services. The attractiveness of freight traffic is a fairly complex process, including services of various types of transport, forwarding services, handling of cargoes and their storage at terminals, etc. [32]. However, future-oriented, modern processes, including transport, require a continuous flow of information in order to constantly develop knowledge [33]. However, with regard to the movement of goods, services, and manpower, there are still many untapped possibilities for changing and extending economic activity. One of the solutions that can help to improve the business environment and economic growth is to ensure a unitary market [34].

As Załoga notes, in the context of the socioeconomic and political integration of the EU, liberalization is an appropriate method for the creation of a unitary market for transport services [35]. Regulation of the EU's transport services market has mainly relied on economic regulation of a structural nature (conditions for market access and the occupation of the carrier), which influenced the shaping of the supply side of services [35]. However, the interest in social regulation has increased in recent years. It has been caused by concern for the global environment, the need to ensure the safety of transport, and the users of transport services. As Załoga adds, economic and social regulations often seek to exclude, and even have conflicting objectives [35]. Sustainability is based on the principle of harmonization of objectives (economic, environmental, and social) and long-term actions with short-term decisions. Sustainability is linked to the need for development programming [36]. Alleviating these conflicting objectives is conducive to sustainable transport policies, derived from the idea of sustainable development [35]. One of the paradigms of sustainable transport is the paradigm shift—so-called modal shift. This paradigm is the expression of new patterns of production and consumption of services, relevant to environmental constraints [35]. Załoga notes the three conditions for the adoption of this paradigm in EU transport policy [35]:

1. The need to halt the dominance of road transport in the transport needs of society and the economy; road transport is characterized by a relatively high environmental impact and affects the barriers to supply of services of modes (congestion, occupancy of area).
2. The occurrence of high-substitutability services of inland (road and rail) and water transport.
3. High complementarity between modes and means of transport.

In principle, the paradigm shift refers to two types of shifts [35]:

- freight—from road transport to water or rail transport;
- people/passengers—from the use of passenger cars to public transport.

From the paradigm shift perspective, the functionality of complementary transport is important. Land transport (road and rail) is a condition for the operation of air and water transport, as it links these transport modes with their target markets [37]. Therefore, the question of cooperation and trust plays an important role.

According to Kożuch and Sienkiewicz-Małyjurek, the phenomenon of cooperation between organizations derives from the necessity of cooperation, goodwill, commitment, and trust [38]. This approach should, in principle, serve as a basis for the implementation of the paradigm shift. Moreover, from an analytical perspective, reference should be made to the approach by Jabłoński [39]. He points out that, when performing a multidimensional analysis, attention should be paid to the importance of public trust in value building. Trust becomes a determinant of the relationship between individual stakeholders and the audience of public value development [39]. These groups may be referred to as all transport users, including paradigm shift implementers and recipient services formed by the realization of this paradigm.

The literature describes many strategies for sustainable transport and decarbonization of transport. However, they are based on strategic areas, in which aspects such as the improvement of transport efficiency, fuel charges, reduction of carbon intensity, or energy intensity, are important [40–43]. Issues that are particularly discussed include, above all, transport demand, energy intensity of transport, intensity of carbon dioxide emissions from transport, modal shift, and transport activity [40–43]. However, all issues fall within the subject of the paradigm shift, because it takes into account the sensitive aspects of sustainable transport. During the analysis of these critical strategic areas for sustainable transport, it is important to take into account the spatial diversity [44,45].

An important contribution to the study of the paradigm shift in (marine) transport was provided by SHINOHARA [46]. It is true that the author did not use an econometric model, but rather presented a conceptual study based on methods of supporting the decision-making process. However, he referred to the mechanism of rationality for the maritime management processes, raising such aspects as

morality and ethics in favor of economic aspects. He drew attention to trust-oriented relations in light of the implementation of the paradigm shift [46].

Equally interesting are the studies conducted by Tuominen, Kanner, and Linkama [47]. The study was based on a theoretical approach to transport planning, using strategic political documents, empirical materials, and a survey addressed to European transport experts (including ERA-NET TRANSPORT, EPTR, and ECTRI networks). About 70 invitations to participate in the survey received 21 responses from experts from the following countries: Austria, France, Germany, Greece, Hungary, Lithuania, the Netherlands, Norway, Spain, Sweden, Switzerland, and the UK. The areas that were included in the study and which were part of the questions in the questionnaire concerned: new governance and organizational structures of the public sector, improved efficiency of the transport sector, transport design for the end-user of transport technologies and services, and new operational procedures to increase innovation in transport [47].

A slightly more recent study was conducted by Tattini, Gargiulo, and Karlsson on modal shifts in the transport sector in Denmark [48]. In their article, they did not use the name paradigm shift, but they referred to the paradigm of modeling, and their interpretation of the problem refers, in its essence, to the paradigm shift. Furthermore, they used the TIMES energy modeling method, focusing on the problems of operational research, and the scenario method. The authors focused on passenger transport, which is different from freight transport. The survey was carried out using data on transport infrastructure, time, fuel, and demand [48]. However, it should be emphasized that while the postulate regarding the need to decarbonize transport can also be transferred to research on freight transport, cargo transport has a completely different specificity and fulfills slightly different functions for the economy. Therefore, it also requires a different approach.

Also interesting are studies on the need for new methods in the paradigm shift of mobility towards sustainable accessibility [49]. Although the study refers to passenger transport, the method of forecasting using the BAU (business as usual) scenario method deserves attention. The study was presented based on Sweden, Norway, Hungary, and Poland. The analysis addressed the problem of decarbonization, energy efficiency, recoverable sources, and the social efficiency of transport. Transport efficiency, transport intensity, and technology level were also considered.

It is also worth mentioning the research carried out by Ercan, Onat, Tatari, and Mathias. They are also concerned with passenger transport (public transport), however, the approach to analysis was not timebound and the analysis deepened [50]. The authors studied the causality directionality between variables and constructed a dynamic development model. It included both macroeconomic factors and transport efficiency, as well as the negative impact on the environment. However, the discussion on multidimensional sensitivity analysis and policy analysis is interesting in these studies. On the one hand, behavioral limitations were tested for policy implications; on the other hand, they assessed leverage for policy implications [50].

There have not yet been any studies in which the paradigm shift in freight transport (especially intermodal transport) was examined in relation to the trust modeling. It should be pointed out that the presented approach is quite generalized, hence, it can only be treated as preliminary research, introducing deeper analyses. The presented approach is consistent with the concept presented in the *White Paper*. It is not easy to discuss the variables and research techniques used, because, in principle, the methodology was not proposed using the example of intermodal transport for long distances. On the one hand, it addressed implementing the needs of the economy and supporting other modes of transport, and, on the other hand, it was oriented on trust in the sense of implementing the paradigm shift. The authors have made every effort to fill this research gap and present a kind of novelty in terms of the methods used. The work mainly uses General Discrimination Analysis, which can be used to decide on the selection of trust-oriented or distress-oriented units. There are various studies where this method is used, for example: Ziolo, Porada-Rochoń, and Szaruga [51]; Safo and Ahn [52]; Chen and Jiang [53], or Dai and Li [54]. However, these studies were applied to completely different issues. The presented approach is aimed at introducing such a significant discussion as though

proposing a toolkit for assessing rather soft aspects, such as trust and distress, in the sense of the paradigm shift for transport. Therefore, the study of the modal shift potential of long-distance road freight in containers seems to be quite interesting in this context. The proposed approaches of the above researchers have led the authors to combine these aspects into one study.

3. Data, Methods, and Steps

In order to carry out the study on trust and distress prediction in the modal shift potential of long-distance road freight in containers, the secondary data from Eurostat [55] and OECD.Stat [56] databases were used. It was assumed that the research period is 2011–2015. The beginning of the research period coincides with the year of publication of the final *“White Paper: Roadmap to a Single European Transport Area—Towards a Competitive and Resource Efficient Transport System”* [57], and the end of this period is when data was last updated. Sixteen countries were included: Bulgaria, Czech Republic, Finland, France, Hungary, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, and the United Kingdom. The choice of countries was deliberately limited to the European territory, and was dictated by the quality, completeness, and availability of the data during the analysis period. The following designations and abbreviations for the representative variables in the paper were used (quantitative predictors express the environmental burden of transport; the abbreviations come from the first letters of keywords for variables that were considered for inclusion in the study):

- Trust: one of the dichotomous values for the DT variable for trust status, corresponds with value equal to 1;
- Distress: one of the dichotomous values for the DT variable for distress status, corresponds with value equal to 0;
- DT: qualitative dependent variable that is vector-encoded (dummy variable); takes the value equal to “Trust” (trust status, not distress) or “Distress” (distress status, not trust); to specify the value, the data from Eurostat database for the modal shift potential of long-distance road freight in containers [tran_im_mosp] were used (percentage of total tkm). In the event that this structure ratio has not increased in relation to the reference period (2011), the variable DT was equal to “Trust” (1); if has increased, then it took the value equal to “Distress” (0);
- TS: continuous predictor; modal shift potential of long-distance road freight in containers (in percentage of total tkm); data from Eurostat database [tran_im_mosp];
- RFTG: continuous predictor; road freight transport intensity (in tkm per 1000 units of current USD GDP); data from OECD.Stat [..IND-Meas-Roadgood-GDP];
- SRFT: continuous predictor; share of road freight transport in total inland freight transport (in percentage); data from OECD.Stat [..IND-Meas-Roadgood-Share];
- CO2EG: continuous predictor; CO₂ emissions from transport (in tonnes per 1,000,000 units of current USD GDP); data from OECD.Stat [..IND-Ene-GDP];
- SCO2: continuous predictor; share of CO₂ emissions from road in total CO₂ emissions from transport (in percentage), data from OECD.Stat [..IND-Ene-Road];
- ENRTG: continuous predictor; energy intensity of road transport expressed by ratio of motor fuel deliveries (in tonnes per 1,000,000 units of current USD GDP); data from OECD.Stat [..IND-Ene-Fuel-GDP].

The division into a dependent variable and continuous predictors was made using the top-down method based on the expert knowledge of the authors; it also resulted from the hypothesis and purpose of the study. However, it should be emphasized that there are econometric methods of division into endogenous and exogenous or quasi-exogenous variables, in which numbers of lags and the degree of cointegration also play an important role. This group includes Vector Autoregressive Models, Vector Error Correction Models (and their structural forms), and Granger causality tests (in the sense

of immediate and delayed causality). The authors have done several other studies in the search for the direction of dependence, the chain of causes, and feedback using these methods [58–62]. However, in this study, the authors focused on a completely different perspective, focusing on the problem of trust orientation.

The authors propose the following research framework (Figure 1) that can be used to conduct similar studies on examples from other countries or groups of countries. Each stage in the below procedure is described in further parts of the work. However, the results from the implementation of this procedure are described in the next part of the work.

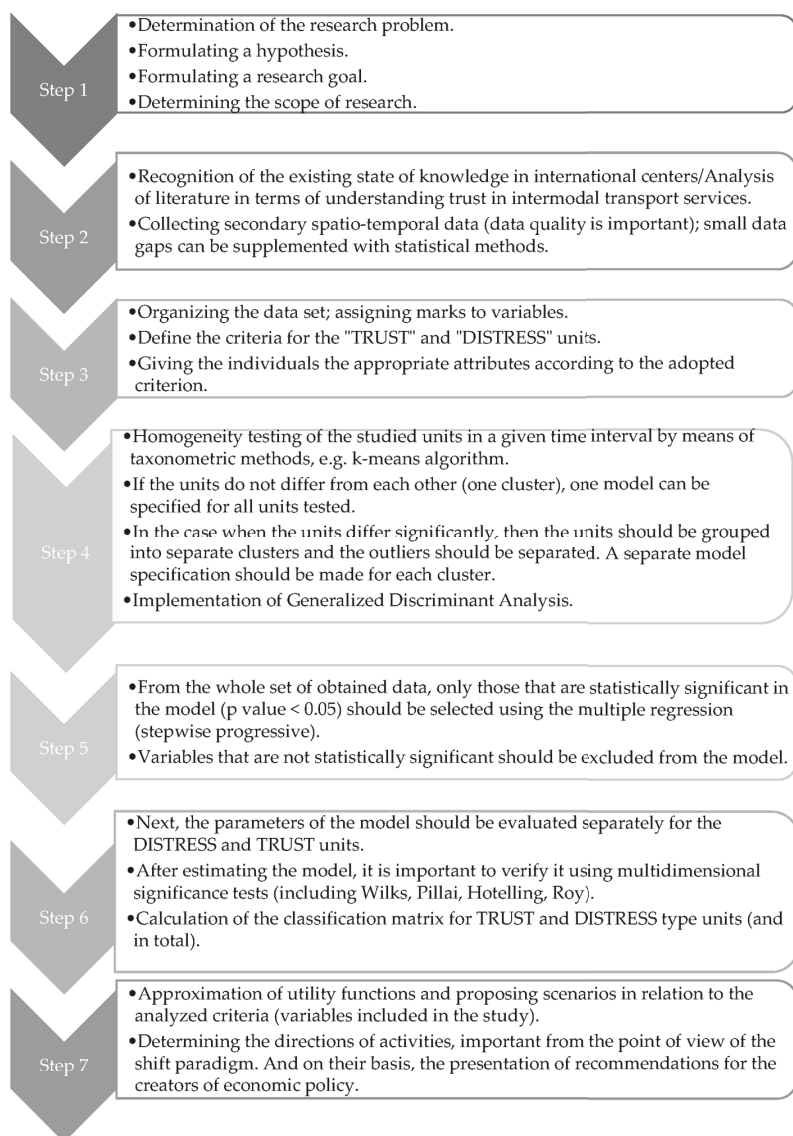


Figure 1. An original proposal for a framework. Source: own calculation elaboration.

The first step in the study was to identify the status (trust/distress) of each country and year on the basis of the criteria described below (Table 1). It was assumed that EU countries that have implemented the paradigm shift (during 2011–2015), which are inscribed in the sustainable transport policy, can be called TRUST. Those that have not realized it (during 2011–2015) were named DISTRESS.

Table 1. Countries and years with trust status and distress status in the modal shift potential of long-distance road freight in containers for selected European countries.

Country	2011	2012	2013	2014	2015
Bulgaria	Trust	Trust	Trust	Trust	Trust
Czech Republic	Trust	Distress	Distress	Trust	Trust
Finland	Trust	Distress	Trust	Distress	Trust
France	Trust	Trust	Distress	Distress	Trust
Hungary	Trust	Distress	Distress	Distress	Distress
Latvia	Trust	Distress	Trust	Trust	Trust
Lithuania	Trust	Distress	Distress	Distress	Trust
Luxembourg	Trust	Distress	Trust	Trust	Trust
Netherlands	Trust	Trust	Trust	Trust	Trust
Poland	Trust	Trust	Distress	Distress	Trust
Portugal	Trust	Trust	Trust	Trust	Trust
Slovak Republic	Trust	Trust	Trust	Trust	Trust
Slovenia	Trust	Distress	Trust	Trust	Distress
Spain	Trust	Trust	Distress	Trust	Trust
Sweden	Trust	Trust	Distress	Trust	Trust
United Kingdom	Trust	Distress	Trust	Trust	Trust

Source: own elaboration based on data from Eurostat [tran_im_mosp] <http://ec.europa.eu/eurostat/data/database> (access: 2 May 2018).

As indicated in Table 1, Bulgaria, Netherlands, Portugal, and Slovak Republic had the trust status throughout the entire period considered, which means that they had implemented the principles of the paradigm shift in 2011–2015. Hungary, which, in the years 2012–2015, had a distress status relative to the paradigm shift, remains in that context. Among the countries that were marked with the distress status for only one calendar year were: Latvia, Luxembourg, Spain, Sweden, and the United Kingdom. Apart from being the reference year, the year 2011 was characterized by having the highest number of states with the status of trust (87.5%). The situation was bad in 2012—as many as 50% of the analyzed countries had the status of distress.

The next stage of the study consisted of classifying the examined countries into clusters due to similar features. This stage is necessary due to the possibility of outliers or the occurrence of several smaller clusters (composed of several countries that are similar in terms of the studied statistical features). If outlier observations are not identified, or smaller clusters are not isolated (the distance from the center is similar), it is possible to specify and estimate one model for all tested units (states). Then, these units are treated as one focus. In short, this stage can be defined as a preliminary assessment of the spatial differentiation of the studied features. For this purpose, the k-means algorithm was used (taking into account standardization, the measure of Euclidean distance, and maximization of cluster distances from initial centers). Previously, the test was conducted using a test sample, where it was assumed that the minimum number of clusters is 1, and the maximum is 16; the minimum decrease is 5%. As a result of the clustering properties assessment, only one cluster was verified, and the distances from the center of the cluster were estimated (Table 2).

Table 2. Distances from the center of the cluster.

Country	2011	2012	2013	2014	2015
Bulgaria	1.0509	0.8743	0.9040	0.9104	1.2677
Czech Republic	1.1539	1.4682	1.4597	1.0809	1.1800
Finland	1.2261	1.4941	1.1449	1.4995	1.2797
France	1.1918	1.1200	1.4784	1.5034	1.1979
Hungary	1.1646	1.4722	1.4447	1.4739	1.5637
Latvia	1.4598	1.6924	1.2742	1.2750	1.3906
Lithuania	1.3194	1.5994	1.6095	1.6149	1.3956
Luxembourg	1.3144	1.5965	1.1838	1.1881	1.2510
Netherlands	1.3930	1.3373	1.3369	1.3530	1.4444
Poland	1.2312	1.1528	1.5352	1.5337	1.2991
Portugal	1.1811	1.1163	1.0778	1.1056	1.1961
Slovak Republic	1.3350	1.3252	1.1364	1.1790	1.2453
Slovenia	1.4236	1.7351	1.3847	1.3661	1.7967
Spain	1.2731	1.1786	1.5885	1.1301	1.1964
Sweden	1.2385	1.1674	1.5128	1.1998	1.2667
United Kingdom	1.2335	1.5241	1.1573	1.2246	1.2884

Source: own calculation based on data from Eurostat [tran_im_mosp] <http://ec.europa.eu/eurostat/data/database> and OECD.Stat [..IND-Meas-Roadgood-GDP; ..IND-Meas-Roadgood-Share; ..IND-Ene-GDP; ..IND-Ene-Road; ..IND-Ene-Fuel-GDP] <http://stats.oecd.org/> (access: 2 May 2018).

By means of the estimated Euclidean distances from the center of the cluster using the k-means method, it can be concluded that there were no years when any of the countries significantly differed from each other for the studied statistical features. There were no outliers were detected. Therefore, all years and all countries can be included in one model without the need to divide the sample into smaller ones.

The next stage of the research was the evaluation of the variability of the variables under investigation, and then the estimation of the model parameters using GDA. After positive verification of the model for the desired properties, an approximation of the utility function was made. To this end, the utility function for TRUST was defined:

- low-for 0.00, utility is 0.00,
- indirect: for 0.50, utility equal to 0.50,
- high: for 1.00, utility 1.00

whereby optimum values were assigned to the factors. The curvature of s (low) is equal to 1.00 and t (high) is equal to 1.00. The inverse range would have the usability function for DISTRESS for low value of high usability and for high value of low usability. In practice, it only required replacing colors on the service contour profiles of scenarios (see Section 3). The test culminated in obtaining profiles for a posteriori and utility probabilities. The empirical results are shown in the following section.

4. Empirical Results

Table 3 shows the basic descriptive statistics for the variables examined. The data show that the greatest variability (in the spatial–temporal dimension) characterized the variable RFTG, and the smallest was for SCO2. The variability in the spatial–temporal dimension of the remaining variables was at a predictable level of 30–40%.

Table 4 provides a summary of the multiple regression (stepwise progressive). In four stages, it was possible to determine the variables included in the model and those excluded from it. Only three variables were significant from the point of view of the conducted study, i.e., TS, CO2EG, and ENRTG. Therefore, the parameters of the General Discriminant Analysis (GDA) were evaluated further, with all effects at the next stage.

Table 3. Basic descriptive statistics for cluster.

Variable	Mean	Standard Deviation	Variation Coefficient
TS	53.9900	17.4480	32.3171
RFTG	227.7875	181.8065	79.8141
SRFT	70.2575	19.4214	27.6431
CO2EG	76.9625	31.6230	41.0888
SCO2	95.0375	3.3246	3.4982
ENRTG	23.5375	10.4093	44.2242

Source: own calculation based on data from Eurostat [tran_im_mosp] <http://ec.europa.eu/eurostat/data/database> and OECD.Stat [..IND-Meas-Roadgood-GDP; ..IND-Meas-Roadgood-Share; ..IND-Ene-GDP; ..IND-Ene-Road; ..IND-Ene-Fuel-GDP] <http://stats.oecd.org/> (access: 2 May 2018).

Table 4. Multiple regression summary (stepwise progressive).

Effect	Steps	F to Put	P to Put	Decision
TS	Step 1	7.89943	0.006250	Entered
RFTG		0.44796	0.505283	Outside
SRFT		0.32878	0.568026	Outside
CO2EG		0.00414	0.948879	Outside
SCO2		1.09327	0.298977	Outside
ENRTG		1.13102	0.290839	Outside
TS	Step 2			In model
RFTG		1.85578	0.177084	Outside
SRFT		0.08135	0.776241	Outside
CO2EG		11.43696	0.001134	Entered
SCO2		0.80317	0.372940	Outside
ENRTG		0.65892	0.419444	Outside
TS	Step 3			In model
CO2EG				In model
SRFT		0.00513	0.943069	Outside
RFTG		0.40656	0.525637	Outside
SCO2		1.67220	0.199882	Outside
ENRTG		4.20252	0.043813	Entered
TS	Step 4			In model
CO2EG				In model
ENRTG				In model
RFTG		0.28034	0.598040	Outside
CO2EG		0.16052	0.689815	Outside
SRFT		0.26922	0.605384	Outside

The variables that have been included in the model are highlighted in bold. Source: own calculation based on data from Eurostat [tran_im_mosp] <http://ec.europa.eu/eurostat/data/database> and OECD.Stat [..IND-Meas-Roadgood-GDP; ..IND-Meas-Roadgood-Share; ..IND-Ene-GDP; ..IND-Ene-Road; ..IND-Ene-Fuel-GDP] <http://stats.oecd.org/> (access: 2 May 2018).

The model includes only those variables that are statistically significantly different from zero. The main test the re-estimation procedure, followed by *p*-value evaluation. If the value was less than 0.05, the variable was included in the model. Each step of this procedure involved re-estimation of all variables and selection of one for which the *p*-value was less than 0.05. At each next stage, re-estimation was performed on only those variables whose *p*-value was greater than 0.05 (i.e., after elimination of the variable included in the model from the previous step). This procedure may have many stages, however, it ends when, in the set of variables not included in the model, a *p*-value lower than 0.05 cannot be obtained (see step 4). In this way, the set of variables was depleted, so the study only accounted for statistically significant variables that do not cause the model's quality to deteriorate.

Subsequently, the parameters of the General Discriminant Analysis (GDA) were evaluated (Table 5). The analysis of standardized coefficient β (beta) shows that the strongest influence on

the recognition of countries with the status of trust or distress is expressed by CO2EG, then TS and ENRTG. The standardized coefficient shows which variables are the most efficient in discriminating between trust and distress countries. The contribution to discriminating between the trust and distress class is distributed as follows: approx. 66.71% from TS, 79.37% from CO2EG, and 35.76% from ENRTG. The correct recognition of countries as trust units is indicated by the positive contribution of CO2EG and with negative TS and ENRTG. The opposite influence with the same level of discriminating efficiency was noted for distress units.

Table 5. The parameters evaluation of GDA for 16 analyzed countries (cluster).

Effect	Trust Parameter	Trust Standard Deviation	Trust t	Trust p-Value	Trust β	Trust Standard Deviation β
Const	1.1479	0.1463	7.8437	0.0000		
TS	−0.0172	0.0038	−4.5288	0.0000	−0.6671	0.1473
CO2EG	0.0113	0.0029	3.9158	0.0002	0.7937	0.2027
ENRTG	−0.0154	0.0075	−2.0500	0.0438	−0.3576	0.1744
Effect	Distress Parameter	Distress Standard Deviation	Distress t	Distress p-Value	Distress β	Distress Standard Deviation β
Const	−0.1479	0.1463	−1.0105	0.3155 ¹		
TS	0.0172	0.0038	4.5288	0.0000	0.6671	0.1473
CO2EG	−0.0113	0.0029	−3.9158	0.0002	−0.7937	0.2027
ENRTG	0.0154	0.0075	2.0500	0.0438	0.3576	0.1744

¹ no statistical significance. Source: own calculation based on data from Eurostat [tran_im_mosp] <http://ec.europa.eu/eurostat/data/database> and OECD.Stat [..IND-Meas-Roadgood-GDP; ..IND-Meas-Roadgood-Share; ..IND-Ene-GDP; ..IND-Ene-Road; ..IND-Ene-Fuel-GDP] <http://stats.oecd.org/> (access: 2 May 2018).

Table 6 presents descriptive statistics for individual classes. Countries with the status of trust had, on average, lower energy intensity than countries with the distress status, and, to greater extent, they used transport modes other than the road (difference of 12 percentage points) in long-distance freight transport in containers. They also had a higher intensity of carbon dioxide than the states with distress status. However, it should be noted that the trust class has as many as 72.5% of the observations, and the distress class is the remaining 27.5%, so the difference in the intensity of carbon dioxide emission is insignificant.

Table 6. Basic descriptive statistics of predicates in classes.

Variable	Mean	Standard Deviation	Variation Coefficient	Mean	Standard Deviation	Variation Coefficient
Trust ($p = 0.7250$)			Distress ($p = 0.2750$)			
TS	50.7517	17.6560	34.7890	62.5273	13.9207	22.2634
CO2EG	77.1035	34.0808	44.2014	76.5909	24.6802	32.2234
ENRTG	22.7759	10.8871	47.8010	25.5455	8.9481	35.0281

Source: own calculation based on data from Eurostat [tran_im_mosp] <http://ec.europa.eu/eurostat/data/database> and OECD.Stat [..IND-Meas-Roadgood-GDP; ..IND-Meas-Roadgood-Share; ..IND-Ene-GDP; ..IND-Ene-Road; ..IND-Ene-Fuel-GDP] <http://stats.oecd.org/> (access: 2 May 2018).

Table 7 presents the tests of decomposition of effective hypotheses, verifying the significance of the variables used to identify trustworthy and unreliable units. Verification tests of Wilks, Pillai, Hotelling, and Roy show that all variables were significant. This analysis confirms that the selection of variables carried out in the previous stage was correct and did not disturb the information values of the model that can be read from it.

Table 7. Multivariate tests of significance.

Effect	Test	Value	F	Effect-df	Error-df	p
Const	Wilks	0.5526	61.5232	1	76	0.0000
	Pillai	0.4474	61.5232	1	76	0.0000
	Hotelling	0.8095	61.5232	1	76	0.0000
	Roy	0.8095	61.5232	1	76	0.0000
TS	Wilks	0.7875	20.5101	1	76	0.0000
	Pillai	0.2125	20.5101	1	76	0.0000
	Hotelling	0.2699	20.5101	1	76	0.0000
	Roy	0.2699	20.5101	1	76	0.0000
CO2EG	Wilks	0.8321	15.3336	1	76	0.0002
	Pillai	0.1679	15.3336	1	76	0.0002
	Hotelling	0.2018	15.3336	1	76	0.0002
	Roy	0.2018	15.3336	1	76	0.0002
ENRTG	Wilks	0.9476	4.2025	1	76	0.0438
	Pillai	0.0524	4.2025	1	76	0.0438
	Hotelling	0.0553	4.2025	1	76	0.0438
	Roy	0.0553	4.2025	1	76	0.0438

Source: own calculation based on data from Eurostat [tran_im_mosp] <http://ec.europa.eu/eurostat/data/database> and OECD.Stat [..IND-Meas-Roadgood-GDP; ..IND-Meas-Roadgood-Share; ..IND-Ene-GDP; ..IND-Ene-Road; ..IND-Ene-Fuel-GDP] <http://stats.oecd.org/> (access: 2 May 2018).

Table 8 contains the percentages of countries correctly classified as a trust or distress class. The model allowed classification of up to 80% of cases into two groups. The model was more accurate for trusted units than untrusted ones. On this basis, the units with the trust status will be selected with greater probability than those with the status of distress. As many as 93% of the variables can correctly identify those units that will meet the criteria for achieving trust, but only in 45% can be selected those units that will change direction to the status of distress.

Table 8. Classification matrix to trust (1) or distress (0) for cluster.

Class	Percent-Correct	Trust	Distress
Trust	93.10345	54.00000	4.00000
Distress	45.45455	12.00000	10.00000
Totality	80.00000	66.00000	14.00000

Source: own calculation based on data from Eurostat [tran_im_mosp] <http://ec.europa.eu/eurostat/data/database> and OECD.Stat [..IND-Meas-Roadgood-GDP; ..IND-Meas-Roadgood-Share; ..IND-Ene-GDP; ..IND-Ene-Road; ..IND-Ene-Fuel-GDP] <http://stats.oecd.org/> (access: 2 May 2018).

Figure 2 shows the utility ranges of the examined criteria for the assessment of trust or distress in the modal shift potential of long-distance road freight in containers for selected European countries (scenarios). Red fields mean high utility, which is desirable (TRUST), and green low utility, which undesirable (DISTRESS). This means that there is not one optimal scenario for the implementation of the paradigm shift, and there are infinitely many of them. It is similar when it comes to DISTRESS.

As can be seen from Figure 2a, the usefulness in assessing TRUST type units from the point of view of realizing the paradigm shift is higher when the intensity of carbon dioxide emissions from transport is high at each level of modal shift. If the intensity of carbon dioxide emissions reaches, for example, a value of around 100 tonnes per 1 mln units of current USD GDP, road transport is best used only for handling 30% of cargo transport for long distances. However, these ranges are very wide (they are not linear). This means that for some countries, even with very high intensities of carbon dioxide emissions, cargo handling by road transport is ca. 80% advantageous. It may be conditioned by the quality, availability, and density of transport infrastructure (e.g., terminals, roads, etc.).

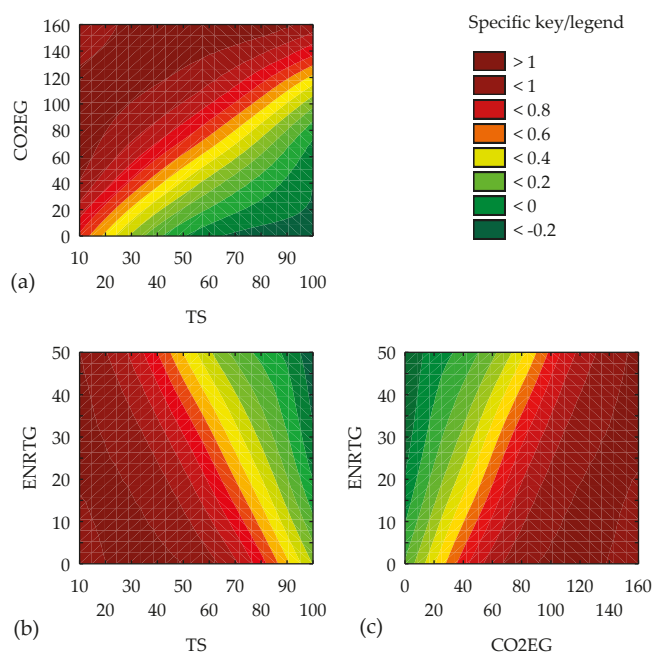


Figure 2. (a) Utility of the assessment of trust or distress, depending on the intensity of carbon dioxide emissions in transport and modal shift potential of long-distance road freight in containers for selected European countries; (b) utility of the assessment of trust or distress, depending on the energy intensity of road transport and modal shift potential of long-distance road freight in containers for selected European countries; (c) utility of the assessment of trust or distress depending on the energy intensity of road transport and the intensity of carbon dioxide emissions in transport. Source: own calculations based on data from Eurostat [tran_im_mosp] <http://ec.europa.eu/eurostat/data/database> and OECD.Stat [..IND-Meas-Roadgood-GDP; ..IND-Meas-Roadgood-Share; ..IND-Ene-GDP; ..IND-Ene-Road; ..IND-Ene-Fuel-GDP] <http://stats.oecd.org/> (access: 2 May 2018).

The results from Figure 2b are rather interesting for energy consumption of this type of transport in relation to its potential. As can be seen from the figure, at almost every level of energy consumption, road transport could handle 10–70% of cargo transport, above 70% usability falls, which means that the implementation of the paradigm shift is not threatened.

However, in Figure 2c, it can be noticed that the need to apply the paradigm shift occurs only at high levels of carbon dioxide emission intensity at each level of energy consumption in road transport. If the intensity of carbon dioxide emissions is not too high, then the implementation of the paradigm shift is not desirable.

In the summary of the investigation, the profiles for a posteriori and utility probabilities appear (Figure 3). The first row (four diagrams) refers to units with the “TRUST” status, and the second row is of units with the “DISTRESS” status. Diagrams in the third row—the last three drawings—relate to the general usefulness for all units under study. It is shown that the selected variables for the identification of the EU countries with the status of TRUST were well-founded. Total utility oscillated within the limits of 0.99. Furthermore, it is noteworthy to underline that the aggregate probabilities are 1.00, which indicates a properly conducted study.

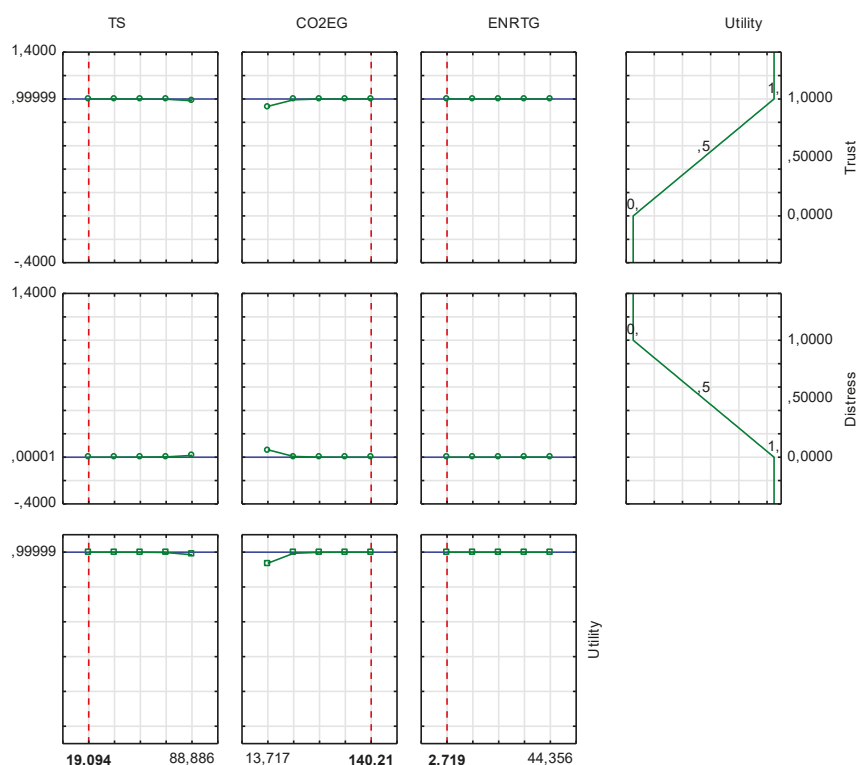


Figure 3. Profiles for a posteriori and utility probabilities. Source: own calculations based on data from Eurostat [tran_im_mosp] <http://ec.europa.eu/eurostat/data/database> and OECD.Stat [..IND-Meas-Roadgood-GDP; ..IND-Meas-Roadgood-Share; ..IND-Ene-GDP; ..IND-Ene-Road; ..IND-Ene-Fuel-GDP] <http://stats.oecd.org/> (access: 2 May 2018).

5. Discussion

The conducted research confirms that the quantitative approach to the issue of trust (non-quantitative) is worth deepening and developing. There are not many quantitative studies on trust in economics, and a negligible number in transport. However, no research was done on modal shift potential of long-distance road freight in containers (expresses the scope of intermodal transport activities). The authors managed to combine three very broad terms: trust, sustainability, and shift, and propose a methodology and the results of their research. The hypothesis has been verified and the goals were achieved.

Only three predictors were significantly different from zero: TS, CO2EG, and ENRTG (Table 4). This means that the standardized coefficient β indicates which variables are the most efficient in discriminating between trust and distress countries (Table 5). The most efficient in discriminating between these two groups was CO2EG (contribution above 20%), followed by ENRTG—contribution is above 17%—and TS, with a of contribution approx. 15%. In this discriminatory analysis, all variables in the analysis were important to the results indicated by the Wilks, Pillai, Hotelling, and Roy tests (Table 7). On the basis of the model, it is more likely to predict units that will implement the paradigm shift (probability of about 93%) than those that will be characterized by the erosion of confidence in the paradigm shift (45% probability). This may mean that it is more likely to correctly identify trustworthy units than those that will lose our trust (Table 8).

The model enables a correct classification of 80.00% cases to trust and distress group (both).

Regarding the usability ranges of the examined criteria for the assessment of trust or distress with respect to the possibility of the modal shift of long-distance road transport in containers for selected European countries (Figure 1), it should be noted that the choice of the optimal scenario depends only on the utility value that satisfies the decision maker. Optimal scenarios are infinitely many, depending on the extent of the burden on the environment; you can assess how strong changes can be made to be able to implement the idea of sustainable development. The impedance range of the paradigm shift is very flexible, allowing adaptation to dynamically changing macroeconomic conditions, sometimes even turbulent ones. Therefore, the authors are deeply convinced that the proposed approach is a contribution to the creation of a comprehensive methodology of trust and distress prediction in intermodal transport in the light of the challenges of sustainable development.

Based on the results and conclusions of the research, the authors' own definition of trust in intermodal transport was formulated. Trust in the modal shift potential of long-distance road freight in containers is based on the implementation of the paradigm shift that is engrained in the idea of sustainable transport. It is expressed by the scale of the environmental burden of transport activity, use of a vector, modal shift potential of long-distance road freight in containers, and CO₂ emissions from the road, in total CO₂ emissions from transport and motor fuel deliveries (own definition, Elżbieta Szaruga and Elżbieta Załoga). Ensuring safety in the implementation of the paradigm shift is therefore an integral element of trust and a form of protection against threats. This applies in transport to ensure continuity in meeting transport needs with various transport modes (own definition, Elżbieta Skapska and Wiesław Matwiejczuk).

In the future, it is worth expanding the research by proposing models for each country, taking into account a wider range of macroeconomic conditions and the drifting of the economy. An inseparable element of the changing drift is structural shocks, which may indicate the participation of the main factors of disruption/erosion of trust.

6. Conclusions

In summary, several important conclusions can be formulated for policy makers, namely:

1. It is necessary to carry out expert opinions related to the implementation of the paradigm shift and set goals and scope of implementation of the paradigm's assumptions.
2. Each country has a different specificity, but there are also points of contact with other countries. Therefore, all kinds of analyses could be carried out both internationally and in-depth on a national basis.
3. It is also important to develop own methodology: unique for a given country and universal for different countries for comparison purposes.
4. It is necessary to deepen the discussion on the selection of analysis tools in light of the assessment of the implementation of the paradigm shift.
5. Based on the research, it is worth knowing the implications for the chosen scenario and create a decision support system.
6. Using utility profiles, it is possible to analyze tolerance ranges and suggest tools that limit or extend tolerance margins.

There are many different practical solutions that make it possible to successfully implement the paradigm shift, e.g., replacing certain activities with IT technologies, improving the efficiency of transport means, increasing the density of infrastructure, increasing the availability of terminals, financial investments in intelligent technology solutions for economy and transport, consolidation and deconsolidation of loads on large and small distances, and introducing appropriate charges. However, when implementing any solution, it is important to monitor its impact on achieving the goal. The proposed methodology is to serve this purpose, because many different dimensions can be analyzed, not only those proposed by the authors.

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Article

The Effects of Inter-Partner Trust on Third-Country Relocation of International Joint Ventures in China

Yong-Sik Hwang ^{1,*} and Kidong Kim ²¹ School of Business, Sejong University, Seoul 05006, Korea² Korea Fire Facility Association, Seoul 06694, Korea; kdkim@ekffa.or.kr

* Correspondence: yhwang@sejong.ac.kr; Tel.: +82-2-3408-3175

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Abstract: This study explores how inter-partner trust in international joint ventures (IJV) affects third country relocation decisions as foreign partners face an uncertain business environment in China due to wage increases and competition from local companies intensifies. As the concept of third-country relocation is relatively new compared to other international business concepts, it is crucial to find a solid framework that can explain this phenomenon. A study of 232 Korean IJVs operating in China was used to assess the relationship between inter-partner trust and third-country relocation intention. Also, we measured moderating variables that strengthen (plant performance, asset specificity, coercive pressure) and weaken (mimetic pressure and normative pressure) the negative relationship between trust and third-country relocation intention. The main effect and interaction effects were significant in showing that inter-partner trust hinders decisions on IJV's third-country relocation. In addition, the results show that trust and third-country relocation relationship interact with other moderating variables. In conclusion, our study suggests that foreign IJVs should explore various aspects such as inter-partner relationships and internal and institutional factors before making decisions on IJV relocation.

Keywords: trust; international joint venture; third-country relocation; foreign direct investment; asset specificity; institutional theory

1. Introduction

Many foreign manufacturing firms operating in China have been facing increased competitive pressure from recent economic transformations. Particularly, average wage increases that are expected to be 8.6% in 2015, two-thirds higher than in Vietnam [1]. In addition to wage increase pressures, the Chinese government has transformed the economic structure from labor intensiveness to new technology-oriented businesses such as 3-D printing and high-end machine development.

Foreign manufacturing firms, which are usually in labor-intensive sectors—such as toys, clothing, and other light manufacturing industries—perceive the transformation as institutional pressures that may cause them to suspend operations in China. The Boston Consulting Group recently surveyed 106 U.S. manufacturing firms operating in China and found that 37% intend to relocate their manufacturing bases to nations that have less institutional pressure [2]. Also, global corporations—including GE, Whirlpool, Toshiba, Foxconn, and Canon—have announced that they will relocate some of their Chinese manufacturing plants to other foreign countries or to their home counties.

China is clearly experiencing relocation disturbances in its manufacturing sector. Global manufacturers operating in China know that relocations are important strategic options involving external uncertainties. Manufacturers considering relocation must evaluate how they are affected by several risk factors [3] such as new governmental/political, macroeconomic, managerial, and competitive environments, cost escalation, hidden costs, future contract negotiation issues, loss of core competencies, and opportunism by partner firms.

Recently, however, some foreign manufacturing firms have begun relocating elsewhere, mostly to the Southeast Asian (ASEAN) region. For instance, in 2001, China had 40% of the world volume in the manufacturing of shoes, but by 2010, Vietnam had seized 37% of the world volume, and China had dropped to 34% [4]. The migration phenomenon is mainly related to increased wages in the Chinese workforce. In 2012, 25 provinces in China increased their average minimum wages by 20.2%. As of 2015, those wages are expected to increase an average of 13% yearly [5]. Specifically, the base wages for entry-level factory workers are approximately 71% higher than they were five years ago.

The wage increases have widened the wage gap between workers in China and workers in other ASEAN regions. For example, in 2013, China's labor cost was 224.8% higher than it was in Cambodia, 182% higher than that of Bangladesh, and 195.3% higher than that of Vietnam [5]. Moreover, the appreciation of Yuan currency, rising raw material prices, and strict environmental and labor laws add to the difficulty of making profits in China. Simultaneously, ASEAN countries are aggressively promoting investment in manufacturing sectors. One incentive they offer is the exemption of import tariffs on previously operated equipment from China for future manufacturing plants.

As a manufacturing firm's relocation strategy is relatively new terminology within the field of international business, academic research on relocation is mainly focusing 'reshoring' topic [6–8]. Reshoring is defined as the relocation of value creation activities from offshore locations to home country locations [6–8]. Specifically, reshoring is defined as the reverse decision of a previous decision to offshore. However, we found a research gap that reshoring does not represent relocation of manufacturing firms since some foreign manufacturers cannot reshore to their home country for some reasons. For Korean manufacturing companies operating in China, they are reluctant to reshore to their home country, South Korea, mainly because of Korea's high labor costs [9]. Unfortunately, intense competition with local Chinese competitors and other business environmental changes drove many to relocate their facilities to Korea or to third countries such as ASEAN nations [9]. Instead, Korean manufacturers opt for more practical decision to relocate to third countries such as ASEAN nations. In this study, we call this type of relocation as 'third-country relocation' and third-country relocation is defined as the relocation of value creation activities from offshore locations to other offshore locations. We find that relocation research is more focused on reshoring issue than third-country relocation. Therefore, in this research, we will further explore the topic of third-country relocation and this concept will be explained in detail following section.

A reshoring paper by Fratocchi et al. [6] summarizes the motivations for manufacturing reshoring by addressing why the phenomenon happens in the manufacturing sector. Specifically, the authors propose that manufacturing firms mainly consider reshoring for cost efficiency. They also note that in addition to the minimization of overall costs, there might be other aspects related to manufacturing reshoring. A study by Foerstl et al. [7] also proposes that manufacturing firms may not only have cost factors in mind. In addition to cost factors, researchers may consider other internal and external factors that shape decisions on reshoring. In this research, we will further explore additional motivations for third-country relocation other than cost factors.

Also, as many foreign manufacturers enter China in international joint ventures (IJV), scholars in the IJV area have been investigating the role of 'inter-partner trust' to explain how foreign manufacturers manage the relational aspect with local Chinese partners [10–12]. Particularly, most research on inter-partner trust in IJV has focused on performance aspects in China rather than relocation decision making. In this study, we also examine how inter-partner trust has different effects on third-country relocation decisions depending on the level of the internal aspects of a manufacturing firm and institutional pressures perceived by foreign manufacturers. We assume that the internal dynamics of the firms in the decision-making process are significant and that they lead to a relocation decision. Firms are path-dependent and may make relocation decisions based on their internal situation, such as asset-specific resources and current firm performance. Before making decisions on third-country relocation, manufacturing firms need to consider how much they have invested in the current operating location and how they have been performing over the years.

In addition, manufacturing operations in China are heavily influenced by formal and informal institutional changes [13] involving macroeconomic government policies and regulations. Previous research applied institutional theory [14,15] to explain how multinational firms manage institutional changes. The institutional perspective is appropriate for exploring how isomorphic pressure coming from institutional changes shapes firms’ decision making [16,17] such as third-country relocation decisions. Although trust helps foreign manufacturers to cope with external uncertainties, we assume that this relationship can be moderated depending on the degree of institutional pressure surrounding the foreign manufacturers.

Furthermore, our research explores the relocation phenomenon from an Asian perspective. Earlier relocation (reshoring) research used either U.S. or European manufacturing firms’ samples [6–8]. Thus, the topic of relocation should not be limited to only Western manufacturers, because Asian manufacturers from South Korea and Japan also entered China throughout the 1990s and 2000s. As of 2016, there are 1967 Korean manufacturers operating in China [18].

In the next section, we introduce the relevant theory and hypotheses. In the third section, we introduce the data and methodology used, followed by analytical results and further elaboration of empirical results. The last section concludes with discussions of study results, significance, and limitations of the research, and further research issues.

2. Literature Review and Hypotheses Development

2.1. Third-Country Relocation

We categorize firm relocation strategies using a four-field matrix (Figure 1) including domestic relocation, internationalization, reshoring, and third-country relocation. Domestic relocation began in the 1950s when European and American firms started searching for new locations [19]. Theories have taken three perspectives to explain reasons for domestic relocations: neoclassical, behavioral, and institutional location [19]. The neo-classical location theory explains that when costs increase and when current locations are no longer inside profitability spatial margins, firms relocate to maximize profit. The behavioral location theory explains that internal factors such as growth and performance [20] affect relocation decisions. The institutional location theory explains that relocation strategies depend on ongoing social, institutional, and governmental interactions [19].

		Current Location	
		Domestic	International
Relocating Location	Domestic	Domestic Relocation	Reshoring
	International	Internationalization	Third-Country Relocation

Figure 1. Four types of firm relocation strategy.

As many firms started relocating their manufacturing bases from domestic to international locations (internationalization), international business researchers began to study internationalization theoretically and empirically [21,22]. They suggested powerful frameworks such as

“internationalization theory” and the “eclectic paradigm of ownership” to explain why firms relocate from domestic to international bases. In the early stage of internationalization, labor-intensive activities were most likely to be relocated overseas, whereas capital-intensive activities stayed in their domestic locations.

Internationalization introduced new problems such as growing transaction and coordination costs, instability of government policy, opportunistic behavior of local partners, cultural differences, and difficulties in supply and material handling. Consequently, some internationalized firms began considering second relocations, either back to their home country (reshoring) or to another international location (third-country relocation). If they choose reshoring, they relocate production activities from the international location to the domestic location [23].

Although researchers have studied domestic relocations, internationalizations, and reshoring for several decades, the literature has failed to consider relocation activities in firms that move from one foreign location to another (shaded area in Figure 1), as is recently occurring in China. We call this type of relocation activity third-country relocation.

Previous literature on relocation describes the factors that drive foreign manufacturing firms to relocate to other countries. The first driver of relocation decision is explained well by transaction cost economics (TCE), which states that individual firms tend to move away from a higher cost location to a lower cost location [24]. In respect to third-country relocation decisions, manufacturing firms may decide to relocate to a third country if the firms find that locating production activities in the third country is cheaper than retaining the current facility. With respect to trust, opportunism from local partner firms plays a major role in relocation. Opportunism describes when transaction partners act with self-interest [24]. For instance, 21.9% of Japanese manufacturing firms operating overseas perceive that technology leakage is a serious problem [25]. If a certain technology is critical for a foreign manufacturing firm’s competitive advantage, they must pay extra attention to intellectual property protection. Eventually, the opportunism of local partner firms may increase transaction costs with higher coordination and control costs, resulting in relocation alternatives [26].

The second driving factor of relocation is the financial performance of offshoring manufacturing firms. Financially under-performing foreign manufacturers tend to have a shorter duration of offshoring than high-performing ones [27]. Dunning’s eclectic theory [28] proposes three determinants of international production by multinational enterprises: that ownership advantages, location advantages, and internalization advantages are the main drivers for foreign direct investment (FDI). If foreign manufacturers are not able to sustain any of these advantages in their foreign operation, they may face strategic imperatives for relocation [29].

The last driving factor of relocation is the environmental uncertainty foreign manufacturing firms are exposed to with potential disturbances and volatility in the marketplace [30]. Specifically, macroeconomic changes—such as economic growth rate, resource shortages, and volatility in exchange rates—stimulate more uncertainty in the international business environment [31]. Since foreign manufacturing firms are operating with the liability of foreignness, they are prone to be vulnerable to changes in institutional policy and regulations such as subsidies, labor laws, tax structures, and political stability [31].

2.2. Trust, Behavioral Theory, and Institutional Isomorphism

First, according to Rotter [32], trust is “an expectancy held by an individual or a group that the word, verbal promise, or written statement of another individual or group can be relied on (p. 444).” In the IJV context, Parkhe [33] specified that inter-partner trust leads to the stability and performance of IJVs. Although it is known that trust is a critical factor in the performance of IJVs, it may have different outcomes depending on external environmental factors [34]. They suggest that the role of institutional support for trust influences IJV performance, and therefore the effect of inter-partner trust on IJV performance is not in a direct relationship all the time.

Second, behavioral theory [35,36] is related to the internal factors of manufacturing firms. Current performance such as lead time, inventory control, and quality management are the determinants of reshoring decisions. Also, reshoring decisions can be determined based on asset-specific investments that cannot be capitalized if firms decide to relocate to their home country. A reshoring decision is likely to be determined depending on how much the foreign manufacturer has invested overseas.

Third, institutional theory in management focuses on how the systems surrounding firms shape their behaviors and decisions [37]. The theory explains that formal regulations and informal constraints such as norms and codes of conduct constrain and control human interactions [38]. Institutional theory fundamentally argues that firms choose acceptable and legitimate behavior within their operational boundaries. In other words, coercive, imitative, and normative pressures coming from institutional environments affect their decisions [39]. When firms within the same institutional environment come to resemble one another, the tendency is called 'institutional isomorphism' [37]. That is, firms align with other firms to achieve legitimacy and social acceptance for long-term sustained operations.

Institutional isomorphism is subject to three forces: (1) coercive pressure from political or governmental influence, (2) mimetic pressure from responses to uncertainty, and (3) normative pressure related to the professional arena [39]. The three isomorphic pressures cause firms to strive for legitimacy within the institutional environment.

2.3. Inter-Partner Trust and Third-Country Relocation

Inter-partner trust may help to achieve the goals of both sides of IJV as contractual and bureaucratic mechanisms may not be useful in controlling the opportunistic behavior of the other party [40]. The presence of trust between partners accelerates closer interaction and information sharing activities, enabling the achievement of "value creating" performance [41]. In other words, inter-partner trust helps to build social capital in the long run, which leads to value in the IJV relationship [42]. Baird et al. [43], found that trust was ranked first for successful Chinese and U.S. joint ventures. Li et al. [44] also emphasized that in uncertain environments, the development of trust between IJV partners may enhance IJV performance. This is mainly because inter-partner trust facilitates partners to readjust to a changing environment by interacting and cooperating with partner firms [45]. When an IJV is confronted with an uncertain external environment, a partner firm with a trust relationship might explain the situation and show commitment to overcoming it. Inter-partner trust expedites mutual understanding and allows IJVs to deal with doubtful and uncertain external environments. Hence, in line with earlier research, we suggest that inter-partner trust is negatively related to a foreign manufacturing firm's relocation intention.

Hypothesis 1 (H1). *Ceteris paribus, inter-partner trust is negatively related to the IJV foreign partner's relocation intention to the third country.*

2.4. Behavioral Theory

2.4.1. Plant Performance

Behavioral theory on plant relocation argues that a firm has a rational system that adapts and responds to organizational performance [35]. The behavioral perspective defines firms as boundedly rational decision makers that are responsive to performance feedback [36]. When firms find their plant performance declining, they may question their current strategies and consider future redirections. Relocation decisions involve significant organizational change, complexity, and ambiguity, so when plants are performing well, instead of considering reshoring, they will focus on continuing their current successful operations and trying to cooperate more with the local IJV partner. Well-performing IJVs

generally have cost advantages in their current operations and are protected from new entrants by entry barriers.

Also, well-performing IJVs may likely have intangible assets, such as technological capabilities [28]. According to resource-based theory, the possession of scarce and valuable resources is a source of competitive advantage [46]. Manufacturers that possess technological capabilities have expertise in mobilizing technical resources through routines and practices that allow new products or innovations [47].

IJVs that have strong manufacturing capabilities perceive that they have sustainable competitive advantages for the present and future. By exploiting their current manufacturing capabilities, they can expect sustained competitive advantages in overseas markets [48]. In volatile external environments in particular, competitive IJVs are assured of continued superior financial performance [49].

Previous research also shows that firm performance affects organizational transformation [36,50]. Well-performing firms are less likely to be sensitive to external changes and less likely to search for better solutions [35]. However, when IJVs face performance pressures, decision makers consider reconfiguring firm operations. In sum, we assume that IJVs with good performance are less likely to consider relocation, which strengthens the negative relationship between inter-partner trust and relocation intention.

Hypothesis 2 (H2). *The performance of IJVs moderates the negative relationship between inter-partner trust and the foreign partner's third-country relocation intention. A high-performing IJV is less likely to relocate to another country.*

2.4.2. Asset Specificity

Certain firms have specific assets that allow them to reduce inefficient haggling and negotiations that lead to transaction costs and opportunism. Asset specificity can be relational and intangible assets that evolve over time. To achieve high asset specificity, firms must either internalize their assets [51] or find business partners that have built long-term trust [52]. The specificity of assets comes from three sources: site specificity, the specificity of physical assets such as components or equipment, and the specificity of human resources [53].

In the Chinese IJV system, foreign manufacturers with asset specificity are likely to benefit from and exploit strategic opportunities that the Chinese government provides—such as tax incentives, subsidies, and assistance in building “*guanxi*” with local suppliers and buyers [40]. IJVs that have accumulated asset-specific trust in and commitment to the Chinese market would find it difficult to relinquish those resources for relocation because in the long run, IJVs need to exploit proprietary knowledge in both technology and management [54]. When foreign manufacturers invest overseas, they assume that they will gain the most out of the assets contributed [53]. As the firms are deeply involved in more asset-specific capital, they may make more efforts to achieve efficiency gains [55]. Following this argument, if the foreign IJV partner finds that their firm has high asset specificity, they are less likely to have the intention to relocate their manufacturing base. Specific assets will then be exit barriers for relocation decisions and strengthen the negative relationship between inter-partner trust and relocation intention.

Hypothesis 3 (H3). *The asset specificity of IJVs moderates the negative relationship between inter-partner trust and the IJV foreign partner's third-country relocation intention. High asset-specific IJVs are less likely to relocate to other countries.*

2.5. Institutional Theory

2.5.1. Coercive Pressure

When governments place mandates or restrictions on organizations, manufacturing firms may perceive coercive pressure [39]. In response, they may decide to change their organizational structure and practices to conform to government mandates. Coercive pressure and the decision making of manufacturing firms will be more prominently related in emerging economies such as China's where the economic structure depends heavily on the government's macroeconomic policies. Government policies exert considerable control over foreign manufacturing firms and choices to relocate. For example, the Chinese government mandates that foreign manufacturers who exit but have less than 10 years of operating history in China must return all the tax incentives they received, must negotiate with labor representatives to provide compensation for displaced workers, must liquidate their remaining assets for local Chinese partners at below market value, and must pay off any loans from Chinese financial institutions. Foreign manufacturing firms may perceive these FDI policies to be coercive pressures and exit barriers. In summary, foreign manufacturers that want to relocate to their home countries must go through complex procedures and face significant transaction costs. As a result, they are likely to enforce the negative relationship between inter-partner trust and relocation intention.

Hypothesis 4 (H4). *Perceived coercive pressure moderates the negative relationship between inter-partner trust and the IJV foreign partner's third-country relocation intention. High coercive pressure reduces the likelihood of third-country relocation.*

2.5.2. Mimetic Pressure

With respect to mimetic pressure, when firms face uncertain environments, they tend to imitate the decisions of other firms [39]; that is, they experience mimetic pressure to adopt similar intentions and implement analogous decisions. In other words, the firms may consider that they will better fit the legitimate social structure by imitating other successful organizations. The literature on internationalization indicates that firms tend to imitate competitors' international expansion strategies [56], entry modes [57], and operational strategies in foreign markets [58]. As internationalization involves high levels of risk, so firms are likely to minimize risks by imitating their competitors' decisions. Similarly, foreign manufacturing firms may observe how other foreign IJV competitors react to China's recent transformations and shape their relocation decision according to the decisions of other firms. For instance, many successful global corporations including GE, Whirlpool, Toshiba, Foxconn, and Canon recently announced plans to relocate their Chinese manufacturing plants to their home country. Also, recent FDI inflow trends clearly show that ASEAN nations are attracting more FDI. In 2001, China had 40% of the world volume in sneaker manufacturing, but by 2010, Vietnam had captured 37% of the world volume, and China dropped to 34% [4]. The recent increase in FDI inflow to ASEAN nations should shape mimetic pressure so that the foreign IJV partner in China will eventually form relocation intentions. The more prevalent relocation practices are in an industry and the more successful relocation practices turn out to be, the more likely relocation decisions are legitimate and reliable. Conversely, the uncertainty of relocation activity may lead to fear of failure, in which case the foreign IJV partners in China are more likely to avoid relocation if peer firms show a tendency to neglect a reshoring decision. Hence, mimetic pressure coming from other foreign competitors in China are likely to weaken the negative relationship between inter-partner trust and IJV foreign partner's relocation intention.

Hypothesis 5 (H5). *Perceived mimetic pressure moderates the negative relationship between inter-partner trust and the IJV foreign partner's third-country relocation intention. Low mimetic pressure reduces the likelihood of third-country relocation.*

2.5.3. Normative Pressure and Third-Country Relocation

Normative pressure is the expectation to follow the social expectations of the host country when foreign manufacturers conduct overseas IJVs. All host nations have normative systems of shared norms, culture, beliefs, and values [53]. Foreign manufacturers may feel that the host government is pressuring them to conform to the local normative system. If the hosts fail, they risk liability that brings loss of social image, deteriorated brand value, and high transaction costs for building business networks. Foreign firms may perceive normative pressure from the local government, business networks, and customers to varying degrees depending on whether the normative system embraces or resists foreign firms. With respect to relocation context, if foreign manufacturing firms perceive high normative pressure, they are likely to consider relocation. If the foreign manufacturer is embedded in the normative system of the host nation, relocation intentions are less likely. For instance, a normative system consists of inter-organizational channels such as firm–supplier networks, firm–buyer networks, and other relational channels within the domestic industry. If foreign manufacturing firms have weak relational norms, they may perceive pressure to conform to shared norms. The failure to adopt a practice of direct or indirect relationships with local counterparts may lead foreign manufacturing firms to consider a reshoring decision. Even when a foreign IJV partner has a trust relationship with a local IJV partner, when they perceive that the competitive advantage of the IJV has eroded due to normative pressure coming from local competition and unfamiliar business practices, the negative relationship between inter-partner trust and relocation intention will be mitigated. Based on the above conclusions, we propose the following hypothesis:

Hypothesis 6 (H6). *Perceived normative pressure moderates the negative relationship between inter-partner trust and the IJV foreign partner's relocation intention. Low normative pressure reduces the likelihood of third-country relocation.*

In summary, Figure 2 describes the conceptual framework of this study. The negative relationship between inter-partner trust and third-country relocation (H1) is positively moderated by plant performance (H2), asset specificity (H3), and coercive pressure (H4); and negatively moderated by mimetic pressure (H5) and normative pressure (H6). This research model was analyzed with empirical data.

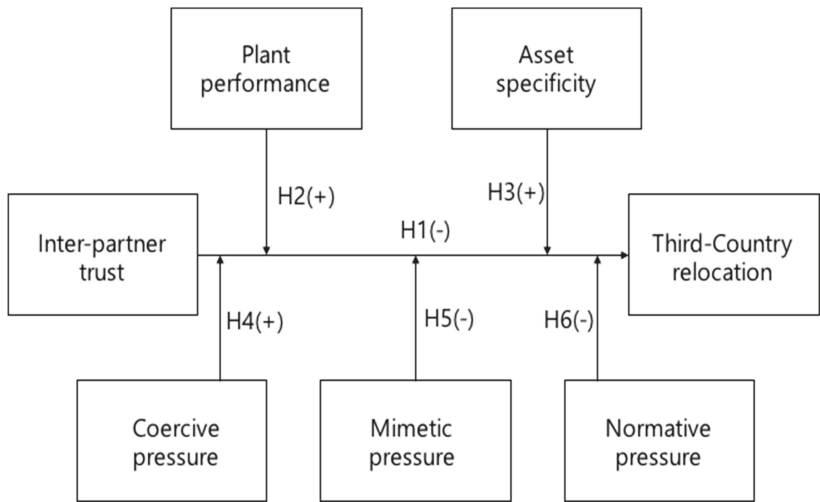


Figure 2. Conceptual framework.

3. Methods

3.1. Research Setting

The Chinese market is a rich context for analyzing the third-country relocation phenomenon in terms of an Asian perspective as many Asian manufacturing firms are located in China. We collected data from South Korean manufacturers operating in China, which is geographically close to South Korea. Since the early 1990s, after South Korea and China officially formed a diplomatic relationship, many Korean manufacturing firms have relocated to China for its low-cost workforce [9].

To ensure the reliability and validity of the survey design, we initially conducted in-depth interviews with factory managers from nine manufacturing firms who have roles in strategic decision making and operations in China. They explained the factors that may influence decision making for third-country relocation. The in-depth interviews allowed us to cross-check the relevance of measures on the relocation decision process and other variables before survey questionnaires were designed.

The data for this research were collected from Korean manufacturing firms operating in China. In order to fully gain an understanding of the trust and third-country relocation decision-making process, we selected Korean manufacturing firms that have IJV ownership in China. If Korean firms did not have an equity share with local Chinese partners, we would not be able to measure the trust relationship between them. We first identified 351 manufacturers by using a database provided by the Korea Trade-Investment Promotion Agency [18]. The database contains detailed information, including company contacts, ownership status, and major product lines. We double-checked the current operation status of each manufacturing firm by either visiting their corporate website or contacting them by phone to confirm the accuracy of the database. Out of the 351 IJV firms listed, 329 were identified to have an operating status.

The survey took place between January and March of 2017, and questionnaires were mailed to the managers in charge of their respective plant operations in China. To increase the response rate, research assistants called and emailed the survey participants reminding them to complete the survey. Of the 329 questionnaires sent out, 232 were completed (a 70.5% response rate), and all were suitable for statistical analysis. The responding firms were from diverse industries such as textiles, clothing, leather, chemical materials, rubber products, plastic products, metal products, general machinery, electrical machinery, and electronics. We categorized each industry into light (43.1%), medium (36.2%), and heavy (20.7%) industry according to Chinese industry code system. Table 1 describes the breakdown of industry sample.

Most of the respondents, 93%, identified themselves as senior managers who make major decisions about firm operations; 7% were at managerial levels and had major strategic roles in firm operations; 82% had been employed for more than five years; and all had college degrees or above. Also, 83% of the companies have parent companies in Korea and 17% of the companies started in China by Korean nationals. We consider Korean startups in China as the second location since these companies are registered as foreign companies in China and they settled down in China for the same reason (low cost labor) of relocation from Korea. 28% have fewer than 100 employees in China, 40% have 100–200 employees, and 32% have more than 200 employees.

We tested the responses for nonresponse bias with Kolmogorov–Smirnov tests by using three parameters (industry classification, total capital investment, and number of employees). The results showed no significant differences between respondents and non-respondents. Also, to check the common method bias problem, we conducted Harman's one factor test [59]. The results showed that neither a single factor nor a general factor could account for the majority of the covariance. In addition, we sent the same questionnaire to top executives of the parent companies in South Korea from 20 randomly selected sample firms whose factory managers in China had responded to our survey earlier. From this process we collected 12 responses, but there were no significant differences between two respondents from the same firm. The results indicate that common method bias was not a major issue in this research.

Table 1. Breakdown of IJVs by industry size

Industry Type	Items	Number of IJVs	Industry Type Percentage
Heavy	Chemicals	8	20.7%
	Basic metal	5	
	Fabricated metal	7	
	General machinery	10	
	Electrical machinery	6	
	Electronics	7	
	Chemical materials	5	
Medium	Transportation equipment	5	36.2%
	Rubber	21	
	Plastic	29	
	Food	8	
	Beverage	5	
	Furniture and fixtures	11	
	Paper	6	
Light	Optical engineering	4	43.1%
	Textiles	38	
	Clothing	32	
	Leather	8	
	Footwear	9	
	Jewelry	4	
Total	Toy	9	100%
		232	

3.2. Measures

For the dependent variable, decision makers indicated their intentions to relocate their manufacturing facility to the third-country in three years on a five-point Likert-type scale (1 = very unlikely to 5 = very likely). We adopted and modified the relocation measurement from Sharif and Huang's [60] study on the decision of Hong Kong firms to relocate from China to other regions.

For the inter-partner trust variable ($\alpha = 0.85$), we adopted the measurement from the research of Morgan and Hunt [61]. Foreign IJV partners were asked to evaluate whether the local IJV partner (i) can be counted on to do what is right, (ii) is always faithful, (iii) is someone we have great confidence in and (iv) has high integrity on a five-point Likert scale (1 = very unlikely to 5 = very likely).

For plant performance measures ($\alpha = 0.79$), we adopted four measurements that are widely used in operation management [62]: lead time, inventory, quality, and set-up time. For each of the items, firms were asked to evaluate the performance of the above measures on a five-point Likert scale with end points of 1 (not satisfied at all) to 5 (very satisfied).

To measure the asset specificity variable ($\alpha = 0.86$), we used three items [51]. We asked respondents to evaluate the current manufacturing operation in China, which requires significant financial and relational investments. The participants rated their perceptions according to a Likert scale with end points of 1 (low extent) to 5 (high extent).

For the coercive pressure variable ($\alpha = 0.93$), respondents were asked to indicate perceived pressure from the host country's central government, local government, and financial institutions on reshoring, respectively [63,64]. The respondents rated this according to a Likert scale with end points of 1 (low extent) to 5 (high extent).

Mimetic pressure [65] was measured with three items ($\alpha = 0.85$): competitors are increasing reshoring decisions; competitors have benefitted from reshoring; and, the industry favorably recognizes reshoring. The participants indicated their responses according to a five-point Likert scale with end points of 1 (low extent) to 5 (high extent).

Following Yiu and Makino [58], we used three items to measure normative pressure ($\alpha = 0.92$) on managers' perceptions regarding whether foreign manufacturers are treated unequally compared with local manufacturers, whether the host country prefers local businesses over foreign businesses, and whether the host country has professional standards that make it difficult for foreign manufacturers to operate there. The participants answered according to a five-point Likert scale with end points of 1 (low extent) to 5 (high extent).

Control variables that may affect relocation decision were IJV age, IJV size, and industry. This paper assumes that larger IJVs that have operated for a long time are less likely to relocate. Institutional theory concludes that older firms are more embedded in trust-based networks [66]. Also, smaller manufacturers may have less invested capital to divest and more flexibility to relocate [67]. The number of years an IJV has operated in China was used as a proxy for firm age. The number of employees and the value of tangible assets (property, plant, and equipment) were proxy variables for measuring IJV size [68]. Lastly, industries were categorized as heavy, medium, and light by adopting the Chinese industry code system (Table 1). Medium industry was used as the reference group and two dummy variables were used to represent heavy and light industry.

4. Results

Table 2 shows the summary statistics and correlations associated with variables. To avoid multicollinearity problems, we further tested the variance inflation factor (VIF), which showed that multicollinearity was not a concern since all the VIF scores were significantly less than 5 [69], and that regression analysis could be executed. Thus, the following examinations identified the factors that contribute to reshoring decisions.

Table 3 shows the results of ordinary least squares regression for this research. In Model 1, the control model, IJV age ($\beta = -0.103, p < 0.001$) and size of IJV assets ($\beta = -0.006, p < 0.05$) were negatively related to relocation intentions. We assume that older and bigger IJVs would be less likely to consider a relocation decision, which requires major changes in current operations in China.

After testing the control variables in Model 1, we analyzed the main variables in Model 2. The results show that inter-partner trust is negatively related to relocation intention. The coefficient for trust of the local partner is negative and significant ($\beta = -0.523, p < 0.001$), supporting Hypothesis 1.

The results of Model 3 show that the incremental variance accounted for by the interactions between behavioral theory variables (plant performance and asset specificity) and trust on host country partner is significant ($\Delta R^2 = 0.052, p < 0.01$). Hypothesis 2 and Hypothesis 3 predict that a negative relationship between trust and relocation intention will be stronger when the IJV's performance is high and the IJV has high asset specificity. The coefficient of the interaction of partner trust with plant performance is significant ($\beta = 0.025, p < 0.05$) and supports Hypothesis 2. Hypothesis 3 is also supported as we find a significant ($\beta = 0.210, p < 0.01$) interaction between partner trust and asset specificity. To further analyze the implications of the regression results, we plotted the relationship of partner trust and relocation intention over the observed range of partner trust with different levels of plant performance (Figure 2). Figure 3 reveals that the magnitude of the slope of relocation intention regressed on partner trust is approximately twice as large for low performance as that for high performance. Also, Figure 4 shows a similar plot with asset specificity. Figure 4 shows that the slope for low asset specificity is almost three times as large as that for high asset specificity. Overall, these results imply that the negative trust–relocation relationship strengthens at high levels of two behavioral variables (plant performance and asset specificity).

Table 2. Descriptive Statistics and Correlation Matrix

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. Relocation	3.256	0.881											
2. IJV Age	9.272	7.332	−0.338 ***										
3. Asset	4524.450	1.661	−0.232 *	0.075									
4. Employees	118.730	92.200	−0.030	0.063	0.041								
5. Light Ind.	0.354	0.490	0.031	0.091	0.242 **	0.013							
6. Heavy Ind.	0.371	0.500	0.002	0.036	0.542 **	0.226 **	0.024						
7. Trust	3.623	0.860	−0.547 ***	−0.316 **	0.008	0.071	0.017	0.161 *					
8. Plant Perf.	2.690	0.580	0.092	0.027	0.040	0.003	−0.020	0.001	0.013 *				
9. Asset specificity	2.420	0.720	−0.369 **	0.239 **	0.158 *	0.032	0.010	0.040	0.039 **	0.026			
10. Coercive	3.590	0.450	−0.260 *	0.010	0.038	0.016	0.006	0.028	0.207 *	0.002	0.012		
11. Mimetic	2.240	0.410	0.212 †	0.020	0.025	0.020	0.142 *	0.023	0.025	0.040	0.028	0.021	
12. Normative	3.010	1.450	0.499 ***	0.067	0.020	0.038	0.054	0.020	−0.242 **	0.016	0.010	0.040	0.039 **

N = 232. Notes: Significant at. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; † $p < 0.10$.

Table 3. Regression Results with Third-Country Relocation Intentions as the Dependent Variable

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
IJV AGE	−0.103 ***	−0.152 ***	−0.144 ***	−0.120 ***	−0.126 ***
EMPLOY	0.004	0.022	0.013	0.014	0.019
ASSET	−0.006 *	−0.005 *	−0.002 **	−0.004 *	−0.078 **
LIGHT INDUSTRY	−0.018	−0.024	−0.031	−0.033	−0.026
HEAVY INDUSTRY	−0.285	−0.301	−0.205	−0.203	−0.105
TRUST		−0.523 ***	−0.470 ***	−0.501 ***	−0.450 ***
PLANT PERFORMANCE		−0.046	−0.048	−0.050	−0.064
ASSET SPECIFICITY		−0.052 **	−0.034 **	−0.058 *	−0.055 *
COERCIVE PRESSURE		−0.301 *	−0.275 *	−0.322 *	−0.248 *
MIMETIC PRESSURE		0.245 †	0.218 †	0.265 †	0.207 †
NORMATIVE PRESSURE		0.337 **	0.329 **	0.326 **	0.328 **
TRUST × PLANT PERFORMANCE			0.205 *		0.207 *
TRUST × ASSET SPECIFICITY			0.210 **		0.260 **
TRUST × COERCIVE PRESSURE				0.412 *	0.304 *
TRUST × MIMETIC PRESSURE				−0.752 †	−0.873 *
TRUST × NORMATIVE PRESSURE				−0.463 *	−0.495 **
R ²	0.350	0.485	0.537	0.535	0.546
ΔR ²		0.135	0.052	0.050	0.061
ΔF value		6.901 ***	5.452 **	3.102 *	4.105 **

N = 232. Notes: Significant at: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; † $p < 0.10$. The changes in R^2 in models 3 to 5 are compared to the value for R^2 in model 2.

Model 4 reveals the additional variance accounted for by the interactions between institutional theory variables and inter-partner trust is significant ($\Delta R^2 = 0.05, p < 0.05$). Hypothesis 4 predicts that the negative relationship between inter-partner trust and relocation intention is strengthened when perceived coercive pressure is higher. A significant positive effect is found for the coefficient of the interaction of partner trust and coercive pressure in Model 4 ($\beta = 0.412, p < 0.05$) and full interaction Model 5 ($\beta = 0.304, p < 0.05$), giving support to Hypothesis 4. Figure 5 graphically supports Hypothesis 4 as the magnitude of the slope of relocation intention on partner trust is almost two times higher for low coercive pressure than for high coercive pressure. This result confirms Hypothesis 4, that the negative impact of trust on relocation intention strengthens when perceived coercive pressure is higher.

Hypothesis 5 and Hypothesis 6 predict that the negative relationship between inter-partner trust and relocation intention will be weaker when mimetic and normative pressure are high. The coefficient of the interaction of partner trust with mimetic pressure is marginally significant ($\beta = -0.075, p < 0.10$) but shows stronger effect in the full model 5 ($\beta = -0.873, p < 0.05$) which supports Hypothesis 5. Hypothesis 6 is also supported as we find a significant ($\beta = -0.463, p < 0.05$) interaction between partner trust and normative pressure. Also, in the full Model 5, an effect becomes stronger ($\beta = -0.495, p < 0.01$). To further analyze the implications of the regression results, we plotted the relationship of partner trust and relocation intention over the observed range of partner trust with different levels of mimetic pressure (Figure 6). Also, Figure 7 shows a similar plot with normative pressure. Figure 6 reveals that the magnitude of the slope of relocation intention regressed on partner trust is marginally larger for high mimetic pressure as that for low mimetic pressure. Figure 7 shows that the slope for high normative pressure is almost two times as large as that for low normative pressure. Overall, these results imply that the negative trust–relocation relationship weakens at low high levels of two institutional variables (mimetic and normative pressure).

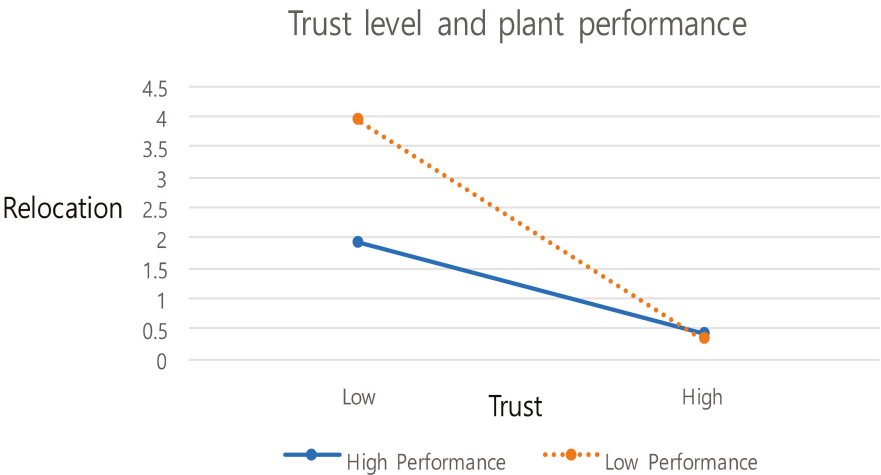


Figure 3. Trust, plant performance, and relocation.

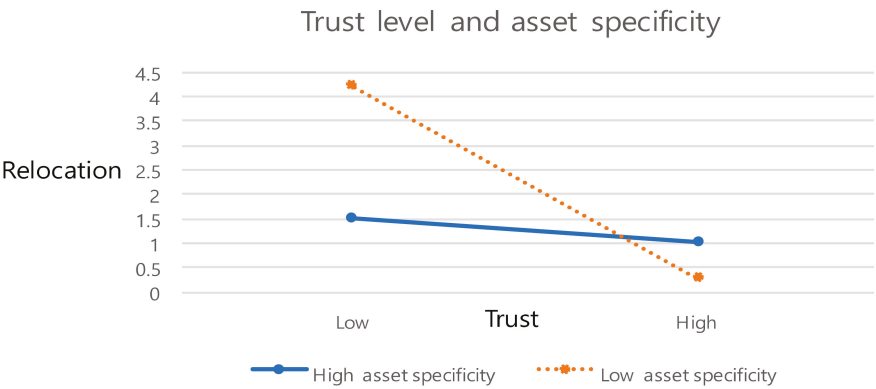


Figure 4. Trust, asset specificity, and relocation.

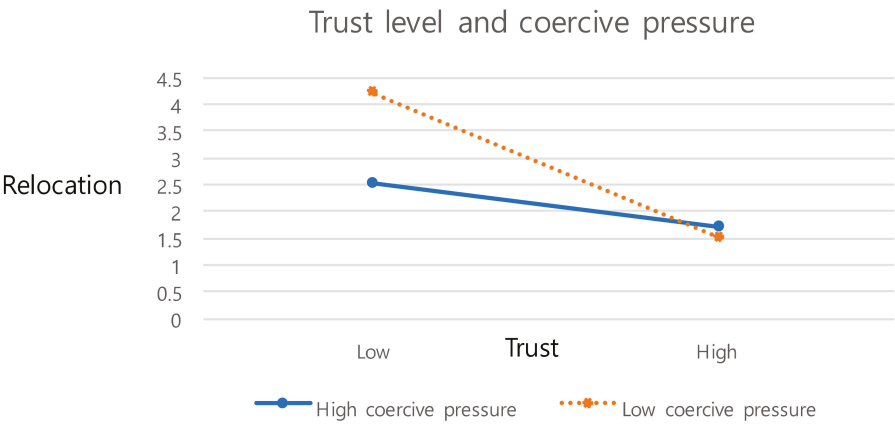


Figure 5. Trust, coercive pressure, and relocation.

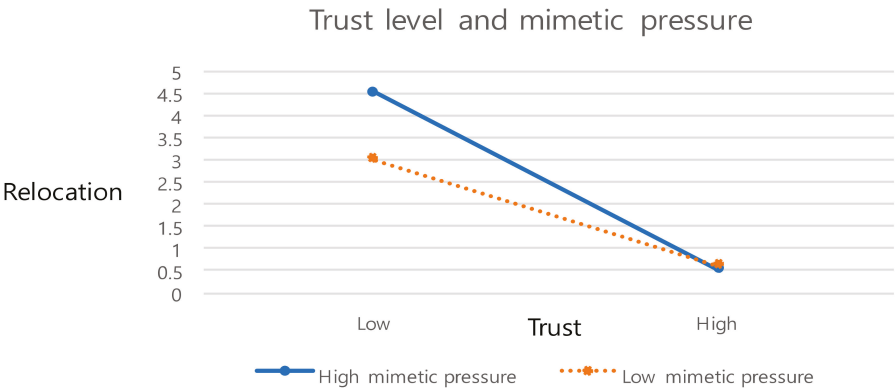


Figure 6. Trust, mimetic pressure, and relocation.

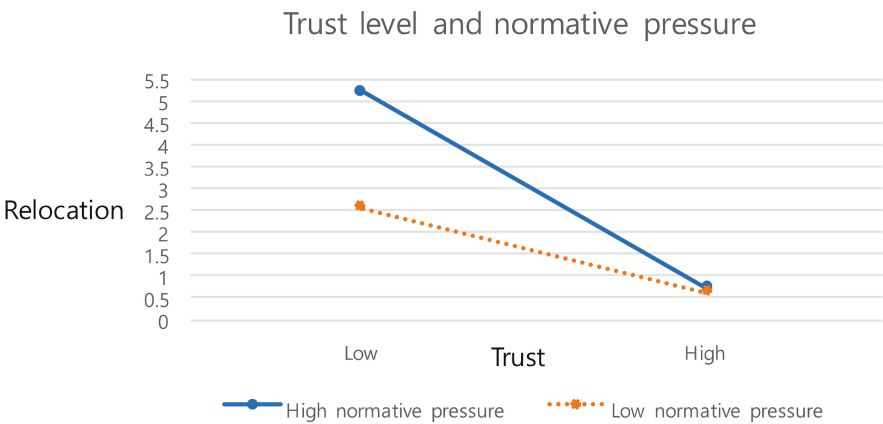


Figure 7. Trust, normative pressure, and relocation.

5. Case Studies: Trust Management and IJV’s Third-Country Relocation

In addition to previous empirical result, we have included qualitative results of trust management in IJV operations. Previous research shows that trust is the key determinant of the organizational intellectual capital [70]. Human, social, relational, organizational, and innovation dimensions interact and influence trust management. Based on the in-depth interviews with Korean senior managers of IJVs, we categorized how dimensions of human, social, relational, organizational, and innovation interact and influence trust management in IJVs which can be also determinants of third-country relocation intentions.

5.1. Trust Management and Human Dimension (IJV-A)

Inter-partner trust relationship has been worsened over the years as Korean senior manager from IJV-A (optical engineering) perceives human resource management (HRM) difficulties. As IJV-A’s factory workers’ turnover rate is increasing, the factory cannot operate regularly due to shortage of the workers. In the optical engineering industry, it takes five months for manufacturing workers to become skilled workers, but many Chinese factory employees quit in less than a year. It appeared that even one or two US dollars per hour was enough to make workers move from one factory to another. Most of all, IJV-A’s Chinese partner did not suggest any solutions for human resource problem that IJV-A is facing. The Korean side perceives that inter-partner trust has been worsened due to the Chinese partner’s passive action. In conclusion, IJV-A’s Korean management is seriously considering relocating to ASEAN nations where they can find abundant low-cost labor and more cooperating IJV partner.

5.2. Trust Management and Social Dimension (IJV-B)

IJV-B, specializing in footwear production, relocated their manufacturing facility to China from Korea in the late 1990s mainly because they found local Chinese partner who have established distribution network within China. Korean manager from IJV-B thought relocation to China would enable them to manufacture their products and supply them to the Chinese market at the same time. However, relocation proved to be a bad choice. IJV-B’s Chinese partner’s distribution network has been weakened over the years which led to sales decline. From foreigner’s perspective, *guanxi* sustains for long time but nowadays in China, *guanxi* applies only when companies have cost advantages over competitors. IJV-B’s Korean partner questions the ability and the role of Chinese partner as more local Chinese wholesalers cancel the supply contract. As the inter-partner trust and the future of

IJV-B is uncertain, relocating to Southeast Asia region is an imminent option for their sustainability in operation.

5.3. Trust Management and Relational Dimension (IJV-C)

IJV-C's clothes manufacturing does not require high technological skills, so cost management is crucial in their success. At the early stage of their operation, IJV-C were not able to compete with local cost structure. For instance, manufacturing a hoodie cost 15 USD but the local Chinese manufacturer produced a similar product for 7 USD. Later, IJV-C had joint effort with local Chinese partner to find the cost structure in order to narrow the gap against local competitors. Based on close working relationship with local Chinese partner, they applied cost-minimization method called PDCA (plan-do-check-act) which find and eliminate the element of cost escalation factors. Due to PDCA joint effort with Chinese partner, IJV-C was able to lower the cost below the local competitors' level. Korean manager from IJV-C recommend that instead of considering relocation to third-country location, try to solve the current problem with local partner of IJV.

5.4. Trust Management and Organizational Dimension (IJV-D)

IJV-D, a plastic product manufacturer, has one value chain system, from designing to manufacturing. IJV-D has been supplying to major multinational manufacturers operating within China and have stable sales and operation. It is mainly because of they have qualified and skillful workforces specially trained for ISO and six sigma standards. IJV-D has confidence in their organizational capability that they will sustain their leading position both in China and in global markets. IJV-D's Korean manager also states that they have strong inter-partner trust and have no intention to relocate their manufacturing facilities to ASEAN nations in the future. Although they are little concerned about rising labor cost in China, they believe that they would not find a local partner with a trust relationship as well as skillful and competent workforces in South East Asia.

5.5. Trust Management and Innovation Dimension (IJV-E)

IJV-E is an electrical equipment company, relocated from Korea to China in the late 2000s for low-cost labor force. IJV-E's parent company in Korea had competitive advantage globally and was confident that they would gain a large market share as they gain cost advantage in China. However, as soon as IJV-E launched new product in China, they realized that they were no longer differentiated from local competitors in terms of technological advantage. It appears that local Chinese manufacturers had caught up with IJV-E's technological skills right after new product release. Moreover, IJV-E's Korean partner suspects technological leakage from Chinese side and question the role of local Chinese partner for intellectual property protection. IJV-E's Korean manager seriously considers relocating to third-country location with less advanced technological ability and lower labor cost.

6. Discussion

In this research, we found that the trust relationship with a local IJV partner influenced decisions on relocation, drawing from the key theoretical perspectives adopted by firm relocation literature (i.e., behavioral theory and institutional theory). As firm relocation is a new research topic and empirical research is still in the initial stage, we wanted to execute and adopt the partner relationship aspect on relocation decisions in the IJV area. Thus, the results of this research may give new perspectives and insights for academic researchers and practitioners engaged in IJV areas.

The first hypothesis is supported because when a foreign manufacturer has a trust relationship with a local IJV partner, a relocation decision is not likely to take place. The notion of trust in IJVs is confidence in the partner firm's cooperative behavior in an uncertain environment [71]. The outcome of a trust-building relationship is related to risk taking, preserving equity in the IJV, more communication with the partner firm, and inter-firm adaptation. By going through these activities, foreign partner firms are more likely to settle down rather than end the IJV relationship.

In addition, based on the analytic results, the moderating variables (plant performance and asset specificity) from behavioral theory are supported for moderating the negative relationship between trust and relocation intention. The main focuses of behavioral theory are the internal aspects of the firm that may influence decisions on relocation. In our study, we explored plant performance and asset specificity as internal factors that are significant factors for manufacturing operation. If the IJV is performing well in its current operation, there is no reason for the foreign partner to relocate. Also, when the foreign partner perceives that the IJV has high asset specificity, this becomes an exit barrier for relocation. High asset-specific IJVs may perceive that relocation costs are very substantial, as the foreign partner must reinvest in a third country when they decide to relocate. Therefore, asset specificity is shown to be a strengthening and moderating factor for the negative relationship between trust and relocation intention. IJVs that have long-term, heavy investments in China, have established networks with local firms, and have close relationships with the local Chinese government also have high asset specificity, which can be categorized as factors of sustainable manufacturing operations.

The second moderating variable, institutional theory, is also supported by the data, showing that all coercive, mimetic, and normative pressures from institutions moderate the relationship between trust and relocation intention. As previous research shows, the institutional location theory assumes that economic activity such as a relocation decision is socially and institutionally situated [72,73]. Specifically, society's cultural institutions and value systems shape decision making on relocation. Our results show that high coercive pressure may play a strengthening and moderating role in the negative relationship of trust and relocation intention. On the other hand, perceptions of mimetic and normative pressure have weakening moderating effects on the negative relationship of trust and relocation intention. The results of this study show that an IJV with a foreign partner is sensitive to changes in external environments such as competing foreign manufacturers and a competitive industrial environment. Overall, the relocation decision of a foreign partner in an IJV is not just based on a trust relationship with the local partner firm, but is also an interactive outcome of an ongoing and embedded network with the local government, industry, suppliers, competitors, and other institutions.

7. Conclusions

7.1. Research Implications

The results of this research shed light on IJV relocation, both theoretically and empirically. It is an emerging research area with room for further research. The empirical results of our research indicate that the IJV relocation phenomenon should be looked at through the lens of partner trust issues. By integrating social factor such as 'trust' into an economically driven firm relocation phenomenon, we can have broad perspective understanding IJV-relocation relationship. Especially, integrating the concept of trust in IJV relocation issue is more significant in Chinese culture which emphasizes personal relationships based on trust rather than formal contracts [9].

We found that the influence of trust can mitigate relocation intention from foreign IJV partner. As a foreign IJV partner relies on a local IJV partner based on trust relationship, a foreign IJV partner less likely to make an ultimate resolution, which is third-country relocation. However, our result shows that at high level of institutional pressures (mimetic and normative), negative trust-relocation relationship is mitigated.

Also, our research framework was based on behavioral and institutional theories that moderate the relationship between trust and relocation intention. IJV relocation is not a simple task for many foreign partners as many IJVs have been operated for more than 10 or 20 years, and can be very asset specific. Having a trust relationship with a local IJV partner may hinder a relocation decision, which can cost a tremendous amount of money. Uncertain business conditions in China do not automatically make relocation an optimal option, and we wanted to identify the inter-partner relationship beforehand.

Our study also used Korean manufacturing IJVs operating in China. Unlike previous relocation studies, our study further explains what factors negatively affect firms' decisions on relocation. In this

research, Korean partners that are performing well, are highly asset specific and perceive coercive pressure are likely to enforce a negative relationship between partner trust and relocation intention. However, it was found that mimetic pressure and normative pressure play a role in mitigating the negative relationship between inter-partner trust and relocation intention.

In addition, our findings can provide some insights into the black box of managerial relocation decision making. We would argue that firms make relocation decisions based on an inter-partner trust relationship, interacting with the perceived external environment that they face. IJVs constantly explore institutional environments, considering external pressures from local governments, competing firms, and other industry stakeholders. The results confirm the co-evolutionary perspective of the organizations [73] which shows that firms co-evolve based on activities as they are embedded in dynamics within and between them. In similar fashion, Lahiri and Kedia's study [74] showed that firms' decisions on offshore outsourcing are based on learning to remain within their respective environments. In conclusion, our study suggests that foreign IJVs should explore various aspects such as inter-partner relationships and internal and institutional factors before making decisions on IJV relocation.

7.2. Practical Implications

In our study, we found that the decision on IJV relocation is a complex one and poses many challenges to decision makers. A relocation decision involves considering various aspects of business environments both locally and internationally. Even if managers are highly interested in relocation, they must consider the inter-partner relationship, local governmental and legal restrictions, and normative pressures coming from the business environment that may make firms less competitive in the foreign manufacturing environment. Most of all, in an uncertain business environment, IJV partners need to explore the optimal structures and processes facilitating trust for mutual benefit. For instance, when IJV partners spot problems and issues surrounding IJV, they should bring the issues to attention immediately [75]. By establishing formal and informal communication channels early on, IJV partners may avoid initial and ongoing problems, thereby sustain IJV cooperation.

Also, foreign IJVs that perceive their assets are highly specific to the local environment are more likely to reconsider or delay plans for relocation. The managers of foreign IJVs must remain alert to changes in the local business environment and should carefully evaluate how a relocation decision affects their sustainability if they move to another country. Also, managers must be always alert to coercive pressures or hidden costs from local government policy, including returning all the tax benefits received from the local government from when operations started.

Also, our study found an important role of trust in IJV. Trust effectively reduces negative signals of partners. IJV partners should facilitate openness in operation by sharing knowledge and increasing more interaction.

For policy makers in other countries, as more foreign manufacturers expect to relocate to adjacent nations, establishing FDI incentive programs can help to host foreign manufacturers. For instance, the South Korean government allocated USD 32 million in 2012 to attract inward FDI from foreign manufacturers operating in China. The same logic applies to other ASEAN nations as the total amount of FDI of Korean firms in five major Southeastern Asian nations (Vietnam, Thailand, Indonesia, Malaysia, and Philippines) surpasses that of China as Korean manufacturing firms witness more wage increases in China [9]. Overall, policy makers need to initiate greater exploration and dialogues with industry so that the negative effects related to inward FDI policy can be minimized.

7.3. Limitations and Future Research

This research is limited in that we used a self-reported survey to gather data measuring inter-partner trust and the relocation decisions of only South Korean IJVs operating in China, which reduces the generalizability of the results. Future studies may include multiple countries, industries, and firm characteristics, which may have different effects on relocation decisions.

In addition, this study is cross-sectional. We suggest further longitudinal analysis that tracks actual relocation outcomes rather than intentions to relocate. As the IJV relocation phenomenon is a relatively new area, a promising research agenda would be to explore the performance of foreign manufacturers that have left China to seek lower wages and better manufacturing environments. Specifically, it will be beneficial for the field of relocation to explore how manufacturing firms take action after relocation decisions are made. For instance, foreign manufacturing firms need to communicate and negotiate with local governments before relocation takes place. As our research shows, there are several exit barriers for relocation, such as coercive pressures from the local government. For foreign IJV partners that decided to exit, these firms should prepare for divestiture in order to avoid conflicts with local IJV partners. Also, future research can be conducted by evaluating relocation performance and benefits or downsides of relocation decisions. Regarding the inter-partner trust issue, we suggest that qualitative insights would be helpful to unfold the whole process of the IJV inter-partner relationship.

In addition, due to the sensitivity of the topic (IJV relocation), we were only able to collect surveys from foreign IJV partners not including local IJV partners. By including samples from local partners, future research can explore IJV dissolution issue rather than the topic of third-country relocation.

As relocation research may draw more attention from the policy makers of ASEAN nations who want to promote inward FDI, future studies should focus more on how industrial policy affects firms' decisions on relocation. Such studies can contribute to favorable and sustainable incentive programs for inward FDI specialized in the relocation of foreign manufacturers operating in China.

Finally, we hope that this study will open more research and discussions on relocation phenomena among scholars in different disciplines. With future studies, scholars can help international executives become more aware of their strategic options for allocating international resources depending on how the executives perceive dynamic, changing business environments. Also, more researchers should explore fundamental questions with respect to the trust relationship in IJVs and how it contributes to operation sustainability.

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Article

In Search of Network Sustainability: A Multi-Level Perspective on the Paradox of Cooperation and Competition in Networks

Agata Austen

Department of Human Resources Management, University of Economics Katowice, 40-287 Katowice, Poland; agata.austen@ue.katowice.pl

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Abstract: Although all types of public collaborative networks are aimed towards taking joint actions, relations between partner organizations are not always so explicit. Referring to the dialectic approach, it may be concluded that a number of tensions are identifiable in networks, among them tension between cooperation and competition. Understanding the tensions that exist in inter-organizational networks is vital for a proper comprehension of networks, as continuous efforts to meet multiple, divergent demands should bring about long-term sustainability. To examine the phenomena of cooperation and competition in interorganizational networks, a quantitative study on local partnerships among Social Welfare Centers and other public institutions and non-profit institutions was conducted. Using a multi-level perspective, the research introduces orientation towards both cooperation and competition at different levels of analysis and examines the tensions between them. The results of this research show that there is a mutual influence of orientation towards competition/cooperation, both at the individual level and the network level, and that there is a mutual influence of the reconciliation of the contradictions between orientation towards cooperation and orientation towards competition both at the individual level and the network level.

Keywords: public collaborative networks; multilevel research; trust; cooperation; competition; paradoxes

1. Introduction

In recent years, the tendency to turn away from the positivist, individualist, or atomistic explanation of paradigms—and move towards a relational, contextual and systemic understanding—has evoked increasing interest in the network paradigm [1]. Over the last two decades, the network metaphor has become influential in research on interorganizational relationships [2]. Although the role of management science is to support management practice, one may get the impression that, in the case of networks, practice has been significantly ahead of theory.

The subject of interest of public management is public networks, i.e., those networks composed of organizations from various sectors whose aim is to undertake activities aimed at achieving public benefits [3]. Among others, collaborative networks, which are “collections of government agencies, nonprofits, and for-profits that work together to provide a public good, service, or value” may be distinguished [4]. These networks usually go beyond one sector, take into account many levels of management and relate to a specific policy area or a specific problem [5]. Public management literature indicates the possibility of its application in areas such as health care [6,7], crisis management, environmental protection [8], education [9,10] and social services [11]. I define these networks as a group of three or more public, social or commercial organizations that are interdependent, make decisions about joint operations based on the equal rights of partners, assuming the network facilitates interaction between partners and the exchange of resources, which allows them to act in the public interest, and call them public collaborative networks.

Although all types of public collaborative networks are aimed towards cooperation, relations between partner organizations may not always be so explicit. Firstly, the evidence from watchdog reports on the Australian and New Zealand public sector confirms that cooperation remains highly problematic for public organizations [12]. In addition, their potential partners from different sectors may find obstacles to cooperation. As the results of research undertaken by Getha-Taylor show, both private and non-profit managers indicated that “some of their partnership experiences left them with the impression that public organizations (and their employees) can be unyielding (“inflexible”, “rule-bound”), untrusting (“secretive”, “watchdogs”), and unmotivated (“afraid to make mistakes”, “not results-oriented”)” [13]. Secondly, research results indicate that networks may be composed of organizations that are existing competitors. Cooperation between organizations may be developed despite perceived competition between them, although of course collaborative perception appears to be a reinforcing mechanism to forge network relationships among potential partners [14]. Therefore, the nature of the relationship between the partners is complex: relationships may vary from cooperative, characterized by mutual trust, towards competitive, where distrust is manifested. Understanding the abovementioned tensions is vital for a proper comprehension of networks [15,16].

Our knowledge on the phenomenon of cooperation and competition in all types of networks, including those operating in the private sector, is limited due to the research projects that have been adopted to date in previous research. Giving only part of Raab and Milward’s reasoning, (1) a limited amount of research has discovered interorganizational and interpersonal factors, even though there is evidence that individuals often matter in these networks as leaders and facilitators, and (2) the number of empirical studies on whole networks, understood as groups of three or more autonomous but interdependent organizations, is still relatively small [17]. In particular, focus on the individual level in explaining interorganizational cooperation is rare [14]. The state of knowledge is all the more bounded when it comes to public networks. This paper addresses the abovementioned limitations. As using a multi-level perspective reveals the richness of social behavior, draws our attention to the context and shows the multiple consequences of behavior [18], this paper conceptualizes the specificity of cooperation and competition in public networks as orientation towards both cooperation and competition that occur at different levels of analysis.

The rest of the paper is structured as follows: First, I present a discussion of the underlying theoretical assumptions about cooperation and competition in the context of trust, the multi-level character of cooperation and competition and the paradox of cooperation and competition. Second, the methodology of research is discussed and multi-level models presenting the discussed relationships are presented. After presenting the results of the study, I interpret the empirical results in accordance with the reasoning in the theoretical framework. The paper closes with a discussion of the study’s conclusions, limitations and implications for future research.

2. Theoretical Background

2.1. Cooperation and Competition in the Context of Trust

Cooperation in the public sector is widely understood as “any joint activity by two or more agencies that is intended to increase public value by their working together rather than separately” [19]. Cooperation involves common standards and mutually beneficial contacts [20] and is aimed at achieving common goals, achieved through sharing resources and the involvement of partners [21]. If the issue of cooperation in relation to public organizations seems obvious, the issue of competition is no longer the case. Competition exists when organizations seek out the same limited resources or target the same markets or customers [22]. From an economic perspective, competition is an instrument to achieve gains in allocative and productive efficiency. It is also seen as an important force to increase capacities to combat financial problems or issues of inefficiency, and for the creation of opportunities in the public sector. Although the expectations towards competition as a mode of governance are still rising, there is no general concept of competition for the public sector, but rather different models of

competition [23]. Following the social interdependence theory [24] and the definition of intergroup competition [25], interorganizational competition may be defined as a situation in which the goals of different organizations are linked in such a way that the achievement of goals by any one organization reduces the ability of other groups to reach their respective goals. If there is no doubt about cooperation in networks, understanding competition may pose certain problems. The presented reasoning indicates that although there are actually situations in which networks are created by competitors, as is typical of strategic alliances, in the case of public networks created by various types of public, social, and even commercial institutions, the phenomenon of competition in inter-organizational networks refers rather to challenges in cooperation resulting from the simultaneous need to maintain autonomy while taking collective actions.

Examining collaboration and competition that coexist in networks is linked to the phenomenon of trust. Although it would seem that networks created to achieve public goals should be characterized by a high level of trust, “collaborative networks are considered to be networks because of their network structure, and not by definition networks that are illustrations of the network governance mode in which trust is a defining characteristic” [26]. Building and sustaining trust is complicated by a host of issues, including potential competition among partners [27]. Research on policy networks in New York State [28] provides some evidence on the sources of distrust between partners. These may be a different worldview of problems that the partnership deals with, incongruent goals in terms of the joint actions taken, policy communication or knowledge exchange. Interorganizational relationships may be characterized by a recurring dilemma: the partners involved are expected to be transparent and explicit regarding their intentions, while at the same time being open to opportunities. Partners may look for the possibility of achieving organizational goals themselves and maintain a certain degree of autonomy towards partners. In the struggle to balance these opposing demands, trust is used by trustees to promise both explicitness and opportunity [29].

The existence of reciprocal relationships based on trust is a necessary condition for the existence of all types of networks [30]. Interorganizational trust is considered to be functional in public administration, serving as a *sine qua non* condition for cooperation and making it effective. Therefore, trust is very important for the achievement of goals and satisfactory network performance [31,32]. However, Oomsels and Bouckaert claim that the same argument can be made for interorganizational distrust [33]. While trust is often defined as one party’s optimistic expectations of the behavior of a second party under conditions of personal vulnerability and dependence [34], distrust is the opposite of trust: it is one party’s negative perceptions of another party’s conduct while in a working relationship [35]. Yet Lewicki et al. [36] propose a different approach. They claim that trust is a belief in, a propensity to attribute virtuous intentions to, and a willingness to act on the basis of another’s words, actions, and decisions; and distrust is a fear of, a propensity to attribute sinister intentions to, and a desire to protect oneself from the effects of another’s words, actions, and decisions. Thus, trust and a lack of trust are not opposite ends of a single continuum. It is possible for parties to both trust and distrust one another, given different experiences concerning the complex nature of relationships.

To sum up, both trust and distrust may bring positive and/or negative effects. Functional distrust inspires atomization, regulation, and behavioral control, which protect actors against any possible abuse of their vulnerability, which arguably results in predictable (but high) transaction costs and predictable (but low) gains. It allows for the maintenance of a critical perspective in cooperation, the identification of conflicting objectives in cooperation, and enables constructive criticism and innovation [33]. On the other hand, too much trust may lead to a vehement defense of inefficient, ineffective, or even downright counterproductive interorganizational cooperation [37]. As Granovetter [38] observed, too much trust allows for lawlessness, non-accountability, and corruption. Trust can “bind and blind” [39], providing ample opportunity for abuse.

Although an increasing interest in trust may be noticed, the concepts of trust and networks are still not fully clear and less straightforward than they seem [26]. In this paper I propose to expand the

comprehension of trust, discussing cooperation and competition in networks where cooperation is an emanation of trust and competition is a sign of distrust between partners [28,40].

2.2. Cooperation and Competition from a Multi-Level Perspective

The importance of combining multiple levels of analysis in the study of organizational phenomena has been increasingly emphasized in the literature [18,41,42]. A multi-level approach involves considering phenomena in relation to the context in which they occur, and searching for the variables by which they are formed. Particular organizational units are nested in larger structures [43]. These units form working groups, which in turn form larger organizational units (departments, or strategic business units making up an organization). Next, all of these may become part of inter-organizational networks. According to the multi-level approach, the study of constructs at the level of an organization or a network should start with an understanding of the individual level [44].

The multi-level phenomenon of individual and collective actions may serve as a background for a hypothesis on the interdependence of different levels of cooperation and competition in the context of interorganizational networks. The manifestation of individual actions (individualism) or collective actions (collectivism) at the individual level in psychological terms are called idiocentrism and allocentrism respectively. Idiocentrism is characterized by independence, uniqueness, and self-reliance, whereas allocentrism may be described in terms of interdependence, a sense of belonging to the group. At the level of an organization, individualism means, among other things, encouraging employees to achieve their potential and appreciating individual accomplishments, as well as accepting competition between employees. Individualism and collectivism have traditionally been seen as opposite ends of a continuum, but new research shows that they are independent dimensions. Individualism at the individual level affects individualism at the level of an organization. The same relationship was revealed for collectivism [45].

Bedwell et al. [46] point out that cooperation does not have to be considered on one level of analysis, but can occur between levels. Their definition of cooperation as “an evolving process whereby two or more social entities actively and reciprocally engage in joint activities aimed at achieving at least one shared goal” ([46], p. 130) may serve as a starting point for understanding cooperation in a multi-level approach. Competition “arises whenever two or more parties strive for something that all cannot obtain” ([47], p. 531). It may occur between entities on different levels of analysis: individuals, groups or organizations [47].

The phenomena of cooperation and competition are thus visible at different levels of analysis. Concerning inter-organizational networks, the whole network level, the level of organizations, and the level of individuals may all be distinguished. I propose to consider the multi-level nature of cooperation and competition in inter-organizational public networks that provide public goods, services, or values, adopting the lens of orientation towards cooperation and competition. Orientation might be described as an inclination, the adoption of a point of reference; it is a coherent set of interrelated activities and processes. It consists of philosophies that determine the character and direction of the activities and plans, and of the adoption of a different perception of priorities regarding how the organization defines its business. Therefore, it constitutes the basis of a decision-making model adopted in an organization [48]. I define orientation towards cooperation as a coherent set of activities and processes that occur in inter-organizational networks, and refer to the phenomenon of cooperation with other network partners. By contrast, orientation towards competition is a coherent set of activities and processes that occur in inter-organizational networks, and refers to the phenomenon of competition with other network partners. These definitions will be elaborated upon later in this work.

I suggest considering both concepts at the individual, organizational, and network levels. Here I wish to emphasize that my intention was not to create isomorphic constructs; starting from the network level, I was searching for variables at other levels, which would facilitate capturing the broader context of the phenomenon of orientation towards cooperation/competition and their potential relationships. At the level of entire networks, I focus on network level strategy, i.e., strategy that an organization

develops together with other organizations. As was mentioned, organizations can cooperate or compete. Cooperation enables partners to share strengths, to create stability in their interaction and to minimize risk. Thus, an organization is embedded in a network of relationships, to maximize the benefits. In accordance with the concept of separate organizations, each organization is perceived as isolated from its environment, with visibly defined boundaries that delineate its borders. A competitive situation is regarded as atomistic, which means that each company focuses on its own goals, which leads to rivalry and conflicts with other organizations. It is consistent with neoclassical economic theory, according to which individuals and organizations created by them are primarily guided by self-interest, because rivalry is a natural tendency. Thus, an organization is seen as an independent, discrete entity [49].

The level of strategy is linked with the individual level. The strategic actions reflect the experiences of managers [50,51]. Since the initial emergence of behavioral theory of organizations, researchers have been using theories of psychology to explain phenomena such as competition or cooperation between organizations. Social interdependence theory states that people's beliefs about how their goals are related determine the way in which they interact, which in turn affects their performance and group cohesiveness [29]. Subsequently, social comparison theory laid the groundwork for the articulation of the concept of "aspiration levels" that exist among organizations [52] which predicts organizational strategy and development. Inclinations, perceptions, and individual motivation are able to affect the results of an organization's operation [53]. Decision-makers, while making strategic decisions, are guided by "mental patterns", which are the result of their experience. Cognitive maps, which may be operationalized as strategic perspectives [54], influence strategic behavior and shape strategy [55,56]. There is also a reverse relationship: the activities and results of an organization shape cognitive maps [57,58]. Therefore, strategy is the result of strategic perspectives adopted by managers. According to the basis of the multi-level approach, the opposite is also true: organizations influence individuals. For example, the structure of an organization determines the flow of information, thus influencing the process of managers' decision-making. Structural aspects of hierarchical systems establish the distribution of power in an organization by stimulating the use of power [43]. The past repertoire of actions which organizations have taken shapes managerial responses to market signals in such a way that active repertoires encourage managers to increase the scope of market-oriented activities [59,60].

In the aforementioned considerations, it was assumed that orientation towards cooperation/competition at the individual level and at the network level are interlinked. I also propose that orientation towards cooperation/competition at the organizational level moderates this relationship. This orientation is manifested in the form of organizational culture, which can promote cooperation or competition. It is claimed that organizational culture impacts strategy [61]. Bates et al. [62] even claim that strategy and culture are essentially synonymous. Organizational culture also shapes the perceptions of organizational members [63] and their cooperative behaviors [64]. Moreover, organizational culture affects the relationship between values expressed by managers and an organization's performance and may strengthen the relationship between cooperative or individualistic orientation and the actions of individual cooperative behaviors and preferences for certain types of organizational practices [65].

Hence the assumption about the moderating character of organizational culture, because in the cases studied, networks include individuals or groups of individuals who are members of organizations, and not entire organizations. In interorganizational networks, each partner's organizational culture may affect the interaction between organizations [66].

The aforementioned reasoning enables the introduction of the following hypotheses:

H1a. *Orientation towards cooperation at the individual level influences orientation towards cooperation at the network level.*

H1b. *Orientation towards cooperation at the network level influences orientation towards cooperation at the individual level.*

H1c. *Orientation towards cooperation at the organizational level moderates the influence of orientation towards cooperation at the individual level on orientation towards cooperation at the network level.*

H1d. *Orientation towards cooperation at the organizational level moderates the influence of orientation towards cooperation at the network level on orientation towards cooperation at the individual level.*

H2a. *Orientation towards competition at the individual level influences orientation towards competition at the network level.*

H2b. *Orientation towards competition at the network level influences orientation towards competition at the individual level.*

H2c. *Orientation towards competition at the organizational level moderates the influence of orientation towards competition at the individual level on orientation towards competition at the network level.*

H2d. *Orientation towards competition at the organizational level moderates the influence of orientation towards competition at the network level on orientation towards competition at the individual level.*

2.3. Cooperation and Competition In Networks—The Dialectical Perspective

Probably in all types of public networks partners may face the “intrinsic tension between self-interest—achieving individual organizational missions and maintaining an identity that is distinct from the collaborative—and a collective interest—achieving cooperation goals and maintaining accountability to collaborative partners and their stakeholders” ([20], p. 26). Additionally, collaborative networks face many interconnected challenges, including goal conflicts, different priorities and values of partners, highly varied stakeholder demands, incompatible organizational cultures, and competition for scarce resources [67,68].

Thus, the nature of relationships between partners may be complex. On the one hand, interorganizational cooperation is viewed by many as a process of giving up organizational autonomy; yet organizations still need to achieve its own objectives. Partners also want to maintain their own distinct identities and organizational authority separate from the collaborative effort. Despite the individual interests of each organization, they are able to cooperate with each other owing to the shared values of their representatives who act jointly within the network. Normative behavioral patterns are complemented by the moral basis of social contracts, which cause units to be guided not only by pragmatism, but also by certain moral principles. Developing standards related to cooperation stabilizes the functioning of interdependent systems of organizations. This does not mean that the desire to preserve autonomy or to pursue an organization’s own interests is eliminated, or that there are no conflicts between organizations, but rather that common standards facilitate the adjustment of individual interests [69]. Consequently, organizations must balance the dualism of agency and collective concerns. When cooperation threatens organizational independence, organizations would be less willing to continue relationships [31].

Referring to the dialectical approach, and rich literature on strategic alliances, it might be suggested that network operation is associated with the occurrence of many paradoxical tensions. These tensions may be understood as “contradictory yet interrelated elements experienced by organizational actors” [70], such as contradictory demands, goals, interests, and perspectives [71]. The literature on paradoxes describes the prevalence of tensions and suggests ways of dealing with tension [72]. Numerous studies apply paradoxes to delineate tensions across diverse contexts and levels

of analysis. At a macro level, paradoxes in inter-firm relationships, such as collaboration-competition tensions, are recognized [73].

Therefore, collaborative contexts are inherently paradoxical, containing persistent contradiction between interdependent elements. For this reason, the paradox perspective has been applied to more adequately represent the complex nature of collaboration and the tensions embedded therein [68]. Paradox theory deepens understandings of the varied nature, dynamics, and outcomes of organizational tensions. In organizational research, the use of paradoxes has often focused on resolving, removing or omitting their existence [72]. Yet the collision of coexisting yet contradictory social forces may produce a new order. Such synthesis seeks a method that will make it possible to reconcile opposing views [74]. Tensions should not be perceived as problems or difficulties, but should rather be viewed and used as opportunities, facilitations, and enhancements. According to Smith and Lewis, although choosing from among competing tensions might provide a boost to short-term performance, only continuous efforts to meet multiple, divergent demands may bring about the long-term sustainability of the network [70]. One of the key aspects of sustainable relationships refers, among others, to the lifespan of cooperation, i.e., the willingness to continue actions with partners (even if the particular project has been finished). Cooperation undertaken in such circumstances leads to the further development of the partnership, boosts trust and eliminates barriers to cooperation between partners [75]. Long-term relationships have advantages regarding the sustainable competitiveness of partner organizations. For this reason, managers should consciously coordinate their inter-organizational exchange relationships towards a long-term orientation based on reciprocity [76]. Yet tensions can also be helpful by increasing alertness and mindfulness and by questioning existing routines [77]. According to the above, networks experience instability not when one of the extremes (in this case: cooperation/competition) is realized, but when one of the poles representing the individual dialectic tensions dominates the other [78]. Cooperation becomes risky for the partners if the exchange relationship involves forgoing one's own short-term profits in order to realize long-term gains together with a cooperation partner [79]. Thus, for the sustainability of the partnership understood in terms of its durability, the reconciliation of contradictions seems to be crucial.

While reviewing the literature in the field of paradoxes that exist in organizations, Smith and Lewis [70] claim that such paradoxes may occur between different levels of analysis: of an individual, of a group, of a project, of a dyad and of an organization. Moreover, the same paradoxes may occur simultaneously at all levels. The authors quote the case of tension between learning and performance, which takes place at the levels of an individual, a group, and an organization. In addition, tensions may cascade from one level to another, and experiences on one level may create challenges on another one. In addition, Fernandez et al. [80] emphasize the multi-level nature of tensions in co-opetition in their discussion. Apart from the inter-organizational level, they discern intra-organizational and inter-individual levels, and propose that resource limitations may influence the priority given to activities undertaken by partners, and that employees may face tension when a current competitor becomes a partner or when a current partner becomes a competitor. Besides, individuals experience conflicting emotions, beliefs and identities within co-opetition.

Concluding the analogy, another two hypotheses were put forward. If cooperation and competition are multi-level phenomena in which one level determines the other, and if tensions between them may occur at different levels of analysis, the reconciliation of contradictions on one of the levels should affect the reconciliation of contradictions on another level.

H3a. *Reconciling the contradictions between orientation towards cooperation and orientation towards competition at the individual level influences the reconciliation of the contradictions between orientation towards cooperation and orientation towards competition at the network level.*

H3b. *Reconciling the contradictions between orientation towards cooperation and orientation towards competition at the network level influences the reconciliation of the contradictions between orientation towards cooperation and orientation towards competition at the individual level.*

3. Research Method

3.1. Sample

In order to test the presented hypotheses, a survey was conducted among the members of inter-organizational networks, aimed at solving important social problems. The area of operation of these networks is connected with the implementation of social services of general interest, which underlie human dignity and guarantee everyone the right to social justice. I was interested in these partnerships including Social Welfare Centers which are public institutions that may undertake formal or informal actions with other public or non-profit organizations. The area of operation of these networks is connected with the implementation of social services of general interest, which underlie human dignity and guarantee everyone the right to social justice. Their operation often relates to minimizing the negative effects of redistribution, which leads to injustices and promotes social arrangements that permit members of society to interact with each other. Thus, the operation of partnerships contributes to strengthening social sustainability [81].

It is often difficult to notice these types of partnerships, as they may not even have individually separated office space in which to function. The local partnerships operating in Poland are not as formal as in other European Union countries. Often, partnerships are concluded to implement individual EU projects. Although cooperation between organizations from three sectors is not excluded, partnerships are most often established between public and non-governmental organizations. Usually they also consist of a few partners only, and less frequently may comprise a dozen or so.

Due to the fact that there is no list or database on such local partnerships, the first step was to identify them. For this purpose, inquiries were sent to all social assistance centers operating throughout the country, with the question pertaining to participating in this form of organized activity. 152 partnerships have been identified, of which 45 refused to participate in the research, while in 30 cases the partnership consisted of only two organizations. In order to increase the reliability of the results and to prevent common-method bias, the survey was carried out based on responses from three partners in each partnership. Each of them assessed the orientation towards cooperation and competition at network, organizational and individual levels. Such a sample selection is a consequence of embedding units in organizations and networks, and is required for multi-level studies. In addition, as indicated by McGuire and Silvia [82], in numerous studies on inter-organizational networks, only the opinions of the network leaders were examined, whereas it would be valuable to examine the perception of other organizations within its network. In total, data from 69 partnerships was analyzed, which gives a total number of 207 respondents when we consider that each partnership contributed responses from a leader and two partners.

3.2. Measures

The survey used six instruments to measure the constructs in the presented conceptual framework. All instruments have previously shown acceptable levels of reliability and validity. A 7-point Likert response format was used for all items (1 'strongly disagree' to 7 'strongly agree'). At the network level, orientation towards cooperation and competition is reflected in the concept of embedded and discrete organization [49]. Six questions were asked to measure the orientation towards competition, including 1. focus on achieving organizational goals, even if the price for doing so is conflict; 2. maximizing organizational benefits from cooperation; 3. rivalry for resources; 4. maintaining independency; 5. clearly defined roles and sharing of power between partners; and 6. short-term orientation, resulting more out of necessity than willingness. Orientation towards cooperation is based on contrary assumptions.

Orientation towards cooperation and competition at the level of an organization may be measured using two opposed types of organizational culture, namely market culture and clan culture. Each type of perceived organizational culture was measured using the six items of the Organizational Culture Assessment Instrument (OCAI) [83]. What lies at the basis of market culture are the assumptions that the environment is unfriendly, or even hostile, so the organization must keep strengthening its competitive position. The main duty of managers is to guarantee efficiency, performance and profits. The organization favors competition between employees and a competitive attitude towards the environment. By contrast, an organization displaying a clan culture might be described as resembling a family. It is dominated by common values and goals, featuring consistency and a high level of participation, together with a sense of community. Rules and procedures, as well as the focus on profit, are replaced by cooperation between employees, a desire to increase the involvement of the members, and the sense of responsibility for the company's employees. The basic belief of the clan culture is that the best way to manage the organization's environment is through teamwork and employee development.

To measure orientation towards cooperation and competition at the individual level, I referred to the proposition of Meyer [54], who extends the discussion on the paradoxes in business strategy, introducing the level of an individual (a manager). The strategic perspective, meaning the perception of strategic issues, is also covered. One of the views refers to cooperation and competition between organizations. In the literature on strategic management, little attention is paid to various "strategy paradigms" that exist between managerial staff members [84]. Underlying the whole concept is the theory of managerial cognition. A manager, while taking strategic decisions, uses his or her own mental models to read the reality and to act accordingly [85]. These cognitive representations of reality are based on experience. Six items from Meyer's scale were used, which deal with opposing perspectives on the perceived effects of the partnership (constraints vs. benefits); partners' involvement (achieving their own goals vs. achieving common goals); or resignation to the possibility of achieving goals (joint action should only occur if necessary vs. joint action should be the norm).

3.3. Data Analysis

After ensuring that the collected data were in order and making the decision to include or exclude individual surveys in the dataset, calculations for every single pair of contradictions were made based on the method presented by Bratnicki [86]. The capability of contradiction reconciliation was calculated using the following equation:

$$d = \sqrt{(7-x)^2 + (7-y)^2}$$

where x and y relate to the items representing the contradictions. This method has been chosen as the only known method which allows one to calculate how contradictions are reconciled. The results of the ratings were collated onto a strategic risk profile grid based on two coordinate axes. The magnitude of the calculated strategic risk profile makes it possible to assess the ability to reconcile contradictions related to cooperation and competition. The profile of the strategic risk is calculated as the distance from the upper right-hand corner of the decision grid—the point with the coordinates (7, 7) signifying the best answer—to the point with the coordinates of the respondent's rating—a point with the coordinates (x , y). The greater the calculated distance, the less effective the organization is in coupling the examined contradictions. The point with the coordinates (7, 7) represents the ideal state (strategic risk profile = 0), while the point with coordinates (1, 1) is the worst possible result (strategic risk profile = 8.49). The strategic risk profile results received take on a value of from 0 to 8.49 and can be subdivided into three basic zones: safety, caution, and danger. The first zone includes the values from 0 to 2.83 and signifies the capability of reconciling key contradictions (safety). A result in the 2.84–5.66 zone is in the caution zone. The highest strategic risk profile (5.67–8.49) indicates a lack of possibility of benefiting from the advantages flowing from the reconciliation of contradictions (the danger zone).

Subsequently, a factor analysis was carried out to capture the structure of hidden variables, and confirmatory analysis was carried out to verify the hidden variables. The factor structure of orientation towards competition at the network level initially created six observable variables (items). Factor analysis with varimax rotation showed that three variables were characterized by a sufficiently high value of factor loads (above 0.5), and subsequent variables had lower values of charges, and were therefore eliminated. In the case of orientation towards competition at the level of the organization, one variable was eliminated. In turn, orientation towards cooperation at the network level was finally assessed using five variables. The results of the factor analysis carried out to reconcile contradictions at the network level allowed the researchers to determine the dependence of items 1, 2 and 3. These results do not mean that the proposed scales were not properly constructed, but with such specificity of the research sample, only the selection of such variables created a strong univariate structure, which made it possible to use in subsequent stages of analysis.

In the analysis of the data obtained and testing hypotheses regarding cause and effect relationships between the examined variables, a Structural Equation Modeling (SEM) and hierarchical linear model (HLM) were applied. SEM is a combination of factor analysis and path analysis in one method—that is, modeling relations between structural hidden variables by means of systems of equations. Importantly for the research conducted, Muthen [87] extends the SEM model to variables with non-normal distributions. HLM is one of several techniques for multi-level modeling of the random coefficient. It answers two questions: (1) What is the effect of the properties of a higher level unit on the lower level result? (2) How does the property of a higher level unit affect the relationship between the lower level variables?

The procedure used to examine the impacts between variables was composed of two stages. In the first, single-level models presenting relationships between variables were calculated using SEM analysis. In the second stage, an analysis combining HLM and SEM was applied to examine multi-level dependencies. Next, the two models were compared based on the likelihood function, using two criteria to assess the quality of their model matching: Akaike’s AICA information criterion (AIC) and the Bayesian information criterion (BIC). RMSEA (Root Mean Square Error of Approximation), TLI (Tucker-Lewis Index) and CFI (Comparative Fit Index) indicators have also been calculated for both models, which are commonly used indicators allowing the researchers to assess the correctness of model fit. The following ratios indicate a good fit: RMSEA < 0.05; CFI > 0.9, TLI > 0.9. Due to limited space, only multi-level models are shown. In each case, they have obtained a better fit than the models which do not take the multi-level nature into account. Data was processed by means of MPlus.

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4. Results

Data was first analyzed through descriptive statistics before the assumed relationships were tested through structural equation modelling (Table 1).

Table 1. Descriptive statistics.

	Mean	D	St.D.	Min	Max	Percentiles		
						Q25	Q50	Q75
Orientation towards competition								
Network level	3.41	4	1.85	1	7	2	4	5
Organizational level	2.86	1	1.67	1	7	1	3	4
Individual level	3.02	1	1.70	1	7	2	3	4
Orientation towards cooperation								
Network level	5.53	6	1.32	1	7	5	6	7
Organizational level	5.04	6	1.37	1	7	4	5	6
Individual level	5.61	7	1.34	1	7	5	6	7

Subsequently, the reconciliation of contradictions was calculated. In analyzing the distribution of answers regarding the individual level, it can be stated that 19.8% of answers can be placed in the danger zone and 13% in the security zone. Referring to the contradictions at the network level, only 5.3% of responses are in the danger zone and 16.4% in the safety zone, but in this case significant differences between the reconciliation of particular contradictions can be observed. The conflict between flexibility and stability in terms of the division of roles between partners is best balanced, while the worst reconciliation refers to the contradiction inherent in the ability to achieve benefits for oneself as opposed to mutual benefits.

Models showing the impact between variables are presented below. Due to the low number of respondents and the low degree of model saturation, no joint analysis of the relationships between variables was made, but instead dependencies were calculated as presented in the hypotheses. Only statistically significant models were presented.

Hypotheses 1a,1b suggested mutual influence between orientation towards cooperation at the individual level and orientation towards cooperation at the network level, and the moderating effect of orientation towards cooperation at the organizational level. For both models presenting the influence between individual and network levels, the models were well fitted and the regression parameter was significant. For the model presented in Figure 1, the value of the regression coefficient (1.312) means there is a strong influence of orientation towards cooperation at the individual level on the orientation towards cooperation at the network level. The reverse influence between variables (Figure 2) is weaker (0.762) yet still can be regarded as strong. Hence, hypotheses 1a and 1b can be supported. For the models testing hypotheses 1c and 1d, the regression parameter was statistically insignificant, which is why they have not been presented, although it is worth noting that the moderating effect of organizational culture was observed.

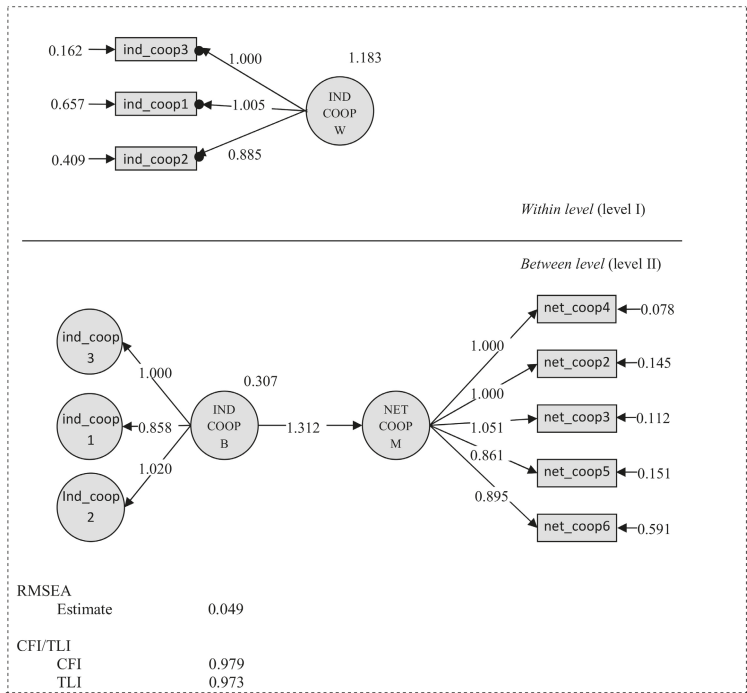


Figure 1. Results of the calculation of the multilevel analysis for H1a (impact of cooperation at the individual level on cooperation at the network level).

Similar results were obtained for the analyses carried out for the purposes of the verification of hypotheses H2a and H2b. The value of the regression parameter for the influence of orientation towards competition at the individual level on orientation towards competition at the network level is 1.736 (Figure 3) and for the opposite influence 0.576 (Figure 4). The regression parameter for the models verifying hypotheses H2c and H2d was not statistically significant. Thus, the results provided support for Hypothesis 2a and 2b, but not 2c and 2d.

An assessment of the parameter values of models, both taking into account the multi-level nature of the phenomenon and without, shows that both models are very well-matched and that the multi-level model explains the phenomenon to a greater extent than the model which does not take the multi-level nature into account. The regression parameter is 1.264, which means that the impact is strong. Thus, hypothesis H3a is supported by the research (Figure 5).

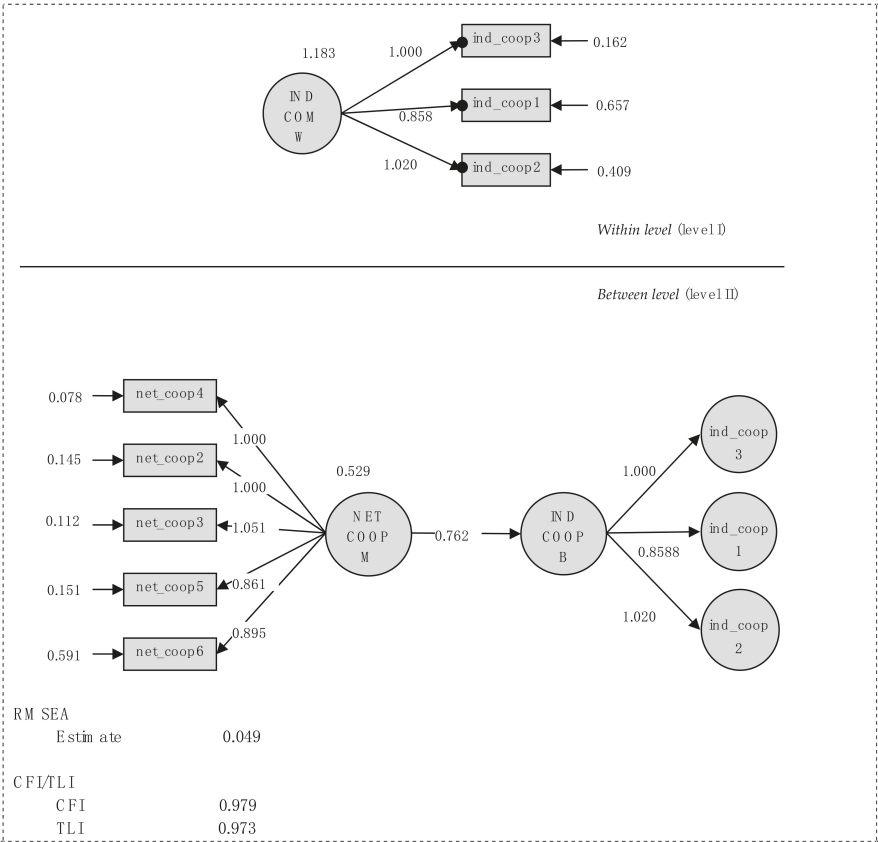


Figure 2. Results of the calculation of the multilevel analysis for H1b (impact of cooperation at the network level on cooperation at the individual level).

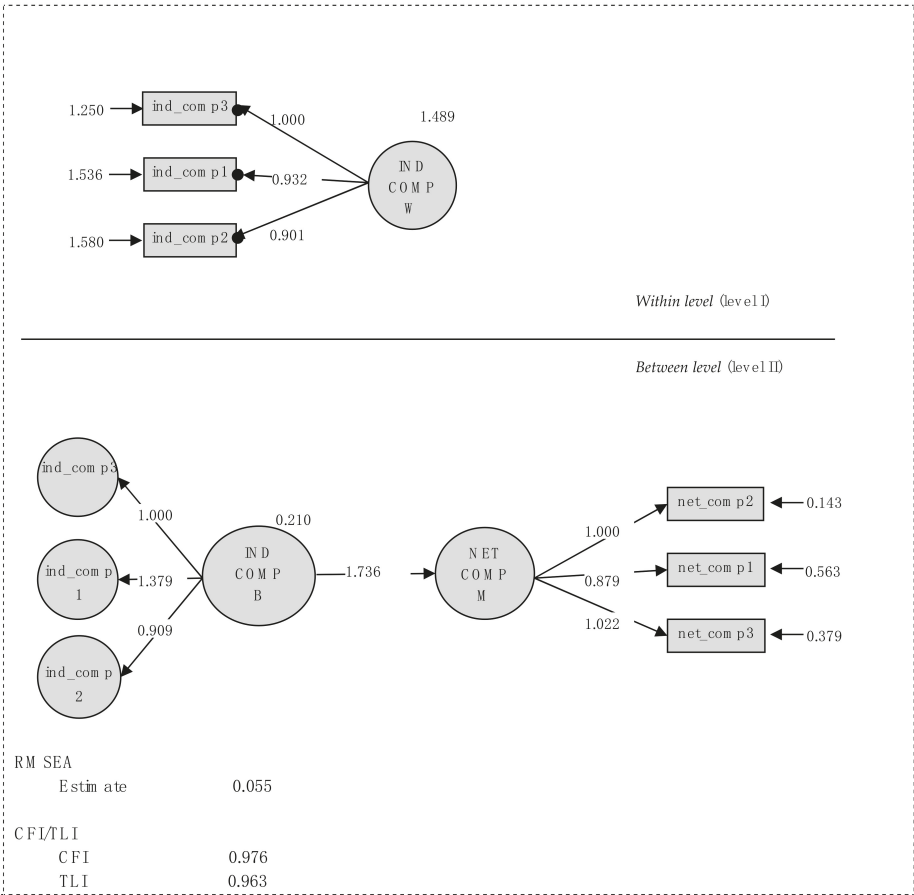


Figure 3. Results of the calculation of the multilevel analysis for H2a (impact of competition at the individual level on competition at the network level).

In the case of Hypothesis H3b, an analysis of the adjustment measures of the single-level and multi-level models allows us to state that, similarly to the model for hypothesis H3a, they are adjusted to a high degree. The regression parameter is 0.791 (Figure 6), which means that the hypothesized impact is moderate. Therefore, hypothesis H3b can be supported.

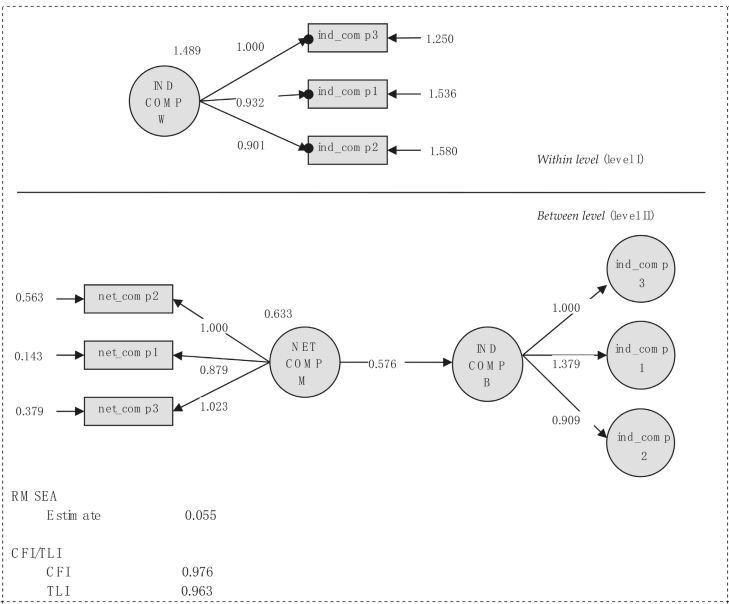


Figure 4. Results of the calculation of the multilevel analysis for H2b (impact of competition at the network level on competition at the individual level).

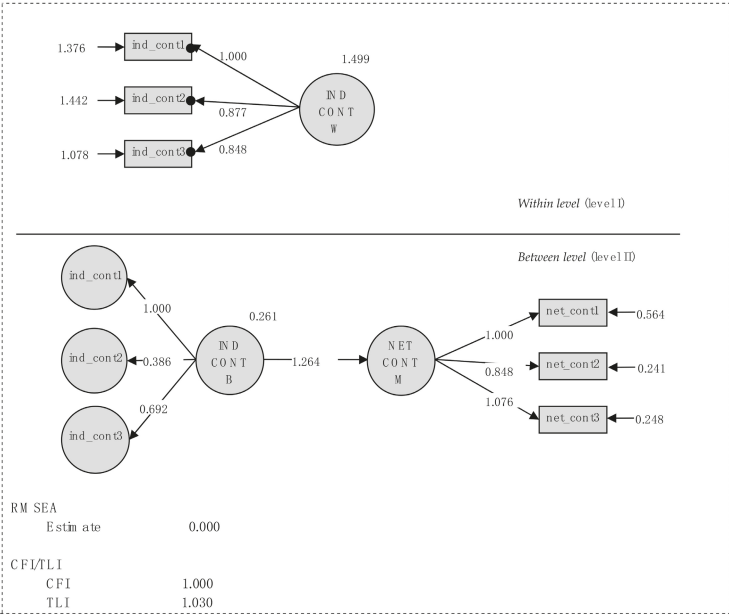


Figure 5. Results of the calculation of the multilevel analysis for H3a (influence of reconciliation of the contradictions between orientation towards cooperation and orientation towards competition at the individual level on reconciliation of the contradictions between orientation towards cooperation and orientation towards competition at the network level).

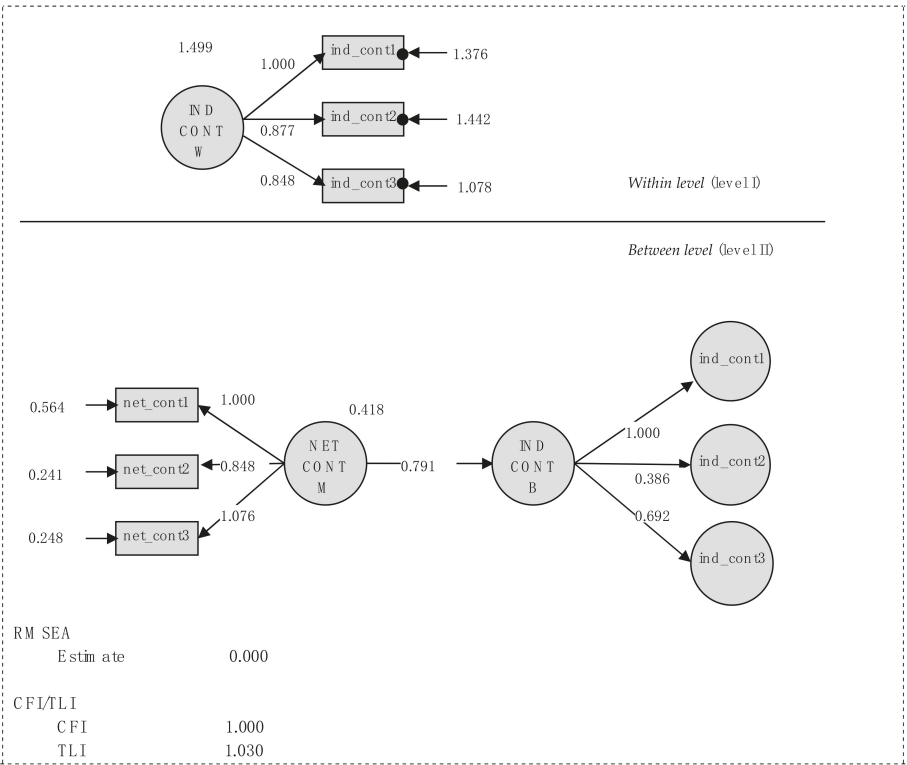


Figure 6. Results of the calculation of the multilevel analysis for H3b (influence of reconciliation of the contradictions between orientation towards cooperation and orientation towards competition at the network level on reconciliation of the contradictions between orientation towards cooperation and orientation towards competition at the individual level).

5. Discussion

This study confirms the relatively strong link between individual and network levels of orientation towards competition and orientation towards cooperation in the context of collaborative networks. First, in the present study, it is assumed that strategic actions taken by partners in a network (network level) are related to the network members' perception of cooperation or competition (individual level). These studies also reveal an influence in the opposite direction: experience of cooperation or competition affects the perception of individuals. Stronger "bottom up" (rather than "top down") dependence was observed while analyzing the relationship between orientation towards cooperation/competition at the individual level and at the network level. The strategic mindset of managers shapes the organization's strategy; therefore the obtained research results confirm the existing state of knowledge. Importantly, the influence of a phenomenon at a higher level of analysis on a phenomenon at a lower level was also revealed. Thus, the strategy pursued in relation to partners, which might be defined as a pattern of activity over a longer period, translates to the perception of cooperation and competition. What is more, the results of the research also allowed the researchers to conclude that there is a positive mutual influence in terms of reconciling the contradictions between orientation towards competition and orientation towards cooperation at the individual level, and reconciling the contradictions between orientation towards competition and orientation towards cooperation at the network level.

No evidence was found to support the moderating nature of orientation towards cooperation/competition. Although the analyses carried out showed a relatively low impact of this variable on the relationship between orientation towards cooperation/competition at the individual/network level, it was statistically insignificant in every case. This may be due to the characteristics of the sample. Another reason is that the public networks surveyed usually consisted of individual members of the organizations in which they are employed. These organizations, as entire entities, are not involved in the operation of the network; therefore organizational culture has no impact on the relationship between the network level and the individual level.

Although the amount of research attempting to capture the multi-level nature of both cooperation and competition in public networks is growing [68,89], to my knowledge, this is the first quantitative study of this topic. The research presented contributes to the field in several ways.

First, taking into account the specificity of the paradox of cooperation and competition in public networks, consideration of these phenomena in this particular context using orientation towards cooperation and orientation towards competition was proposed. Looking at cooperation and competition through the prism of trust and distrust enabled the researchers to extend the conceptualization of these phenomena in the context of public networks. Hence, orientation towards competition assumes that self-orientation, independence, and risk avoidance dominate the partner's mindset, the culture of their organizations, and strategy towards partners within networks. Conversely, orientation towards cooperation relates to other-orientation, interdependence, the risk-taking mindset of partners, organizational culture, and strategy towards other partners within networks.

Second, despite growing interest in applying the multilevel perspective in the context of public networks, few researchers [90–92] investigating the tensions between individual persons and organizations have employed a multilevel approach so far. Referring to the analysis of competition and cooperation, previous studies (the majority of them concerning alliances) focused solely on the network level. However, according to a multi-level approach, it seems that a full grasp of a given phenomenon requires the consideration of its relationship with phenomena at other levels of analysis. As actors cognitively assess the consequences of cooperation and label it as beneficial or harmful [84], cooperation and competition with network partners are thus dependent on the individual partners' mindset. On the other hand, past experiences (actions taken towards partners in a network) also shape the attitude towards cooperation/competition. So far empirical research has focused more on top-down processes rather than bottom-up processes, suggesting that the larger context is more likely to influence lower-level variables than the opposite [93]. This research shows that upward processes determine downward (contextual) processes. In this instance, it is in line with expectations, since many phenomena in an organization have their origins in the phenomena occurring at a lower level of analysis.

To sum up, the results allowed for confirmation of the multilevel nature of competition and cooperation, which was suggested, among others, by Bedwell et al. [46] and Kilduff et al. [53]. The results of the research are in line with the proposal of Gnyawali et al. [75], according to which the challenges and tension in inter-firm relationships generally start at the individual level and manifest at the upper levels.

The presented study has certain practical implications. Individual beliefs about cooperation or competition translate into further action taken by the organization in relation to its partners. In other words, if the members of a network are convinced that cooperation makes sense, it is more likely that the organizations will collaborate with partners in the network. Conversely, if the members are more focused on competition, the result is that the actions which the organizations in the network take towards their partners are competitive in nature. This results in two conclusions. Since people learn through action as well, network members can shape each other's perception of reality. If individuals come across behaviors geared to cooperation, there is a high probability that they will perceive cooperation as beneficial in the future. The same applies to competition. Network actors who experience more competitive than cooperative behaviors in the network may perceive cooperation as

unprofitable. For the education system, this requires an appropriate shaping of public specialists and managers' beliefs about cooperation and competition which they would translate into future strategy towards the partners in the network. Although our knowledge of cooperation and competition is still limited, public sector specialists should be able to understand different patterns of behavior towards partners and the possible positive and negative consequences, and be able to monitor the situation and react when a partnership is underperforming due to problems in this area.

The main limitations of the research relate to three areas: the design of the study, the research sample, and the operationalization of variables. The study was conducted based on the research model which assumes the existence of dependence within the constructs of orientation towards cooperation and orientation towards competition, as well as the relations between them. Both constructs could be operationalized using other variables and scales. Additional research is required to fine-tune the measurement. Restrictions also apply to the research sample. The first aspect of this limitation relates to the representativeness of the sample. The number of all partnerships operating in Poland in the area of solving social problems is not known. A request to complete the questionnaire was sent to all registered partnerships, but it is difficult to determine the level of sample representativeness. The second aspect concerns the design of multi-level studies. The respondents were asked to assess the phenomena at the level of the organization or the network. However, their responses did not reach a high level of homogeneity. There are two reasons for this, the first of which is related to the sampling procedure. In order to obtain the most objective picture of the situation, the partnership leaders were asked to identify partners for further contact, namely partners with whom they cooperate most and least successfully. The replies of these partners differed, which lowered the internal correlation, but increased the level of objectivity of the data. The second reason is the size of the groups, in this case the networks. If there had been several or a dozen respondents from each network, rather than just three, the opportunity to obtain satisfactory results in this respect would have been greater. Next, when studying the relationship between an organization and a network, the unit of analysis is the organization, and the researcher can gather data from many organizations, both within a single network as well as several networks. When studying inter-organizational networks to capture the full picture (in order to take the multi-level approach into account), one should consider the views of all participants, or at least a significant number of them, which would certainly multiply the costs of research.

Future research could focus on improving our confidence in the results provided by such research and overcoming its limitations. Additional research is required to fully understand the compound nature of trust and distrust in the context of networks, as "trust determines long-term (and in this sense sustainable) exchange relationships between two organizations" [94]. Further measurement of collaboration and competition based on the concept of trust is needed. I also suggest conducting longitudinal studies, allowing researchers to study the dynamics of cooperation and competition in networks and explain their specifics. Is the intensity of orientation towards cooperation/competition changing over time? If so, what are the trajectories of this process?

Cooperation and competition can arguably be viewed as a multi-level paradox. The paradox mindset denotes the extent to which one is accepting of and energized by tensions. The acceptance of tensions enables an awareness of the capabilities of fully capturing ambiguous and complex configurations of reality. Individuals with a paradox mindset are able to unlock the potential of everyday tensions and achieve higher results [71]. Parties may both trust and distrust one another, and individuals may fight an internal struggle in terms of beliefs about competition and cooperation. According to the paradox theory, it allows them to benefit from cooperation while maintaining vigilance and autonomy. The results of presented research show, that so far, only very small numbers of examined network actors are able to reconcile conciliations to a high extent. To provide more detailed conclusions for the practitioners, further research on reconciling the paradox of cooperation and competition is needed. It could help to determine a suitable relationship between cooperation and competition which is necessary for the positive effects of partnerships. In other words: does

reconciliation of this contradiction really produce positive results for the network? Or would another configuration perhaps be more beneficial? It is worth noticing, that overwhelming majority of research refers to strategic alliances. Our knowledge on the topic in the context of public network is still limited.

The above considerations are focused on collaborative public networks, although the conceptualization of orientation towards cooperation and orientation towards competition in the multilevel context seems to be universal, taking into consideration different types of public networks. In addition to the need to provide evidence of the benefits of reconciling contradictions in cooperative networks, it is certainly worth examining the idea of reconciling contradictions between orientation towards cooperation/competition in policy and governance networks.

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Article

The Effect of Trust on Acquisition Success: The Case of Israeli Start-Up M&A

Piotr Trąpczyński ¹, Ofer Zaks ² and Jan Polowczyk ^{1,*}

¹ Department of International Competitiveness, Poznań University of Economics and Business, 61-875 Poznań, Poland; piotr.trapczynski@ue.poznan.pl

² Hadassah Academic College, Jerusalem 9101001, Israel; zaks-@013.net.il

* Correspondence: jan.polowczyk@ue.poznan.pl; Tel.: +48-500-031-809

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Abstract: Given the frequent failure of many M&A deals, the question of their sustainability is a critical one. Still, in existing literature, there is a visible emphasis on the perspective of the acquiring firm and its characteristics in affecting M&A performance. Moreover, the role of trust, both from the acquiring and acquired firms, has not received extensive attention to date. The present paper builds on a quantitative and qualitative study of Israeli high-tech start-ups acquired by international firms to explore the effects of trust on M&A success. Our study indicates that trust from acquired firm managers positively affects acquisition success, although trust from the acquiring firm (expressed with the autonomy that it leaves to the acquired firm) is not a significant predictor of acquisition success.

Keywords: trust; M&A sustainability; performance; start-ups; retained autonomy; mixed-method research

1. Introduction

Mergers and acquisitions (M&A) belong to the focal strategies for organizations to ensure a sustainable competitive position. Global M&A activities reached \$936.8 billion in 1Q2018, representing an increase of 24.9% as compared to the same period of the previous year [1]. (These phenomena include mergers, acquisitions, divestitures, spin-offs, debt-for-equity swaps, joint ventures, private placements of common equity and convertible securities, and the cash injection component of recapitalization according to Bloomberg standards). These transactions involving two organizations are oftentimes used to achieve economies of scale, diversification, and economic growth. M&A can allow companies to grow, shrink, and—more importantly—change the nature of their business or competitive position, particularly by acquiring technological or managerial know-how [2]. However, the volume of these deals stands in sharp contrast to the actual sustainability of M&As. Estimates indicate that a significant proportion of M&As are financial failures [3–5] and, overall, the value creation is negligible [6]. Hence, not surprisingly, for the past decades, a number of researchers have dealt with different factors affecting the sustainability of M&A. In spite of this plethora of research, the critical success factors behind M&A and the reasons for their frequent failure still remain rather poorly understood. King et al. [6] concluded that despite a long tradition of research, none of the variables most frequently featured in extant research (including the level of diversification and relatedness, payment method, or earlier acquisition experience) turned out to be significant predictors of variance in post-acquisition performance.

More recently, scholars have concentrated on sociocultural variables and human factors contributing to the sustainability of M&A. A potentially crucial, yet underexplored, variable in the post-merger integration process is trust. Despite significant advances in this field, our understanding of the role of trust in M&A still remains incomplete. M&As increase negative reactions such as ambiguity [7,8] and a lack of organizational commitment [9,10]. Uncertainty arising after the announcement of an M&A deal creates a fertile ground for mistrust, as the situation is turbulent and members of an organization

may feel vulnerable. Trust in a brand new top management team (TMT) may be lacking at the beginning, while employees are unsure as to the extent and magnitude of upcoming changes which can affect them in different ways [5]. The period after the announcement of an M&A transaction is therefore full of vulnerability, whereby mutual trust between the involved parties is of vital importance.

The acquiring firm's TMT can possibly contemplate a couple of activities in order to develop trust and guarantee the commitment on the part of employees of the acquired firm [4]. In specific, trying to accelerate the process of integration, refraining from imposing the own culture on the acquired company, or offering proper structural incentives (such as granting the acquired firm to retain a desirable level of autonomy), may possibly lead to superior post-integration performance.

This human side of M&A, which arguably explains a significant part of the challenges of M&A sustainability, has been studied from the perspective of multiple theoretical concepts and approaches. These include, *inter alia*, the psychological perspective looking at how M&A affect individual stress levels, coping, and involvement [11,12]; the micro-foundations of organizational behavior affecting the pre-acquisition stage, e.g., [13]; the social perspective focusing on group dynamics, social comparison, and status [14,15]; and the cultural perspective considering culture clashes that afflict M&A performance [16]. However, much of the research into M&A to date remains fragmented and suffers from several gaps [17]. We argue that these result from an inadequate and simplified treatment of trust in the related research. Thus, while the integration of foreign units has been examined from the point of view of strategy-related variables, it has rarely been viewed as a manifestation of trust in the acquired entity, which may be crucial for its performance [18]. Moreover, trust in a transaction involving two parties is a mutual phenomenon, which can be analyzed in a one-sided manner.

In light of the above, our paper aims to examine how trust affects a sustainable, successful integration of two companies, viewed both from the perspective of the acquiring and the acquired company's management. In addressing M&A success, we recur to managerial perceptions, which result from the difficulty of defining and measuring M&A success, particularly for technology acquisitions. As Zollo and Meier [19] noted, no single item can possibly capture all of the important dimensions of M&A performance. Such transactions may have little or no immediate influence over buyers' stock prices or even over the P&L account. Conversely, TMTs from the acquired firms usually have intimate knowledge on the integration process and its outcomes. Furthermore, past studies found evidence that evaluations provided by managers correlate with objective success measures [20].

In order to address this research question, acquired Israeli start-ups were chosen as the empirical setting. We study the relevance of trust within the context of start-ups, because most acquired companies, nowadays, are small and medium enterprises (SMEs), with a preference for creative and entrepreneurial start-ups. The reasons for acquiring such firms are numerous, ranging from the ability to adopt a flexible strategic approach, through the integration of an entrepreneurial and innovation-oriented culture, to absorbing new technology. And yet, although SMEs do play a crucial role in the economy, as they represent 99% of the number of firms in Europe [21], and they actually drove M&A transactions in the past [22], they are often ignored in current research.

Many companies forge relationships with young, innovative start-up firms in order to provide them with ideas and financial support, while working on joint innovative projects [23]. Such relationships demonstrate how interactions and shared socio-cultures may arise from joint interests, whereby trust plays an important role in ensuring knowledge transfer and a seamless alignment of objectives, as well as connection to each other's networks. The relevance of trust in this context is accentuated by the fact that the acquiring and acquired firms display divergent characteristics, particularly in terms of the level of formalization and the complexity of organizational structures. Therefore, if the innovation-related objectives driving such deals are to materialize, the acquired unit has to receive trust in its approach, despite potential differences between the companies.

The setting of Israel was selected for its particular relevance to start-ups and innovation. Over the past few decades, large companies have been scouting Israel for their technology acquisitions and for innovative ideas [24]. Starting in early 1990s, Israel has seen an impressive rise in the number of

start-ups and the venture capital (VC) industry accompanying high tech sectors [25,26]. Moreover, Israel is famous for its entrepreneurial orientation, its superior technological skills, and its growing start-up-intensive high-tech cluster [27].

The paper is organized as follows. The second section features a literature review devoted to the role of trust in M&A, with a focus on its outcomes, and leads to the formulation of two hypotheses pertaining to trust on both sides of the transaction. Subsequently, we present the mixed-method design of our study, with a focus on the data collection and analytical methods used in the quantitative and qualitative study. In the ensuing section, we elaborate on the results of both studies. Not least, the final section elaborates on the implications and limitations of the study.

2. Theory and Hypotheses Development

Trust is of interest to many scientific disciplines, such as philosophy, psychology, sociology, economics, or management. Mainstream economic theory puts forward a formal process for making rational decisions, in which individuals consider all options available to them [28]. Yet, many important investment decisions are intuitive rather than analytical [28], particularly when the decision-making process is made by a group of people [29]. Hence, trust is a core concept of behavioral economics which enhances the explanatory potential of economic sciences by giving them a more realistic psychological backbone [30,31]. The Nobel Prize winners G.A. Akerlof and R.J. Shiller in their bestseller book [28] regarded trust as the cornerstone of the so-called animal instincts of a man. K.J. Arrow [32] called trust “an important lubricant in the social system”. It is very effective because it allows you to save on the costs of gathering information about business partners. According to Arrow, “*in the course of evolution in societies there were quiet agreements*” creating ethical and moral principles that contribute to the smooth functioning of economies. The factor of trust and its impact on economic development are the subject of many different studies [33].

Hence, not surprisingly, trust is also regarded as a key element of sociocultural variables that are crucial drivers of M&A performance. Support for the focal role of trust can be found in research indicating that trust is critical to successfully implementing strategic alliances in a form of joint venture, e.g., [34]. As for the M&A context, trust appears to be critical, particularly in the post-merger integration process, e.g., [35,36]. In fact, it may reduce the intention to leave the company by its managers as a result of the takeover. It may also facilitate an effective transfer of knowledge between the parent and the subsidiary, as well as reinforce the commitment and dedication to the redefined business objectives after the acquisition. And yet, in spite of substantial practical, albeit mostly anecdotal, support for the significance of trust in M&A, our knowledge of the facilitators of trust emergence in acquired firms and effects of this trust on sustainable outcomes of M&A still remains quite limited [4].

In this paper, we refer to trust as “a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another” [37] (p. 395). These expectations are related to perceptions of the partner organization and its trustworthiness, while the intention to accept vulnerability can be essentially regarded as a risk-taking act [38]. Trust appears to be characteristic of successful integration efforts [4]. Maguire and Phillips [39] point out that institutional trust can be weakened by the ambiguous perception of the identity of a new organization. Stahl and Sitkin [40] suggest that the acquired firm employees’ own image of the acquirer TMT’s trustworthiness can be influenced by the past relations between the two organizations, the distance between them, and—most notably—the approach to integrating both organizations chosen by the acquiring firm.

Thus, we argue that the decision of the acquirer as to the extent of autonomy of the acquired firm is relevant in explaining the success of the cooperation and integration of two organizations, as it reflects the trust given to the acquired organization. While the structural integration can be inevitable in order to exploit potential synergies between the acquired and acquiring firms [41], the loss of autonomy that typically accompanies integration can *per se* be detrimental to acquisition outcomes [42]. Furthermore, a sustainable merger of both organizations requires a significant involvement of managerial attention

on the part of the parent company, which results in possible distraction of the acquiring firm from its strategic priorities [43].

Indeed, the integration-autonomy tension may be particularly important in M&A of high-tech firms. Such deals are oftentimes driven by the intention of getting access to knowledge-related assets [44]. However, integration can eventually afflict the tacit know-how of the purchased organization, as employee turnover may increase, while organizational routines which can be part of the previous competitive advantage, may be discontinued [44,45]. Past research has regarded the integration between the acquiring and acquired firms as something imposed on the acquired organization, rather than an active process which requires a significant involvement by leaders from both sides of the deal. Öberg [46] argues that “if the acquirer aims to keep the innovative firm innovative, its target should not be too young a firm, while it, in compliance with previous research, should be kept autonomous” (p. 400).

However, for the operational process of merging two firms to be truly sustainable, it requires involvement on both sides of the transaction. On the one hand, the acquiring firm must go on to grow independently in order to remain competitive. On the other hand, the acquired firm must continue working on its own technology. Not least, the two organizations must jointly explore the potential for exploiting new solutions and sharing them effectively [47].

Thus, we propose that:

H1: *The retained autonomy level of the acquired company will have a positive influence on acquisition success.*

Furthermore, a number of studies stress the relevance of a trust in the contacts between two organizations as a key to initiatives related to organizational change [48]. M&As often lead to a change in ownership for acquired firms, which often leads to changes in their organizational and management practices. Hence, inspiring employees and instilling them with a feeling of trust may be among the key strategies for reducing barriers to change.

There is substantial anecdotal case-based evidence [36] and interviews with acquired managers and employees [35] suggesting that the time after an M&A is characterized by constant risk assessment, whereby trust can be damaged, its restoration being more difficult. New executives functioning within a new organization may not necessarily inspire trust in the acquired firm, as the latter’s members may feel insecure as to their future in the organization [46,49].

Employees of the acquired firm may likely experience ambiguity, uncertainty, and stress related to the change process and its results [50]. Trust can alleviate these concerns, as it is an important tool in managing risk, reducing complexity, and overcoming unfamiliarity [51]. Conversely, the readiness for change on the part of the acquired firm will decline if leaders, which serve as role models to their employees, behave in a manner which is inconsistent with their communication [52]. In other words, TMTs serve as a behavioral point of reference which employees recur to during times of organizational change, therefore trust in them appears to be a crucial determinant of a sustainable merger and cooperation of two organizations. Hence, we posit that:

H2: *The acquired firm management’s trust in management will have a positive influence on acquisition success.*

3. Methodology

Due to the complex nature of M&A transactions, quantitative evidence alone is insufficient and qualitative data is needed to help explain the initial quantitative data [53,54]. In this current research, the quantitative data collection stage preceded the qualitative data collection stage which utilized in-depth semi-structured interviews [53]. Accordingly, we applied an explanatory sequential research design [55], summarized in Figure 1 below. Over the past few decades, M&A research has used rather standardized methods. However, if researchers are to enhance their knowledge of sustainable M&A facilitators, they ought to rethink the ways in which they generate knowledge in the field, both with regard to research designs and data sources. In this context, a mixed-method design can contribute to exploring M&A success factors more effectively. Mixed methods, furthermore, allow more views

to be voiced and therefore can lead to a more balanced evaluation. The next paragraphs describe the procedures and building blocks of this research’s design and the tools developed to cope with the sample and data collection.

To summarize, we employed a two-phased, sequential mixed-methods research design with a key role of quantitative results, followed up with qualitative semi-structured interviews. The reason for the qualitative extension is to enhance the understanding of the quantitative results [56]. More specifically, the purpose of using qualitative analysis was to obtain frontal and “live” information from TMTs concerning their attitudes, drive, interest, and arguments. The interviews allowed us to analyze the processes along the strategic milestone decisions to sell their start-up. Also, the mixed-method design aimed at enhancing the reliability and validity of this research.

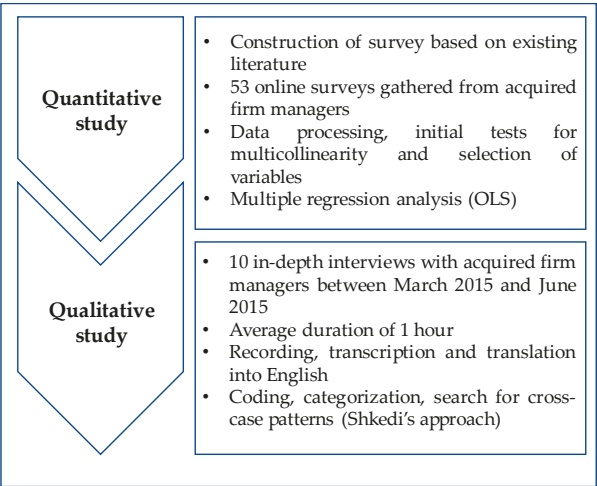


Figure 1. Summary of the research process.

3.1. Quantitative Study

3.1.1. Data Collection

The quantitative sample was comprised of TMT members of Israeli high-tech start-ups acquired over a six-year time period (2009–2014). Data analyzed by the IVC-research center (IVC-Meitar Exits Report, 2014) indicates that 547 transactions were executed in Israel during this time period. The research sample was gathered from several sources. Most participants were pulled out of lists containing entrepreneurs’ and TMT members’ names and positions in Israeli start-up companies which have gone through a process of M&A during the six-year period (2009–2014).

In total, 125 invitations were sent via e-mail during the first quarter of 2015. An electronic reminder was sent to those who had not responded within 14 working days. The survey invitations, including a link to the online survey, were e-mailed to the top managers of acquired companies through Qualtrics™. In total, 105 surveys were viewed (but not necessarily completed) and 12 surveys remained incomplete. 53 respondents filled out the survey, leading to a 58% response rate. The size of the acquired firms ranged from 5 to more than 200 employees (48% of them employ 5–50 employees). Ultimately, the sample comprised 53 companies, the basic description of which is provided in Table 1.

Table 1. Sample characteristics.

Characteristics		# (N = 53)	%
Number of employees (in the acquired company)/size	5–50	24	45.3
	51–200	13	24.5
	201–	16	30.2
	0	25	47.2
Previous experience in M&A	1	14	26.4
	2+	14	26.4
Age (group)	20–39	6	11.3
	40–59	42	79.2
	60+	5	9.4
	1–4	16	30.2
Tenure (years)	5–9	19	35.8
	10–	18	34
	–2	16	30.2
Time since the merger announcements (years)	–4 less	22	41.5
	4+ more	15	28.3

3.1.2. Operationalization of Variables

With regard to the operationalization of variables (see Table A1 in Appendix A for a summary), the dependent variable was perceived performance, which we used as an indicator of success and hence a possibly sustainable acquisition. Managers from both firms usually have extensive knowledge about the deal, as well as the subsequent integration phase. Furthermore, numerous studies found clear evidence indicating that the ratings provided by managers correlate with objective success measures, e.g., [57]. Although acquisition results are to some extent uncertain, particularly in technology industries’ settings, one can certainly assume the existence of an alignment between the genuine motives and the outcomes of an acquisition [58]. In the current study, five items measured ‘perceived performance’, with a value of Cronbach’s alpha of 0.87 (see Appendix A for details).

Secondly, satisfaction with the acquisition can be described as the degree to which a manager anticipates feeling satisfied following the acquisition. Participants were requested to evaluate their satisfaction with the acquisition process in five questions with a Cronbach’s alpha value of 0.89.

The use of perceptual measures in our research context also has further reasons. As argued by Podsakoff & Organ [59], reasonable alternatives to perceptual items may be absent with regard to smaller organizations. Moreover, Venkatraman and Ramanujam [60] noted that perceptual data displayed less method variance as compared to secondary data. The perception of integration success was also advocated and used by Graebner [61] in cases where historical data is hardly or not available to the researcher, which holds true for acquired small firms.

With regard to independent variables, retained autonomy was measured using three items regarding asymmetric shift in control from one firm to the other: (a) financial control; (b) administrative control; and (c) operational control. These added three more questions inspired by extant literature [42,62], yielding a scale with six items and the alpha of 0.88.

With regard to trust by the acquired firm, the questions pertained to the managers’ beliefs regarding the acquiring firm management’s trustworthiness and fairness. The survey included six questions regarding trust [63,64], whereby Cronbach’s alpha amounted to 0.63.

Due to a large number of further factors affecting organizational performance identified in extant studies, we incorporated a number of control variables in our analysis. The first one among them, the quality of information regarding the change process, was also measured using a four-item scale adapted from Wanberg and Banas [65]. Further, consistent with Schoenberg’s [66] research, in this study, knowledge transfer was captured with the extent to which knowledge was transmitted from, and to, the acquired organization in such areas as product and service design, R&D, service manufacturing operations, purchasing/supplier relation, distribution/outlets, HRM, or marketing

and sales. Readiness for change was measured using a combination of two types of scales: the first one by Holt, Armenakis, Field, and Harris [67] to assess readiness at an individual level and the second by Meyer and Allen [68] to assess affective organizational commitment.

Furthermore, acquired company size was assessed by requesting survey participants to provide the number of their acquired firms' employees before the acquisition (on a scale ranging between less than 50 to more than 200). Previous experience with M&A was captured as a binary variable. Survey participants were additionally requested to state how many M&As they have experienced on a scale ranging from one to three and more. While all respondents were drawn from high-tech industries, such industries are highly diversified and there is significant difference in their technological and patenting-intensity, which can be to some extent attributed to inter-sector discrepancies in the nature of knowledge and the appropriability regime [69]. For that reason, respondents were asked to mention the sector they work in. Finally, the intention to leave was captured with five questions derived from Cammann et al. [70], with an alpha of 0.87.

3.2. Qualitative Study

The data were gathered from ten acquired firms' managers by means of in-depth interviews. Each interview lasted roughly one hour and all ten interviews were carried out between March 2015 and June 2015. All the interviews (conducted in the Hebrew language) were recorded, and then transcribed and translated into English. In the analysis of the scripts obtained from the recorded interviews, we followed the approach of Shkedi [71]. Accordingly, we focused on the inductive connections between the sub-texts as units of analysis, which are referred to as 'themes'. The objective of devising thematic categories pertains to assigning a couple of response codes which have a functionally equivalent meaning to a higher order thematic category.

A phenomenon can usually only be fully understood within its own nature and culture. Therefore, after interviews with informants were conducted, the data was analyzed by splitting the information into categories and by re-arranging the different categories into a meaningful analytical order. The process of categorization, or coding, was conducted by differentiating, classifying, and separating texts in order to find the data's conceptual meaning. We began the analysis of data with data narrowing by coding of interview texts and preparing data displays by putting all coded data and quotes into a table. A 'categories tree', a data driven schematic presentation of the themes, was another tool used to support the analysis.

4. Results

4.1. Quantitative Results

To gain an initial overview of the data, a series of Pearson correlation tests were conducted between all research variables in order to achieve indications regarding the relationships between them. As shown in Table 2, Pearson correlations are generally consistent with the research hypotheses.

Table 2. Statistical distribution of the research variables.

Variable	Min	Max	Mean	S.D.	1	2	3	4	5	6	7
Retained autonomy (1)	1	5	2.61	0.88							
Knowledge transfer1 (2)	1	5	3.15	1.03	0.038						
Knowledge transfer2 (3)	1	5	3.44	1.03	0.002	0.366 **					
Trust (4)	1.33	5	3.27	0.88	0.267 *	0.184	0.445 **				
Readiness for change (5)	1.8	4.8	3.75	0.68	0.188	0.144	0.285 *	0.516 **			
Performance (6)	1	5	3	0.95	0.058	0.362 **	0.204	0.524 **	0.245 *	0.398 **	
Satisfaction with acquisition (7)	1	5	2.99	1.12	0.15	0.382 **	0.426 **	0.704 **	0.327 **	0.519 **	0.834 **

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Subsequently, a series of multiple regression analyses (OLS) were conducted. In two analyses, shown in Tables 3 and 4, the expected influence of trust on both sides of the relationship on the two dependent variables, ‘perceived performance’ and ‘satisfaction with acquisition’, was examined. Both analyses display a high percentage of variance explained (R^2). The findings suggest that only trust in the acquired firm has a significant effect on the performance measures, both for ‘perceived performance’ and ‘satisfaction with acquisition’. Conversely, trust given by the acquiring firm in the form of autonomy granted to the new subsidiary, does not turn out to be significant.

Table 3. Results of OLS regression on perceived performance. The original analysis also included some further control variables, notably a communication variable, which is not shown for clarity reasons, as it is not key to the present focus of the paper and does not affect the results. The same remark pertains to Table 4.

Variable	B	SE B	β	t	
Independent variables					
Retained autonomy (H1)	−0.31	0.18	−0.29		−1.77
Trust (H2)	0.74	0.25	0.65	***	2.94
Control variables					
Knowledge transfer1	0.4	0.15	0.42	**	2.66
Knowledge transfer2	−0.07	0.14	−0.07		−0.49
Readiness for change	−0.28	0.24	−0.20		−1.14
Intention to leave	−0.40	0.12	−0.47	***	−3.39
Gender	−0.78	0.48	−0.22		−1.62
Education level	0.31	0.29	0.15		1.06
No. of employees	0.08	0.3	0.04		0.28
Previous merger experience	−0.30	0.25	−0.15		−1.19
Time from notice to merger	−0.45	0.3	−0.24		−1.52
R^2					0.69
F					3.74 **

** $p < 0.01$. *** $p < 0.001$.

It appears, accordingly, that acquired firm-related variables have a significant effect on satisfaction and performance. For both dependent variables, on the side of the control variables pertaining to the acquiring firm, knowledge transfer turns out to be significant. While the readiness and commitment to change did not turn out to be significant, one of our control variables, the intention to leave, was negative and significant, partly supporting the relevance of commitment of the acquired firm for acquisition success.

Table 4. Results of multiple regression on satisfaction with acquisition.

Variable	B	SE B	β	t	
Independent variables					
Retained autonomy (H1)	−0.20	0.18	−0.16		−1.12
Trust (H2)	0.86	0.26	0.65	**	3.34
Control variables					
Knowledge transfer1	0.32	0.15	0.29	*	2.11
Knowledge transfer2	0.11	0.14	0.11		0.8
Readiness and commitment to change	−0.35	0.25	−0.21		−1.40
Intention to leave	−0.33	0.12	−0.34	**	−2.76
Gender	−0.25	0.49	−0.06		−0.52
Education level	0.39	0.29	0.17		1.34
No. of employs	−0.28	0.3	−0.13		−0.93
Previous merger experience	−0.13	0.25	−0.06		−0.50
Time from notice to merger	−0.26	0.3	−0.12		−0.86
R^2					0.75
F					5.25 ***

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

4.2. Qualitative Results

The aim of this section is to better understand the findings of the quantitative analysis and to look for in-depth explanations of unclear or conflicting findings.

No support was found for Hypothesis 1 that the retained autonomy level of the acquired company will have a positive influence on M&A success. However, the qualitative data indicates that there is some support for it. In most cases, the interviewees mentioned that their strategy and negotiating tactics were mainly aimed at realizing and finalizing the deal, which meant that *“to retain autonomy is not a must unless in some specific things. The acquirer doesn’t buy in order to replace the owners but to use the acquired company as a multiplier power and you can’t achieve this unless you match yourself to the big company”*. This quote, and others, suggest that, in their negotiations, the acquired TMT primarily prioritizes flexibility, openness, reasonable compromises, and taking care of employees’ concerns and culture. Next on the priority list are exclusive projects that do not necessarily require the retention of autonomy.

It can therefore be concluded that acquired start-ups do not necessarily insist on remaining autonomous and that retained autonomy is viewed as part of the negotiations’ ‘give and take’ trade-offs. After the deal has been sealed, some of the interviewees reported regret that they did not insist on retaining some of their authorities and decision-making privileges. A follow-up on the reviewed cases indicated that three out of the six M&A success stories are managed as separate units, retaining a broad autonomy. The factors which limit autonomy are mainly related to purchasing, accounting reporting, hiring approval, legal issues, and administrative regulation (e.g., travelling procedures etc.).

Instead, the continuity of the product development seems to be more important to TMTs than other considerations, such as allowing more autonomy to the acquired firm etc. Only in rare cases did the start-up founders admit that *“in the beginning we very much wanted to become integrated. Afterwards we saw that we’ve integrated too deep and were breaking into pieces, so we took a step back. It was a complicated challenge”*. Another interviewee summarized: *“We won a lot of advantages from working according to the American system but we lost elasticity, bastardy and corner rounding”*.

With regard to Hypothesis 2, the results of our qualitative research resonate with earlier studies examining trust, as it found consensus building, providing feedback, and delivering appropriate communication to be important tools for developing trustworthiness. The interviewed managers emphasized the significance of two aspects of trust: trust in the management of the start-up itself and trust in the TMT of the acquirer. Moreover, although the acquirers of our sample of start-up managers were all foreign companies investing in Israel, national cultural clashes were not reported as a hurdle for the development of mutual trust. The mutual agreed upon premise was that *“it is good for the company, for the technology and for the employees”*. This consensus formed a shared vision with enough transparency for all M&A participants. Once a highly credible acquired leader communicates to his or her employees that the TMT of the acquirer is trustworthy, and that it is likely to keep its promises (during and after the integration process), the employees will usually believe their leader. Therefore, by communicating the above to the employees, the leader reinforces the development of trust in acquiring firms’ TMT.

5. Discussion and Conclusions

The findings of this paper indicate that trust is a significant factor influencing M&A success. While some other studies also emphasize the significance of trust with regard to M&A, the present study is the first one to examine trust on both the side of the acquired and acquiring company. In doing so, it is also arguably the first one to apply this research question to the context of high-tech start-ups. Many of the theories employed in M&A research have used an individual or group level of analysis to address behavioral issues. Only a small number of studies use a firm-level analysis to explore behavioral aspects related to the acquired firm’s management. This paper is one of these studies. Moreover, contrary to the majority of M&A-related research, which focuses on the acquirer’s perspective, this study explores the acquired firm’s perspective in more depth, making it an essential contribution of our paper.

The role of trust also gains importance due to the international dimension of the phenomenon under study. When the acquirer comes from a different country, both sides, the acquirer and the acquired, feel less secure about the outcomes of integration. The said situation leads to tensions when attempting to forge links between the members of both organizations [72]. Integrating two organizations following a cross-border acquisition appears to be so challenging since it necessitates a 'double-layered' acculturation, in which both organizations have to adapt not only to a new country culture, but also to different organizational values and practices [73]. Most Israeli start-ups are established with an international orientation and can be viewed as 'technology-based born global' firms, which facilitates integration with foreign firms [74].

On the other hand, our quantitative findings did not support the hypothesis postulating that the acquiring firm's trust, as manifested in the retained autonomy level of the acquired company, has a positive influence on acquisition success. It is worth noting here that also the study by Zaheer et al. [75] recently observed a negative link between acquired unit autonomy and the consolidation of the functional operations of the acquired firm into the reporting hierarchy of the acquirer. We strongly argue that the motive of technology acquisition should coincide with a visible level of trust from the acquirer if the acquired organization is to retain its innovative mandate and flexible approach, a point which resonates in our qualitative study. Although previous research on M&A has often accentuated the challenge of balancing integration and autonomy [41], the loss of autonomy can indeed be detrimental to acquisition performance [42]. An effective integration of the acquired firm demands a substantial commitment of managerial resources, a requirement that may distract the acquirer from its own core business [43]. In particular, this dilemma between integration and autonomy may be important in acquisitions of technology firms. Such deals are oftentimes led by the intention to gain access to tacit knowledge [44]. And yet, as discussed earlier, the negative outcomes of acquisition in the absence of trust may in reality turn out to be counter-productive and detrimental to knowledge generation [43,44].

However, due to the heterogeneity and the small size of our sample, it is impossible to reach to generalizable conclusions regarding attitudes towards autonomy. Nevertheless, it seems that, even for managers who have previous experience with M&A, the recognition of the importance of autonomy retention often only arises post-mortem, after discussions regarding autonomy have been neglected or continuously postponed in the negotiation process. This observation takes into account that while negotiating, managers must deal with a vast number of considerations simultaneously in order to highlight their attractiveness to the acquirer, which is a useful managerial implication of our study.

Another managerial finding is that when the two firms are highly complementary, it may make economic sense for the acquiring firm to grant trust to the acquired firm by leaving it autonomous and not interfering with its operations, even if only temporarily. When a mutual understanding and an agreed performance tracking system are in place, the acquired entity could be managed autonomously as a separate business unit. A similar case is when the acquirer does not have any technological value to add to the knowledge of the acquired firm. In such cases, some responsibilities may be transferred to the acquirer (e.g., budget and performance control, procurement, headcount planning, and accountancy matters), while others, such as R&D responsibilities, may be retained by the acquired company.

In conclusion, even though autonomy is expected to be a subject of great importance to start-ups, Israeli TMTs treat retained autonomy as one of many items listed on their negotiation checklist. During the negotiating process, they tend to adopt a pragmatic approach prioritizing certain topics over others. During this process, the subject of mutual trust and the resulting granted autonomy is at times removed from the list of items that the acquired company wishes to insist on. In retrospect, during the post-merger phase, acquired managers may come to regret their approach towards autonomy retention during the negotiation process.

The authors of this paper recognize that there are several issues which may partly reduce the validity of the findings of this study. The scope of this study was limited to the post-acquisition stage. While studies have demonstrated that the post-acquisition stage is a major predictor of acquisition

performance, there are many variables having concurrent effects at each stage of a given merger. Such factors may affect subsequent stages. It was not feasible to address all stages of M&A in this paper. Thus, a future study addressing similar research questions during different stages of M&A, including the buyer's perspective, may be useful. Such study would also address a limitation of the present paper that for some of the more recent transactions in the sample, the timeframe for managers to assess the outcomes of the acquisition may not be sufficiently long to provide a meaningful assessment.

Furthermore, the outcome of this is highly sensitive to variables such as the form or type of acquisition, the strategy and underlying motivation of the acquiring firms, or the capital control over the acquired unit. As this information was not gathered in this research project, a promising avenue for future research would be to investigate the moderating role that such strategic and structural variables may have on the effects of trust.

The conclusions of this paper may be limited to the Israeli culture of start-up organizations. Therefore, it is assumed that respondents reflect their own domestic culture, which affects their perceptions of the role of leaders' communication during the post-merger or post-acquisition integration stage. While the literature review consisted of an analysis of both domestic and foreign firms, the study itself featured the 'organizational culture' concept, but not the 'national culture' concept. National culture shapes the manner in which foreign firms are regarded by the host country and affects any host government's preferences in economic, social and trade policies. Thus, examining the effect of country cultures on the acculturation of international M&A might lead to divergent findings to those reached in this study. Future studies could therefore be extended to include an analysis of cross-border M&A, focusing on the construct of 'national culture' and examining the impact of this construct on mutual trust. This is more relevant given that, as Vaara et al. [76] discovered, both organizational and national cultural differences are positively related to knowledge transfer. Colman and Lunnan [77] investigated how identity threat can support knowledge transfer. They established that the threat to identity intensified the initiatives among acquired managers, who made sure to gain more acknowledgement and appreciation for their know-how and technological solutions in the eyes of the acquirer. This led to the generation of serendipitous value with regard to "*new work processes, technologies, and organizational and cultural renewal*" ([77], p. 853). Interactions between culture, trust, and innovative initiatives in acquired firms can be interesting a field of enquiry.

The sample size of the study was admittedly small and included mainly executives. It was impossible to reach out to more employees of acquired companies. While we strove to include a wide variety of high-tech industries in the research, the results of this study cannot be generalized to sectors not represented by the sample. The objective of this research was to examine both positive and negative M&A experiences. The quantitative questionnaire was anonymous and it was therefore impossible to distinguish between success and failure cases. The significance of such a distinction only became clear to us during the qualitative phase, and we were therefore unable to monitor the success or failure cases in advance. A future study could extend our methodology to compare success and failure stories with regard to trust or the lack thereof.

Finally, longitudinal studies could be designed in order to further shed light on the development of trust in acquisitions from a process perspective. Such longitudinal research capturing various points along the integration timeline could assess alterations in mutual trust and their effect on integration successes. Contrasting the perspectives of both organizations involved in the process would also generate valuable insights.

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Appendix A

Table A1. Operationalization of key variables.

Construct	Items	Scale
Dependent Variables		
Performance	Please specify, to what extent the expectations you had before the merger were indeed materialized after its completion:	
	In your opinion—to what extent did the planned merger process was conducted in a similar manner (1) To what extent did the merger's results meet your expectations (2) In your opinion, to what extent the goals that were set before the merger were achieved (3) Expectations for improvement in company's decision-making (4) expectations about the company's ability to meet its forecast regarding its performance (5) To what extent do you agree with the following statements:	To a very small extent—1; to a very large extent—5
Satisfaction with the merger	I was satisfied with the results of the merger (1) The integration process was successful in my opinion (2) I was not satisfied with the way the merger has been implemented (3) I was pleased with the performance of the Company's management (4) to what extent did the merger meet your expectations of it (5)	To a very small extent—1; to a very large extent—5
Independent Variables		
Retained autonomy	How your company's management (Acquired) was involved in making these decisions during the merger: Setting performance goals (1) Managing research and development budgets (2) Providing work plan priorities (3) Building periodic company budget (4) Establishing procedures and practices (5) Managing purchases, suppliers and subcontractors (6) Building and managing an employee recruitment plan (7)	Liability of the acquiring company—1; acquired company's liability—5
	To what extent do you agree with the following statements: I had a feeling I could trust management during the merger (1) Senior management exercised, upon completion of the merger, the promises given to us prior to the merger (2) Management has consistently implemented the policy of the Company in all of its units (3) I thought that the merger could harm the way things are done in the organization (4) I thought the merger and the change followed, would be beneficial for me (5) I thought that if management is entering a merger process, it must have good reasons to think that the merger is necessary for the company's success (6)	Strongly disagree—1; definitely agree—5

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Article

Investigating the Links of Interpersonal Trust in Telecommunications Companies

Helena Bulińska-Stangrecka ^{1,*} and Anna Bagieńska ²

¹ Faculty of Administration and Social Sciences, Warsaw University of Technology, 1 Plac Politechniki Street, 00-661 Warszawa, Poland

² Faculty of Engineering Management, Białystok University of Technology, 45A Wiejska Street, 15-351 Białystok, Poland; a.bagienska@pb.edu.pl

* Correspondence: h.bulinska-stangrecka@ans.pw.edu.pl; Tel.: +48-504-317-811

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Abstract: The purpose of this paper is to determine if there are links between interpersonal trust and competences, relations, and cooperation in Polish telecommunications companies. It examines which factors affect trust in co-workers and managers in sustainable organizations. The paper surveys a sample of 175 employees of telecommunications companies in Poland by means of a questionnaire. The results indicate that competences, relations, and cooperation are related to interpersonal trust. Regression analysis showed that competences and relations predict a significant variance in trust amongst co-workers. Additionally, cooperation contributes to prediction of trust in managers. Given the importance of trust in sustainable organizations, better comprehension of which factors are related to team confidence provides valuable information for stakeholders and about how to improve interpersonal trust in sustainable organizations.

Keywords: interpersonal trust; sustainable organizations; competences; relations; cooperation

1. Introduction

Contemporary companies which aspire to be sustainable in the long term should not only make sure they turn a profit but should also implement a sustainable development strategy and be socially responsible. The sustainable activity of organizations arises from the needs and expectations of both the external environment and the internal stakeholders. However, above all it is the result of the appropriate management and involvement of all staff and managers. Research demonstrates that companies' sustainability strategies are not motivated by public relations, but that such strategies reflect "substantive changes in business processes" [1,2]. Sustainability is a management concept of successful contemporary organizations because it facilitates flexibility in adapting to constantly changing environmental conditions and it even helps companies operate in times of crisis and chaos.

Sustainability is considered to be a crucial challenge for organizations seeking a competitive advantage, but also for organizations facing other kinds of problems, such as talent retention. 70% perceive sustainability as a key element in their management programs [3]. Organizations which include in their strategies practices and activities that are in line with the idea of sustainability are called sustainable enterprises [1,4–6]. What distinguishes a sustainable enterprise is, among others, the fact that its dominating capital is social capital that is based on good relationships between itself and its external and internal environments, including its employees. Building social capital is based principally on trust and thus it is emphasized that this is one of the main components of sustainable enterprises [7].

Trust is one of the crucial conditions of sustainable management [8]. Many scholars allude to the fact that organizational trust is a crucial element of successful cooperation [9–12]. Organizational trust impacts various areas of management: communication [13], negotiation [14], leadership [15],

and work performance [16]. Subsequently, it is an important factor that supports the functioning of an organization. Understanding how trust works in organizations is an essential challenge in the contemporary economy.

The acknowledged trust model that illustrates the factors affecting trust consists of three basic elements: ability, benevolence, and integrity [17]. It has been empirically confirmed that these factors have an impact on trust development [18]. Most studies have focused mainly on analyzing trust between subordinates and managers [19–22], but there are not enough studies that assess trust between co-workers [23]. Therefore, in this study we want to verify the conditions for trust both among employees and between employees and leaders. We want to establish what factors affect trust using the following independent variables: competences, relations, and cooperation. The primary goal of this study is to understand which of these factors are related to trust. The research described in this paper aims to determine whether there are links between trust and competences, relations, and cooperation. More specifically, we decided to examine whether better competences, relations, or cooperation are associated with higher levels of trust. Thus, we want to provide guidance on how to improve factors that are related to a high level of trust. Additionally, we want to encourage the development of specific business practices that help to maintain a sustainable organization.

This paper is organized as follows. First, we analyze the theoretical background and present the literature on sustainability, trust, and the relation between trust and competences, relations, and cooperation. Secondly, we outline the methodology used in this study to verify the research problems. We then present the results, and finally we discuss the conclusions and practical implications of this research.

2. Conceptual Framework

Sustainability in an enterprise is defined by Grudzewski and Hejduk as “an ability to constantly (1) learn, (2) adapt and develop, (3) revitalize, (4) reconstruct, (5) reorient, in order to maintain a stable and distinctive position on the market by offering outstanding value for customers both at the current time and in the future (in compliance with the paradigm of innovative growth) due to the organic variability that is characteristic of sustainable business models and the new possibilities and targets and ensuing responses to them, while balancing the interests of various groups” [24].

The concept of sustainability consists in applying the rules of sustainable development and a constructive combining of resources, aims, and strategic factors which are indispensable for the existence and development of organizations [25,26]. It should be emphasized that it is the organization itself which determines and identifies the common areas (denominators) in its economic, social, and environmental aims [27]. However, it may seem that effective management of the social responsibility of a company is impossible because of the difficulty in combining the varied and sometimes discrepant aims of effectively functioning in a competitive environment [28].

Organizational sustainability encompasses the economic, societal, and environmental goals of an organization [29]. Sustainable organizations are capable of surviving whilst satisfying a triple bottom line of economic, environmental, and human performance [30] because sustainable development ensures simultaneous benefits in these three fields. Much research demonstrates that sustainable enterprises achieve better results in the long term than other companies [1,2,31]. This is made possible by the construction of a so-called sustainable business model which maintains an equilibrium between stakeholders’ and shareholders’ interests. At the same time, these enterprises implement management rules based on value and societal responsibility [32].

Organizations which operate in accordance with the sustainability model may be characterized by the following distinctive features:

- knowledge and trust are considered as dominating forms of capital [33],
- focus on teamwork and constant learning [33],
- promotion of a proactive role in controlling the impact of the business on the natural environment, social environment, and human resources [34],

- taking into account social relationships (external and internal) in activities that aim to ensure long-term organizational effectiveness.

As can be seen from the above, what is emphasized is the significance of human capital as a factor that is essential in meeting the sustainable targets of an organization [3]. Human development is highlighted as the basis for the sustainable development of companies [35]. Building sustainable organizations is based on focusing on employees' skills, competences, motivations, and behavior [36]. Such a managerial attitude is a fundamental condition for sustainable development. It leads to mutual gain: employees fulfil their individual potential and improve the organization's intangible assets. Thus, both individuals and the organization gain a competitive advantage [37]. The practices of human resources management help to build sustainable organizations as a community of people which with time develop structures and behaviors and discover ways in which an entrepreneur becomes a sustainable employer [38].

Viewing a person in the light of the sustainability concept seems to combine contemporary approaches that are based on patterns of human behavior. Namely, it is a combination of knowledge, particular skills, particular talents, and attitudes adopted in the workplace and in the process of work [33]. It has been noted that behavioral sustainability in an organization requires particular conditions for its development; these include trust and cooperation with others, both of which are responsible for strengthening employees' inclination towards sustainable behaviors [39]. Furthermore, trust enables collaboration and collective transactions [40]. Additionally, trust in co-workers is associated with greater satisfaction with career advancement [41], and nurturing trust among employees and managers leads to increased productivity [16]. The importance of trust has been recognized as a driving force for innovative behaviors in sustainable organizations [12]. Furthermore, employees' willingness to maintain their work engagement is associated with trust, which can be improved by managerial practices that nurture and boost a supportive work environment [12].

The concept of sustainability is associated with corporate social responsibility (CSR), which is defined as voluntary actions and commitment aimed at achieving positive social and environmental changes [42]. CSR, whose concept is strongly focused on dialog and cooperation between an enterprise and its stakeholders [43], attempts to meet the needs of various groups of stakeholders. A sustainable organization should thoughtfully shape its relationships with all stakeholders in order to achieve long-lasting results, conduct business in compliance with their expectations, dutifully meet commitments, and use transparent business practices [44]. CSR projects result from strategic thinking through which companies endeavour to transform threats into opportunities [45]. An example of such threats is the turnover of key employees who have knowledge and skills that are essential for the enterprise to operate.

For this reason, high sustainability organizations focus on non-financial tools to build employees' commitment and motivation [46] (p. 23), while trust and cooperation are crucial for building social capital in these organizations [47].

2.1. Definition of Trust

A sustainable organization is based on trust [48]. Moreover, trust is a significant element responsible for achieving a competitive advantage [49]. The general definition of trust refers to the reciprocal assumption made by an individual in regard to another party's actions and their consequences [50]. Trust can be understood as the way an individual's attitude is affected by the way he/she perceives a particular relationship. This refers to confidence in the positive consequences of the actions of other parties [51]. Organizational trust means having positive expectations about an organization [22].

There are various scientific approaches to categorizing trust. The classification of Shapiro, Sheppard, and Cheraskins [52] assigns business trust to three categories: deterrence-based trust, knowledge-based trust, and identification-based trust. The analysis conducted on this model argues that this is a hierarchical concept of developing trust: one level of trust can arise only when the previous one is in place [53]. Another approach was presented by McAllister [54], who introduced two kinds of trust: cognition-related and affect-based. This concept states that cognition-based trust depends

on the competency and reliability of the other side. Affect-related trust is established on the basis of interpersonal relationships. Additionally, Stranes, Truhon, and McCarthy [55] list three forms of organizational trust:

- interorganizational trust—refers to trust between two organizations;
- intraorganizational trust—describes trust between subordinates and managers, and between employees and the organization;
- interpersonal trust—concerns trust within relations and interconnections in teams.

Furthermore, Ting [56] distinguishes two types of interpersonal trust within organizations: towards managers and towards fellow employees. This can lead to the conclusion that there are two different aspects of interpersonal organizational trust. The first refers to whether a subordinate trusts their supervisor; the second focuses on trust relations between co-workers [57]. In summary, interpersonal trust consists of two dimensions: trust towards managers and trust towards fellow employees. This paper aims to explore both types of interpersonal trust in the business environment.

Additionally, Mayer, Davis, and Schoorman [17] focused on behavioral aspects of trust. In their research they emphasized the factors that determine the development of trust: competences, benevolence, and integrity. According to this model, trustworthiness depends on three factors: competence, which concerns the skills and abilities of the other person; benevolence, which reflects the relations and attachment between the two sides of the trust process [17] (p. 718); integrity, which is related to behavioral consistency [17] (p. 719). Understanding the conditions that can impact organizational trust provides information on how to improve organizational effectiveness.

The research framework in this study is based on the previous findings in the literature and emphasizes two aspects of interpersonal trust in organizations: rational trust based on the competences of other parties, and relation-oriented trust, which focuses on the bonds between involved persons. Rational aspects of trust will be analyzed through competences and self-efficacy; the relation elements of trust will be examined through relations and cooperation. We will study both horizontal (between co-workers) and vertical (between supervisors and subordinates) trust relations. The research problem focuses on the links between interpersonal trust and competences, relations, and cooperation. It is shown in Figure 1.

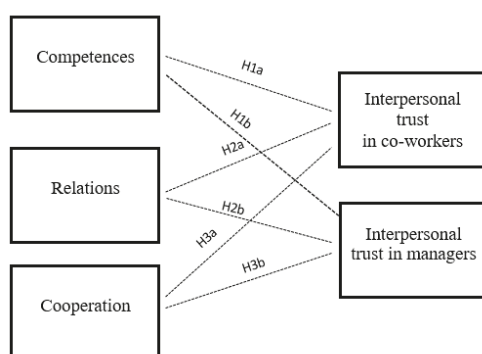


Figure 1. Conceptual model.

For the purpose of this research, trust is defined as positive expectations regarding another party's actions and behaviors towards an individual. We will examine trust as a phenomenon that affects organizational processes. The study will focus on interpersonal aspects of trust in organizations in the hope of providing suggestions for facilitating trust in sustainable organizations.

2.2. Competences

Generally, competency is understood as capabilities that are based on one's knowledge, abilities, and attitudes [58]. A number of definitions of competence exist in the literature. The first group refers to employee's visible performance or behavior [59–62]. The second group describes competency as a standard or quality indicator [63]. The third group understands this term as an individual's characteristics [64]. All in all, the meaning of competency depends on the research approach.

For the purpose of this study, competency is used as an indicator of reliability in trust-building relations. We adopt the view that competency is understood as an ability or knowledge that helps in dealing with work-related tasks.

There are numerous ways of assessing competences, depending on their application [65]. Since competences understood as work-related ability can be successfully measured using quantitative methods [66], we adapt this approach in our study.

The rational perception of others and its relationship to trust in co-workers have been analyzed in previous research [67] but with conflicting results. In general, confidence based on another person's skills has been suggested to be an important element in trust development [68]. According to some research, ability was recognized as an important factor that affected trust in a Chinese sample, but not in a Turkish one [69]. Gill, Boies, Finegan, and McNally [70] established that situational context impacts the propensity to trust. This was in alignment with the results of Snijders and Keren [71]; it implies the importance for trust of situational factors. Similarly, trust is considered to be a result of cognitive factors such as reputation or credibility [72]. Ability and competences are also treated as a basis for trustworthiness by numerous scholars [73–75].

Furthermore, many scholars have identified ability or competency as a significant factor that influences organizational trust [17,20,51,67,76]. Consequently, rationale-based trust is established on the reasoning that one party will be able to fulfil the other's obligations. Subsequently, competency provides information that guides trust-related behaviors. Competency serves as a cognitive display of another person's trustworthiness [20]. Hence, the hypothesis states:

Hypothesis 1 (H1). *Competency perception is positively related to interpersonal trust.*

2.3. Relation and Trust

Focusing on the relationship aspect of trust, Colquitt, and Rodell state [77] that relationships among employees are an important trust-enhancing element. Furthermore, Tan and Lim [78] implied that benevolence is related to trust rather than ability. The emotional bonds among employees create a platform for trust development [67]. It has been confirmed that emotional aspects of trust are associated with emotions [79].

The importance of positive relations as a crucial element of building trust in organizations has increasingly been recognized [5,80]. Likewise, employee-oriented practices enhance trustworthiness in a given organization [81]. Similarly, a recent study shows that relationships and benevolence are vital in establishing trust in organizations [82]. Therefore, to examine this assumption the second hypothesis was formulated:

Hypothesis 2 (H2). *The strength of a relationship is positively related to interpersonal trust.*

2.4. Cooperation and Trust

It has been acknowledged that cooperation is associated with trust [83–85]. Cooperative conditions of trust lead to an increase in team confidence [86]. The two-way relation between trust and cooperation has been confirmed [87]. In the context of interpersonal trust, cooperation is perceived as a condition that determines trustworthiness. Kanter [88] acknowledged that cooperation is the cornerstone of

building team confidence. Moreover, she recognized that cooperation creates a network of connections which helps in establishing trust-relations, hence the importance of cooperation in the model that represents how to nurture trust. We assume that a high level of cooperation is associated with a high level of organizational trust. Thus, the third hypothesis reflects this aspect of the conditions of trust:

Hypothesis 3 (H3). *The degree of successful cooperation is positively related to interpersonal trust.*

Additionally, the formulated hypothesis will be verified in both the vertical and horizontal relations in an organization. Usually those are independent patterns of connections and interactions. Therefore, this study examines the links between trust in co-workers and trust in managers. Consequently, we hypothesized the following:

Hypothesis 1a (H1a). *Competency perception is positively related to interpersonal trust between co-workers.*

Hypothesis 1b (H1b). *Competency perception is positively related to interpersonal trust in managers.*

Hypothesis 2a (H2a). *The strength of relationships is positively related to interpersonal trust between co-workers.*

Hypothesis 2b (H2b). *The strength of relationships is positively related to interpersonal trust in managers.*

Hypothesis 3a (H3a). *The degree of successful cooperation is positively related to interpersonal trust between co-workers.*

Hypothesis 3b (H3b). *The degree of successful cooperation is positively related to interpersonal trust in managers.*

3. Method

3.1. Sampling

The empirical research applied in this study was used to analyse the relation between trust (dependent variable) and competences, relations, and cooperation (independent variables). Data were collected via questionnaires among employees of telecommunications companies ($n = 175$). The telecommunications services sector is among the fastest developing sectors in the modern economy. It is a sector that combines advanced technologies with a high level of innovation and considerable investment. Productivity and profitability in telecommunications companies are often significantly above average in the non-financial business economy. Turnover and added value in telecommunications services are steadily increasing in spite of falling tariffs and pricing [89]. The telecommunications services market encompasses both wireless and wireline services, which are some of the most profitable segments in the IT industry. In 2015, global telecommunications services generated approximately 1.1 trillion euros in revenues. The great significance and potential in this industry was recorded in Europe, where in 2015 it produced around one-quarter of total revenue [90]. The research was conducted in a group of telecommunications companies in Poland, in which the turnover of the telecommunications sector amounted to approximately 10 billion euros in 2014 [89]. Statistics show that on average in OECD countries in 2011, jobs in the information and communication technology (ICT) sector represented 3.7% of business sector employment [91]. In Poland in 2014 the telecommunications sector employed 48,794 people [89].

The Office of Electronic Communications' register of telecommunications companies operating in Poland was used as a framing sample (it includes all organizations that provide telecommunications services in Poland that are obliged to register under the *Telecommunications Act, 2004*) [92]. When choosing the types of business enterprises (LLC, stock-offering companies) we established the research

population and consequently obtained the research sample, $n = 175$. The questionnaire was distributed via e-mails (108 questionnaires) and in person by the author (67 questionnaires). The respondents' confidentiality was assured. The basic introduction to the research topic was described in the headline of the survey. Data were entered and coded using Excel.

The sample contained 34.86% (61) women and 65.14% (114) men; 84% (147) declared that they were employees of telecommunications organizations; 13.14% (23) were IT sector employees; 2.86% (5) were employees in other sectors. The number of respondents in the companies varied: enterprises with 251 and more employees—77.14% (135); organizations with 51–250 employees—13.14% (23); organizations with 11–50 employees—7.43% (13). More than half the respondents had over 10 years' professional experience 60% (105); 22.86% (40) had 1–5 years' experience; 13.71% (24) had 6–10 years' experience; 3.43% (6) had less than a year of professional experience. The following positions were represented: directors 5.14% (9); managers 18.29% (32); specialists 67.43% (118); experts 3.43% (6); analysts 1.71% (3); assistants 0.57% (1); others 3.43% (6). Among respondents, 67.43% (118) had a master's degree; 17.71% (31) had a bachelor's degree; 11.43% (20) had an engineer's degree; 1.14% (2) had a high-school diploma; 2.29% (4) of questionnaires were left blank.

3.2. Measures

There were four items in this questionnaire: trust, competences, relations, and cooperation. Each item consists of statements that were based on indicators. All items in the questionnaire were rated on a five-point Likert-type scale (1 “strongly disagree”, 5 “strongly agree”). The Likert scale is an appropriate tool to measure trust within an organization [80,93–95]. The respondents were asked to refer to the team they currently work in when answering questions.

The indicators were operationalized according to the conceptualization presented in Table 1.

Table 1. The conceptual framework.

Variable		Dimension	Theoretical Background
Dependent variable	Interpersonal trust	Trust in supervisor	Ermisch, Gambetta, Laurie, Siedler, Uhrig, 2009; [96] Oh, Park, 2011 [97]; Wu, Lin, Hsu, Yeh, 2009 [98]
		Trust in co-workers	Moye, Henkin, 2006 [99]; Rotter, 1967 [100]
Independent variables	Competences	Team competences	Margerison, 2001 [101]; Meyer, Brünig, Nyhuis, 2015 [102]; Waters, Sroufe, 1983 [103]; Knoll, Gill, 2010 [23]; Robotham, Jubb, 1996 [104]
	Relations	Team relations	Wiese, Botha, van Heerden, 2015 [105]; Tierney, 1999 [106]; Forret, Love, 2008 [107]; Hornsey, Hogg, 2000 [108]
		Emotional bonds	Price, 2013 [109]; Shih-Tse Wang, 2014 [110]; Graf, Ausserhofer, Schwendimann, Zúñiga, 2015 [111]
	Cooperation	Team cooperation	Nonose, Kanno, Furuta, 2014 [112]; Sun, Qi, 2004 [113]
		Team cohesion	Grossman, Rosch, Mazer, Salas, 2015 [114]; Knott, Geyer, Sidman, Wiese, 2011 [115]; “Team Cohesion” 2007 [116]

Source: own elaborations.

3.2.1. Dependent Variable

The measures for trust were developed based on the literature. The first variable, “trust in supervisor”, is based on Mayer and Gavin's [117] and Mayer and Davies' [118] instrument. It consists of three items: “I would be willing to let my supervisor have substantial control over my future in the company”, “I can talk freely with my supervisor”, “I have confidence in my supervisor”. A three-item measure was developed to evaluate trust in co-workers. It was based on an instrument used by Forret and Love [107] and Poon [119]. Trust in co-workers was assessed by having participants indicate their level of agreement with the following statements: “Most of my co-workers can be relied upon

to do their work”, “Most of my co-workers are trustworthy”, “I have confidence in my co-workers”. The Cronbach’s alpha of Trust was 0.76.

3.2.2. Independent Variables

Competences were assessed by a two-item scale based on Naim and Lenka [120]. The respondents were asked to indicate their opinion on the following statements: “My team has the ability to complete a task”, “My team is very competent”. The relations measure was developed as: “My team is like a community”, “I feel part of a team”, “There are strong emotional relations between the members of my team”. In order to assess cooperation, the participants were asked to express their opinion about the following statements: “Cooperation in my team is good”, “My team pursues its goals collaboratively” [115,121]. The Cronbach’s alpha for items in this measure was: competences 0.87, relations 0.84, cooperation 0.94.

3.2.3. Control Variable

Since the relation between generalized trust and trust in business organizations has been recognized [122], we decided to include this variable in our analyses. Assuming that trusting people are more likely to display higher levels of trust in co-workers and managers, it might bias the results of our research. Therefore, generalized trust was controlled in this study.

4. Results

Trust among respondents was generally high. However, the average trust in co-workers ($M = 0.4$) was higher than the average trust in managers ($M = 3.69$). The average generalized trust ($M = 3.96$) was lower than the average trust declared by fellow employees, but higher than the average trust in managers. Table 2 provides the percentage of responses to questions relating to interpersonal trust. Generalized trust was used as an indicator of a person’s individual attitude towards others and helps in estimating the results; 65% of respondents trust co-workers (24% “strongly agree” and 40% “rather agree”); only 3.43% (disagree 2.86% and strongly disagree 0.57%) disagree with the statements relating to trust in co-workers. This indicates that trust in fellow employees is very high (higher than generalized trust). In comparison, 12% declared that they do not trust their leader (3.43% rather disagree and 8.57% strongly disagree with the statement referring to trust in the leader).

Table 2. Interpersonal trust.

	Profile of Responses						
	M	N	1	2	3	4	5
Trust co-workers	4.4	175	1	5	22	105	42
Trust leader	3.70	175	6	15	38	83	33
Generalized trust	3.96	175	1	8	27	100	39

Notes: 5—Strongly agree, 4—Rather agree, 3—Neither agree nor disagree, 2—Rather disagree, 1—Strongly disagree.
Source: own elaboration.

In conclusion, this illustrates that in the research sample there is a high level of trust among employees. It also implies greater distrust (four times more) in managers than between peer employees.

Verification of Hypotheses

Both H1a and H1b were strongly supported. Moderate positive correlations were found between trust in co-workers and evaluation of the team’s competence ($r = 0.438, p = 0.000$) and between trust in the manager and competences ($r = 0.298, p = 0.000$). The result of correlation analysis is presented in Table 3. It implies that competences are related positively to interpersonal organizational trust.

Table 3. Intercorrelation matrix.

	1	2	3	4	5	6
1. Competences	1					
2. Cooperation	0.800 **	1				
3. Relations	0.720 **	0.730 **	1			
4. Generalized trust	0.107	0.084	0.094	1		
5. Trust to co-workers	0.468 **	0.535 **	0.499 **	0.425 **	1	
6. Trust to manager	0.431 **	0.480 **	0.389 **	0.185 *	0.624 **	1

Notes: * $p < 0.05$; ** $p < 0.01$. Source: own elaboration.

To further explore these relations, a one-way ANOVA analysis was conducted. To examine the links between trust in co-workers and competence level, three groups of trust in co-workers were distinguished: low trust level ($M = 3.21$, $SD = 1.07$), medium trust level ($M = 4.12$, $SD = 0.73$), and high trust level ($M = 4.5$, $SD = 0.55$). There was a significant difference in evaluation of mean competences ($F(2,172) = 24.91$, $p < 0.001$) between the different levels of trust. Those with a low level of trust in their peers have the lowest average level of trust. Those with the highest level of trust were characterized by the highest assessment level of competences. Post hoc t -test comparisons using Bonferroni correction, with adjusted alpha ($\alpha_{\text{altered}} = 0.05/3$), 0.016 per test) confirmed that there were statistically significant differences in competences between the low trust group ($M = 3.21$, $SD = 1.07$) and the high trust group ($M = 4.5$, $SD = 0.55$), $t(37) = -5.88$, $p = 0.000$. The verification describes statistically significant differences between competences in medium and high trust level groups ($t(99) = 3.38$, $p = 0.000$), as well as low and medium trust groups ($t(34) = -4.25$, $p = 0.000$). Hence, this supports Hypothesis H1a.

To analyze whether there were statistically important differences in relations between competences and trust in managers, a one-way ANOVA analysis was conducted on three groups: low trust ($M = 3.78$, $SD = 0.98$), medium trust ($M = 4.11$, $SD = 0.78$), and high trust ($M = 4.48$, $SD = 0.57$). There was a significant effect of competences on trust in managers ($F(2,172) = 7.96$, $p < 0.001$). A further post hoc test using an altered alpha value (0.016) confirmed the significant differences between the low trust group ($M = 3.78$, $SD = 0.98$) and the high trust group ($M = 4.48$, $SD = 0.57$) in mean competences ($t(90) = -4.36$, $p < 0.001$). These results indicate that competences level affects trust in managers in an organization. In consequence, it supports Hypothesis H1b.

There was a positive correlation between trust in co-workers and relationships ($r = 0.499$, $p < 0.000$). Additionally, emotional bonds were positively correlated to trust in fellow employees ($r = 0.419$, $p < 0.000$). These results demonstrate the links between relations and interpersonal trust in co-workers. The one-way ANOVA analysis indicates that there is a significant difference between trust in co-workers depending on relations ($F(2,172) = 23.174$, $p < 0.001$). A post hoc t -test with Bonferroni correction ($\alpha_{\text{altered}} = 0.05/3$) 0.016 supported this result ($t(41) = -6.15$, $p < 0.000$). The high trust group ($M = 4.35$, $SD = 0.65$) was characterized by a higher average level of relations in comparison to the low trust group ($M = 2.96$, $SD = 0.2$). The relationship also varied among low and medium trust ($t(37) = -4.59$, $p = 0.000$) and medium and high trust ($t(98) = 2.93$, $p = 0.002$). This provides further support for Hypothesis H2a.

The correlation between trust in managers and relationships ($r = 0.389$, $p = 0.000$) shows that confidence in managers is related to relationships in an organization. An additional one-way ANOVA analysis suggested a significant difference between trust in managers and average relations ($F(2,172) = 8.11$, $p < 0.001$). This was confirmed by a series of post hoc t -tests ($\alpha_{\text{altered}} = 0.05/3$) 0.016, $t(89) = -3.87$, $p = 0.001$, since relations were significantly different in the low trust ($M = 3.54$, $SD = 1.14$) and high trust ($M = 4.30$, $SD = 0.72$) groups. Moreover, relations were different for the low and medium trust ($M = 4$, $SD = 0.79$) groups. This supports Hypothesis H2b.

There was a moderate significant correlation between cooperation and trust in co-workers ($r = 0.486$, $p = 0.000$) and group cohesion ($r = 0.535$, $p = 0.000$). The one-way ANOVA variance analysis indicated that cooperation is significantly different for low, medium, and high trust groups ($F(2,172) = 21.398$, $p < 0.001$). The series of post hoc t -tests with Bonferroni correction and adjusted alpha

emphasizes that cooperation was much more positively evaluated in groups characterized by high trust between co-workers ($M = 4.26$, $SD = 0.79$) than in low trust groups ($M = 2.82$, $SD = 1.21$), $t(42) = -5.51$, $p < 0.001$. Cooperation was a significant factor that distinguishes trust in fellow employees between low and medium trust ($M = 3.88$, $SD = 0.88$) groups ($t(37) = -3.61$, $p < 0.001$), as well as medium and high trust groups ($t(89) = 3.45$, $p < 0.001$). The difference between average cooperation and low and medium trust ($t(37) = 3.61$, $p = 0.000$) was statistically important. By illustrating the positive links between cooperation and trust in peers, this calculation supports Hypothesis H3a, and Hypothesis H3b was also confirmed. A moderate significant correlation was discovered between trust in managers and cooperation ($r = 0.431$, $p = 0.000$). Moreover, the cohesion was also correlated to trust in supervisors ($r = 0.480$, $p = 0.000$). Further examination of this relation was conducted using one-way ANOVA analysis. The test ($F(2,172) = 10.65$, $p < 0.001$) established that average cooperation is different in low, medium, and high trust groups. Those who trust managers the least ($M = 3.37$, $SD = 1.15$) were characterized by the lowest level of cooperation. In contrast, those who trust their supervisor the most ($M = 4.30$, $SD = 0.76$) have the highest cooperation scores. A further series of post hoc t-tests with adjusted alpha value (0.0167) revealed that high and low level of trust in managers was statistically related to cooperation ($t(87) = -4.61$, $p < 0.001$). Similarly, cooperation levels significantly differ in medium and low trust groups ($t(68) = -2.32$, $p = 0.011$). Average cooperation varies in low and medium trust groups ($t(105) = 3.01$, $p = 0.001$). This provided further support for Hypothesis H3b.

Generalized trust, which was used as an indicator of average individual trust level, was not significantly correlated to any variable.

In pursuance of establishing the determinants of interpersonal trust, a linear multiplied regression analysis was conducted. In H1a, H2a, and H3a we proposed that trust in co-workers is predicted by competences, relations, and cooperation. The findings of statistical analysis suggest that combined competences, relations, and cooperation account for a statistically significant proportion of variance in trust in co-workers $F(3,171) = 25.62851$, $p < 0.001$ and accounted for 31% of the variance in trust in co-workers with adj. R^2 of 0.31. The Beta weight for cooperation was not statistically significant ($\beta = 0.151$, $t = 1.558159$, $p = 0.12$). This indicates that only competences ($\beta = 0.215$, $t = 2.785$, $p = 0.002$) and relations ($\beta = 0.287$, $t = 3.119$, $p = 0.005$) contributed to the variance in trust in co-workers.

A multiple linear regression was calculated to examine the relations between competences, relations, cooperation, and trust in managers. The analysis results indicate that together these factors explain 20% of the variance in trust in managers ($F(3,171) = 14.655$, $p < 0.001$) with adj. $R^2 = 0.204$. Cooperation was the only component that predicted trust in managers ($\beta = 0.295$, $t = 2.820$, $p = 0.005$).

5. Discussion

The research hypotheses were formulated to show that interpersonal trust is partly connected by two main factors. The first condition involves the cognitive process of rationally analysing the trustworthiness of a second agent based on his/her abilities. The second factor refers to the emotional perception of the state of the relationship between co-workers based on relations and cooperation in teams. In our research, both cognitive and emotional aspects of interpersonal trust were examined to provide an understanding of the specific patterns that are associated with an increased level of organization.

The verification of Hypothesis H1a has implications for the importance of strengthening the cognitive aspect of interpersonal trust. Competences are correlated with trust in fellow employees. These findings align with [20,67]. However, our results are focused on a specific sector. The presented study analyses the telecommunications sector and helps to examine its unique characteristics. The studied telecommunications employees' trust in their co-workers is associated with the team's competences. Similarly, the examination of Hypothesis H1b points to the fact that recognition of competences affects trust in managers. This corresponds with the literature on trust antecedents [21]. Further analysis indicates that perception of abilities is an important factor that is related to trust. This is a significant finding which emphasizes the role of competences in organizational confidence.

Hypothesis H2a suggests that emotional conditions related to trust play an important role in building trust. The analyses provide an insight which illustrates that employees who have good interpersonal relations and emotional bonds have a higher level of trust. Furthermore, our research supports previous studies which indicate a connection between trust and interpersonal relations [67].

Additionally, the emotional aspect of trust in supervisors is also confirmed (H2b). This is in alignment with earlier findings [19]. The main contribution of this study indicates that interpersonal relationships are strongly related to organizational trust. Furthermore, increased positive interactions facilitate interpersonal trust.

The examination of Hypothesis H3 provides support for links between cooperation and trust. Cooperation is correlated with organizational confidence. This corresponds with both theoretical assumptions [123] and practical studies [112,124] and demonstrates the importance of good cooperative patterns that enhance organizational trust. The interpersonal trust relationship model is illustrated in Figure 2.

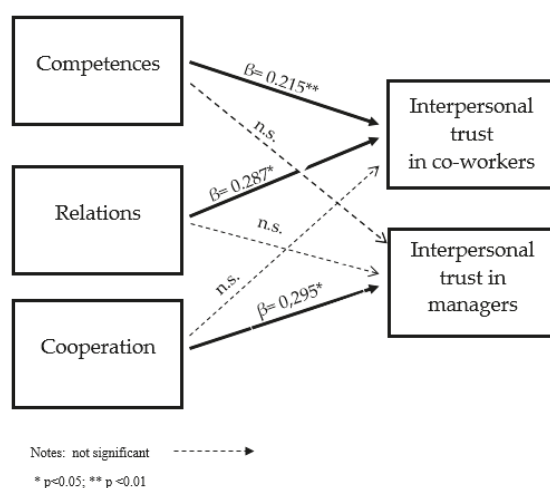


Figure 2. Relationship model.

Overall, the study confirmed the results of McAllister [54], who recognized the cognitive and affective foundations of trust. Our findings show that in order to strengthen organizational confidence, both ability and competences as well as relations and cooperation should be improved. According to these results, organizational practices that facilitate trust should emphasize both the cognitive and emotional aspects of trust. Developing competences, creating opportunities for interaction, and improving cooperation are core elements of organizational interpersonal trust.

More precisely, our study assessed the factors that determine interpersonal trust in organizations. Consistent with our hypotheses, we found that trust in co-workers is related to competences and relations. However, cooperation was not a significant predictor of trust in fellow employees. This implies that creating opportunities to bond and maintain good relationships among peers in organizations and building work-related ability and skills help to improve interpersonal trust between co-workers. On the contrary, in order to build trust in managers, one should stress the need for successful cooperation as this determines trust in supervisors. Thus, it seems that it is important for employees to demonstrate proficiency to be considered trustworthy. Furthermore, positive group interaction leads to improved group trust. Managers should focus on maintaining successful cooperation to build their own credibility. The core components for building organizational confidence are competence, relations (for co-workers), and cooperation (for managers).

The practical implications of our study indicate the significance of cognitive and affective factors in building trust. One of the most important conclusions of this study is that it provides evidence of the importance of creating trust-enhancing organizations by improving employees' competences and providing space for bonding activities that nurture interpersonal relations. Employees' trust is associated with abilities and relationships. Hence, by providing adequate support (such as training and integration opportunities), one is able to improve interpersonal trust in organizations.

In conclusion, our findings suggest that interpersonal trust in sustainable organizations is associated with cognitive and affective factors. Since trust is a core element of sustainable development [125], implementation of practices that enhance team confidence improves the way these organizations function. Additionally, understanding various aspects that influence interpersonal trust in sustainable organizations helps to reinforce the development of organizational trust. There are two basic strategies that can help to improve trust: firstly, strengthening competences and abilities; secondly, building mutual relationships and improving cooperation. According to our results, it is especially important to develop and subsequently maintain positive trust-oriented bonds between employees and managers. Sustainable management involves encouraging confidence and improving the quality of social aspects of work by strengthening trust. Our study provides guidance which specifies the core aspects of establishing interpersonal trust in sustainable organizations.

Further research could be conducted in different countries to provide cross-cultural comparisons. Moreover, future analysis could explore more aspects of interpersonal trust. Furthermore, the analysis only considers three conditions related to trust. Further exploration of additional elements that affect interpersonal trust is required. Even though we acknowledge some limitations of this research, we support our claim that competences, relations, and cooperation affect interpersonal trust.

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Article

Trust-Based Quality Culture Conceptual Model for Higher Education Institutions

Małgorzata Dżimińska ¹, Justyna Fijałkowska ^{2,*} and Łukasz Sułkowski ³

¹ Management Department, University of Social Sciences, 9 Sienkiewicza Street, 90-113 Łódź, Poland; mdziminska@spoleczna.pl

² Finance and Accounting Department, University of Social Sciences, 9 Sienkiewicza Street, 90-113 Łódź, Poland

³ HEI Management Department, Jagiellonian University, 4 Prof. Stanisław Łojasiewicz Street, 30-348 Kraków, Poland; lukasz.sulkowski@uj.edu.pl

* Correspondence: fijałkowska@spoleczna.pl

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Abstract: Higher Education Institutions (HEIs) play a crucial role in societies as they enhance the sustainable development of nations. In a context of increasing competition and financial difficulties in higher education institutions, the loyalty of students, faculty and administration staff as well as institutional reputation are key factors for survival and success. They are built upon trust and high quality of services rendered by HEIs. The intentional development of trust serves the purpose of enhancing the quality culture in higher education. The concept of quality culture has become a natural successor of quality management and quality assurance in universities presenting a new perspective for viewing quality at HEIs—as a combination of structural and managerial with cultural and psychological components. This paper provides an elaboration of a novel Trust-Based Quality Culture Conceptual Model for Higher Education Institutions which presents the perceived interconnections between trust and quality culture at HEIs. It can form a source for an inquiry process at HEIs, thus contributing to better contextual diagnosis of the stage where HEI is in the process of building the quality culture based on trust. The findings of this study are important in better understanding the quality culture development in HEIs that is based on trust, loyalty and reputation. It may have an impact on the decision-making processes concerning HEIs' management. The proposed model contributes to the need for greater clarity, ordering and systematization of the role of trust in the processes of quality culture development.

Keywords: trust; quality culture; universities; higher education institutions; conceptual model

1. Introduction

The Higher Education Institutions (HEIs) play an important role in the society: They are essential partners of the knowledge creation and knowledge exchange networks, catalysts of innovation, suppliers of tangible outputs of research results, and institutions providing consulting and advisory services. Universities are supposed to foster progress, build social capital, prepare students for outside realities, provide access to knowledge, extend the bounds of justice and, therefore, contribute to the creation of a democratic and sustainable society. However, the increasingly competitive and dynamic educational environments bring up numerous challenges, such as declining enrolments and growing competition [1]. Today, universities are involved in in-depth changes with the aim of increasing their effectiveness, efficiency and transparency [2]. Universities in Europe are faced with numerous challenges embracing both opportunities and threats [3]. These include [4,5]:

- The increasing level of internationalization of education and research;

- Implementations of new research modes;
- The extended competition with other organisations such as the new public and private universities, the education given by companies through what they call “corporate universities” to contribute to the lifelong learning process of their own employees;
- Pressure to harmonise the different national university systems (e.g., Bologna Process);
- The claims and aspirations of various stakeholders (including industry and society in general);
- Increased demand for transparency and accountability about the “results” and “benefits” derived from the public funds.

Universities have been charged with key roles in promoting and implementing sustainable development (SD) [6]. Due to their high importance for humanity and civilization, many scholars see the impact of universities on SD as vastly greater than any other single sector of society [7–9]. HEIs are seen as multipliers for disseminating SD principles with the ethical obligation to systematically integrate SD into their institutions [6–8,10–12]. At the same time, it should be noticed that trust management [13–15] is the key focus of the sustainability concept [16–20], closely referring to sustainable organizations [21–23] and to sustainable business models [24–29]. In the context of HEIs, there is an ongoing change from traditional universities, relying upon Newtonian and Cartesian [30] reductionist and mechanistic paradigms, to the more SD focused institutions and the factors/initiatives boosting this change [31,32]. Lozano et al. [32] underline that the more sustainable development presents “a daring challenge to higher education institutions (HEIs) and society in general, in order to achieve a sensible future for those not yet born generations, especially if the rate of change in universities is taken into consideration”. They continue that “for universities to become sustainability leaders and change drivers, they must ensure that the needs of present and future generations be better understood and built upon, so that professionals who are well versed in SD can effectively educate students of ‘all ages’ to help make the transition to ‘sustainable societal patterns’, as indicated in the declarations, charters, partnerships and conferences” [32]. However, despite the progress made and some signs of transition in parts of the academic community, there is still a long way to go to mainstream sustainability in higher education, and a paradigm shift from unsustainability to sustainability is still difficult to identify [33].

The environment that universities operate under is getting more similar to the private companies market conditions; universities need to compete not only for grants and funds, but also for students and faculty members. Therefore, HEIs become more aware of the importance of student and faculty satisfaction. In order to gain and maintain satisfied students and academia members, HEIs focus on building trust that is aligned with developing a high reputation for the institution and loyalty among students and faculty. Reputation and related constructs, such as prestige, brand personality and identity attractiveness, have been well-established as predictors of consumer-organisation identification [34], but fewer researchers have considered the influence of trust [35]. Although the literature on the topic of customer satisfaction and loyalty is very rich, there are not many studies on trust as a basis of satisfaction, and loyalty from students’ perspective in higher education. In the context of higher education, the focus has often been on investigating the link between teaching quality/learning outcomes and student satisfaction/loyalty or other relationships separately [36].

In this paper, we propose that an important step towards the sustainable development of HEIs’ is the focus of these institutions in the application of a quality culture approach that would be based on trust. Quality in higher education is declining, and colleges and universities are not adequately preparing students for life in a rapidly changing and increasingly competitive world [37]. Colleges and universities need to ensure that the quality of their service, education, and research produces well-educated graduates [38]. Only in that way is it possible to move forward towards greater sustainability. These statements fall in line with the conclusions of Shriberg [39], underlining that one of the critical parameters to achieving sustainability in higher education is pursuing incremental and systemic change simultaneously. Basing such a transformation on a trust-building approach and quality culture development might be one of the answers to this need.

The development of reputation of HEIs and trust requires proper quality culture enhancement. Achieving quality is an imperative goal of higher education universities, colleges or institutions nowadays [36]. Successful quality improvement practices require both the formal side (i.e., tools and mechanisms to measure, evaluate, assure and enhance quality) and a quality-conducive organisational culture in terms of attitudes and practices of participants [40]. In regard to the formal side, “instruments are in place” [41]; however, there is a “lack of quality culture” [41].

The majority of the existing research on sustainable aspects of organisations do not make the explicit connection to trust factor, neither paying much attention to its role or its importance in the sustainable business models. This research tries to fill this gap underlining the role of trust in the development of the sustainable quality culture model that can lead to generally more sustainable HEIs. In our paper, we formulate a thesis that trust is a vital determinant of a quality culture in HEIs. Therefore, the main aim of this paper is to propose a novel, Trust-Based Quality Culture Conceptual Model for Higher Education Institutions. We base our research on Nørreklit et al. [42], pointing out that “Business processes require on-going reflection in which concepts and conceptual structures are developed and reshaped to observe, control and re-formulate the construct causality on which successful management action can be executed”. The proposed model offers a framework for showing the importance of trust for building the quality culture which can fill a gap in the literature on HEIs, trust, loyalty, reputation and quality culture.

The model was built based on the systematic critical analysis of scientific literature, and theoretical and empirical findings. It has been developed as a result of an inductive process aiming at the synthesis of the existing views in the literature concerning trust and quality culture. In our study, we applied a systematic literature review approach, following the four stages indicated by Sulisto and Rino [43]. The model represents an “integrated” way of looking at the concepts and their perceived relations and permits cognitive evaluations and attitudinal associations analysis, emerging as a result of interactions between students, faculty and higher education institutions.

The paper is structured as follows: After the introductory part, the second section provides the main findings concerning trust as a general concept crucial for the development of the reputation of the organization and loyalty of its clients. The third section of this paper gives more insights into trust-related aspects in higher education institutions. The fourth section describes the quality culture concept, its importance in HEIs, as well as supporting and hindering factors for its development. In the fifth part of this paper, the research methodology for the study is presented, and in the sixth section the proposed conceptual model is described. The last section offers the conclusions and suggestions for further research.

The findings described in this paper are important for a better understanding of the quality culture development in HEIs that is based on trust, loyalty and reputation. It may have an impact on the decision-making processes concerning HEIs’ management. The proposed model contributes to the need for greater clarity, ordering and systematization of the role of trust in the processes of developing quality culture.

2. Trust as an Antecedent of Loyalty and Reputation

No organization can endure without trust. Trust is a complex construct that comprises of a cognitive element, which is based on the consumer’s knowledge of the organisation and its capabilities, and an affective component, which is the emotional bond between the individual and the organisation that develops over time [44].

Trust is studied and used in a number of disciplines, such as sociology, psychology, economics and computer science. As a result, there are many definitions of trust and no general consensus has been achieved so far on one common statement of meaning [45]. Trust may be understood as a relationship existing between two participants where a trustee is the participant being evaluated by the truster [46]. Trust is the willingness of the trustor (evaluator) to take risks based on a subjective belief that a trustee (evaluatee) will exhibit reliable behavior to maximize the trustor’s interest under uncertainty

(e.g., ambiguity due to conflicting evidence and/or ignorance caused by complete lack of evidence) of a given situation based on the cognitive assessment of past experience with the trustee [47]. Morgan and Hunt [48] specify trust as associated with partners' qualities, such as consistency, competence, honesty, responsibility, benevolence and integrity. Moorman, Zaltman and Deshpande [49] relate trust to variables such as beliefs, feelings and expectations. Flores and Solomons [50] suggest that since trust is created through social interaction, it can, and should, be learned as a social skill "...essential to our emotional well-being." Brenkert [51] makes a distinction between trust and trustworthiness, namely that whereas trust is an attitude, trustworthiness is an evaluative appraisal. Soule [52] proposes that trust is deeper than confidence, co-operation and reliance and that it implies vulnerability. Bews [53] defines trust as "a voluntary action of one party, flowing from an evaluation, based on the social skills of that party, concerning the potential of another, or others, not to take advantage of the vulnerability of the first party." This leads to a consideration of the dynamics of trust. In the broadest sense, trust may be understood as confidence in one's expectations [54]. In our study, concerning the relation between quality culture and trust we adopt a definition of trust stating that this concept is a positive belief, attitude, or expectation of a party that the action or outcomes of another will be satisfactory [55]. We see the following attributes of trust as crucial for our study:

- Trust can only be earned, not sold, bought or transferred [56];
- Trust as a relation is very fragile, it takes a long time to build and is destroyed very easily [57];
- Trust includes the expectation that an organisation will not behave in an opportunistic manner and that it will deliver its products at the quality expected by the consumer [58];
- Trust involves the belief of the engaged parties that the organisation will act with integrity and that it will be reliable [48].

The concept of trust is related to loyalty and reputation and is considered to be their antecedent. Trust plays a central role in fostering successful relational exchanges and has been demonstrated to be positively and directly related to customer loyalty [48,59–61]. The relation between trust and loyalty has been also researched by e.g., de Madariaga and Valor, 2007 and Sarwar, Abbasi, and Pervaiz, 2012 [62,63]. Ladhari et al. [64] defined loyalty as a deeply held commitment. Loyalty may be considered as a multidimensional construct encompassing: (i) a behavioral dimension that includes repeat-buying patterns, recommendation and referral; and (ii) an attitude dimension entailing cognitive and emotional components such as accessibility, reliability, emotions and feelings [65]. Customer loyalty is typically analysed in terms of preferences and intentions, which might be regarded as attitudinal loyalty [66]. In our study, we apply the attitudinal loyalty approach that defines loyalty as the situation in which a consumer holds a favourable view of an organisation and feels an emotional attachment to the organization [35].

Trust also leads to the development of organizational reputation. Reputation can be defined simply as an overall evaluation of the extent to which an organisation is substantially good or bad [67]. According to the resource-based view, a firm's sustainable competitive advantage is derived primarily from its intangible capabilities, such as its reputation [68] and its ability to gain the trust of consumers [69]. It is also empirically proved that organizations that have a favourable reputation are likely to command higher levels of confidence among consumers, which results in increased feelings of trust towards the organisation and reduced perceptions of risk [70]. In our study, we use the definition of reputation which says that it is a collective assessment of an organisation's ability to provide valued outcomes to a representative group of stakeholders [71] and that strong reputations are rare and impossible to imitate in totality, owing to the unique sets of assets, skills and choices made by organisations [72].

According to Rizan, Warokka & Listyawati [73] and Grönroos [74] there is a paradigm shift from transactional marketing to relationship marketing which influences customer satisfaction. Customers will buy or use the same product or service when they are satisfied with the quality [75–77]. Satisfaction is an overall customer attitude towards a service provider or an emotional reaction to the difference

between what customers anticipate and what they receive [78]. Many researchers stated that customers' satisfaction is needed in order to keep the customers from choosing other products [79,80]; therefore, satisfaction creates trust to the product and/or the institutions [76,77] and as a result leads to customer loyalty [48,59–61,76,77,81,82] and organizational reputation [76,77]. Organizational reputation also enhances trust [70]. Customer loyalty enhances organizational reputation and vice-versa; empirical research proves that organizational reputation also increases customer loyalty [83,84].

The above overview of definitions of trust, loyalty, reputation, and satisfaction form the basis for their further considerations in the context of HEIs. The highlighted attributes of the presented concepts are instrumental for the development of the Trust-Based Quality Culture Conceptual Model for HEIs, presented in part 6 of this study.

3. Trust in HEIs

One of the most important features of a strong HEI culture is trust. The globalization of educational services and the increasing competition coming from the private sector have forced higher education institutions to market their programs more aggressively and to look at student loyalty [61] and organizational reputation as crucial for future success. Bhattacharya and Sen [85] suggest that the link between consumers' perceptions of an organisation's identity and their reactions to it depend on the extent to which they know and trust the identity. It is expected that this would be the same for students/faculty/administration in HEIs context.

Trust is an important factor that affects commitment to a university [81,86]. In our study, based on the systematic critical review of the literature, we analyse the concept of trust looking at it from the individual and institutional levels, where trust is represented by loyalty and reputation respectively. We also analyse trust using a multidimensional perspective represented by students, faculty and institution understood as administration, management representatives, and also the brand and image of HEI.

3.1. Individual Level and Institutional Level of Trust in HEIs

3.1.1. Individual Trust—Loyalty

Trust is a concept that may be investigated at the "micro-level" psychological dimension. This concerns individual trust of a particular person. The principal definition of loyalty, used in this study, defines this concept as the situation in which a consumer holds a favourable view of an organisation and feels an emotional attachment to the organization [35]. In case of HEIs context, a consumer is understood as students, faculty and administration staff. They expect that the HEI will act with integrity and that it will be reliable [48]. In the case of higher education, Østergaard and Kristensen [1] define student's loyalty as "willingness to recommend the institution and the programmes to others, considerations whether the student would have chosen the same institution and programme today, and willingness to continue education or participate in conferences at the institution in the future". A similar definition concerning students' loyalty is proposed by Temizer and Turkeyilmaz [82] claiming that it is "the tendency of a student to choose the same provider (i.e., HEIs) or service over another for a particular need." Loyalty is the combination between students' willingness to talk positively about the institution and to provide information to new candidates [87]. Webb and Jagun [88] defined the concept of loyalty in the higher education context as student's willingness to recommend the university/institution to others, the wish to say positive things about the university/institution and their returning willingness to the university/institution in order to continue their studies [88]. Loyalty is positively related to student satisfaction, which increases performance and profitability in the long run [89,90]. Therefore, having satisfied students will lead to loyalty behavior [91,92] through the process of trust creation that is a link between satisfaction and loyalty. Loyalty can lead to a sustainable competitive advantage in the increasingly demanding higher education market [93]. The efficiencies that result from the increased student loyalty cause not only increased lifetime tuition revenues from students but also provide some synergy for enrolment

through low-cost word-of-mouth recommendation activities [94]. The positive relationship between satisfaction and loyalty reveals that satisfied students with their overall programme experience and with the quality of university facilities and services, are more probable to be loyal to the university [36]. Shahsavari and Studzian empirically proved that the most effective factor that positively influences students' loyalty is students' satisfaction, meaning that the more satisfied students become, the more loyal they become [36]. As it is underlined by Carvahlo and Mota [61], student loyalty has recently received increasing attention in the fields of marketing [95], service [96,97], and educational management [84,98]. Within the educational literature, student loyalty has been shown to be influenced by student satisfaction [99] and university reputation [84]. As it was mentioned before, satisfaction lays foundations for trust creation that leads to loyalty. Student satisfaction can be understood as a short-term attitude resulting from the evaluation of the student educational experience [36]. What is more, satisfaction is built when perceived performance meets or exceeds the student's expectations [100], which is being shaped continually by repeated experiences in campus life [100]. Providing quality education and a 'feeling of belonging' are key determinants of student satisfaction [101]. It is empirically proved that students' satisfaction has a positive impact on student motivation, student retention, recruiting efforts and fundraising [1,36,102,103], thus creating loyalty.

3.1.2. Institutional Trust—Reputation

This other dimension of trust regards "macro-level" institutional arrangements and refers to the reputation of an organization. As it was mentioned before, in our study we adopt the definition that reputation is a collective assessment of an organisation's ability to provide valued outcomes to a representative group of stakeholders [71]. In an educational context characterised by an increasingly marketised system [104], the reputation of the institution—in this case the university—built upon strong brands, has become an important factor in determining institutional competitiveness and positioning [105]. Further, university reputation has been shown to influence (enhance) the individual trust creation—e.g., students' supportive behavioural intentions [83], that lead to greater loyalty. Trust, especially in public institutions, is the belief/faith that they will provide the results asked of them, even in the absence of constant auditing, i.e., that they will act efficiently [106]. This is a specific type of trust relationship where the institution is worthy of the trust and the citizen trusts the institution's rules, roles and regulations, regardless of the people who play those roles [107]. Building a strong reputation requires strategic choices to be made by the institution that align decisions on strategy, culture development and corporate communication [72].

Institutions promote or constrain trust relations [108,109]. Thus micro-level trust relations are constrained and enhanced by macro processes [110].

3.2. Multidimensional Trust in HEIs

Trust relations are an integral aspect of the quality of a school's social system [111]. It is clear then that trust relationships in the education context display a multidimensional and dynamic nature [112]. Trust in HEIs may be analysed not only on individual and institutional levels, but also between different actors. In this study, we decided to concentrate on three main dimensions: trust in the relations between students and faculty members, students and the institution, as well as trust of faculty versus institution. The "institution" is understood here in the large sense and it embraces the trust versus the particular university (its brand, image, its perception) as well as trust put in the management and administration that operate within this institution.

1. Student—Faculty

When students perceive that their faculty members support them, students' attachment to school increases [113]. It is indisputable then that academics are key actors regarding students' social integration and experiences in school [114]. A significant level of students' satisfaction with overall programme quality could be attributed to the role of teaching staff in order to keep students satisfied

with their programmes [115]. Academic support and advising are powerful tools for universities to help students to be successful and to improve satisfaction with their experience [115]. Schertzer and Schertzer (2004) [116] proposed a model that addresses the congruence between students' values and faculty, as a significant component of academic fit and student satisfaction and retention. Returning students are those having positive interactions with the faculty [117,118]. It is important that the students develop trust in teacher, as it denotes the quality of school life of both students and teachers [114]. When students do not experience trust from their teachers, they will be less likely to engage in learning processes [119,120]. Positive teacher-student relationships, based on trust, produce favourable outcomes for student learning and teacher functioning (e.g., [121–123]). The importance of trust in students is partly revealed through its influence on the way teachers work and interact with students [121]. Trust in students can be regarded as a form of teacher-based social capital available to students [124,125].

2. Student—Institution

Noticing the student as the primary customer of HEIs has already changed the relationship between students and the higher education institutions in several countries. It led also to a paradigm shift in the education sector concerning the creation of new types of student demands and requests for the quality of learning processes and support services. It can be expected that the students' and the graduates' accusations about bad service and fraudulent marketing will become more common if their expectations as paying customers are not met satisfactorily [126]. Student trust in the HEI entails: (a) expertise—the technical competence in its field of education; (b) congeniality—the extent to which a university demonstrates courtesy and goodwill towards the students; (c) openness—in interpreting and disclosing ambiguous higher education issues; (d) sincerity—honesty and promises fulfilment; (e) integrity—unwillingness to sacrifice ethical standards to achieve organizational objectives [127]. Hennig-Thurau, Langer, and Hansen, [96] notice that trust in HEI's personnel is an antecedent of student loyalty that is crucially important. Sirdeshmukh, Singh and Sabol [60] suggest that although a student may trust that the HEI's faculty members are doing their best to aid students in achieving their learning and career goals, that same student may be suspicious of whether the HEI's administrative policies and practices are centered on the students' best interest. They highlight also that such independent evaluations of HEIs might reflect the use of distinct inferential bases for the evaluations. Student trust were found to be significant predictors of student identification with higher education institutions [35]. Carvalho and Mota [61] demonstrated that trust in both the HEI's personnel (faculty and staff members) and in the HEI's management (as reflected in its administrative and process policies and practices) increases students' perception of value of the HEIs, which in turn leads to student loyalty. The empirical research confirms that there is a significant relationship between student trust, behavior and high school outcomes; students who trust have fewer behavioral incidents and better academic outcomes with results suggesting that trust functions through behavior [128]. Therefore, building long-term relationships based on students' trust and commitment is important for university managers in the competitive international education market [129].

3. Faculty—Institution

The third pillar of trust creation in the HEI is the trust of faculty versus the institution. It is strictly related to the concept of organizational trust that refers to employees identifying with an organization and willing to establish long-term relationships with the organization [16]. Organizational trust is a type of institutional trust, including trust in supervisors and in an organization as a whole [130]. The nature of the social relations academics have with other school actors is an important aspect of their job and an important output of schooling [131]. It determines the quality management in the organization. In the organizational context, the degree of social exchange between employee and organization reflects the level of employee-organization relationship (EOR) [132]. Yu et al. [16] underlines that EOR is an important predictor of organizational trust. Trust can be an effective predictor

of employees' positive attitudes and behaviours, such as cooperative attitudes [133], organizational commitment [134] and employee loyalty [135]. Previous studies have found that when employees trust in their organization, they will perceive their environment as safe [136] and this will lead them to be more likely to share ideas and knowledge and be more creative in their job [137].

4. The Quality Culture Concept

The development of trust serves the purpose of enhancing quality in higher education. As the quality culture in HEIs cannot be taken for granted, it has become the subject of international scientific research contributing to the deeper understanding of this aspect of university functioning [138–140]. In research conducted under the patronage of the European University Association (EUA) [141–144], quality culture is defined as an organizational culture whose main aim is to constantly improve quality. Two key components of the quality culture have been distinguished: The first concerns the cultural and psychological aspect, relating to common values, beliefs, expectations and commitment to quality improvement, while the second is of structural and managerial character and refers to defined processes supporting the quality enhancements and coordinating the work of those involved in quality improvement [141]. This understanding of the quality culture assumes that educational institutions should take care of this aspect of the university's functioning in such a way that both structural and managerial elements (referring to institutions) as well as cultural and psychological elements (referring to the role of individuals) synergistically support each other and they lead to the constant development of a higher education institution.

In the consciously developed quality culture, there should be a constant interaction between structural/managerial processes, which are top-down, and cultural/psychological factors that follow the bottom-up path. The first ones play the role of drivers of change, because they are introduced as a result of external and internal legal acts or regulations, while the latter ones act as supportive measures in the process of quality culture development. At the same time, the interplay of both sets of factors is a unique feature of each institution.

It should be noted that the quality culture (Quality Culture—QC) and quality management (Quality Management—QM) or quality assurance (Quality Assurance—QA) are terms that are different in meaning. QM is “an aggregate of measures taken regularly at system or institutional level in order to assure the quality of higher education with an emphasis on improving quality as a whole” [145], while QA by the same authors is seen as a component of QM as it offers a set of mechanisms and tools that make QM possible. Currently, the QM and QA mechanisms typically consist of periodically conducted self-studies and evaluations of HEI's units following standard measures for the review, approval and monitoring of an academic programme: They involve gathering student feedback on teaching effectiveness; student and staff satisfaction surveys; student workload assessments and tracking alumni careers; monitoring of adapted indicators and statistical information to analyse student achievements and success; and analysis of the quality of teaching and learning resources [144].

The term quality culture emerged later than quality management or quality assurance and became the answer for growing concerns of academicians sceptical about introducing processes, procedures and tools typical of quality management and quality assurance, often considered as burdensome and bureaucratic, used for accountability purposes and usually accompanied by the establishment of national quality agencies focusing on compliance verification rather than supporting HEIs. This situation was interpreted by many academicians as the withdrawal from trust [146] and following the managerialism approach [147], which obviously did not contribute positively to quality perceptions. In this context, the concept of quality culture offered a very comprehensive statement of meaning, because apart from the focus on structural and managerial aspects, it proposed a reference to cultural and psychological elements taking into account the values shared at the university, employee involvement, convictions, history and academic tradition. The term of quality culture pointed to the importance of co-existence of both components (structural/managerial and cultural/psychological), thus showing a new, wider perspective on perceiving quality at the university. The complementarity

of both aspects was further emphasized by noting that the university may have highly developed quality management and assurance processes, but its quality culture without a well-developed cultural and psychological component will be incomplete [148]. The situation was perceived similarly in the opposite case. The academic ethos without accompanying mechanisms of quality management and its provisioning will be an isolated and impermanent element in the process of building a comprehensive university's quality culture [141]. A strong and sustainable quality culture no longer requires just a quality assurance system, it is also based on mutual trust between all parties of the educational process, it is not enforced and it is built step by step, action by action, until it becomes a reality [149].

The results of EUA's work [141] informed that a mature quality culture was present in institutions that had a high level of autonomy. It was also developing well in such organizational structures where institutional responsibility was emphasized, with very mindful and reflexive implementation of quality improvement projects. It was also pointed out that the quality culture should be regularly monitored and evaluated; however, entangling it in excessive bureaucracy, often represented by various accountability systems, can harm its development.

Recognition of the value of the quality culture promotion at the university entails constant financial expenditures and investing in human resources. Undoubtedly, financing the development of quality culture is a significant expense for the university, but these costs should be treated as a long-term investment. Additionally, the development of quality culture should not be at the expense of the basic tasks of university staff, but be a kind of approach and attitude in which employees constantly ask themselves: *what can be done better?* instead of *what else should be done?* [141]. In addition, the cost of investment in building the quality culture is outweighed by the cost that the university would incur if it gave up a structured quality culture development, especially in the context of growing competitiveness on the HEIs market, demographic decline and changing expectations of the recipients of higher education services.

A critical review of current international empirical research on the quality culture [150] resulted in the establishment of a list of factors supporting and hindering the development of quality culture in universities; a set of mechanisms accompanying the creation of a quality culture; and a list of effects related to the functioning of quality culture in higher education institutions.

The structural and managerial elements that positively influence the development of quality culture include creating a strategy for continuous development of the university; well-operating and useful quality management and quality assurance systems; the practice of including students and academic staff in decision making; taking into account, in the process of management, the constantly changing needs and expectations of students, or the transparency of decisions, procedures and responsibilities. This list of supportive measures is complemented by cultural/psychological elements such as recognition of common values or creating empowering academic environments favouring the coexistence of various quality subcultures [150].

On the other hand, the inhibitors to quality culture development are related to the lack of empowerment of students and academic staff represented by not involving them in decision-making processes which additionally lack transparency [2,151]. Ignoring the evolving needs of students, academic staff and administrators, as well as the lack of sufficient financial, material and human resources also constitute serious barriers to QC improvement. A similar effect is brought by a top-down approach to the implementation of quality management structures. The presence of an overly bureaucratic system of permanent quality control although intended to make processes more transparent can evoke discouragement by showing distrust in competences and commitment of academic staff, thus hindering the development of loyalty for the HEI [152]. In addition to that, the existence of strict discipline, rigid, control-oriented patterns of action, or low prestige and progressive devaluation of teaching also belongs to serious cultural/psychological types of barriers in quality culture development [150].

Leadership and communication are perceived as the key elements connecting cultural and psychological with structural and managerial aspects of the university's functioning. Leaders are

perceived as the main adversaries of the quality culture development due to their competences related to influencing employees' activities, delegation skills, ability to create working teams, building a climate of mutual trust and understanding, playing various academic roles, or focusing on the optimization of management processes serving the development of the university's quality culture. The lack of a committed leader or his/her weak leadership competences, concentration on control and actions hindering the smooth flow of information and making it a hard-to-reach value, are factors definitely hampering the development of quality culture [153]. Additionally, the lack of a tradition of sharing good practices in the organization, or the failure to use various communication channels to effectively reach the stakeholders with the relevant information about quality culture can also impede the QC development. Proper communication is seen as an indispensable tool for identifying values and beliefs of stakeholders in the process of building the quality culture, promoting quality strategies and policies, or discussing the results of ongoing evaluations [150]. It is important also to view communication in a broader sense than only the proper exchange of information. It should be perceived in the meaning of "reciprocal reconciliation", thus underlying a need for the presence of continued dialogue leading to an agreement or a compromise between the discussion participants that constitute key stakeholders and beneficiaries of the quality-oriented actions [152].

The review of literature points also to the list of mechanisms identified as key in the context of creating quality culture. They include a list of actions strengthening the practices of collaborative development and widespread sharing of knowledge. For the QC to blossom, the HEI should also put emphasis on the promotion of processes favouring the distribution of ownership, sharing responsibility and awarding employee involvement in HEI initiatives. In summary, the presence of supporting factors, limiting the barriers, and introducing supportive mechanisms should lead to developing the HEI quality culture resulting in intensified learning and the development of students and academic staff, and an increase in the level of student and staff satisfaction [150].

In summary, the concept of quality culture has become a natural successor of QM and QA, thus presenting a new perspective for viewing quality at HEIs as a combination of structural and managerial with cultural and psychological components. By doing that it has also offered an opportunity to emphasize the role of trust within the HEI context as an empowering element of the academic environment that has an enabling effect on all HEI actors discussed in this publication: students, academic faculty and institution with its administration and management representatives [152].

5. Research Methodology

This study aims at developing a Conceptual Model of Trust-Based Quality Culture in HEIs. As the terms such as "conceptual" and "theoretical" models are often used interchangeably there is a need for clarification what exactly is meant by the conceptual model used in this study and what the characteristics and differences between conceptual and theoretical models are.

In general, a theoretical model is derived from a theory and a conceptual model is derived from concepts. Starting with a broader term, a theory has four components: (a) definition of terms, concepts or variables, (b) a domain to which the theory is applicable, (c) a set of relationships amongst the variables, and (d) specific predictive claims. A theory is therefore a careful outline of "the precise definitions in a specific domain to explain why and how the relationships are logically tied so that the theory gives specific predictions" [154]. Therefore, a theoretical model is built upon a theory and refers to the theory that a researcher chooses as a guideline for his/her research. It usually involves deductive processes related to theory testing and verifying its power and is located mainly in the quantitative research paradigm. Data are collected mostly through experimental designs, empirical surveys and tests. Researchers make an effort to standardize context, or ignore it, so that wider application beyond the current research problem and context is possible.

However, in a situation when there are no theories in a given domain (especially in the areas of social sciences, contrary to natural sciences), or research problems cannot ordinarily be explained

by one theoretical perspective, the researcher may have to “synthesize” the existing views in the literature concerning given phenomena from both theoretical and empirical findings. The synthesis may be called a conceptual model, which essentially represents an “integrated” way of looking at the concept [155]. The term “concept” refers to a mental image or abstraction of a phenomena [156]. Miles and Huberman [157] defined a conceptual model as a visual or written product, one that “explains, either graphically or in narrative form, the main things to be studied—the key factors, concepts, or variables—and the presumed relationships among them” (p. 18). The process of arriving at a conceptual model is usually through an inductive process where different concepts are researched and put together to form an integrated bigger map of the phenomena and their possible relationships. A conceptual model may be defined as an end result of bringing together a number of related concepts to explain or predict a given event, or give a broader understanding of the phenomenon of interest, or of a research problem. The most innovative conceptual models are often those that link various fields of study, or that integrate different approaches, lines of investigation, or theories that no one had previously connected. A conceptual model is something that is constructed, not found. It incorporates pieces that are borrowed from elsewhere, but the structure and overall coherence is something that is built, not something that exists ready-made.

The proposed Conceptual Model of Trust-Based Quality Culture in HEIs was built based on the critical analysis of scientific literature, theoretical and empirical findings, which provided an input to form a bigger map of the abstract concepts such as quality culture and trust and their perceived interplay. In our study, we applied a systematic literature review approach, following the four stages indicated by Sulisto and Rino [43]. Researchers of organisational culture [158,159] point to the fact that culture-related concepts are a very complex phenomena that are not that easy to decipher. There is also a variety of terms used to refer to manifestations of concepts which very often are not visible. For example, Hofstede writes about “practices” and “values”, Schein refers to “artefacts”, “basic underlying assumptions” or “espoused values”. In the area of trust, concepts can be inferred from behavior, but trust encompasses also expressions such as faith, confidence and hope [160]. The concepts of quality culture and trust are complex ones and the conceptual model cannot offer its full representation, but rather a simplified representation of the phenomena, however useful for further exploration and understanding of the concepts and their interplay. Conceptual models developed inductively obviously have their limitations and so does the Conceptual Model of Trust-Based Quality Culture in HEIs that has been built as a result of this study. A conceptual model does not have the power of a theoretical framework as it is highly dependent on context. However, it does offer a structured basis for designing qualitative or mixed-methods approaches with data mostly collected through both empirical and descriptive survey instruments, interviews and direct observations, where contextual data are of major importance. It can form the basis for follow-up studies that will test the model, but the interpretation of the findings will be limited to the specific research problem and its application or context [161].

6. The Proposal of a Novel Trust-Based Quality Culture Conceptual Model at HEIs

In order to clarify the interplay of trust and quality culture in HEIs based on the research findings, the following model of Trust-Based Quality Culture has been conceptualized. The proposed model involves the assumption that if trust-based relationships at HEI are promoted and properly nurtured, and if the structural/managerial as well as cultural/psychological conditions for the quality culture development are adequately accounted for, and the actions are focused on the areas of the university’s educational mission favouring partnership, empowerment and commitment of stakeholders, such a situation will lead to the development of trust-based quality culture. It is important to note that trust is a concept that while being the key input for the process of developing the trust-based quality culture that is strong and sustainable, it also generates output at the organizational level represented by reputation. The whole process of trust-based quality culture development requires support in

the form of professional and responsible leadership and effective communication which are the key elements supporting integrity and compatibility of the quality culture improvement actions.

The presented assumptions have been derived from a systematic critical literature review presented in Sections 2–4 of this paper and gives groundings to the model creation. They provide conceptual indications on how people relate to the reality in which they exist and they provide frameworks for the conceptualizing of how the practitioners can construct themselves successfully in relation to the environment and for the conduct of empirical qualitative research [42]. Figure 1 presents the proposed novel Trust-Based Quality Culture Conceptual Model for HEIs.

The following description summarizes the key elements of the model with a focus on the best practices as indicated by the literature review:

a. Trust as the foundation for quality culture development

The model assumes that trust is the phenomenon that is built between:

- students and faculty,
- students and institution,
- faculty and institution.

Best practice examples indicate that the development of such relationships should be facilitated and supported, i.e., through establishing appropriate channels of communication for each type of relation and a common goal that unites various stakeholders in joint efforts. Intentional development of trust among the key university stakeholders seems to also constitute a strategic approach that HEIs can take. It can be regarded as an investment that if addressed professionally can pay off in loyalty and reputation that adds to quality culture enhancement [162].

b. Drivers of change: structural/managerial components of quality culture

The presence of the structural/managerial component in the proposed model presumes that there should be assured adequate drivers for the quality culture to develop. The following list of structural and managerial elements derived from the literature review [150,162] offers best practices in supporting trust-building among the university's main stakeholders:

- quality management system avoiding excessive bureaucracy;
- users-friendly quality assurance mechanisms;
- collegially developed university's strategy and goals;
- transparency in making decisions and taking actions;
- availability of resources: time, place, people, budget to support the quality culture improvement initiatives and actions.

The listed elements of structural/managerial character that largely contribute to building the university's quality culture belong to the most important ones in the context of building trust between the key university stakeholders (students, academic teachers, institution with its administration and authorities). However, their presence is not an end in itself, but the necessary foundation for improvement actions to take place.

c. Supportive measures of change: cultural/psychological components of quality culture

The model assumes there is a need for a strong presence of the cultural/psychological components of quality culture. The most forceful ones, as indicated by the literature review, include [141–144,150,162]:

- common value system developed and adopted collaboratively and then respected by the academic community;
- understanding and acceptance of the fact that quality improvement is a continuous process;
- commitment and an openness attitude to change;

- cooperation in teams for improvement projects.

Trust can constitute one of the elements of the university's value system and the mechanisms of its generating, progressive building and strengthening should be incorporated into the system of supporting the development of cultural/psychological elements of quality culture at HEIs.

d. Areas of actions

For the quality culture to blossom in the areas of teaching and learning the actions should favour a partnership approach of the involved parties, empowerment of the participants of the educational process and their ownership of teaching and learning processes [150]. A partnership approach requires conviction that all the educational process participants are equal contributors, especially in the times when a further paradigm shift—the transition from teaching to learning—is expected [162]. Over recent years, higher education policy initiatives across many countries have highlighted the importance of students' active engagement in their learning, and the benefits to be gained when students play an active role in shaping and enhancing their learning experiences. "Student engagement" has become a core aim for the sector and, increasingly, is being linked to ideas about students' roles as partners in their higher education communities [163]. Engaging students and staff effectively as partners in learning and teaching is arguably one of the most important issues facing higher education in the 21st century [163]. Example actions favouring the development of partnership involve emphasising the benefits of collaboration or forming interdisciplinary and multi-stakeholder teams. An interesting example of the latter is the publication edited by Nygaard [164], which required each chapter to be co-authored by a student as a concrete example of the teacher-student partnership. Other example is the pedagogical framework for learning developed at Laurea University of Applied Sciences in Finland, called Learning by Developing (LbD). The main goal in LbD is to produce new knowledge for all partners of the collaborative learning process i.e. students, teachers and working life partners and in some cases the customers. In this approach the teacher's position and role is changing towards a transformative leader in an expert organization and its multidimensional-networked activities – a long way from traditional lecturing and course delivery. According to Laurea's pedagogical strategy, students are treated as junior colleagues, and the competence development happens in authentic, networked collaboration. [165]. Similarly, in the DEEP project (Documenting Effective Educational Practice) run by a number of US higher education institutions the emphasis was put on stimulation of student engagement and strong community-building around shared experiences, values and norms.

For the educational processes to contribute to the development of quality culture their participants need to develop a strong sense of ownership for the processes and effects of teaching and learning and to feel empowered to shape the academic environment in a way which makes it more enabling to address their educational goals and needs [162]. Manifestations of owning the quality enhancement process by the academic staff is visible for instance in their willingness to professionalize their teaching skills [166] or perceive teaching and learning as a shared responsibility [167]. Empowerment is essential for changes to occur; therefore, the employees need to develop their readiness to make decisions and to solve problems appropriate to their levels in the organisation [168]. This can be built for example by granting the faculty sufficient autonomy over choices which are within their area of expertise. For the teaching faculty, this means autonomy over the choice of teaching methods, developing and implementing teaching innovations or initiating educational improvement projects.

Providing incentives and structured, focused support to enhancing empowerment, partnership and ownership over teaching and learning processes can form strategies aiming at the increase of the level of trust between key players of HEIs and thus contribute to the enhanced sustainability of the developed quality culture. Strategic support of these three aspects is an example of a top-down approach, but manifestations of empowerment, partnership and ownership should be visible in bottom-up quality culture-enhancement initiatives and projects. Therefore, it is important to remember the risk of over-formalizing the support structures, because as EUA's Quality Culture Project has shown [141], "centralised strategies ensure the uniformity of efforts and their compatibility with the

institutional mission, yet are less inclined to generate ownership for quality processes on any other level than the management's" [152]. Therefore, in order not to share the fate of accreditation-related processes which often turned out to be too bureaucratic and did not lead to developing ownership among academic staff [162], it is important to develop strategies which assure a balanced approach, thus avoiding excessive formality. It is not enough to "involve" stakeholders or "let them participate", they need to see themselves as a part of the HEI's quality culture [152].

e. Communication and leadership

The proper application of the proposed novel model will trigger the need for increased communication in universities and engaged, professional leadership in the process of introducing quality-oriented changes. Professional leadership and effective communication contribute not only to the creation, but also to maintaining an appropriate level of quality culture [162]. The effects of reforms and changes aimed at improving the quality culture will depend then on the professionalism of university leaders in the process of change, their leadership style and commitment. The implementation of thorough quality-oriented changes requires constant communication, which is designed to soothe everyday fears of people affected by changes, explain reasons and justify decisions. The bigger transparency of these decisions, the greater the understanding of the recipients and the opportunity to gradually build trust. Therefore, the need for wise leadership and intensive, professional communication accompanying the introduction of quality culture improvement projects seems to be crucial in building awareness about new opportunities and attitudes that can constructively support the quality-oriented changes. Leest et al. found out that in the good practice programmes, it was leadership that was able to create a feeling of ownership of the quality care among teachers achieved through recognition of teachers as professionals and making teaching and learning a shared responsibility [167]. The most successful leaders in enhancing the quality culture were those individuals who were able to provide convincing narratives on the purpose and effects of the intended changes, unite potential opponents, or establish a professional discourse on teaching and learning [162]. Also "leading by example" had the power of boosting the leader's credibility and acceptance of change [162]. The good practices also included low thresholds for communication and informal communication. Open communication including students, teachers and management should be prevailing. It should also favour respect and collegial feedback, and it should leave room for making mistakes. Formal as well as informal communication should be focused on the quality of teaching and learning and be based on a shared vision of high quality teaching and learning [167].

In summary, given all the listed elements of the model are present and implemented with care, commitment and strategic edge, the efforts performed by students, academic faculty and institutional administration representatives including authorities should result in the development of a university's trust-based quality culture that not only uses trust as its foundation, but also transforms it into loyalty of the university's key stakeholders and the reputation of the HEI.

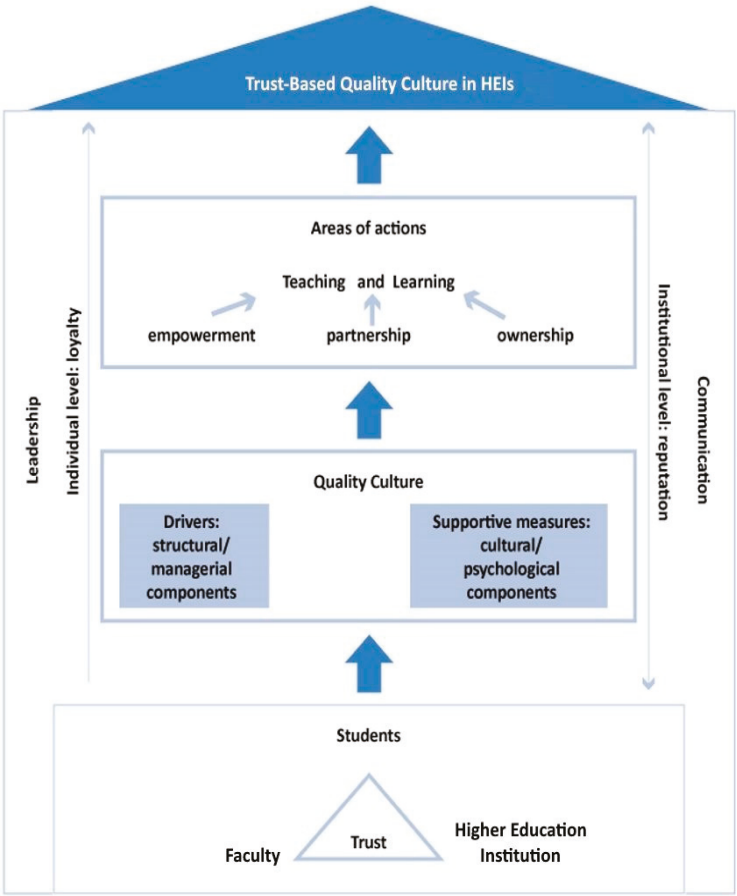


Figure 1. Trust-Based Quality Culture Conceptual Model for HEIs. Source: authors’ own work.

7. Conclusions

Wals [33] underlines that higher education institutions are beginning to make more systemic changes towards sustainability by re-orienting their education, research, operations and community outreach activities all simultaneously or, which is more often the case, a subset thereof. They are doing so amidst educational reforms towards efficiency, accountability, privatization, management and control that are not always conducive for such a re-orientation. The Authors of this paper believe that all these above-mentioned movements, in order to be successful and effectively lead to more sustainable organization development, need to be based on trust that gives an important foundation to the quality culture development. Trust could lower the resistance to change, create more loyalty and improve reputation of HEIs and through the quality culture development prepare the HEIs for the further engagement in organizational changes leading to more sustainable development. It could give the basis for the changes of traditional attitudes of many universities relying on Newtonian and Cartesian mental models and make them more open to the management approaches focusing on human factors.

Higher education institutions are in the process of constant change and need to grow their readiness for ongoing reforming. The proposed Trust-Based Quality Culture Conceptual Model might

be used as an instrument guiding the change process. It presents the interplay of trust and quality culture elements in HEIs. It identifies the interrelations of their key representations and can also constitute a reference point for any HEI to conduct an in-depth inquiry process or reflection allowing for a better contextual diagnosis of the stage where their HEI is in the process of building the quality culture based on trust. Nowadays, quality culture is seen as the most holistic approach to perceiving quality in a higher education context [102]. It builds upon the achievements of QM, QA, academic ethos, traditions and convictions present at HEIs, thus showing its uniting role for the structural and managerial as well as the cultural and psychological components of a university [141]. The presented model recognizes the growing role of trust in the process of QC development and assumes that when trust is properly nurtured and developed between key stakeholders, the quality culture is more sustainable. As a result, it may contribute to the creation of an empowering academic environment that supports the pursuit of goals such as increased student and faculty loyalty and improvement of HEI's reputation. A systemic approach to developing a quality culture based on trust seems to be an option for getting better prepared for the organizational and mentality changes that are continuously on demand [169]. Therefore, a better understanding and use of the knowledge about the interplay of QC and trust can bring additional valuable input for the process of defining the vision of HEIs in the XXI century.

Stemming from the systematic critical literature review, the conducted inductive scientific process of building the conceptual model has allowed us to identify the critical elements of the new Trust-Based Quality Culture Conceptual Model. However, a detailed research into the interplay of its various elements, the analysis of the directions and strengths of relations of the identified variables, as well as an elaboration on the ways of nurturing and maintaining the various elements of QC based on trust are required for continuing the scientific exploration of this complex phenomenon.

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Article

Trust at a Distance—Trust in Online Communication in Environmental and Global Health Research Projects

Jasper R. de Vries ^{1,*}, Séverine van Bommel ^{1,2} and Karin Peters ³

¹ Strategic Communication Group, Wageningen University, PO Box 8130, 6700 EW Wageningen, The Netherlands; severine.vanbommel@wur.nl

² School of Agriculture and Food Sciences, The University of Queensland, Gatton, QLD 4343, Australia

³ Cultural Geography Group, Wageningen University, PO Box 47, 6700 AA Wageningen, The Netherlands; karin.peters@wur.nl

* Correspondence: jasper.devries@wur.nl; Tel.: +31-(0)-317-482-456

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Abstract: Online collaboration to deal with (global) environmental and public health problems continues to grow as the quality of technology for communication improves. In these collaborations, trust is seen as important for sustainable collaborations and organizations. However, face-to-face communication, which is often lacking in these contexts, is seen as a pre-requisite for trust development. Therefore, this paper aims to explore empirically which factors influence the emergence of trust in the early stages of online collaboration. Using the relevant literature, we conducted a series of interviews around projects in the field of public health and the environment on the interface between science and practice. The results show that trust does develop between participants. This trust is strongly influenced by perceived ability and integrity, fostered by reputation, third-party perceptions, and project structure. In these contexts, these types of trust facilitate collaboration but are also influenced by a wider set of aspects such as power, expectations, and uncertainty. However, from the results we also conclude that online collaboration does not create benevolence and a shared identity, thereby limiting further trust development and leading to less strong relations. Strong relations, however, are deemed important to reach creative and innovative solutions and long-term sustainable collaboration and organizations.

Keywords: trust; collaboration; virtual teams; integrity; ability; online

1. Introduction

Many of the world's most challenging environmental and public health problems (such as climate change, loss of biodiversity, and the invasion of pests) cross national borders and disciplinary divisions and require experts from both practice and science [1–3]. Because of this international, interdisciplinary, and transdisciplinary character, (global) public health and environmental problems are transboundary in nature and thus complex to deal with, as they challenge organizations and institutions to work with people who are best suited for the job irrespective of their geographical location [4]. To facilitate collaboration between partners in geographically dispersed settings, online collaboration is seen as vital [5].

These developments take place in the broader development of an increasing role for online communication for environmental conservation and improving public health, such as digital conservation, Nature 2.0, and e-health [6,7]. There is a trend whereby people increasingly rely on new ways of communication to coordinate tasks and build relations within and between organizations of all sizes and natures, often in different physical locations and time zones with diminishing physical

interaction [8]. Existing and emerging new technologies like smartphones, e-mail, video conferencing, FaceTime, or Skype all enable communication at a distance [9], thereby solving the (potential) logistical problem of meeting physically and reducing the travel time otherwise required. As the quality of technology for communication improves, online collaboration continues to grow [10]. In the literature, these types of collaboration are referred to as online collaboration, virtual teams, or collaborations with limited physical interactions. In the remainder of this paper, we use the term online collaboration for this, by which we mean any communication online in text, visual or vocal.

However, collaborating with and in such geographically and professionally diverse groups is also challenging. Group members often hold strongly diverging perspectives on the issues at stake, the future solutions, their own role, and the roles of other group members [11]. Long-term sustainable collaboration is therefore complex and uncertain [12]. To deal with this complexity and uncertainty, trust is crucial for online collaboration.

Trust as a foundation for collaboration and broader social order spans many intellectual disciplines and levels of analysis [13–15], such as social psychology [16–18], sociology [19], political science [20], economy [21], anthropology [22], and organizational behaviour [23]. Notwithstanding the differences between the fields and various ways of conceptualizing trust, all scholars emphasise the key role played by trust as a foundation for sustainable organizations and collaboration [24,25]. More specifically, in all social domains, trust in the relations between parties is considered critical for sustainable collaboration for dealing with complex problems [26]. It is indicated that trust needs face-to-face interaction, also referred to as ‘touch’ [27]. But it is exactly this ‘touch’ that is often lacking in computer mediated communication (CMC) and online collaboration. Consequently, the literature on trust in CMC shows diverging and sometimes contradictory results [28–30]. Therefore, our main research question is: What factors influence the emergence of trust in early stages of online collaboration?

In studies on the growing importance of online collaboration and interaction for dealing with (global) environmental and health issues, trust is regularly mentioned as an important concept [31]. Trust aspects mentioned include, for instance, the importance of mutual interpersonal trust in cases of extreme events like earthquakes [32] or in relation to the data shared [33,34]. In addition, others mention trust while focusing on social relations and, for instance, social capital [35]. Despite this attention, empirical studies focusing in-depth on the role of trust in such contexts are lacking. With this in mind, we analyse the type of trust between individuals in organizational settings that can develop in such collaborations. Then we analyse the way in which this type of trust can develop. Our argument is situated within recent directions in communication research that attempt to gain insight into online collaboration for sustainable collaboration and organization [36]. Our brief outline of the theoretical premises of trust explains trust from a dynamic perspective. Reviewing literature across communication research and other disciplines, we discuss our dynamic trust perspective in relation to collaboration and uncertainty. Advancing our argument, we explore trust in virtual collaboration settings in practice and discuss the further implications for trust research and sustainable collaboration and organization.

2. Theoretical Framework

2.1. Collaboration and Uncertainty

Collaboration is the process of individual entities acting together for mutual benefit, often (but not necessarily always) achieving a partially shared goal or common goals, as opposed to working alone or in competition with each other [37]. Collaboration through computer mediated communication (CMC) complicates this process due to a number of disruptive effects [36]. Disruptions on the one hand relate to the geographical dispersion of team members which can result in differences in common knowledge, specifically related to the situational and contextual factors that impact colleagues [38]. This may lead to misunderstandings and unexpected responses. On the other hand, disruption in CMC based collaboration can relate to interpersonal relations (such as affect and cohesion) and the

end products aimed for in terms of quality and form [39]. In addition, it may impact the way social and task orientation may be interpreted [36]. As such it is argued that interpersonal relations develop slowly in these contexts [40], as collaboration through CMC is accompanied by uncertainties and risks.

Uncertainty and risks in collaborations can on the one hand be caused by contextual factors such as political change, economic development, social and natural changes at global, national, and local level [41]. On the other hand, interpersonal factors such as perceptions about one's ability to perform a task, one's integrity, and more relational aspects such as affection and benevolence may lead to uncertainty [42], especially as these aspects may all foster diverging perspectives on the problems at hand and acceptable solutions. Another possible cause of uncertainty in collaborations on the interpersonal level is the tension between self-interest and collective interest [12]. Participants who collaborate often have a mutual interest in achieving the collective objectives of the collaboration. Yet in many cases, there is also tension between collective interest and individual interest. An individual may be tempted to act in a way that benefits him/herself or his/her position, and this action can harm others in the collaboration. These conflicts of interest may encourage opportunistic behaviours when combined with a lack of internal control, such as a sense of morality, or a lack of external control, such as monitoring, threat, or punishment [43]. This then may threaten the sustainability of the collaboration and lead to unreliable and unpredictable actions by others, thereby intensifying uncertainty [44]. This is especially the case in contexts of collaboration through CMC as day-to-day and face-to-face interactions are absent, thereby limiting the opportunities to deal with these dynamics. To deal with this multifaceted uncertainty, trust is often mentioned as a mediating concept [45].

2.2. Trust and Trustworthiness

Many theories of trust emphasise that trust is most relevant to behaviour in situations with high uncertainty and conflicts of interest [46]. In these contexts, trust encourages the initiation of mutually collaborative relationships [47,48] and brings greater relationship commitment and satisfaction [49,50]. Most scholars agree that trust is needed to cope with uncertainty in situations where parties are (inter)dependent on others. In other words, trust is seen as a foundation for collaboration and essential to initiate, establish, and maintain social relationships [18].

Underlying these positive statements about trust are a wide range of studies across disciplines that have generated many insights into the functions of trust and various related conceptualizations. These conceptualizations all have different, sometimes conflicting, underlying assumptions about what type of construct trust is [15,51–53]. Despite these debates, a general distinction can be made between theories referring to trust as a behavioural intention—associating trust with choices made (e.g., [47,54,55])—and trust as a psychological state—associating trust with aspects like expectations, affect, and intentions [56–59]. Although these studies give interesting insights into trust, they pay limited attention to the evolution of trust through and in interaction [60–62]. Consequently, these studies fail to take into account the dynamics that play an inevitable role in collaboration settings.

From a dynamic perspective, trust can be conceptualised as individuals' expectations about the thoughts, behaviour, and decisions of other people. These expectations are constantly balanced by past experiences and what one knows about the other [61,63,64]. The image of the other is constructed on the basis of accumulating events and the interpretations of these events, mutually influencing one another [65]. Given this image and its relation to present-day events, individuals may experience uncertainty, risks, control, and vulnerability. These experiences influence not only the perspective on the past, but also expectations about future events, actions, and decisions in relation to the particular trust situation. In this process, the collective or common history and interactions that build upon one another over time strongly influence trust development.

Central to our conceptualization of trust dynamics is the image that the trustor has of the trustee. On other words, does the trustor find the trustee trustworthy. It is often argued that trustworthiness precedes trust [15,66]. In relation to this, Mayer et al. [15] argue that trustworthiness can be analysed by looking at the attributes of the trustee. If we look more specifically at these attributes in trust

research, three core characteristics have been identified that influence trustworthiness and further trust development, namely: ability, integrity, and benevolence [15,67–70]. Following Mayer et al. [15], the aspect of ability indicates the competence of collaborating partners to perform their tasks and role, and relates to knowledge, skills, and expertise. Integrity focuses on a general feeling of the reliability of the collaborating partners about agreements, for example, to deliver results on time and up to standard despite the differences in cultural or organizational background. The benevolence of collaborating partners indicates the aspect of resisting the temptation to engage in opportunistic behaviour and harm the interests of the collaboration and/or other collaborating participants for personal gains—aspects that might become particularly evident in situations where conflicts of interest are at stake.

Ability, integrity, and benevolence are important attributes of trustworthiness, influencing the direction and character of further trust development, and each may vary independent of the other. However, despite the fact that the different attributes are separable, they are strongly interrelated. In trust dynamics, these different attributes may possibly thus all play a role, resulting in the development of different types of trust (e.g., being to a greater or lesser extent based on integrity, ability, or benevolence). Through trustworthiness and consequent trust development, these attributes influence future collaboration, perceived trustworthiness, and trust. Consequently, studying the role of trust in online collaboration should focus on trustworthiness, the underlying attributes, and further trust development.

Starting from our main question: which factors influence the development of trust in early stages of online collaborations? We can now add three research questions based on our theoretical framework for further empirical investigation:

1. What are the experiences with perceived trustworthiness, and underlying attributes?
2. How did perceived trustworthiness influence trust development?
3. How did these experiences influence collaboration?

3. Materials and Methods

This research aims to investigate how trust helps to cope with (inter)dependence and uncertainty in online collaboration. The intersubjective meaning of trust, interdependence, and uncertainty are starting points and require a qualitative-interpretive approach [71]. Moreover, because of the limited existing knowledge on the factors influencing the emergence of trust, a more exploratory approach was deemed suitable [72]. For our study, we selected research projects in the field of environment and health, on the interface between policy and science. We selected these settings as they are comprised of participants from various interdisciplinary backgrounds, leading to complexity and uncertainty in collaboration, and in which online collaboration was the main *modus operandi*. Interviewees were selected on the basis of long-term experience with projects in collaborations with online collaboration. They were therefore able to reflect on experiences from several projects. Another criterion for the selection of the interviewees was their experience with participation in projects that heavily relied upon communication technologies. Additionally, participants were selected through snowball sampling.

The data were collected through semi-structured interviews with 18 participants. The interviews were semi-structured along a list of questions and topics. This set-up was chosen to allow interviewees to share their own perspective on collaboration and the role of trust [73]. The interview topics were based upon theoretical exploration and focused on: (1) experiences with trustworthiness and underlying attributes; (2) influence on trust development; (3) influence on collaboration. In addition, interviewees were asked to share insights or information that they thought were relevant for the research. The projects under study were all government (including universities), or semi-government led projects. The participants, therefore, were researchers, policy advisors, and project managers working for a semi-governmental research institute (9), university (6), or local or national government (3), and had managerial positions in research-focused projects (11) or in policy development and implementation-oriented projects (7). The interviewees were all based in the Netherlands, and 10

were male and 8 female. The interviews were conducted in Dutch, took about an hour, and were audiotaped and transcribed. Afterwards, the transcribed interviews were sent to the interviewees for verification. The number of interviewees was based upon data saturation: we stopped interviewing once we noticed that no new codes could be added to the raw data [74].

The interview data were analysed according to the inductive codes-to-theory model described by Saldana [75], supported by the qualitative data analysis software Atlas.ti. In a first round of coding, we assessed whether interviewees mentioned types of trust, trust development, and aspects influencing trust (ability, benevolence, integrity). Through category building, we then grouped the initial codes into themes and concepts that related to ideas of trust development in online settings. Finally, we examined how the themes and concepts interrelated and allowed us to inductively identify different mechanisms through which trust emerged and developed in these online settings.

This interpretative methodology [71,76] provides insight into the multiple meanings of trust in different unique settings. Our point of departure was that meanings and interactions are context specific. Thus, the paper does not aim to establish causal relations or quantitative generalizability. Rather, this paper shows the “how” of trust emergence and development in online settings—insights that can be used to explain other cases and analyses of trust development in online collaboration settings, by focusing on both differences and similarities.

4. Results

In this section, we discuss the results in relation to the collaboration process. The first section of the results explores how collaboration in these professional settings started and how the interviewees dealt with various uncertainties that come with collaboration. The second section focuses on the process of collaboration and how collaboration developed over time.

4.1. Starting Collaborations

At the start of collaborations, interviewees expressed a strong general trust basis for collaboration. One of the interviewees explained about starting a new public health study: *“I am someone who is quite fast to start with a 9, that is how I usually begin, I think. Very trusting, probably naïve. That is how I begin, and it must take a lot, almost, to think: Ho . . . something is not right.”* Another stated: *“I assume that everyone gets out of bed in the morning and thinks: ‘I will act conscientiously...’ well maybe not consciously thinking that but . . . I don’t assume people get up in the morning and think: ‘look who I can deceive (today)’.”* These quotes reveal the general feeling of trustworthiness towards the collaboration partners that we encountered among the participants at the beginning of projects. Looking more closely we see that, from the start, this feeling is influenced by the structure and content of the project.

A closer look at the structure revealed that interviewees were of the view that, at the beginning, a clear and familiar structure defined the initial collaboration and created initial trust, especially as people had to get to know one another, had to discuss future tasks and planning. In addition, it was mentioned by several interviewees that the structure of the collaboration helped to deal with the other important aspect, the content. Particularly as the content of a project could be new to some members, it was felt that clearly structured projects could help to deal with content-related uncertainties. Or as one project coordinator on a project about air quality in urban areas stated: *“The structure of the project but also the content, it’s very important. It’s about the predictability, you know what you can expect from others.”* A clear structure and related expectations, it is argued, defines the further development of the collaboration.

Through the structure, tasks, roles, and responsibilities could be negotiated. In many projects, a virtual consultation was specifically set up by the different participants to get a clear picture of the various tasks. The virtual consultation had an additional function, as one of the interviewees from the public health sector stated: *“It helps to inform everyone about the direction (of the collaboration), but not only that, on one side people feel the need to contribute (to decision making in the collaboration), but the consultation also focuses on the time schedule and tasks, a kind of a back-up. It is clear, and it is agreed upon,*

and it helps that everyone knows about the whole picture.” This quote illustrates that the consultation round clarified the contribution and commitment of all members. *“You know what you can expect from others, if they can deliver, instead of wasting time to double check, and flogging a dead horse.”* Thus, tasks and responsibilities are discussed, and this helps participants to judge people’s ability, thereby helping to create a feeling of trustworthiness. In addition, the consultation round was experienced as a transparent, clear set-up to start the collaboration; this is seen as highly relevant as it helps to facilitate initial trust. Some participants expressed this need for trust at the initial stage of the collaboration to kick start the process: *“You can feel the energy, that helps to have the trust at the very beginning, it’s really necessary to have that ‘click’ that we are all going for it, that we can achieve it.”* All in all, the structure not only clarified tasks, roles, and responsibilities, but also strengthened the trustworthiness and trust development that smooths collaboration.

The second important aspect at the beginning of working together is the content. All our interviewees were focused on projects on the interface between science and practice in the fields of public health and environmental management. In terms of content, many interviewees considered their experience in online collaborations to be very expertise and knowledge driven. All the projects in which the interviewees had participated so far had utilised up-to-date scientific knowledge to develop and implement health and environmental policies or issues, often in collaboration with local and/or central governments and other knowledge institutes. One of the project managers from an environmental science department explained his work: *“We work at the interface between policymakers and scientists ... I translate questions into concrete research projects and translate knowledge into answers.”* This focus on content formed a first basis for collaboration. This was made clear by the interviewees as, despite the different backgrounds, the focus on content and the related expertise were stated to be a basis for trustworthiness: *“Sure, people have the expertise, the papers so I trust them for it.”* And, if this is the case: *“you notice quickly, are people content driven or just interested in being with the group... these leave quickly.”* The focus on content therefore works as a social control mechanism, limits possibilities for free-riders, and thus supports trustworthiness through focusing on ability and integrity.

So, our findings show that, by focusing on structure and content, collaborations start with trustworthiness based on integrity and ability and not too many uncertainties, fostering further trust development.

4.2. On the Way—The Collaboration Develops

After the initial stage was set, other factors started to play a role in the projects, influencing trust. Reflecting on the process of different projects, interviewees discussed their perception of low power inequality and hierarchy. These dimensions created situations in which it was possible to discuss openly and express uncertainties, making collaboration easier and contributing to trust development. As one of the interviewees from the national health organisation stated: *“I personally have no one using their rank on me, ... yes of course someone will make the final decision ... it’s all done with consultation and accepted by others. I guess it’s the kind of organization we have here, it could be different in other places, I am not sure.”* In other words, agreement and equal relations seem to be part of the working culture, a culture that is partly shaped by the fact that the participants know one another already from earlier projects and have positive experiences regarding their expertise and collaboration style. This contributes to positive expectations and therefore trust development.

More specifically, interviewees mentioned the competence of others in the collaborating networks as a dimension of trust, as illustrated by the following quote from a research institute employee: *“Of course it is relevant, it’s about investment, you invest your time and energy in it (the collaboration), and you need to know who are these people, of course they are selected for their competence first, what you don’t want is someone just freeriding on the rest.”* This shows not only the importance of perceived competence in these types of projects, but also more specifically that competence is a prerequisite for collaboration and trust. The competence of others is also expressed in other parts of the interviews. Many interviewees expressed trust in the ability of other participants who possess the knowledge to contribute to the

collaboration as an expert or specialist. This feeling of trust developed more strongly during the process based on positive experiences, a municipal health officer reported: *"I get (scientific information) ... most often from my colleagues here, but sometimes from people outside our organization, ones who are specialised in that field. Working with these people for a longer time helps me, you know what to expect."*

When questioned about how this trust in the ability of others was obtained, interviewees from a health and environmental knowledge platform frequently mentioned, in addition to experience, general trust in colleagues or people from familiar professions (health and environmental scientists), or their reputation within the respective profession or organization: *"Yes, there were these board members in a project I last did, you don't have to worry about them not keeping their word [...] From previous experiences, I know they simply deliver, you tell them that things need to happen before a certain time, and you can count on them that they will deliver on time."* However, this did not mean that everything had to be executed according to plan for trust to develop. *"Yeah, you talk about the tasks you intended to fulfil, but also the tasks you could not fulfil, you have to communicate clearly about ... it's also about being honest and transparent in the way you work. That I find very important to be able to work together."* This shows that trust is perceived as a combination of delivering what is agreed upon, showing integrity through communicating, being honest and transparent about what one is doing so others can adjust their expectations throughout the project.

In relation to transparency, many interviewees indicated that there is a mechanism of 'reputation' in their professional circle. People may know one another, and a bad reputation for opportunistic behaviour may be harmful in the future for individuals who have displayed such behaviour. It was therefore perceived to be in everyone's own interest to display collaborative behaviour in projects to contribute to the projects' objectives. One of the civil servants working on health policies even explained that he uses his reputation for working in projects as a means to gather a team: *"I make sure that I can get the people involved that have the same goals as the project, but you can hear from others if they are competent or not, or have the time to invest (here in this project), I would still like to know more about that, you go around asking if anyone can recommend someone who is good, someone you trust."* This shows again that reputation functions as a type of social contract, as a back-up for not abusing the trust of others. This means that, even without much face-to-face contact, the interviewees tend to judge their partners positively because of common characteristics and interests in relation to the content and taking third-party judgements into account. In many cases, these judgements were re-emphasised by personal positive experiences, contributing to trust development.

Furthermore, many interviewees identified the perceived absence of conflicts of interest among participants as a relevant factor in trust development. This was underpinned with the argument that interviewees considered other participants as experts who enjoyed their work of producing and contributing their knowledge to the project. As a project manager from a research institute stated: *"You notice it very quickly, are people here just to be interested in being with the group? And further ... not doing anything, that happens too but not often, but they go quickly too because ... people notice. But all in all, most people are there because they want to, they all find it interesting to be part of this ... and that creates confidence."* This quote shows that participants are part of the collaboration mainly because they want to participate in collaboration relating to their own interest or expertise. This does not mean that there were no tensions at all, or that the perceived absence of conflicts of interest did not change during the collaboration. Various interviewees articulated the importance of trust in dealing with possible conflicts of interest, as illustrated in the following quote from a research institute employee: *"It's ... you don't want to let people down, and you don't want them to think you have some secret agenda ... that I was using them, but yeah, of course the best way is to talk it out, make it explicit."* Here, the trust people placed in the interviewee quoted made the interviewee perform his task, made him communicate and start a conversation.

All in all, the interviewees were rather positive about the relation developed through collaborating online. However, this does not mean that face-to-face interaction did not play a role at all. In cases where a misunderstanding or a possible conflict was emerging, face-to-face interaction was deemed

important. For instance, in a project between the public health organization and an environmental research institute, a possible conflict emerged over a misunderstanding of data: *“But there are situations, you know. You can’t do that on the phone. That is the case then with trust ... they know I am not like that.”* And the interviewee explained further: *“It was that time I had a project (with an institute for environmental science), it felt so strange to email and call back and forth, and it only got worse. I decided, talked to my supervisor, I said I needed to go there, the headquarters to sort it out. That was the only way ... but fortunately, I don’t have to do that too often.”* So, although not often needed, physical interaction in the form of a meeting or conversation is seen as important. It also shows a willingness to put effort into the project and personal relations.

In addition, many interviewees argued that face-to-face interaction is useful for facilitating further technology-aided communication, by lowering the perceived threshold to contact each other: *“Once you met someone, you know their style. Is he more formal or more informal, does he have the same type of humour? You can adjust your communication, and you have more confidence that you are doing it the right way. I don’t know, maybe it’s just me. I feel like it’s easier for me to contact them if I know them personally.”* In other words, face-to-face interaction helps people to get to know each other better, get more personal insights, and it is sign of investment of time and effort, helping to find the right style and form of communication, creating a basis for further trust development at a distance.

5. Discussion

Starting from the notion that the relation between trust and different forms of interaction seems to have become even more relevant with the current and emerging communication technologies [8,77], we turned away from (semi-)experimental settings because we aimed to explore empirically the emergence of trust in online collaborations. Following this aim, we posed the question: which factors influence the development of trust in early stages of online collaboration? Exploring this question through in-depth interviews, discussing the experiences of our interviewees in projects we found several interesting insights for analytical discussion and future studies both more in-depth as well as studies allowing for empirical generalization.

The results from this explorative study show that experiences of perceived trustworthiness are especially fostered by integrity and ability, and less by benevolence. These experiences foster further trust dynamics that are strongly influenced by reputation and earlier experiences and are characterised by trusting the other to perform the job within the project. In addition, the strong focus on performing tasks, reputation, and the underlying ability and integrity experiences strongly influenced the online collaboration. In online contexts, the results show a particularly strong focus on: (1) the structure of the cooperation to bridge the differences between the stakeholders involved; (2) the process to deal with the technical and practical complexities that come with collaborating in online contexts; and (3) the content as shared elements that bind the stakeholders together in which reputation plays a vital role. The focus on these factors and the strong role of ability and integrity mutually reinforced each other as the collaboration continued, fostering a more functional form of trust and limiting the development of trust based on benevolence and identity.

The role of trust in online collaborations has been the topic of studies before, ranging from studies in virtual teams [8] to CMC [36]. These lines of inquiry have a strong experimental character or only mention trust as one of the many important factors playing a role in social relations. To contribute a clear added value to these studies, we stepped away from top-down interventions and experimental methods and explored in-depth the emergence of trust in real-life interactions. In line with earlier studies, we expected to find insights relating to cultural backgrounds that characterise real-life interactions between geographically dispersed stakeholders [38]. However, in our case, the cultural background hardly played a role in trust development and online collaboration. What did play a role was the professional and organizational reputation of involved stakeholders. The strong role of reputation could, on the one hand, be explained by the professional character of the collaboration in which scientific reputation within a certain domain or profession was found to be key [78]. This shows

that the type or character of the cooperation can have a strong influence on the type of trust developed, taking shape in the strong influence of integrity and ability on the character of trust developed. In the field of CMC and online collaboration, there is, thus, a need to move beyond discussing trust in general terms and to be specific about: (1) the character of trust; and (2) the type or character of the collaboration. Increased precision is highly relevant to elucidate further the role of trust in online collaboration and CMC [28,36], especially as in real-life settings, as opposed to controlled (semi-)experiments, different online platforms are used interchangeably and the character of collaborations may vary over time. From these results, we propose that future research should focus on the interrelation between types of collaboration and the character of trust in these contexts.

Looking more closely at the role of structure, process, and content, we see that these helped to facilitate trust development through the perceived trustworthiness of other participants, based on their professional track record, personal past experiences, and third-party experiences. In these experiences, ability and integrity to fulfil tasks on time and up to standard particularly tend to play an important role. The role of these three factors is very interesting, as the development of trust is often viewed as incremental over time, beginning at a low level at the start of collaborations (but high enough to be able to initiate the collaboration) when there are many unknown factors and, therefore, a relatively high level of uncertainty [16,55,57]. Our research thus shows that in online contexts trust development is not so straightforward and might develop differently than in face-to-face contexts in relation to a clear collaboration context. Future research should elucidate this further, by taking a longitudinal perspective focusing specifically on trust development and related dynamics.

The existence of this strong role of ability and integrity is seen as relevant for the initial stage in order to kick start the collaboration, especially as this helps in the reflexive iterative process of displaying actions that confirm expectations, helping further trust to develop. The kick-start function of trust for further collaboration is seen as important because of the absence of benevolence in trust development. Following Mayer et al. [15], the absence of stronger trust relations could be explained in terms of benevolence possibly requiring more time, being more intense, and needing frequent interaction to emerge in collaboration. In addition, benevolence is estimated to be less needed when the level of conflicts of interest is low [44], as was the case in our online collaboration cases. Despite the fact that other elements like openness and expectations started to play a role and influenced trust dynamics, this did not lead to stronger trust relations. Scholars focusing on trust development in professional environments suggest that benevolence is often absent, as this requires participants to have a collective identity, to commit to shared values, and to work in the same location or neighbourhood [79]. These, and our, findings are contrary to studies focusing on online communities that show that these groups have a strong basis of shared identity, commitment, and related mutual trust [80]. Combining insights from both worlds would be an interesting future line of inquiry as, in our explorative case, it could be seen that, in situations where conflicts emerged, such values were highly relevant and face-to-face contact was needed to strengthen relations.

In relation to dealing with global environmental and public health problems, trust is seen as vital [81–83], especially as environmental and public health problems are often regarded as wicked problems requiring collective action by a diverse group of stakeholders but lacking clear-cut solutions from which all could benefit [84]. To foster trust development, face-to-face interaction is seen as a prerequisite in these contexts. With the emergence of online collaboration and developments such as digital conservation and e-health, the reality is that face-to-face interactions are often replaced by online interactions [7]. Our results show that in these contexts trustworthiness and trust development are much more ability and integrity driven, and elements such as identity, affection, and benevolence play a less clear role. Potentially, this limits the ability to deal with complex problems and come to innovative solutions, as this requires strong relational ties between involved stakeholders [85,86]. However, to get more insight into how different trust types in online collaboration influence the solvability of global environmental and public health problems and wicked problems remains unclear and is a topic for further research and debate.

The aim of this study was to gain a better understanding of trust emergence and development in online collaborations for dealing with global environmental and health problems. Our study shows that trust development in these contexts is characterised by the type of collaboration and is strongly influenced by aspects of integrity and ability. For professionals in these settings, this means that familiarity still plays an important role, also in online settings. We trust people we know or who we have been told are trustworthy by familiar others.

In online collaboration projects, our study shows that this means subsequently managing these relations by focusing on structure, process, and content. Moreover, it shows that professional networks and reputations are key to facilitating trust in these contexts. However, if collaboration requires stronger trust relations, innovative solutions, or conflict resolution, online collaboration could benefit from strengthening relations through face-to-face contacts and strategies aimed at creating shared identities. Future research is needed to understand collaborations that are a mix of online and offline interactions. Studying trust in such processes would be highly relevant.

6. Conclusions

Dealing with global environmental and public health problems is a complex undertaking in which a wide range of actors are involved. Negotiations over the issues at stake and related solutions are more and more fostered by online means of collaboration, in which trust plays a vital role. Following these notions, we conducted an explorative study focused on the question: Which factors influence trust development in the early stages of online collaborations? Overlooking our findings we have to take into account the explorative character of this study, the limited number of interviewees included and projects reflected upon in this study. Based on this work, we can conclude that in the specific contexts under study trust started from a general trustworthiness towards the partners and developed over time. The perceived mutual trustworthiness increased through initial interactions that were facilitated by clear structures and processes. The structures created transparency and also helped people involved to deal with the often-complex content through which new positive experiences emerged that facilitated initial trust dynamics. In the continuing process, the low power inequality experienced and competence of actors gave rise to further trust development. Consequently, trust development was experienced as strongly based on professional reputation and antecedents such as integrity and ability, whereas shared identities and aspects of benevolence were lacking and needed face-to-face interactions. All in all, we can conclude that in our case of online collaborations, structure, content, and process played major roles in trust development. We can also conclude that, in these specific contexts, trust was experienced as strongly characterised by aspects of ability and integrity. In addition, we conclude that in the projects under study the focus on structure, content, and process limited further and stronger trust development based upon shared identity and aspects of benevolence, needing more face-to-face interactions to develop.

Exploring the role of trust in online contexts of (international) collaboration, our study showed interesting insights. However, due to the nature of our study no empirical generalizations can be made, but are analytical by nature [87]. Therefore, the results of our study should be seen as first insights, that are promising analytical threads for future large n-studies. Such studies are highly relevant in order to come to generalizations that foster further insights in the role of trust and the sustainability of online collaborations dealing with global environmental and public health issues.

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Article

The Strategic Hybrids of Water Supply Companies as an Effective Management Tool

Barbara Kozuch ¹ and Adam Jabłoński ^{2,*}

¹ Department of Human Resource Management, Jagiellonian University in Krakow, Stanisława Łojasiewicza 4, 30-348 Kraków, Poland; bkozuch@uj.edu.pl

² Scientific Institute of Management, WSB University in Poznan, Sportowa 29, 41-506 Chorzów, Poland

* Correspondence: adam.jablonski@ottima-plus.com.pl; Tel.: +48-606-364-500

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Abstract: The mechanisms of water supply company management have been dynamically evolving recently. This is particularly related to factors that regulate the functioning of companies in this sector. This applies both to embedding such entities in the legal structure, and the management rules at both the strategic and tactical-operational levels. It is increasingly important how decisions are made in the conditions of pressure, limitations, opportunities and threats that these companies, which create value for stakeholders, face. This way of making decisions is determined by the adopted model of business, strategy, business processes and strategic projects that create a kind of a strategic hybrid. The hybrid determines the effectiveness of water supply companies that operate in accordance with the rules of the regulated market.

Keywords: strategic hybrids; business model; strategy; business processes; strategic projects; water supply companies

1. Introduction

The business model of water supply companies is mainly based on the principles of ‘reasonable profit, reasonable costs and expected revenues’, but also takes into account the specificity of being public services.

This strategy is implemented by an adopted bundle of strategic goals, whose recipients are company stakeholders. From this perspective, business processes present a value chain, the result of which is a product (water) that is supplied in accordance with the adopted parameters described in the measurement system of water supply companies. Strategic projects, however, defined in the so-called project portfolio, mainly determine the investment dimension of growth and development of these entities. A special blend emerges that creates a management tool, that is the joint operationalization of the business model canvas, a strategy map, a process map and a project matrix for water supply companies. The aim of the paper is to identify the effectiveness of the principles of the operationalization of the strategic hybrids of water supply companies. This paper analyzes the strategic hybrids of several water supply companies based in Silesia with a diversified capital, resource and location structure. The authors argue that in order to achieve high effectiveness, water supply companies have to build and implement a consistent strategic hybrid.

The research problem discussed in this paper is as follows: The joint and consistent implementation of a business model, strategy, business processes, and strategic projects (in the form of a strategic hybrid), while taking into account risk management, affects the economic and social effects of water supply companies.

The occurring research gap is as follows: There is a small amount of scientific research into the use of a strategic hybrid in individual sectors of the economy, including water supply companies.

2. The Outline of Scientific Discussion

The issue of strategic management is currently a very dynamically developing area of science. Due to the use of various paradigms in it, it is interdisciplinary both in theoretical and practical terms. This all causes the multidimensionality of the issue, which should result in highly effective company management, taking into account sector specific conditions. The search for effective solutions applicable in business becomes a challenge for contemporary managers of modernly managed companies. A holistic, comprehensive and clearly exposed approach is thus required. The understanding of macroeconomic conditions and a given sector along with microeconomic conditions allows for the creation of effective management mechanisms. The authors would like to present the issue of the strategic hybrid of water supply companies in such a cognitive perspective.

The main purpose of the paper is to demonstrate that the use of a strategic hybrid model, that takes into account economic and social objectives, and at the same time creates the mechanisms of the effective management of water supply companies—especially those operating in the network environment.

A scientific goal is to identify a scientific problem and a cognitive gap. According to M. Lisiński, it can be stated that there will be two sources of scientific problems in management sciences. The first problem will be theoretical research related to the lack of knowledge about theory, undertaken within the theoretical trend. The second problem will be a theoretical discussion undertaken within the empirical trend. It constitutes a theoretical superstructure of practical problems. Therefore, it can be concluded that a scientific problem in management sciences will always concern a theoretical discussion and it will be a theoretical problem. “At present, the methods used to solve scientific and practical problems identified in organization management should be considered (...). A deduction method will be used to solve scientific problems in management sciences related to the lack of knowledge about theories that are undertaken within the theoretical trend. It is supported by a number of auxiliary methods and techniques belonging to formal sciences, including, for example, classification, modeling or deductive reasoning” [1].

In the paper, the abovementioned argumentation was adopted, based on which a scientific problem was presented. It is related to the fact that a key factor related to the development of water supply companies is the precise determination and assessment of mechanisms for the effective use of a strategic hybrid built from a business model, strategy, business processes and projects. A cognitive gap emerges from such a research problem, based on the fact that currently there is no scientific research and resulting inference related to the efficiency of strategic management systems using the strategic hybrid discussed, as well as key attributes that determine the conceptualization and operationalization of these systems in the efficiency criterion. In light of the achievements of organizational theory, efficiency is a superior category in relation to concepts, such as productivity, profitability, efficacy, and even rationality. In this context, efficiency can be understood as an input-output ratio, the ability to quickly adapt to changes, a measure of the organization's ability to implement strategy and achieve goals, and a tool for measuring effectiveness and efficacy [2].

The authors understand management efficiency as a set of rational actions, focused on dynamic decision making under the conditions of pressure, limitations, opportunities and threats guaranteeing that the company will achieve its business goals. A company will focus its attention on the efficiency of processes and the ability to permanent changes using a variety of management methods and techniques. The authors understand the mechanisms of effective strategic management as a set of principles and approaches to making management decisions, using the best possible tools, methods and management techniques.

Within the framework of theoretical assumptions related to solving a scientific problem defined related to the strategic management of water supply companies, an analysis was conducted aimed at embedding this problem in the theory of management sciences. In order to correctly identify a phenomenon occurring in science, it is important to refer to scientific discussions that determine the principles of the adopted, appropriate interpretation. According to J. Niemczyk, it is much easier to

build scientific hypotheses than verify them as scientific knowledge. It is much easier to falsify existing scientific knowledge than verify it positively. It is much easier (stereotypically) to use quantitative rather than qualitative methods. Building scientific knowledge requires discipline. It is not possible to treat any solution to a problem as a learning process. Creating science requires a scientific approach, at least in its methodological part. From this perspective, the dilemmas indicated aim to serve the right choices, relevant to the context of the hypothesis examined or a research question [3]. In this approach, it is very important to understand the place and role of a given theory in relation to various scientific disciplines. According to Ł. Sułkowski, the most important argument for drawing inspiration and combining the approaches of various sciences is to seek the integration of problems and scientific methods. The ordering of scientific areas, fields and disciplines is a kind of social and academic convention, while many research problems are located at the intersection of different disciplines [4]. This is the case with the mechanisms of the effective strategic management of water supply companies as a significant scientific problem in the present time in terms of creating a scientific theory. It is worth citing the definition of a problem in management according to Z. Mikołajczyk, where a problem is a situation or a task that cannot be solved using existing patterns. The problem is solved by finding an optimal, rational or satisfactory way of acting in given conditions [5]. Research in the area of management problem categorization is a serious challenge for management science methodologists. In addition, they are struggling with the difficulty of operationalizing this type of construction, especially with the identification of elements that should be included in the management problem category [6]. As a result of the operationalization of the theoretical construct, a research model is created, illustrating variables that are studied and measured, and their interrelationships that take the form of hypotheses (...). In research practice, the hypothetical-deductive models built are more complex, and several different relationships are taken into account in one model. However, what is a key element in the research model construction is to precisely define individual variables, and what should result from the research problem, the adopted theoretical and conceptual framework because depending on the adopted research concept, individual variables may have different functions [7]. Practical management problems are the most important driving force behind the development of organizational theory. How does this driving force work? Practical problems result primarily from the changing conditions of competition. These problems are solved by managers who, together with their teams, achieve success and ensure a competitive advantage to their organizations. These successes are described and generalized, and also explained on the basis of more general, usually psychological, sociological or economic, sometimes technical regularities. In this way organizational theories emerge [8]. It should also be remembered that, formally, one of the sources of scientific problems can be a research gap. Filling this gap is that is most often the motivator of undertaking scientific and research work [9].

Research and scientific discussion covered the functioning of the water supply sector in Poland in 2007–2017. In order to achieve the assumed objective, the qualitative longitudinal research among water supply companies building and using strategic management systems in the form of a strategic hybrid consisting of a business model, strategy, business processes and strategic projects in the above time period was applied.

Research into the dynamics of organizational and managerial processes should, by its very nature, be longitudinal as a result. In such research, in order to understand a process, the search for mechanisms of change becomes more important than determining the stages of development [10].

It is very difficult to draw conclusions about the organization's activity by looking at parts from the study of various organizations. It is cognitively more valuable to look at a few of them in action, seeing how their parts interrelate from the perspective of their initial and final state. In this way, changing and static elements can be distinguished. Such knowledge is essential for every researcher. Theoreticians are aware of this, which is expressed in at least one level of theorizing, namely attempts to locate their theories in a dynamic approach, but unfortunately often with a tendency to examine only cross-sectional data based on which theories are generated and tested [10].

Longitudinal research requires the study of same people, subjects or cohorts. Analyses conducted are exploratory in nature. According to J.R. Kimberly [11], longitudinal scientific research consists of such techniques, methodologies and activities that enable the observation, description and/or classification of organizational phenomena in such a way that processes can be identified and empirically documented. In principle, longitudinal research examines processes in many periods. The method used is a diagnostic survey can provide information regarding the mechanisms of effective strategic management in the water supply sector. Due to the nature of longitudinal research, the observations were of a repetitive nature, which guaranteed the assessment of changes in the dynamics of safety development. Research conducted in the specified measurement period met the criteria of the representative sample. In the case of longitudinal research, the method of its conducting allows for observing the same objects many times: Water supply companies over many years (in this case, 10 years).

This research was based on a time criterion and was used to understand the mechanisms of change and factors affecting the behavior of enterprises in terms of strategic management systems. These economic entities functioned in the same socio-economic period, where at the time they were influenced by the same external factors, such as legal requirements or others. The changes related to the factors that influence the strategic hybrid of the companies analyzed, found in this research are so well documented that there is a low probability of misinterpretation.

As part of the research method of the mechanisms of the effective strategic management of water supply companies, the following sequence of activities was adopted (Table 1).

Table 1. The sequence of activities as part of the research method of mechanisms for the effective strategic management of water supply companies based on a strategic hybrid.

No.	Sequence of Activities as Part of the Research Method of Mechanisms for the Effective Strategic Management of Water Supply Companies
1	Gathering relevant literature about strategic management.
2	Analyzing the evolution of the concept of strategic management.
3	Defining key management attributes taking into account strategic reflection
4	Selecting the research sample of mechanisms for effective strategic management.
5	Defining characteristics that describe the specificity of strategic management in the water supply sector.
6	Analyzing contextual conditions of the Polish and European water supply market included in legal provisions and their practical implementation.
7	Defining good practices in the strategic management of the water supply sector.
8	Developing analyses, resulting synthesis, conclusions and recommendations for improving the strategic management of the water supply sector.
9	Defining the theoretical determinants of effective strategic management in the water supply sector.
10	Indicating the new directions of the development of effective strategic management of water supply companies in theoretical and practical terms.

Source: Own study.

The basic conditions necessary to maintain the correctness of the implementation of longitudinal research strategies have been preserved.

1. Research results can be generalized only as regards a group of companies functioning in the same period as the data collection period—this assumption has been retained.
2. This kind of research is very expensive—research was conducted as part of the processes of OTTIMA plus Sp. z o.o. specialized in the subject matter.
3. Another difficulty is to maintain constant contact with all subjects studied—this condition has also been satisfied.

Such defined research with the use of longitudinal qualitative studies allowed us to answer the research questions posed and achieve the goals defined in the paper. Such extensive experience of the authors

allowed for the creation of both a research apparatus and conducting wide theoretical and practical research. The inference is the result of comparing the issues of strategic management theory with their application solutions tested by the authors in management theory and practice. The study is cognitive and evaluative and is based on multidimensional scientific reasoning. The subject of scientific discussion includes scientific and application reflections on strategic management systems, including business models, strategies, processes and projects applicable in the water supply sector. It should be noted that by conducting a multidimensional analysis of the theoretical assumptions used for the proper structuring of the paper, the literature was reviewed from the perspective of a separate research method. The literature review is not a prelude to proper research, but a separate research method. The methodological rigor of this research, after all, affects the quality of conclusions, and subsequently, the correctness of hypotheses or interpretations of empirical research [12]. In this case literature was reviewed critically. A critical review involves a characteristic approach to the synthesis of multidisciplinary research, conducted by means of various methods, when criticism of the available literature is required, and the existing findings of researchers are questioned [13]. A feature of critical reviews is that they are focused on the creation of new theories [14]. The individual stages of the review are subordinated to this goal. As a result, less emphasis is put on the regularity and repeatability of search, selection, critical evaluation and synthesis methods. Instead of a standard assessment of the critical methodical quality of sophisticated research, resources are more specifically assessed in terms of their theoretical usefulness [15].

At the same time, key words were defined during a critical review of the literature and they were a basis for the selection of scientific articles constituting the source of the theory and its review. The selection of literature focused on scientific publications mainly from the last ten years appearing in well-known national and global scientific journals.

Cognitive objectives include:

1. Analysis of the principles of building strategic management systems in the water supply sector, including the conceptualization and operationalization of business models, strategies, processes and strategic projects.

Methodological objectives include:

1. Discussing key issues regarding business models, strategies, processes and strategic projects applicable in the water supply sector.
2. Developing strategic recommendations for the development and improvement of strategic management systems in the water supply sector.

Utilitarian objectives include:

1. Presenting the ways of constructing effective strategic management systems in the water supply sector to managers.
2. Presenting key mechanisms for increasing the effectiveness of strategic management systems in the water supply sector.

Within the framework of defined research objectives, the following research questions were posed:

Question 1. Are strategic management systems built from a strategic hybrid effective?

Question 2. What strategic management mechanisms built from a strategic hybrid ensure the effectiveness of water management systems in the water supply sector?

Question 3. What key problems do managers in the water supply sector face in terms of the development and improvement of the strategic management system?

Question 4. What are key factors that determine the effectiveness of a strategic management system built from a strategic hybrid?

Question 5. What are the limitations of individual methods and techniques supporting the functioning of a strategic management system based on a strategic hybrid and how should it be neutralized in the water supply sector?

The criteria that should be fulfilled by a water company with an effective strategic management system include:

1. They fully comply with all legal requirements.
2. They voluntarily go beyond the binding legal requirements, creating management mechanisms towards increasing the management culture in the water supply sector.
3. They build the principles of full responsibility for the development and improvement of strategic management systems in the water supply sector.
4. They manage business continuity taking into account the criteria of strategic management.

Due to the multidimensional and holistic character of the functioning of the water supply sector, the subject of scientific discussion requires addressing many issues related to the theory of management science.

The paper is based on the following assumptions:

Macroeconomic assumptions:

1. In the situation of a globalizing market, strategic management systems must take into account the assumptions of economic liberalization.
2. The free movement of goods and services positively influences the development and improvement of strategic management systems of water supply companies.

Sector assumptions:

1. The place and role of the water supply sector in the economy is radically changing.
2. The water supply sector is becoming one of the crucial links in the economy.
3. The water supply sector and its management, technological and operational conditions affect other sectors of the economy.

The microeconomic assumptions of water supply companies:

1. Water supply companies should focus strongly on the constructive comparison of economic efficiency with the ability to create technological solutions in the criterion of strategic management.
2. A water supply company should be a source of permanent innovation taking into account the criteria of strategic management.
3. A water supply company should be a source of permanent innovation taking into account the criteria of strategic management.

The paper is based on the following restrictions:

1. In Poland, there is no unambiguous research into the effectiveness and efficiency of strategic management systems of water supply companies based on a strategic hybrid.
2. The high complexity and multitude of strategic management criteria result in difficulties in identifying clearly the mechanisms of the effective functioning of management systems in the water supply sector.
3. A strongly legally regulated system of the functioning of the water supply sector may limit the flexibility of using strategic management systems in the water-supply sector based on a strategic hybrid.

3. The Description of the Water Supply Sector in the Province of Silesia

During research, the authors decided to conduct a synthetic analysis of the water supply sector in the Province of Silesia. The analysis shows that sustainable water and sewage management and water resources management are very important for the Province of Silesia due to its industrial character and high urbanization. The Province of Silesia is characterized by high topographical diversity and

unequal spatial distribution of waste. This fact directly affects the diversification of the area of the hydrographic network. The exploitation resources of groundwater in the Province of Silesia in 2014 are low compared to domestic resources. The province occupies only the eighth place in the country (945 hm³), while the Mazowieckie Province with most resources had 2199,4 hm³ of resources. The total geodesic area of the Province of Silesia (as of 1 January 2016) amounted to 1233,3 thous. ha and accounted for 3.9% of the country's area (on the basis of: Waste management plan for the Province of Silesia for 2016–2022, IETU Katowice IMBiGS, Katowice branch, SAVONA PROJECT Sp. z o. o.). Taking into account the data of the Data Bank, the length of the active distribution network in the Province of Silesia (expressed in kilometers), an upward trend can be observed. In 1995, the length was 15,365 km, and in 2017 it reached the value of 21,550 km. Therefore, the distribution network is constantly developing.

Having data on the population using the water supply network in the Province of Silesia, a decreasing trend can be observed from 2002 to 2013, from the value 4,381,666 to 4,305,137. However, in 2014 there was a huge increase in this area, even exceeding the maximum value from 2002. 4,385,171 people from the Province of Silesia used the water supply system in 2014. According to the Local Data Bank, the 2014 estimates of the population using a sewage system were given according to the revised estimation method. Despite this significant increase, the trend continued to decrease from 2014 to 2016, where the population was 4,365,021. Comparing the data on the increase in the active length of the distribution network in the Province of Silesia (km), the trend is opposite in the case of the number of people using the water supply system. (Figure 1).

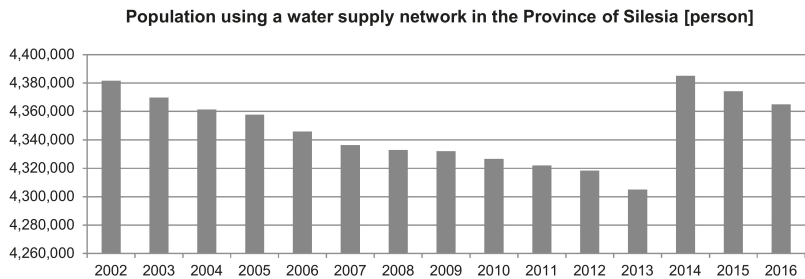


Figure 1. Population using a water supply network in the Province of Silesia (person) in the years 2002–2016. Source: Own study.

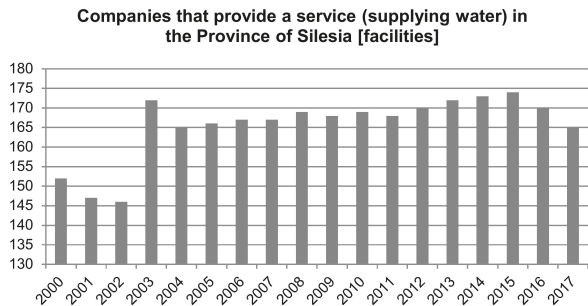


Figure 2. Companies that provide a service (supplying water) in the Province of Silesia (facilities) in the years 2000–2017. Source: Own study.

In the context of the analysis, it is worth looking at the number of companies that provide water supply services. In the Province of Silesia, their number fluctuated in the years 2000–2017. In 2002, 146 companies dealing with water supply were recorded (which is the lowest value in the analyzed period) and their number increased to almost the maximum value in the analyzed period in 2003–2015

companies. The maximum number was 174 in 2015. Since then, the number of water supply companies have been decreasing. However, according to the comments of the Local Data Bank, data for the years 2008–2011 may be incomplete. Figure 2 shows the companies that provide a service (supplying water) in the Province of Silesia (facilities).

Taking into account the fact that the length of the sewage network is constantly increasing from year to year, and the number of companies providing water supply services is still high, it should be mentioned that the Province of Silesia is constantly investing in the entire water management.

The analysis presented refers to the key strategic resources of water supply companies located in the Province of Silesia. It should be noted that this is one of the most dense and complicated networks, because it is located in a large urban area of an industrial nature. This affects the number of inhabitants directly as well as the number of companies in this area with a very large strategic potential.

4. High Company Performance

The complexity of this process results from the specificity of companies as unique business entities, the multitude and diversity of phenomena occurring in the course of company operation as well as from the various scopes and tools for measuring their effectiveness [16].

Companies operating in the market, often in a network environment, do not search for mechanisms to achieve performance, but they search for mechanisms to achieve high performance. One of the key definitions of high performance organizations is the definition developed by A. de Waal. The author states that a high performance organization achieves better financial results than those achieved by another group representing the same status for a longer period, thanks to the ability to adapt to changes and respond quickly to them through long-term management, the establishment of an integrated and targeted management structure, by constantly improving the main potential and by treating employees as their main value [17].

A. A. Waal combines the concept of a high performance organization with the assumptions of strategic performance management, where he defines the basic benefits of using this concept in the form of high quality strategic information, information retrieval time, management support, communication effectiveness and setting organizational culture principles [18].

P. C. Light defines four pillars of high performance:

- *Alertness*—Alertness is the first pillar of solidity. Organizations have little reason to reallocate, train, renew or adapt if they do not see the upcoming changes. (...) However, alertness is more than just planning techniques. It also involves a basic commitment to the rigorous monitoring how the organization is doing at the moment.
- *Agility*—organization actually sets up a signpost and discovers when an assumption does not work well in some respect and has time to take action. Although this knowledge may be interesting as a herald of incoming turbulence, it is useless if the organization cannot react.
- *Adaptability*—Adaptability is not synonymous with what is innovative. It is rather the ability to adapt strategy and tactics quickly to meet changes in the environment. Sometimes adaptability requires a technical breakthrough, such as an Intel multi-core chip; or it involves gradual changes in response to market pressure. As such, innovation is a form of adaptation, but not every adaptation is innovative.
- *Alignment*—another matter is the process of planning the Air Force or the development of general school reforms, and another is the implementation of the program to help children on a relatively small scale. Regardless of whether the change is large or targeted, the organization as a whole must be involved in the mission [19].

According to L. Holbeche, a high performance organization is an organization that strives to reconcile contradictory goals. The most important elements of this model include:

- An ability to change,

- A context rich in knowledge for creating innovations,
- Organizations without borders,
- Committed people,
- An ideal place to work,
- A value-based organization [20].

D. Miller, I. Le Bretton-Miller define four key priorities of a high performance company in the long-term perspective:

1. Command.
2. Continuity.
3. Community
4. Connection [21].

5. The Specificity of Public Services

Public services are defined as those aimed at improving the quality of life of inhabitants. They help to ensure a uniform standard of social benefits and equal access opportunities [22].

To explain the essence of public services and their management in terms of satisfying the needs of citizens or inhabitants of a specific territory, three types of these services can be distinguished [23]. First of all, these are services for citizens related to citizenship and residence in a given state territory, such as ensuring public safety or environmental protection. In addition, an important group of public services is providing households with utilities in the most important spheres from the perspective of the state and its citizens. These are situations when private organizations do not do it at their own risk, and social organizations do not have the opportunity to provide these services without the support of public entities, e.g., social welfare or free educational services at the basic level. The provision of services that create conditions for the proper functioning of all—business, social and public—sectors is an underestimated and sometimes even overlooked the type of services. They include investments in social and technical infrastructure, security of business transactions, and regulations ensuring equal treatment of organizations from all sectors. This classification directly refers to the nature of public services. Bearing in mind the nature of public services, they can be grouped as in Table 2.

Table 2. Classification of modern public services.

Categories of Public Services	Types of Public Services
Administrative services and e-services	Issuing documents that are not administrative decisions, permits, or concessions
	Entering data obtained directly from customers into databases
	Granting permits and making decisions in accordance with the Code of Administrative Procedure
	Granting permits and concessions regarding economic activities regulated by the state
Social services and e-services	Healthcare
	Education and upbringing
	Culture
	Physical culture and recreation
	Social welfare and care
Technical services	Housing industry
	Public safety
	Transport—services and infrastructure
	Water supply and sewerage
	Waste management and maintenance of cleanliness and order
	Cementary services
	Energy supply (electric power, gas, heating)
	Public greenery

Source: Reference [23], (p. 33).

Improvement in public services management mainly concerns increased availability and improvement of the quality of services provided by public administration units, which should create conditions for their effective implementation based on defined standards and a specific market of service providers.

As regards the economics of services and the management of services provided by local government, it is useful to distinguish municipal services and their management models [24]. Most often, three core models are indicated: Autonomous, commercial and external outsourcing, as well as mixed models that use the elements of core models [25].

A dozen or so years ago, the sources of improvement in the effectiveness of public service provision were seen as improvement processes in the following areas: Organizational structure, planning and decision making, motivating, evaluating and rewarding, communicating with the environment, organizational culture, controlling and, on the other hand, using modern management tools, such as strategic management, organizational change management, and shaping relationships with stakeholders. In addition, these issues were often focused on as selected research problems.

Unlike in previous studies, the analyses conducted in this research are characterized by the application of the concept of business models, which allows for the consideration of many areas as interrelated and perceived in perspectives appropriate to this concept.

6. Business Model in Defining Business Management Mechanisms in Strategic Terms

When analyzing the mechanisms of effective strategic management, it is important to determine the key ontological being that determines the development and growth of the organization. It seems that it is now a business model. The model and its configuration contribute not only to competitive advantage and standing out in the market but, above all, achieving high company performance. It is important, however, that there are many definitions of business models that create this particularly complex issue. To explain the place and role of the business model, its basic definitions were presented with reference to the key word sequence referring to the concept of the model.

The definitions presented in the Table 3 are important to understand the business model in the context of its structure, which allows for combining this ontological being with other beings, creating a specific strategic hybrid.

Table 3. List of selected definitions of a business model along with a reference to the key word sequence referring to the concept of the model.

No.	Source	Selected Definition of a Business Model	A Key Reference to the Concept of the Model
1.	P. Timmers [26], (p. 4)	An e-business model is an architecture of the product, service and information flows, including a description of the various business actors and their roles;	Architecture
2.	G. Hamel [27], (p. 74)	A business model is, associated with customers, a composition of core strategy, strategic resources and value network	Composition
3.	R. Amit, C. Zott [28]	A business model is a system of interconnected and interdependent activities that determines the way the company “does business” with its customers, partners and vendors	System
4.	A. Osterwalder, Y. Pigneur, C.L. Tucci [29]	A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm	A conceptual tool
5.	B. Nogalski [30]	A business model is a general concept, formulating the framework of business logic and its features, such as innovativeness or competitiveness.	Concept

Table 3. Cont.

No.	Source	Selected Definition of a Business Model	A Key Reference to the Concept of the Model
6.	A. Jabłoński [31], (p. 19)	A business model is understood as the mapping, in a given place, time and business space, of the structure of relationships between factors that guarantee the fulfillment of current, internal and external needs of stakeholder groups, which enables a company to gain competitive advantage and is the creation of a future platform for company growth and development that ensures business continuity	Mapping
7.	J. Niemczyk [32],	A business model is a blend of strategy, tactics and operational activities that is the key to success in a given group of businesses and in a given period	Blend
8.	D. J. Teece [33]	A business model articulates the logic, the data and other evidence that support a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value	Logic, Architecture
9.	J. Muehlhausen [34], (p. 30)	A business model is a framework of rules and moral imperatives within which the business operates. It provides the strategic context for both the long and short term. It defines and articulates strategic intent, which then becomes the common focus and driver among all levels of strategic management (Missions, Objectives, Strategies, and Tactics). The combination of these four becomes the compass and laws, by which the organization navigates and the glue that holds it all together.	Framework
10.	T. Falencikowski [35], (p. 37)	A business model is a relatively isolated multi-component conceptual object describing running a business by articulating the logic of creating value for the customer and capturing part of this value by the company.	Relatively isolated conceptual object
11.	M. Jabłoński [36], (p29)	A business model is a specific combination of tangible assets and intellectual capital used to implement a value growth strategy appropriate for a given market situation.	Specific combination
12.	P. Banaszyk [37], (p. 9)	A business model is a more or less developed image of the desired development of the business and its conditions.	Image
13.	Morris et. al [38]	A business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create a sustainable competitive advantage in defined markets	Concise representation
14.	Golebiowski et. al [39]	A business model is a new conceptual tool, containing a set of elements and mutual relationships, which presents the logic of the operation of a given company in a specific field (business).	Conceptual tool

Source: Own study.

7. A Hybrid Approach in the Strategic Management of an Organization—Strategic Requirements

In the modernly managed world of business and economy, new approaches that determine the development of management sciences emerge. In this perspective, various goals of running a business are revealed, not only in strategies, but in the full models of the functioning of companies. Classical economics is often superseded by social economics, the sharing economy, and network economics. In view of these changes, a new dimension of enterprises is created, namely social enterprises.

Social enterprises are responsible both for social mission and for making profits. Due to their hybrid nature, they are required to achieve both social and financial results [40]. It is also worth noting that in the last decade new organizational forms appeared at the meeting point of business and

non-profit sectors in the context of state withdrawal and new management methods, clearly revealing the blurring borders. This phenomenon has been largely investigated in the broader context of corporate responsibility, where business helps solve social problems, such as poverty or environmental degradation, and at the same time increasingly plays a strong public role [41].

The pressure towards being both financially viable and socially responsible has led both for-profit companies and non-profit organizations to a hybrid zone, which some people even call a “hybridization movement”, which includes both the social and financial basis of activity. This movement into a more hybrid-like approach takes different names, such as the shared value approach, conscious capitalism, social entrepreneurship, benefit corporations and B corporate certification [42].

Hybrid organizations are associated with a rapid change in the use of technologies, materials and practices and are high-risk companies that critically rely on their management control systems [43].

Hybrid organizations are also supported by a new and growing group of people who put greater emphasis on a healthy lifestyle, environmental and social justice and ecological sustainable development of products and services they buy, companies they invest in, politicians and policies that support, companies they work for and ultimately, the lifestyle they lead [44]. In this context, the value created is related to the economic value and competitive advantage, resembling more the hybrid forms of an organization where value can also take into account social needs [45].

Therefore, we adapted the hybrid approach to actions that also prevent risk to examine how the behavior of managers differs from the general assumptions of the model, such as neutrality and rationality of risk, influences the results of planning and analyzes the results of a hybrid approach for two different behavior patterns [46].

Analyses also show that a hybrid competitive strategy can also affect some dimensions of the organizational structure, although such a structure does not have a direct impact on performance. Therefore, the organizational structure can play an important role in gaining a competitive advantage through its influence on the development of competitive strategy [47].

Critical analysis emphasizes that the regulatory policy of organizations that do not use appropriate regulatory tools may have a significantly adverse impact on competition and consumer welfare [48]. Hybrid logic seems quite convincing that the existence of such a regulatory relationship reduces opportunist behavior, and the presence of the regulatory agency ensures a procedure that is necessary to solve problems, but the question remains whether this model can be consistent and sustainable for a long time [49].

A hybrid assessment model may be considered as one of the mechanisms used to increase the internal control capability in public sector organizations and to limit some inconveniences associated with purely internal approaches to assessment. Advantages and challenges associated with the use of the hybrid model can be presented on the basis of a literature review and case studies. Some recommendations regarding the use of hybrid assessment models are also available to those interested in implementing similar strategies [50].

Supply chain participants also decide to use hybrid business models to respond to changes in customers' requirements (and be able to compete in today's market) [51].

Hybrid management forms are a problem because of limitations that may affect their results. There is limited knowledge of how these hybrids work, especially in different socio-ecological and economic contexts. Their results may vary depending on the range of possibilities of combining different institutions and the presence of various interests and objectives of the participating institutions. Moreover, these forms are likely to fail in achieving fair and lasting results if they do not deal with local power relations problems or if they are managed and designed by entities with their own interests [52]. Table 4 below presents the selected typologies of a hybrid approach.

Table 4. Typology of a hybrid approach—selected aspects.

Typology of a Hybrid Approach—Selected Aspects	
Hybrid in the criterion of an organization's goal	A hybrid organization is an organization focused on profit for social purposes. A hybrid organization, i.e., a social enterprise, meets at least the following criteria: Explicitly expressed social goals; directly expressed economic goals (understood as striving to obtain a certain level of revenues from the sale of products and services and as bearing economic risk); democratic management; social property [53].
Hybrid in the criterion of methods and management concepts	Municipal sector enterprises are firmly embedded in both new public management as well as the general concepts of organization management. Then management methods and techniques are constructively compared, which determines the development and growth of such enterprises. If we refer to the definition by B. Kozuch in the field of public management, public values become crucial as well as the public interest, the achievement of which is possible by building mutual trust [54].
Hybrid in the criterion of the regulated and business market	In the regulated sectors, the concept of profit is strongly formalized and subject to strict control in such a way that its framework is within legally set limits that define closely monitored sections. Although the goal of achieving profitability is maintained, its value determined top-down and the need to maintain it at a certain level is one of the key determinants of business management and the fundamental determinant of business model design. After all, profit is a priority aspect of enterprise survival and development.
Hybrid in the criterion of the application of ontological entities	The method of making decisions in water supply companies is conditioned by the adopted business model, strategy, business processes and strategic projects creating a kind of strategic hybrid. This hybrid is a determinant of the effectiveness of water supply companies operating in accordance with the rules of the regulated market. The dimension of the business model of water supply companies is mainly based on the principles of the functioning of so-called reasonable profit, reasonable costs and expected revenues. The strategy is implemented by an adopted bundle of strategic goals whose recipients are company stakeholders. Business processes in this approach present a value chain, the result of which is a product, which is water, supplied in accordance with the adopted parameters described in the measurement system of water supply companies. Strategic projects defined as the so-called project portfolio mainly determine the investment dimension of growth and development of these entities. A special blend emerges that creates a management tool, that is the joint operationalization of the so-called business model canvas, a strategy map, a process map and a project matrix for water supply companies.

Source: Own study.

The table shows the key findings:

- A hybrid approach may have many dimensions.
- A hybrid approach may concern an enterprise itself and its ontological entities,
- A hybrid approach may also concern the impact of market mechanisms on the hybrid organization.

8. A Hybrid Approach in the Strategic Management of the Organization—Specific Interpretation

A strategic hybrid is understood as a blend of a business model, strategy and business processes, used to achieve an acceptable level of company performance in the short and long-term. A strategic hybrid can allow for the faster achievement of the assumed results due to its eclectic nature. Interrelationships between the strategy, business model and business processes may also determine the simultaneous development of the company in terms of product, market and resources. Consistency in the strategic hybrid is the mutual and interdependent compatibility of all components of the business model, strategy and business processes with specific criteria that ensure the ability of the company to achieve high performance in a long and short term. The result of hybridization is the so-called synergistic effect (a hybrid demonstrates features that are difficult to find in primary components). This hybrid creates new value based on a non-standard configuration consisting of predefined components, while ensuring its full integrity. The adoption of such a solution is a decision of prudent managers [55].

By making a detailed analysis of the concept of hybridization, hybrid approaches were combined by presenting the assumptions of a hybrid organization managed with the use of a strategic hybrid. In order to achieve long-term results, it is important to look at the company in a holistic manner. Then a certain strategic system can be set that determines its development. Using the interpretive approach, two ways to build strategic systems can be adopted. They are a strategic triad and a strategic hybrid.

The common goal of the triad and strategic hybrid is to capture higher value from the market by the company. A hybrid or strategic triad can be a blend of a business model, strategy and business processes. The authors believe that there is a fundamental difference between the strategic triad and the strategic hybrid. The triad occurs when its attributes, i.e., the business model, strategy and business processes come from a homogeneous, original system. The hybrid occurs when there is a configuration of hybrid attributes, i.e., a business model, strategy and business processes from other heterogeneous systems. An environment that is conducive to the creation of a hybrid is the network environment, because the probability of the origin of hybrid attributes from other systems is then very high. The hybrid is based on a specific and unique configuration, where at least one element comes from different heterogeneous components and through this situation, it creates a solution that offers a new value for the customer, giving the opportunity to capture more value from the market.

The use of the hybrid approach in the near future will be an effective tool for designing effective business models functioning in a network environment. A hybrid is treated as a combination of at least two components of a business model deriving from systems with different technological, organizational and process structure, but which provides a triad after applying specific integrity adjustments to the business model system, and thanks to this innovative and interdisciplinary link, it can successfully create the new assumptions of the income generation logic, a new value proposition and it will be characterized by innovation in the sphere of a business solution being a condition for business success. As part of some strategic triads based on a combined and consistent use of these three components (strategy, a business model and a process model), hybrid business models may be created, characterized by the fact that at least two components come from other systems. The condition for the positive effect of creating such a hybrid is to ensure the integrity of the company's strategic system. A strategy hybrid can be used in the context of using "clean" and/or "hybrid" business models, strategies and business processes. A strategic hybrid can then consist of:

1. "Clean" (single, homogeneous) business models, strategies and business processes.
2. "Hybrid" (multidimensional, complex, several-option) business models, strategies and business processes.
3. Combinations of (single, homogeneous) business models, strategies and processes, as well as "hybrid" (multidimensional, complex, multi-option) business models, strategies and business processes.

Hybrid business models and hybrid strategies can be used by hybrid organizations. Considering the importance of hybrid organizations in strategic management, selected elements of company hybridization can be defined:

1. The possibility of combining hierarchy and virtualization principles in the company structure
2. The possibility of combining systemicity and networkedness principles in management.
3. The possibility of structuralizing jointly and blurring the boundaries of the company.
4. The possibility of achieving company goals as seen from a short, medium and long perspective.
5. The possibility of dichotomous confronting the various resources of the company to achieve competitive advantages in the market.

In order to achieve the results assumed, the company can use the strategic hybrid.

In order to achieve the results assumed, the company can use the strategic hybrid. In the case of companies surveyed in the Province of Silesia, the water supply companies that have the greatest importance have a defined strategy, business model and business processes, and their effective implementation aims to ensure the integrity of the company's strategic system.

A strategic hybrid can be operationalized by means of a hybrid scorecard. The Hybrid Scorecard is used as a tool for measuring the effectiveness of a company embedded in the network. Undoubtedly, such an organization is a hybrid organization.

According to A. Jabłoński, the Hybrid Scorecard consists of four perspectives:

1. a strategy perspective,

2. a business model perspective,
3. a business process perspective
4. a network perspective.

The Hybrid Scorecard model of a company embedded in the network is presented below in Figure 3.

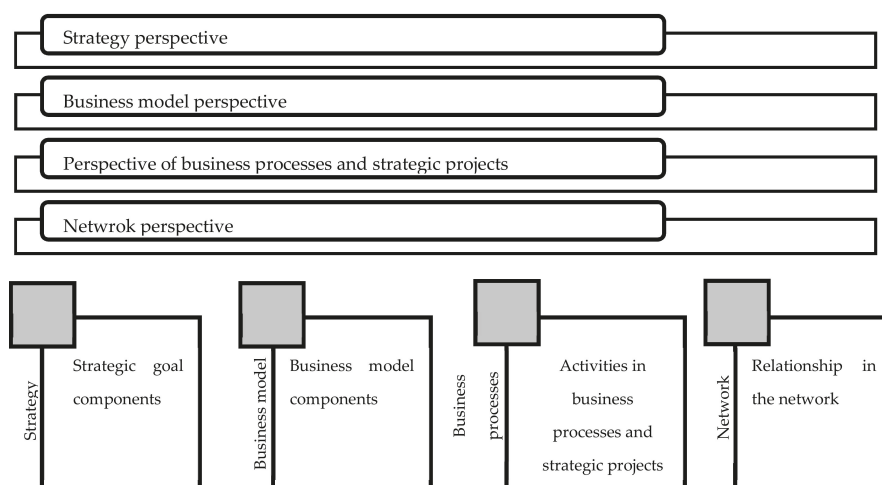


Figure 3. Modified Hybrid Scorecard of a company embedded in the network. Source: Reference [55], (p. 54).

There should be a balance between particular perspectives. Then the logic that ensures consistency between the individual elements of the strategic hybrid occurs. During the operationalization of the strategic hybrid, the strategy perspective is implemented by defining strategic goals and defining measures for their implementation. As regards the business model perspective, it is necessary to specify the key components of the business model and also determine the measures of their usage assessment. As regards the business process perspective, key activities in the processes must be defined and also measured.

It should be noted that the Hybrid Scorecard may mainly apply to companies for which the fundamental operating environment is a network environment, e.g., water supply companies. Hence the fourth, subsequent perspective in the assumptions of this model will be a network perspective. As regards the network perspective, the key relationships occurring in it are defined and a measurement system for the assessment of their functioning is built. The following is the graphical presentation of my own proposition of the Hybrid Scorecard for a company operating in a network environment. In the construction of the Hybrid Scorecard, it is particularly important to develop a hybrid measurement system for a company embedded in the network.

When analyzing tools that are necessary to implement a hybrid measurement system of a company embedded in the network, the following tools can be used for this purpose:

1. The Balanced Scorecard as a tool for the operationalization of strategy towards the management of company high performance.
2. The operationalization of the business model and it gaining an ability to achieve high performance by the company.
3. Systems for increasing the efficiency of processes so that the company could achieve high performance.

Figures 4 and 5 describe the hybrid measurement system of a company embedded in the network in terms of application.

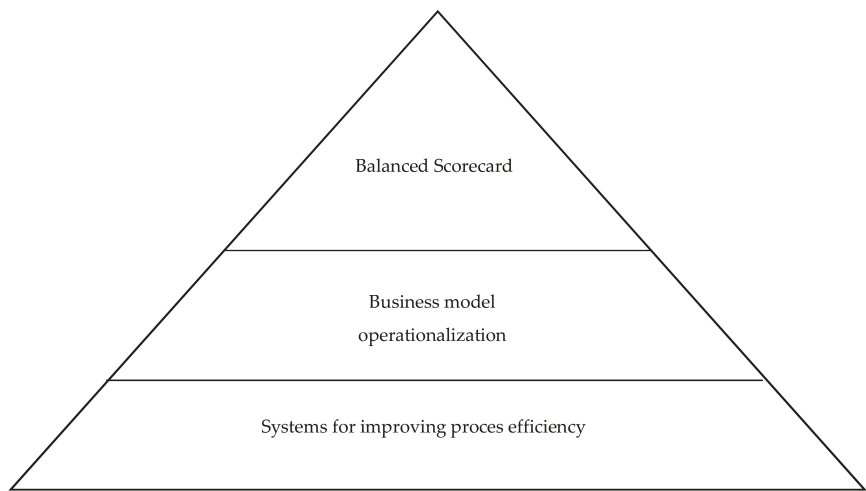


Figure 4. A hybrid measurement system of a company embedded in the network in terms of application. Source: Reference [55], (p. 57).

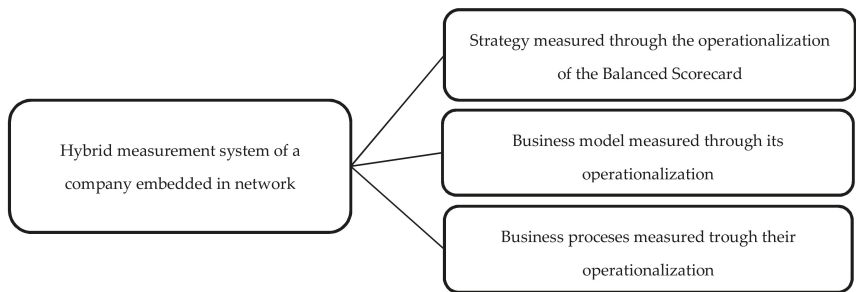


Figure 5. Operationalization of the hybrid measurement system of a company embedded in the network. Source: Reference [55], (p. 57).

A hybrid measurement system obtains information from three interrelated elements, which are a source of strategic information in the decision-making processes. This system determines the principles of achieving results in many dimensions.

Municipal sector companies are firmly embedded in so-called new public management, as well as in the general concepts of organization management. Then a constructive comparison occurs that determines the development and growth of this type of companies. If we refer to the definition by B. Kożuch in the field of public management, public values become crucial, as well as the public interest, the achievement of which is possible by building mutual trust. According to the definition by B. Kożuch, public management deals with examining the ways and scope of harmonizing activities that ensure that the goals of organizations that form the public sphere are properly set and the opportunities of organized human action aimed at creating public values and pursuing public interest are optimally used [54]. An interesting issue is the application of the concept of a strategic hybrid to organizations that function in the mechanisms of public management [55].

To sum up this discussion, it is worth noting that trust is crucial in defining a hybrid approach. It determines proper relationships with other stakeholders of public or social organizations. In this understanding, the key trust relationship that creates solutions in the criterion of the effectiveness of social or public organizations is important.

What is interesting is that in the relationship between reasonable costs, the revenues achieved and a reasonable profit, trust can be a factor binding this type of relationship (Figure 6).

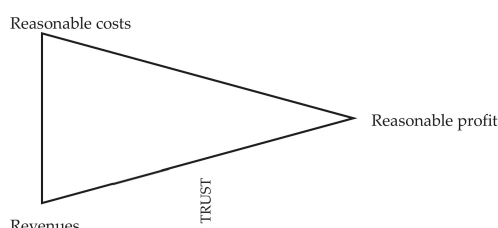


Figure 6. Trust as a determinant shaping the reasonable profit of hybrid organizations. Source: Own study.

Trust, therefore, becomes a link between individual stakeholders, while creating mechanisms for effective management based on the principles of reasonable profit.

9. A Hybrid Approach and the Mechanisms of Sustainable Development in Business Models and Corporate Strategies, Taking into Account Stakeholders' Needs

When analyzing the hybrid approach, it is worth paying attention to the mechanisms of effective company management in the environment criterion. An increasingly emphasized environmental aspect in business management and management of its value is related to the concept of ECSR (Environmental Corporate Social Responsibility), also referred to as Environmental Corporate Responsibility (ECR).

It can be examined from two perspectives:

- primarily as a result of the development of the concept of Corporate Social Responsibility (CSR) along with the concept of sustainable development as pro-environmental assumptions are increasingly introduced to the CSR concept;
- on the other hand, it is worth noting that the creation of the ECSR concept is clearly supported by the practical implementation of the idea of sustainable development at the levels of the economic ecosystem and companies themselves.

ECSR will be used more in sectors where environmental factors play a significant role in terms of the company's impact on the natural environment. However, it seems reasonable to present the view that environmental criteria, especially in the context of corporate social responsibility (CSR), often have a cross-sectoral dimension.

ECSR can be treated as a strategic concept for building company value based on environmental criteria. ECSR assumptions can be used in the construction of a business, as well as an eco-business model, which is stimulated by environmental criteria. Such a model is an attempt to shape a combination of effective value drivers [56], (p. 27). The value built on environmental criteria that are a value driver results in increased company's financial results. A company as an entity operating in a broad social and economic context, should also not contribute to generating costs that will be shifted to others. This also applies to environmental issues [57].

According to S. Sharma and H. Vredenburg, two key business capabilities can be identified, using environmental criteria to increase the financial result:

- the ability to constantly learn,
- the ability for continuous innovation [58].

Abilities shape inter-organizational relationships in the area of:

- the flow of knowledge, including environmental knowledge based on environmental competencies developed,
- the diffusion of environmental innovation based on the redundancy of environmental resources and competencies,

- the development of relational capital in the context of bilateral flow of value between stakeholders and the company.

In this way, a new, dynamic platform for creating corporate strategies is created in the business space, where a coherent combination of three components, namely environmental criteria, company value and corporate social responsibility determines the directions of the company's development in the network of market links. The ECSR-based strategy can be a source of building a competitive advantage based on unique and difficult-to-follow corporate competencies that give the basis for creating special value for customers and other stakeholders.

ECSR provides [59]:

- The source of business risk reduction (improvement of creditworthiness, improvement of business credibility, reduction of the process risk of the company's strategic resources);
- The source of creating environmental innovation to achieve long-term company development and growth and its environmental safety.

ECSR develops activities related to a pursuit of the balance of business needs between shareholders and stakeholders, where the dialogue platform is related to:

- Treating ecology as a key success factor,
- Treating ecology as a key success factor,
- The development of products in terms of their environmental performance [59].

Exhibiting the place and role of the environmental factor in corporate strategy leads to the concept in which an environmental factor is a basis for building the value of companies and creating a new type of a business model. This model takes into account:

- The internal assumptions of running a business with regard to environmental criteria: they include the greening of business processes and products,
- The external assumptions of running a business with regard to environmental criteria: environmental criteria are treated as a key factor of success, also environmental sector conditions are taken into account,
- Assumptions regarding the activity aimed at meeting internal stakeholders' needs,
- Assumptions regarding the activity aimed at meeting internal stakeholders' needs,
- Assumptions regarding the creation of internal centers of environmental corporate social responsibility as centers defining the strategic trajectory as a source of measurement and monitoring the strategy based on environmental criteria.

The fulfillment of environmental criteria can be a source of success. Key success factors are criteria that determine competitiveness in the sector. They are used to analyze the resources and skills of every company operating in the sector. Using key success factors, we can examine the strengths and weaknesses of the company and its development opportunities, as well as assess companies that are in a given sector or constitute a strategic group [60]. Environmental criteria as a key success factor should refer to the organization as a whole, as well as to processes taking place in the organization that create a value chain for stakeholders. This means that processes should also be managed in such a way that the environmental effect allows for improving the company's image in the market, customer relationships and other stakeholder groups and creates added value in the process itself.

It is worth noting that environmental criteria as value drivers are a platform of connections linking the CSR concept with the ECSR concept.

In the strategic perspective, it should be noted that environmental criteria:

- form the basis for company development,
- are a source of competitive advantage,

- are a platform for implementing the company's growth strategy,
- are a distinguishing feature of the company in the market,
- can be a basis for building company value,
- play an important role in social dialogue,
- provide a balance between shareholders and other stakeholders,
- are treated as a comparative criterion in the process of assessing company competitiveness [61].

Environmental criteria are multidimensional. They are a link between internal vertical and horizontal links in the organization and become the basis for building an effective business model, which may contribute to increased company value based on social assumptions, but also environmental business responsibility, the assumptions of which may be as follows:

1. Building a sustainable business model as a platform for dialogue between stakeholders.
2. Redefining business value so that it includes the analysis of stakeholders' needs towards building the sustainable value of an environmentally responsible organization. Eight areas for building sustainable value can be distinguished [62]:
 1. analyzing the current situation,
 2. anticipating future expectations,
 3. setting goals,
 4. developing value-building initiatives,
 5. developing business analysis,
 6. creating value,
 7. confirming results and drawing conclusions,
 8. developing skills of building sustainable value.
3. Setting sustainable value-related goals based on Sustainability Business principles [63]:
 1. Positive impact of the company.
 2. Positively perceived brand and reputation.
 3. Environmental processes in line with the environmental effect planned.
 4. Achieving acceptable financial results.
 5. Multidimensional measurements.
 6. Implementing an effective competitive strategy.
 7. Clearly answering the question: Can a responsible company function better or can a well-functioning company be more responsible?
 8. Testing effective business scenarios.
 9. Work and growth.
 10. Searching for and closing gaps in the area of sustainable company development based on ratio analyses.
4. Redefining the role of stakeholders and their relationship with business by determining the impact of a company's activities on the value for stakeholders and the impact of stakeholders on the value for shareholders [64].

To this end, it is necessary to deal with the creation of a map of stakeholder relationships, mapping stakeholders' agreements, identifying stakeholders' expectations, determining the type of stakeholder power, and monitoring stakeholders, as well as developing a matrix of priorities.

Therefore, the ECSR concept is related to the following assumptions:

- ECSR is a concept of increasing company value through the dynamics of using environmental criteria to meet the needs of shareholders and other stakeholders.

- ECSR is a platform for building an effective business model based on environmental criteria.
- ECSR is the source of creating environmental innovation to achieve long-term company development and growth.
- ECSR creates activities related to a pursuit of the balance of business needs between shareholders and stakeholders, where the dialogue platform is related to treating ecology as a key success factor, examining critical processes in relation to their greening and product development in terms of their environmental performance.
- ECSR is a source of the effective use of a combination of tangible resources and intangible factors of company operation in the context of environmental criteria adopted (pro-ecological raw materials, environmentally friendly machines, equipment and other material resources of the company, environmental knowledge, and environmental competences).
- ECSR is a link between the internal and external environments (a comparison of macro-environment factors, e.g., regulatory, legal and political factors in relation to the interior of the company affecting the natural environment).
- ECSR is a guarantee of effective reporting of standards of conduct for stakeholders in relation to the internal functioning of the company (human and nature rights, work and technology, work environment and the natural environment, health protection and environmental protection, etc.).
- ECSR is a platform for the effective use of the company intellectual, relational, organizational, innovative and human capital in terms of increasing social capital among all stakeholders.
- ECSR is a source of business risk reduction (improvement of creditworthiness, business credibility, reduction of process risk of company strategic resources) [59].

It is necessary to ensure appropriate environmental competencies for the development of this trend of business responsibility. Competencies are treated as the ability to coordinate resources to achieve organizational goals. Key competencies that are at the top of the hierarchy of resources are the unique combination of knowledge, technology and skills. Environmental competencies built based on environmental knowledge can be seen as environmental quality and innovativeness. They can be the basis for environmental strategies of companies. Environmental competencies should be examined in terms of cooperation with the environment and the implementation of corporate social responsibility [65].

Effective company strategic management in a hybrid approach determines the new areas of mutual relationships also in the subjective approach. These new areas of relationships are focused on the principles of management taking into account the needs and expectations of the stakeholders of social and public organizations. In such a cognitive perspective, it is important to understand the place and role of stakeholders in shaping effective business models and corporate strategies focused on public, social and economic goals.

Table 5 shows the typology of stakeholders in terms of the business model of the individual organization.

Table 5. Typology of stakeholders in terms of the business model of the individual organization.

No.	Criteria	Typology of Stakeholders
1	Focus on the social and public sector	Social stakeholders, Public stakeholders Non-stakeholders
2	Location to the organization	Insiders Outsiders
3	Role in strategic management	Primary stakeholders Secondary stakeholders Key stakeholders
4	Criterion of the concluded cooperation agreements	Consubstantial stakeholders Contractual stakeholders Contextual stakeholders
5	Market orientation	Non-market stakeholders Market stakeholders

Table 5. Cont.

No.	Criteria	Typology of Stakeholders
6	Degree of relationship dynamics	Silent stakeholders Real stakeholders Global stakeholders
7	The degree of influence	Regional stakeholders Local stakeholders Sectoral stakeholders
8	The degree of mutual relationship	Universal stakeholders Specific stakeholders
9	The degree of mutual relationship	Primary stakeholder Secondary stakeholders Third-degree stakeholders
10	The degree of influence strength	Majority stakeholders Minority stakeholders Dominant stakeholders Dangerous stakeholders
11	The degree of influence strength	Dormant stakeholders Decisive stakeholders Demanding stakeholders Flexible stakeholders
12	The degree of impact	Dependent stakeholders
13	The degree of impact	Pressure groups
14	The degree of mutual relationship	Stakewatches
15	The degree of mutual relationship	Stakekeepers
16	The degree of mutual relationship	Multi-stakeholders networks
17	Type of influence	Business units
18	Type of influence	Civil society
29	Type of influence	Governmental institutions
29	Type of influence	Public-policy network

Source: Reference [66], (p.21–22).

10. The Hybrid Approach and the Sustainability Concept

The concept of hybridization has been analyzed in recent years in a wide context. In particular, hybridization is associated with a combination of management practices from the field of business management and public management. Public management is subject to dynamic changes aimed at improving the efficiency of public funds management and shaping social values. Hybridization can be an effective way of shaping social business models. Sustainable business models as a concept develop dynamically not only in the sense of the balancing of ecological, ethical and economic aspects. It also serves to sustain of business in the long term. It is the nucleus for building cooperation between various groups of stakeholders in a network environment and creating conditions for the effective receipt of social economic activity. Therefore, it is essential to use the concept of sustainability to fully implement the principles of a hybrid approach in management. There are currently three approaches to sustainability:

1. The classic approach broadly described in literature and well-recognized based on the Triple Bottom Line [67], (p.18–22). Then we can talk about a business model based on the Triple Bottom Line. These may be mature companies based on stakeholders' analysis and CSR or young companies working on ecological aspects, for example in the field of renewable energy sources. Then some people call them business models as sustainable business models.
2. The second approach is based on assumptions, for example Schaltegger says: "The value proposition must provide both ecological or social and economic value through offering products and services"—business model for sustainability" [68–75].
3. The third approach that matters is that new business ventures are based on technological innovations that break the classical economic rules (profit is not the most important), for example

business models based on sharing economy (Uber, Didi Kuaidi, Lyft-Market of car journeys (for example, in China—Alibaba—Sale of used goods) because the profit in these companies is not the most important and they work with network effect, so it is important to ensure their sustainability as the continuity of business (the requirements of law rules and social needs, ecological rules, labor rules and others are also very important, as well as the stability and sustainability of these business models).

Focus on maintaining the system's functioning should, above all, take into account the needs of public and social organization stakeholders [76], (p. 161).

11. The Adopted Methodology of Scientific Research into the Strategic Hybrids of Water Supply Companies

Research into the dynamics of organizational and management processes should, by their nature, be longitudinal. In such research, the search for mechanisms of change rather than the determination of the stages of development becomes more important to understand the process [10], (p. 47).

It is very difficult to infer about the organization's activity from the studies of various organizations. It is more cognitively valuable to look at a few of them in action, how their parts are interdependent from the perspective of their initial and final state. In this way, we can distinguish between volatile and static elements, and such knowledge is essential for every researcher. Theoreticians realize that, which is expressed in at least one level of theorizing, namely attempts to present their theories in dynamic terms, but unfortunately often with the tendency to test only the cross-sectional data, on the basis of which theories are generated and tested [10]. According to J.R. Kimberly [11] longitudinal scientific research consists of such techniques, methodologies and activities that enable the observation, description and / or classification of organizational phenomena in such a way that processes can be identified and empirically documented. In principle, longitudinal research examines processes in many periods. Since the period between data collection activities is determined by the researcher, the number of data collection periods is different according to different formulas. Longitudinal research is designed by changing six parameters: Research duration, time between data collection activities, number of data collection periods, a data collection method, research objectives and subject of analysis [77]. C. Janson suggests two broad classes of longitudinal research: Correlative longitudinal research (including studies of both normal representative populations and non-representative populations) and experimental research [78]. Longitudinal research is associated with the implementation of repetitive measurements of the same population of individuals for a long time, i.e., in a time that allows the detection of changes. Longitudinal research is often called a prospective study. An important feature of longitudinal research is that an individual makes measurement several times over time. Longitudinal research contrast with cross-sectional research where the measurement for each individual is single, i.e., at a single point in time, although the same research questions can be posed in cross-sectional and longitudinal research, but the main advantage of the former is its ability to separate different types of changes. The analysis of longitudinal data in statistical modeling is distinguished by special features, which include [79]:

1. The ability to control the heterogeneity for individuals;
2. More information about data: Greater variability, less collinearity, more degrees of freedom and greater efficiency;
3. The better ability to study the dynamics of the phenomenon, through the use of cross-sectional research (percentage of the unemployed) and longitudinal research (the division of periods of unemployment);
4. The ability to identify and measure outcomes that are not detectable in cross-sectional research or in a traditional time-series analysis;
5. The ability to build and test more complex behavior (behavioral) models than from cross-sectional or time series data;

6. Avoiding biased aggregation due to the fact that the majority of longitudinal data are set at the micro data level, but also different data structures (hierarchical and non-hierarchical) are included;
7. The ability to control unobserved variables and the possibility of examining the causality mechanism.

It was in longitudinal research in the context of business models that the cause and effect relationships in the conceptualization and operationalization of the observed business models were analyzed. The cause and effect of connections are important mainly in relation to the attributes (components) of business models of the companies surveyed. Events important for the development of change processes and development of the company's business models and their attributes were identified and examined. They allowed for understanding and explaining the processes of changes to the configuration of the business model.

The developed set of principles is applied to the business model assessment with the use of longitudinal research [80] characterized by:

1. A long observation of the business model allowing the evaluation of its revolution or evolution;
2. The frequency of research may enable the adjustment of the business model at the individual stages of the company's operation;
3. The researcher's observation that determines the emergence of the business model scalability capability;
4. Observation positively influencing the selection of business model attributes suitable to the needs;
5. Scientific research of a proactive nature, informing not only about the past, but also about the future development of the business model.

Therefore, according to the above assumptions, research into the strategic hybrids of water supply companies is based on longitudinal research.

11.1. Research Results

The result of research is to learn the essence of strategic hybrids as modern management instruments based on the analysis of data from several water supply companies operating in Silesia, i.e., their strategic solutions, presented in the comparative tables. These hybrids are presented in the form of business model canvases, strategy maps, process maps and project matrices. Strategic recommendations for the companies surveyed and companies operating under comparable conditions can also be included in the research results.

11.2. Research Results and Their Discussion

The research result is the identification of the strategic hybrids of several water supply companies based in Silesia with diversified capital, resource and location structure.

The discussion is in part based on the authors' own observations regarding the use of business models in management practice. Therefore, they can be used as a reference point for management mechanisms used by managers in the design and operationalization of the sustainable business models of companies.

11.3. Research Limitations

The features of the research gap in terms of consistency between the business model, strategy, business processes and strategic projects consist mainly of the following:

1. There is very little research in the world into the consistency of business models, strategies, business processes and strategic projects, hence the subject is relatively poorly recognized. As a result, there is little comparable research that can be used as a benchmark for the results achieved in the research presented.
2. Research into the consistency between the business model, strategy, business processes and strategic projects is of a particularly complex character, which creates specific limitations.

11.4. Consequences for Practice

Attention should be particularly paid to the conceptualization and operationalization of the strategic hybrids of water supply companies as solutions that are a model to follow or adapt to the needs of companies.

11.5. Consequences for Society

The use of the strategic hybrid opens a new dimension of perception of water supply companies as close to the society, where social innovations are focused on management mechanisms that are a source of exchange of social values among the stakeholders of water supply organizations. This approach contributes to the development of intellectual and social capital based on the management solutions for water supply companies.

11.6. Originality/Value of Research

Too little research into the strategic management instruments of water supply companies indicates the need for original studies on the strategic hybrids of water supply companies. The value of the study is included in a unique approach to research into the relationship between the organization's strategy, its business model, business processes and strategic projects.

12. The Operationalization of the Strategic Hybrid of Water Supply Companies in light of Scientific Research Conducted

The operationalization consists of the following steps:

1. Defining the strategic context of a water supply company
2. Defining its mission and vision
3. Defining the business model of a water supply company and developing its graphic form
4. Defining the strategy and operationalizing it as a strategy map
5. Defining processes and presenting them as a map of processes
6. Defining strategic projects in the form of a project portfolio
7. Defining the mechanisms of water supply company risk management
8. Defining interrelationships between the components of the strategic hybrid presented.

Therefore, the analysis of selected missions of these companies located in Silesia was conducted first (Table 6).

Table 6. List of selected missions of water supply companies in Silesia.

Missions of Water Supply Companies
Mission
"Our mission is to provide the community with high quality water and sewage treatment and to provide these services in a reliable and effective manner, respecting the natural environment."
By providing professional services in the field of water and sewage management, we increase the value of our company taking into account the voices of its stakeholders. We focus on partnership in relationships with inhabitants, care for the natural environment and a high level of management culture.
The mission of Przedsiębiorstwo Wodociągów i Kanalizacji is to guarantee the reliable operation of the water supply system and the sewage disposal and treatment system, satisfying the requirements of our clients and ensuring the safety and protection of the natural environment.
The Company's mission is a municipal task, that is water supply and sewage disposal, and the smooth and reliable operation of the Company is necessary for the comfort of life for the inhabitants of ten municipalities. It is therefore imperative to secure these tasks in a special way, and leave them in the local government sector.

Table 6. Cont.

Missions of Water Supply Companies	
Mission	
<p>We give people water, and water is life. The mission is to ensure, together with our partners, the security of the water supply system of the Upper Silesia, Zagłębie, Podbeskidzie and West Małopolska regions. Drinking water intake, treatment and supply are and will be our main activity.</p> <p>By completing the mission, we participate in the implementation of the objectives of the Province of Silesia development strategy for the years 2000–2020 for the benefit of the region and its inhabitants.</p>	
<p>We exist for inhabitants. We are a company that was established to serve you and meet your needs. Therefore, every day we take care of effective water supply in the city and we make every effort to ensure clean water from Bytom taps. Taking care of the comfort of inhabitants' lives and the natural environment, Bytomskie Przedsiębiorstwo Komunalne Sp. z o. o. also deals with sewage disposal and treatment. And all this is thanks to the work of specialists employed in BPK and the use of the latest technology. This allows our business to achieve high standards. Plans for the future:</p> <p>we are a company that primarily thinks about the Customer. We want to be close to inhabitants and respond to all their needs and problems. As a result, the Customer Service Office was established. We want our company to be always open to Bytom inhabitants, that's why we organize information and promotion campaigns,</p> <p>we will continue to professionally supply clean and safe water for Bytom inhabitants,</p> <p>we will continue to provide professional sewage collection and treatment using modern technologies,</p> <p>we will continue to invest and modernize the water and sewage network (we have implemented the EU project titled "Improvement of water and sewage management in the Bytom municipality" co-financed from the Cohesion Fund),</p> <p>we will launch educational and ecological campaigns in the coming months. They will allow us to develop ecological awareness and care for the natural environment in the local community—both among children and adolescents as well as adults.</p> <p>Our promotional and information campaigns will allow us to build a system of modern communication with the local community and the environment.</p> <p>What are we guided by?</p> <p>professionalism and ethics in action,</p> <p>care for the high quality of services we provide,</p> <p>a professional and kind approach to customers, because we are for them and establishing positive relationships with them,</p> <p>innovation and modernity in the implementation of investments,</p> <p>constant improvement in the quality of our company's operations,</p> <p>taking care of the public good and satisfying the needs of city inhabitants in terms of supplying clean water, sewage disposal and treatment.</p> <p>All this allows us to build a modern company that serves Bytom inhabitants. 100% shares of Bytomskie Przedsiębiorstwo Komunalne Sp. z o. o. belong to Bytom municipality.</p>	
<p>The mission of Przedsiębiorstwo Wodociągów i Kanalizacji Sp. z o.o. is to supply good quality water in the adequate amount and to dispose and treat sewage in a harmless and environmentally-friendly way.</p>	
<p>"The measure of the quality of our services is customer satisfaction" is the motto that accompanies us every day.</p>	
<p>The company's mission is to meet the collective needs of Pszczyna city and municipality inhabitants in the field of water supply, collection and treatment of sewage and other municipal services.</p>	

Source: Own study.

In order to demonstrate interpretation differences concerning the appearance of the strategic goals of economic and social strategic goals outlined in the strategies of water supply companies in the Province of Silesia, key strategic goals have been defined in the table (Table 7).

Table 7. Summary of strategic economic and social goals presented in terms of the strategic hybrid.

No.	Strategic Economic Goals	Strategic Social Goals
1	To ensure the dynamic development of the Company by improving the existing fixed assets and their expansion, related with organizing water and sewage management	Care of the interests of inhabitants, expressed in determining the cost at the necessary minimum level
2	To increase the efficiency of tangible, human and financial resources	Shaping the Company's image as a company that is well-known and valued by customers for the reliability and efficiency of the implementation of tasks in the public utility sphere

Table 7. Cont.

No.	Strategic Economic Goals	Strategic Social Goals
3	To maintain financial sustainability	To ensure job satisfaction for company employees through an appropriate incentive, remuneration and management system
4	To manage business assets effectively	To build social trust
5	To maintain long-term financial stability	Financial and organizational support for valuable social initiatives
6	To raise finance (EU funds, loans, leasing, co-funding by municipalities)	To promote a healthy lifestyle
7	To optimize operating costs (controlling, strategy implementation and evaluation).	To build a system of values inside and outside the organization
8	Professional systems of service settlement	Support for the so-called vulnerable customers
9	To provide sources of financing for the implementation of the strategy	To protect the interests of the recipients of services
10	To achieve a cost leadership position	Professional service and facilities in handling various matters
11	To maintain the water sales volume	To share knowledge and skills
12	Cost allocation, price policy	To build transparency and corporate governance principles—generally available information and regulations
13	-	To provide an appropriate offer that guarantees the security of water supply to the inhabitants in the region
14	-	Care for the quality of services
15	-	To develop social and environmental education

Source: Own study.

With reference to the above-mentioned goals it can be concluded that water supply companies in the Province of Silesia pursue social and economic goals. On the one hand, these goals complement each other, but in some cases they are mutually exclusive. On the one hand, when analyzing economic goals, the aim is to achieve a cost leadership position, while as regards social goals, to ensure job satisfaction for company employees through an appropriate incentive, remuneration and management system or financial and organizational support for valuable social initiatives. Therefore, it is crucial to building a coherent strategy based on the correlated form of goals described in the form of a strategic hybrid.

The next step is to present the business model of a water supply company. The model includes four key components, which may include stakeholders, value proposition for the customer and satisfying the needs of inhabitants, income generation logic, the organization of internal suppliers correlated with strategy, position in the value network and value chain configuration (Figure 7).

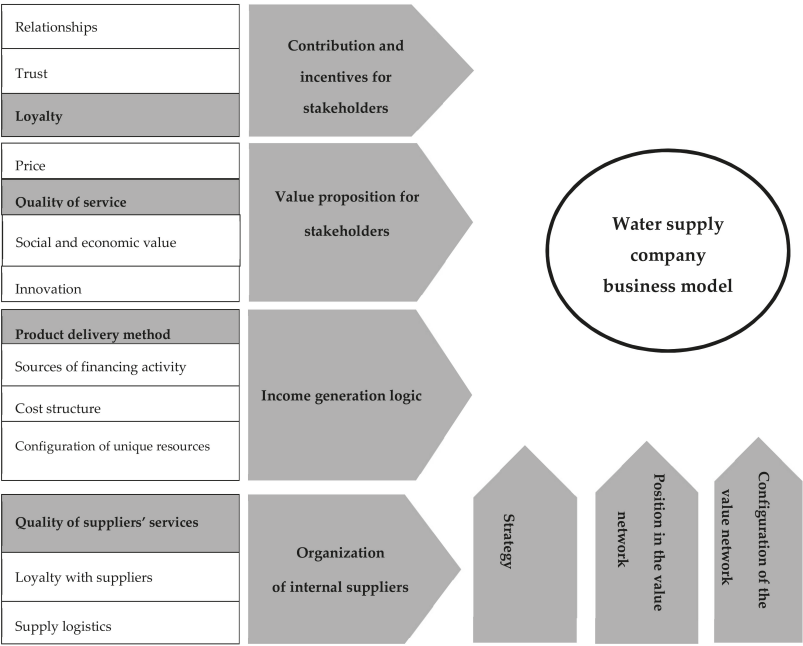


Figure 7. The shape of the business model of a water supply company. Source: Own study.

The two stages allowed for defining the components of the business model in relation to the description and evaluation criteria together with the determination of the significance of a component for a water supply company (Table 8).

Table 8. Components of the business model of a water supply company.

Business Model Component Criteria	Description and Evaluation Criteria	Significance of a Component for a Water Supply Company
Stakeholder	A stakeholder is the main pressure center on the basis of which the structure of building a business model is created. He is the recipient of products or services.	In the stakeholder component, the most important element is relationships.
Relationships	Bonds that connect a loyal stakeholder with the brand.	All strategic activities should aim to ensure that stakeholders' expectations are met.
Public and business trust	Trust is the readiness to be sensitive to the actions of the other party based on the assessment of its credibility in a situation of interdependence and risk.	The second factor that defines this component is trust that connects stakeholders with the organization.
Loyalty	Cooperation with the stakeholder is based on the pressure of the company to maintain multiple transactions and solve its problems.	

Table 8. Cont.

Business Model Component Criteria	Description and Evaluation Criteria	Significance of a Component for a Water Supply Company
Value proposition for stakeholders	Value proposition for stakeholders defines elements, such as the material benefits of the product, the emotional benefits of the product, a transaction cycle, and relationships with final consumers	In the value proposition for stakeholders' component, the most important component is the quality of services (resulting mainly from the quality of infrastructure and stakeholder service at the point of service).
Price	The amount of money that stakeholders must pay for a product or service.	Another factor is brand—a water supply company should be characterized by a brand (trademark) recognized by its stakeholders.
Quality	Quality is a feature or a set of features that differentiate a given item from others, or all features of a given item that are important due to its internal structure and because of its relationships, impact and relationships with the environment.	Innovation in the product sphere is a no less important component
Brand	Brand is a name, date, symbol or graphic design or a combination thereof, the purpose of which is to identify the goods or services of one seller or group of sellers and to distinguish goods or services offered by competitors.	
Innovation	Innovation is the implementation of a new or significantly improved product (product or service) or a process, a new marketing method or a new organizational method in business practice, workplace organization or relationships with the environment. It has been assumed that the minimum requirement for innovation is that a product, process, marketing method or organizational method should be new (or significantly improved) for the Company. It includes products, processes and methods that the Company developed first, and those that have been adopted from other entities.	
Income generation logic	Income generation logic is shaping of resources and activities that are used to generate financial surpluses.	In the income generation logic component, the most important element in the Company is the method of product and service delivery and the configuration of unique resources.
Product delivery method	How are products and services delivered?	Other elements include the sources of financing the activity (including external funds, such as subsidies) and cost structure.
Sources of financing activity	How is operational activity financed?	
Cost structure	What is the cost structure?	
Configuration of unique resources	What resources must be available to provide a product or service?	
Organization of internal suppliers	A cooperation method with suppliers defining the mutual principles of action and the course of the relationship.	For the organization of internal suppliers' component, the most important factor is loyalty with suppliers and supply logistics.
Quality of suppliers' services	The degree to which expectations as to the delivery method of the product or service by the supplier are met.	
Loyalty with suppliers.	Cooperation with suppliers based on a continuous and lasting relationship.	
Supply logistics	Value proposition goes to customers via communication, distribution and sales channels.	
Type of implemented strategy	The strategy of qualitative leadership is also called the strategy of differentiation; it is based on the attractiveness of the product or service offered, that is making the offer available to the customer, who will notice and appreciate its unique character.	
Position in the value network	Position in the value network is the location of the company in relationship to: Customers, suppliers, competitors and other stakeholders. A water supply company has a dominant position resulting from the conditions of the water supply sector. All activities undertaken by the Company should aim at keeping the dominant position in the market.	
Configuration of the value chain	A water supply company aims to control and capture value in the area of the entire chain—market integration in the local area. The logic of the Integrator model is double—controlling and minimizing assumptions, which makes it possible to understand the difference in the priorities of this business model in planned and market economies. A company intends to control and capture the added value created in the areas of the entire water supply business chain, from supply, through service provision, to marketing.	

Source: Own study.

The next step in the construction and operationalization of the strategic hybrid of water supply companies was the development of a strategy map for a water supply company, determined by four key perspectives: Learning and development, internal processes, stakeholders and finances together with defining the maps of strategic groups in relation to individual perspectives.

These perspectives are expressed through the cause and effect relationships between various objectives embedded in these perspectives. Such logic allows for the determination of strategic scenarios that move from the perspective of learning and development to the financial perspective.

At the same time, it enables the cascading of strategic goals to the lower levels of management along with defining specific objectives, strategic initiatives and the measures of effectiveness and efficiency of the objectives set. Then a specific measurement system is created that includes financial and non-financial measures.

At the same time, processes necessary to implement the strategic and tactical and operational assumptions of the water supply company were taken into account and their mutual relationships in the process map were presented. The processes presented in this map were classified as management, core and supporting processes. Cause and effect relationships also occur between the processes taking place as part of the integrated value chain. The effect of this chain is the implementation of the main process, which is the production and distribution of water (Figures 8–13).

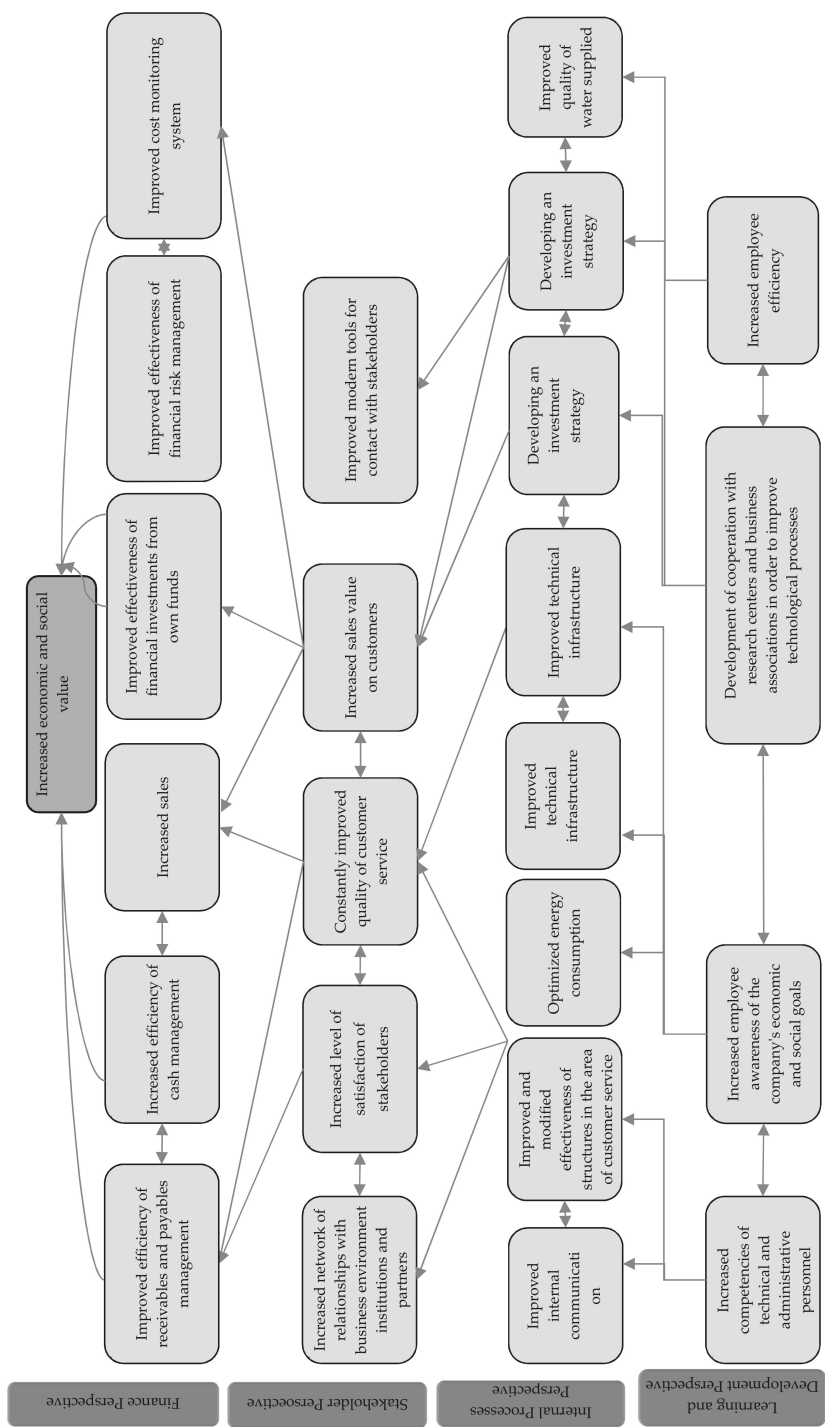


Figure 8. Strategy map. Source: Own study.

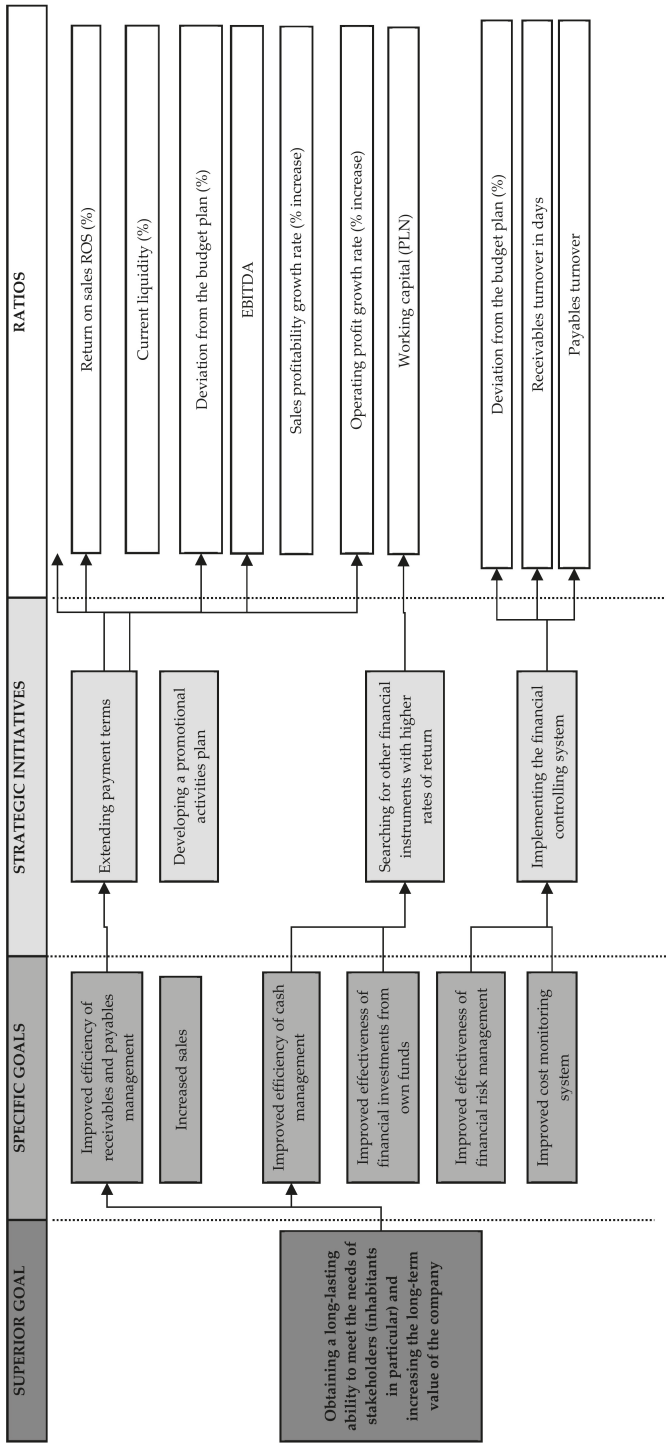


Figure 9. Map of strategic goals—a finance perspective. Source: Own study.

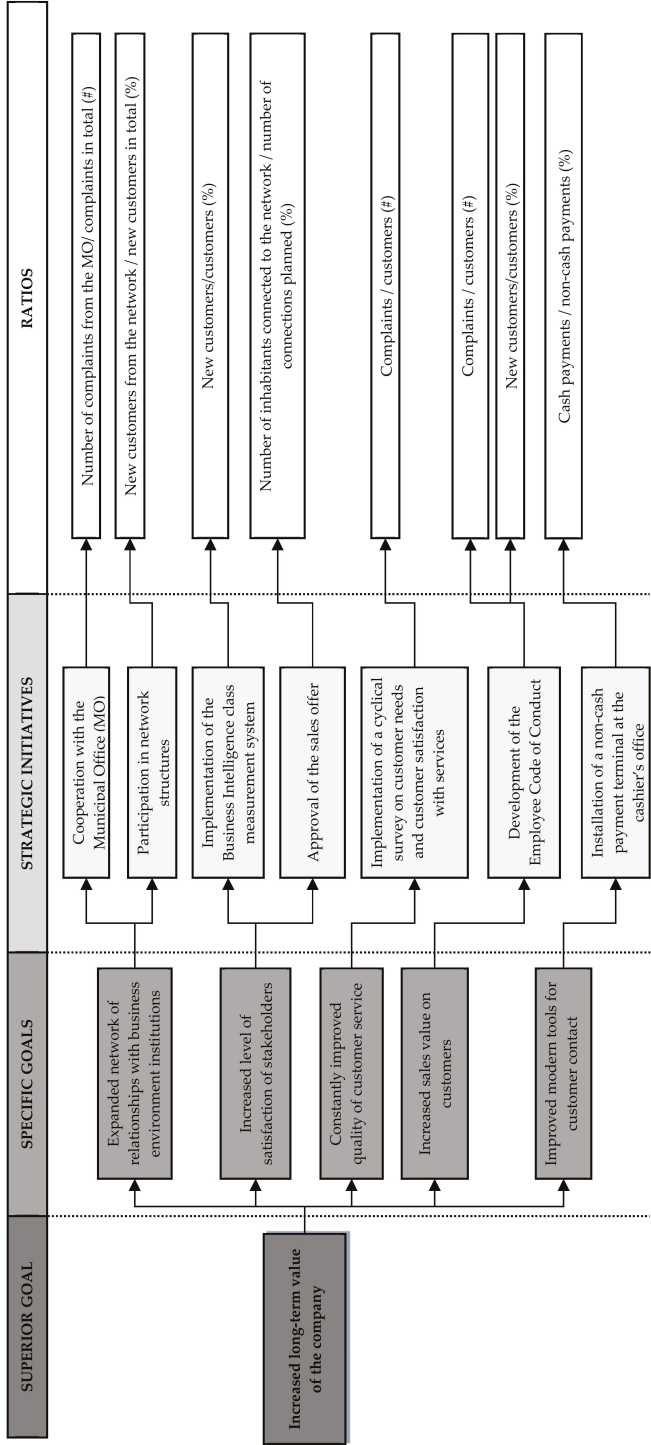


Figure 10. Map of strategic goals—a stakeholder perspective. Source: Own study.

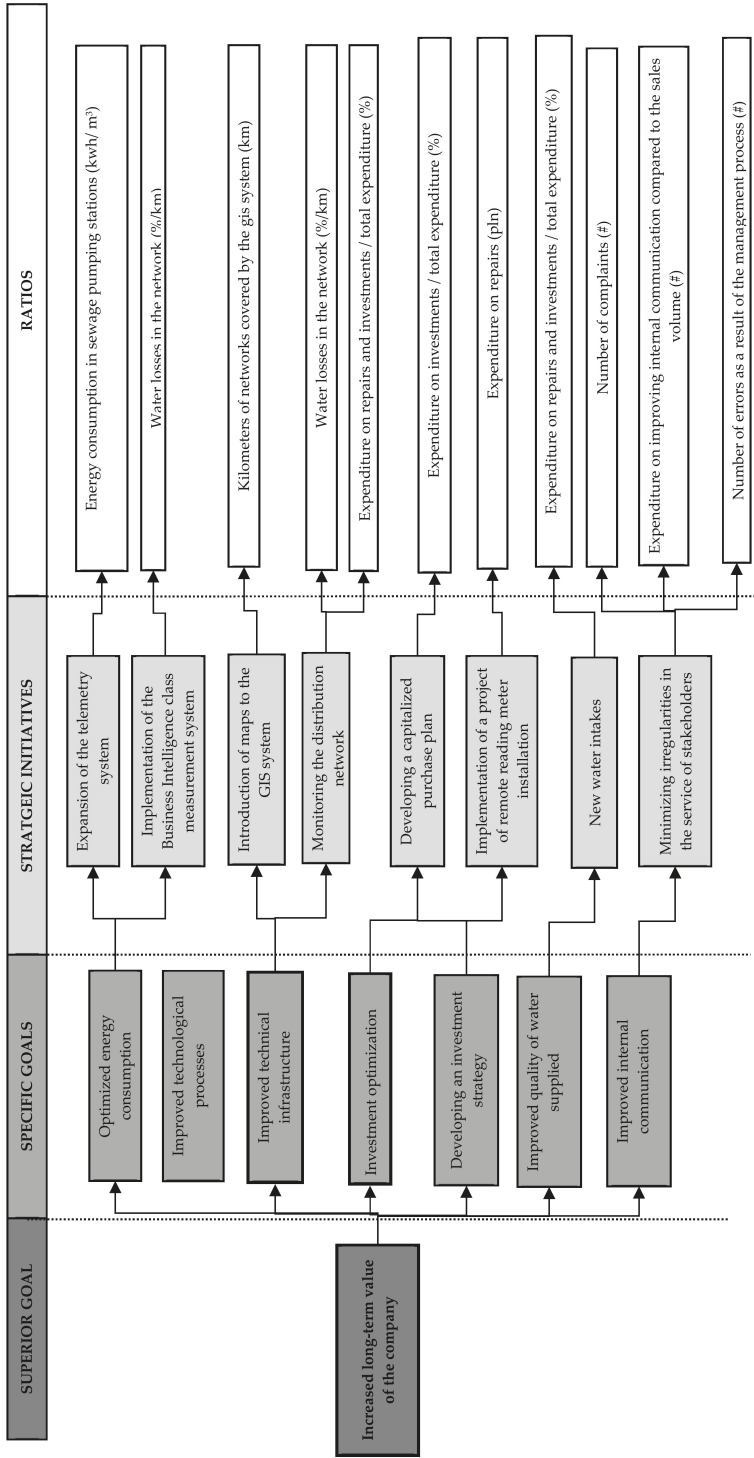


Figure 11. Map of strategic goals—the perspective of internal processes. Source: Own study.

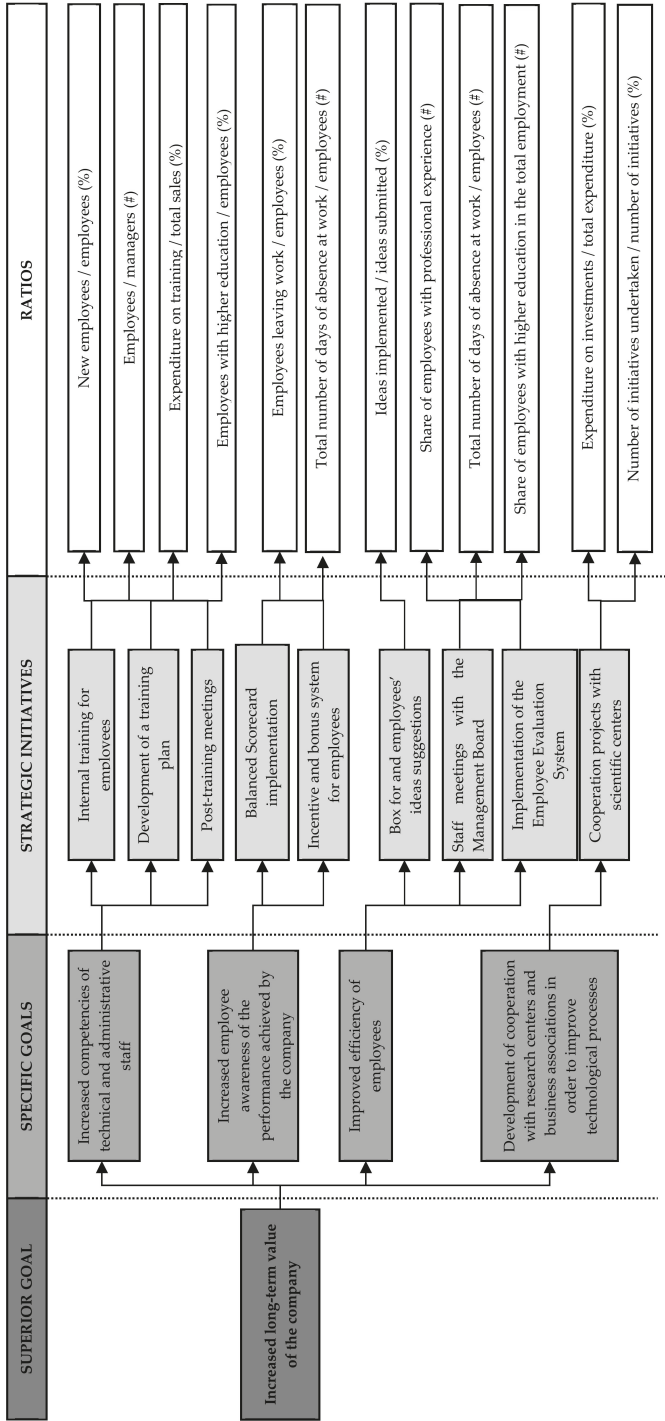


Figure 12. Map of strategic goals—the perspective of learning and development. Source: Own study.

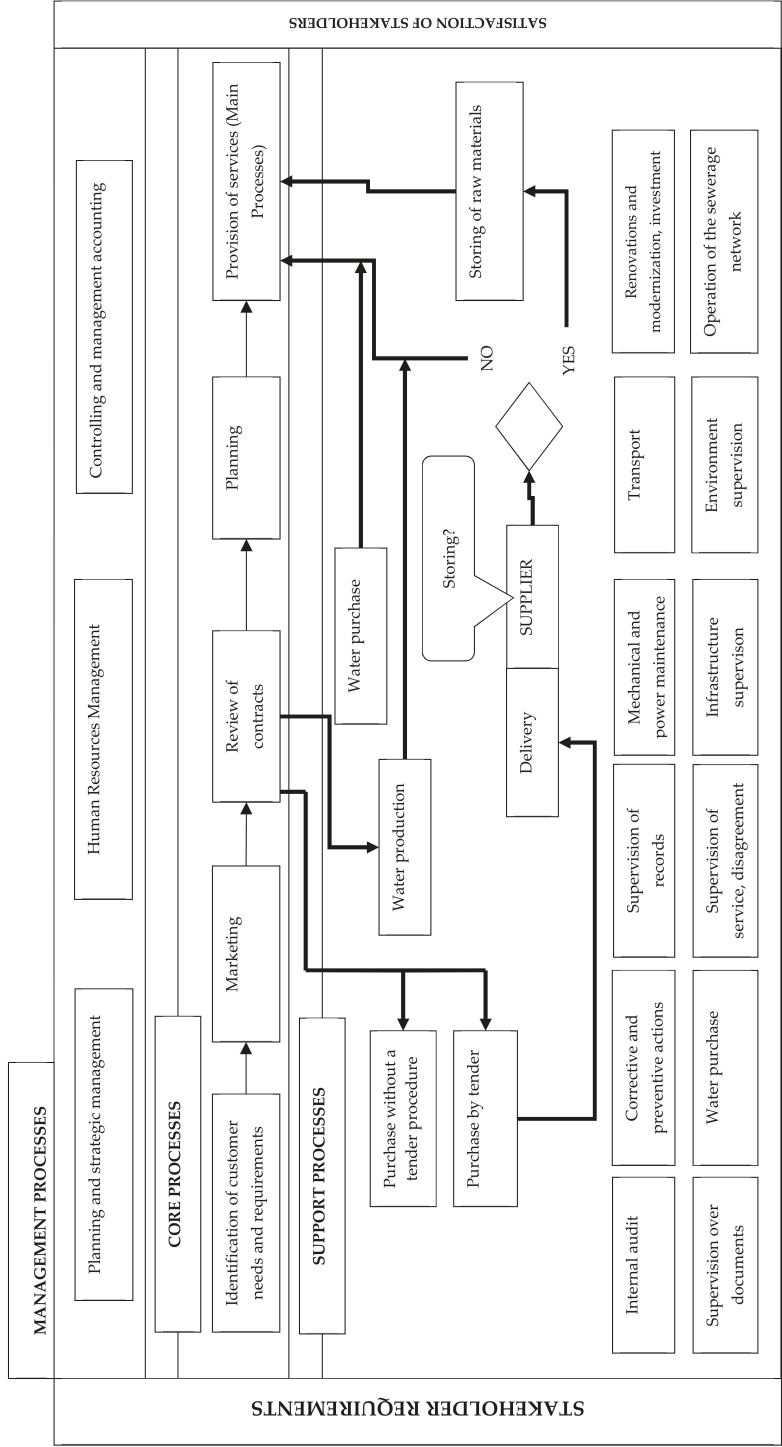


Figure 13. Map of the processes of a water supply company. Source: Own study.

Subsequently, the concept of project management for a water supply company was presented. As is widely known, the essence of project management is the application of knowledge, skills, tools and techniques used in the implementation of the project to meet the required objectives and expectations of stakeholders. Therefore, the selection of strategic initiatives to be implemented should be consistent with the Mission and Vision of a water supply company. As project management is a sequential decision-making process, it was assumed that each project implemented in a water supply company should take into account the assumptions of the project management concept and the implementation of this project should be divided into stages:

1. Stage one—defining a project resulting from strategic initiatives set;
2. Stage two—project planning—before the implementation of activities defined, a project schedule is developed. It contains a work division structure and a need for resources during project implementation, including a project budget.
3. Stage three—project implementation—this is the time necessary to perform the activities defined and planned. During the implementation, activities are continuously monitored and coordinated.
4. Stage four—completion of the project—a stage aimed at determining whether the final outcome of the project implemented fulfills the requirements assumed in the project planning stage.

In the implementation of the concept of project management, it is important to define a project portfolio that includes a set of strategic projects. Four key portfolios were proposed for a water supply company: Quality Creation, Water Safety, Sustainable Development and Intellectual and Social Capital (Figure 14).

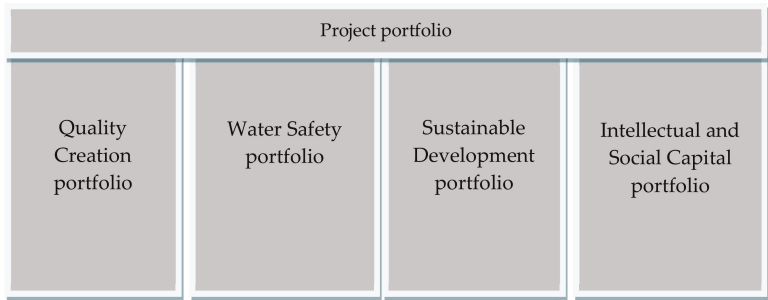


Figure 14. Project portfolio of a water supply company. Source: Own study.

Each project implemented in accordance with the Project Management concept should be described in the "Project Charter" of the implementation of the initiative developed for a water supply company. The project charter of initiative implementation is part of the Strategic Scorecard; it describes the course of the entire project implementation process (a project schedule). It contains data on the subject of the project and its description, the sources of project financing (a project sponsor) and necessary resources (project budget), a person responsible for the implementation of the initiative (a project manager) and the team involved in the project.

While building the strategic hybrid of a water supply company, reference was also made to the mechanisms of the conceptualization and operationalization of the risk management concept. The assumptions of risk management in a water supply company are based on a sustainable value chain that ensures an effective water supply system [81].

Recognizing the complexity and interdependence of water availability and use, the World Business Council for Sustainable Development has grouped water risks associated with economic activities into five categories that can be reduced by clearing and treating water. Production that includes [82]:

1. financial risk (capital restriction, higher loan interest rates and premium insurance),

2. operational risk (increased production costs and distortions),
3. product risk (loss of market share caused by the increased number of consumers, care and preferences of customers),
4. risk of reputation loss (potential community conflicts and loss of business license), and
5. regulatory risk (an opportunity for new fees, regulations, fines and even lawsuits if the company's activity is contrary to the public interest).

The assumptions of the risk management system in a water supply company are as follows:

1. The Management Board is responsible for the level of risk in the company.
2. Every decision in the company has financial consequences.
3. A company should have a risk management system that covers technical and financial risks.
4. Risk can be reduced, transferred to third parties or covered by insurance.
5. The risk strategy should be included in the responsibilities of senior employees.
6. It is necessary to determine boundary conditions for effective risk management
7. Each separated area of the organization should determine risk boundary conditions in its area.
8. The company's management board sets objectives and tasks in relation to risk taking into account previously recognized boundary conditions.

Taking into account the core activity of a water supply company, the safety of the water supply system is mainly exposed to risk. The functioning of the water supply system carries the risk related to the lack of water supply and its poor quality. Domestic and global regulations [83,84] and the democratization of public life require the adaptation and development of research methods related to the safety of this system. Therefore, appropriate risk control is of great importance.

It is important that security systems adopted are reliable and effective, which determines their security potential. The management of the safety of water supply systems should take into account contemporary trends that make this area develop in the following directions:

- the integration of the safety management of the water supply system with quality management systems in accordance with ISO 9000 standards and environmental management systems, in accordance with the ISO 14000 standard,
- improvement into safety management with the use of comprehensive quality management,
- paying attention to the IT security issues of a water supply company.

The risk management methodology in a water supply company is shown in Figure 15.

The research and own observations, as well as research conducted by the authors mentioned above, show that risk in a water supply company is also related to the occurrence of damage or failure. Damage is an adverse event that causes small-scale losses and occurs relatively frequently. The risk in this case is related to damage to the water supply network (distribution, home connections), pump units, water treatment equipment, as well as fittings in internal installations. The level of risk is estimated on the basis of empirical data with the use of indicators of damage intensity, repair intensity and financial losses due to unsupplied water and the maintenance costs of maintenance and repair teams by the water supply company. The risk reduction strategy consists mainly of reducing the unreliability of facilities. In turn, failures as adverse events causing losses on a medium scale are rare. They include major pipeline failures, power outages due to lightning discharges, and the incidental deterioration of the water quality in the source, requiring adjustments in the water treatment process. The level of risk is estimated based on relevant reliability indicators. Risk management in this case focuses on monitoring the functioning of the water supply system by means of qualitative and quantitative methods. In turn, major failures and disasters are adverse events that cause significant damage and occur very rarely. The frequency of their occurrence is estimated based on probabilistic models. They include global water contamination in the water supply network and problems with the quality and quantity of water that arise as a result of flood or long-term drought. Risk estimation is

prognostic on the basis of emergency scenarios. Risk management consists of analyzing the work of a multi-barrier system that protects consumers against poor water quality (monitoring water quality in a protective and warning station, the cross-section of water intake, the key areas of water treatment process, clean water, selected sites in the water supply network and selected recipients), and water supply for consumption from alternative sources.

A basis for an efficient risk response system is its proper identification, and then the development of decision-making scenarios for each risk, which consequently gives the opportunity to choose a strategy on how to deal with it. One of the major factors that determine the strength of the influence of a given factor is also cost analysis.

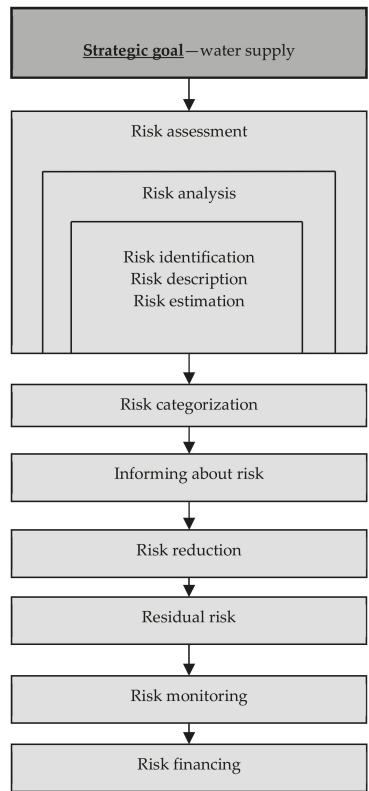


Figure 15. Risk management methodology in a water supply company. Source: Own study.

13. Conclusions

Modern management mechanisms in the contemporary world open new spaces for the development of management sciences. They are focused not only on the establishment of new organizational forms but also on hybrid solutions. The joint implementation of social and economic objectives is one of the forms of a hybrid approach. However, that is also not sufficient. It is necessary to look for refined, multi-criteria options of the functioning of companies. Undoubtedly, water supply companies are such companies. It is crucial for them to find management solutions that guarantee their high both economic and social performance. In this approach, it may be important to use a specific strategic hybrid for a hybrid company, such as a water supply company. The paper attempts to present such a strategic option., where the assumptions of the hybrid scorecard were also used as a tool that supports the achievement of high performance. It has been demonstrated that strategic

hybrids in water supply companies can be an effective management instrument. Solutions for the operationalization of the hybrid scorecard in the form of a selected strategy map, business model canvas and project portfolio taking into account risk management principles were highlighted.

The synthetic findings of scientific research and related to the use of hybrid mechanisms by water companies indicate that:

1. This approach has a significant impact on the social and economic effects of water supply companies
2. The joint implementation of strategic hybrid components ensures the tightness of the network-based ecosystem where the water supply company is embedded.

The principles of implementing the business model and strategy together with processes and projects cover all levels of the water supply company, creating its social and economic value

The relevance, significance and contribution to science of the issues related to the mechanisms of effective strategic management of water supply companies based on the strategic hybrid are presented below.

In writing this article, the authors wanted to contribute an original and comprehensive approach related to defining the mechanisms of effective strategic management to the development and the theory and practice of strategic management of water supply companies. In the relevant literature, the place and role of strategic management systems based on the strategic hybrid of water supply companies in the context of their effectiveness has not been so extensively discussed so far.

The distinctiveness of the creative contribution is related to the presentation of a comprehensive scientific discussion and application solutions in the field of creating mechanisms for effective strategic management in the water supply enterprises.

The scope of the creative contribution is international because, due to the liberalization of the economy, the proposed solutions can be extended to water supply companies operating in the European Union. The effectiveness of the creative contribution is related to the achievement of the utilitarian goals of the paper, i.e., presenting managers with multidimensional strategic recommendations in the scope of the development and improvement of strategic management systems of water supply companies. The developmental character of the creative contribution lies in the fact that it will be the basis for further research and scientific reflections in this area.

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Article

A Study of Trust and Cooperation in the Nzoia River Basin Using a Water Policy Game

Abby Muricho Onencan *, Bert Enserink and Bartel Van de Walle

Policy Analysis Section, Multi-Actor Systems (MAS) Department, Faculty of Technology, Policy and Management, Delft University of Technology, Building 31, Jaffalaan 5, 2628 BX Delft P.O. Box 5015 2600 GA Delft, The Netherlands; B.Enserink@tudelft.nl (B.E.); B.A.vandeWalle@tudelft.nl (B.V.d.W.)

* Correspondence: a.m.onencan@tudelft.nl; Tel.: +31-15-2781-810

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Abstract: Nzoia river basin county governments barely cooperate in water resources management to jointly increase the basin's food and energy productivity levels, due to limited trust. In this paper, we propose a game-based approach that can be replicated in any river basin, to assess trust and collaboration processes. In particular, we used the pre-game, in-game, and post-game assessment results to assess the relationship between Cooperation and Competition; Trust and Trustworthiness; Trust and Distrust; and (Dis) trust, Complexity, and Uncertainty. The initial assessment of respondents' propensity to trust (PTS) was divided into two variables (trust and trustworthiness) while adopting the unidimensional view of trust and distrust. We later examined whether we could separate the two constructs using a multidimensional scaling (MDS) technique known as the ALSCAL procedure. There are potentially significant results. Namely, that: trustworthiness and trust are not complementary; both cooperation and competition coexisted and increased throughout the game; more profound complexity and uncertainty led to an increment in trust, and reduced complexity and uncertainty led to a decrease in distrust. Based on the results and discussions, we provide recommendations for further research on trust, trustworthiness, and distrust in the river basin management context.

Keywords: trust; trustworthiness; distrust; water cooperation; competition; complexity; deep uncertainty; risk perception; Nzoia river basin; water policy gaming

1. Introduction

Studies show an increasing difficulty for countries to make all their food and energy, within national geographical boundaries, due to scarce water resources [1–10]. Therefore, basin states are faced with a difficult decision: whether to maximize food and energy production or limit and/or stop production and buy the shortfall from other riparian states [11]. Rational decision-making supports cooperation aimed at maximizing production while minimizing costs, regardless of where the food or energy is produced within the basin [6]. Based on previous research, trust is a critical element needed when making the bold decision to stop or limit production and buy the shortfall from other riparian states [9,10,12]. The willingness by the parties to cooperate is sufficient to emit signals that get reciprocated and based on repeated reciprocation of signals that foster cooperation, trust can be cultivated [13] (p. 225). Some riparian states are not willing to cooperate, due to low levels of trust [7,9,10,12,14,15]. Therefore, many basin states are locked in an impasse: they need to cooperate to build trust, and they cannot cooperate because they lack the 'willingness to cooperate,' which is a core element that initiates cooperation [13] (p. 225).

We define a trusting relationship as one where the trustor (A) has definite feelings of assurance and hope that the trustee (B) will act in the trustor's favor "to do X" [16], and not take advantage of the relationship to the detriment of the trustor [16–18]. According to Hardin [18], the relationship is

divided into three parts “A trusts B concerning matters X.” In the case of basin states, A can trust B with food production for A’s residents, but not energy production. In other instances, A can trust B with money and not personal secrets. Therefore, X is a critical component of the trust relationship, and A can trust B on some issues and not others [16].

One critical advantage of trust is the reduction of complexity [19,20]. In this paper, we define complexity as decision makers inability to assess future effects of planned actions due to unknown interactions between many variables [21]. The past is used to reduce the complexity of the familiar present, through repeated actions reinforced when they lead to the same outcome [22]. However, when the present and future is uncertain, trust is one possible mechanism for reducing complexity. We define uncertainty as the absence of knowledge [23] (p. 16), or when the available knowledge is not certain (impacts of climate change, unknown adaptation and mitigation costs, unknown effects of policy options, and unpredictable social and political environment) [24] (p. 160). According to Luhmann [25] (p. 23), the act of trust reduces deep uncertainties and complexity of the future world. Even though there are many plausible future possibilities, trust reduces the possibility to one possible outcome, the act X by the trustee (B).

Since the fulfillment of X is dependent on B taking into account the interests of A, then B’s trustworthiness encapsulates A’s interest. Ben-Ner [26] (p. 65) defines trustworthiness as “the willingness of a person B to act favorably towards person A when A has placed an implicit or explicit demand or expectation for action on B.” For instance, in a river basin, A (downstream riparian government) entrusts B (upstream riparian government) to maintain good water quality upstream (X). In this instance, it is in the interest of A for B to cooperate and not pollute the river (X). Conversely, it is B’s interest to act in a trustworthy manner, and thus maintain good diplomatic relations with A. Therefore, B’s trustworthiness encapsulates A’s interest.

According to Mayer et al. (1995), trustworthiness consists of three factors: benevolence, ability, and integrity [17]. Evans and Revelle (2008), define benevolence as “the general desire to do good” [27] (p. 1586). Benevolence is the willingness to support others, notwithstanding the costs [27]. Ability refers to a set of competencies, skills, and characteristics that facilitate the effective operation in a certain discipline or domain. Evans and Revelle (2008), define integrity, as “the desire to uphold rules and social norms” [27] (p. 1586). Both benevolent and persons of high integrity reciprocate in a trust relationship [17]. However, the driving force for reciprocity differs. According to Evans and Revelle (2008), the benevolent reciprocate because they are concerned and have a desire to help and perform good actions. Contrary, integrity driven individuals reciprocate out of the conviction that “it is the right thing to do” [27] (p. 1586). If B cannot maintain good water quality (maybe B cannot monitor and stop water polluters), then B will not be considered trustworthy, even if B demonstrates integrity and/or benevolence. Research indicates that evidence of being trusted by the trustor increases the likelihood of the trustee reciprocating [27].

B may choose not to reciprocate and thus take advantage of the trust relationship and act to the detriment of A. The perception by a trustor (A) that the trustee (B) will reciprocate or not, introduces the third element of our study, distrust. According to Gambetta (1988) “it is important to trust, but it may be equally important to be trusted” [13] (p. 221). In trust, the trustor is willing to take the risk of being vulnerable to the trustee, whereas distrust feelings are risk-averse. The distruster is not willing to be vulnerable to the distrusted and take any risks that arise from cooperative actions. Distrust feelings create fear, avoidance, and discomfort. Distrust helps to defend the distruster from the distrusted [28]. In a high trusting relationship, there can also coexist very high distrust levels [28–30]. Lee (2018) explains that distrust has for a long time been perceived as “the opposite of trust.” Recent studies have discounted the unidimensional view of trust and distrust and adopted a bi-dimensional view [28,31,32]. Lee (2018) states that “high trust is not the same as low distrust” and argues that distrust is distinct from trust and should be treated as a separate construct [28,31,32]. Thus, low levels of trust are not similar to high distrust levels, and an increase in trust does not automatically lead to decreased distrust [28,32,33].

Most studies focus on understanding trust [18,25,26,34–38], with insufficient research on trustworthiness and the relationship between trust, trustworthiness, and distrust [34]. Reiersen [34] (p. 1) states that it “is somewhat surprising given that trustworthiness is fundamental to trust.” Hardin [16] explains that most of the trust literature barely mentions the term trustworthiness, “though implicitly much of it is primarily about trustworthiness.” Reiersen [34] (p. 1) adds that “It makes no sense to trust others if others are untrustworthy.” Also, it is detrimental to the trustee to trust an untrustworthy person. According to Reiersen [34] (p. 1) trust is based on the belief that the trustor can be entrusted not to abuse the trust shown. Furthermore, some models theorize that the trust–trustworthiness relationship is complementary and cyclical [27,39]. Moreover, there is limited research on the relationship between trust and distrust, especially in the context of water cooperation [6]. Also, due to weak conception of trust, many studies do not incorporate the three elements of trust in their research instruments: trustee, trustor, and the trustee’s behavior (X). Countless researches focus on A and B with no reference to X [40] (p. 19). Hardin [16] explains that A and B without X is an incomplete understanding of trust. Bauer [40] (p. 19) further states that the inclusion of X has diffused slowly within the trust scholars. Bauer [40] (p. 20) recommends that trust scholars should conceptualize trust and formulate questions that demonstrate the three dimensions of trust.

To increase trust amongst riparian governments that share a river basin, it is essential to understand trust elements and how they relate to one another [34] (p. 3). We seek to study trust and collaboration processes using a game environment. We chose policy gaming method because of the low risks associated with gaming, which provide a safe learning and policy practice environment. Through the game, we simulated the river basin context and facilitated the process of interaction, joint problem solving, and learning [41–44]. We used the pre-game, in-game, and post-game assessment results to assess the relationship between:

1. *Cooperation and Competition*: Are cooperation and competition alternatives, or can they coexist [13] (p. 215), in the context of river basin management?
2. *Trust and Trustworthiness*: Is the trust–trustworthiness relationship complementary [27,34,39], within the context of the Nzoia WeShareIt game?
3. *Trust and Distrust*: Is the trust–distrust relationship bi-dimensional [28,31,32], within the context of the Nzoia WeShareIt game?
4. *(Dis) Trust, Complexity, and Uncertainty*: Increased trust leads to the reduction of complexity and uncertainty [25,45]. What is the effect of reduced complexity and uncertainty on distrust [46], within the context of the Nzoia WeShareIt game?

In this research, we undertake a subjective assessment of respondents’ propensity to trust (PTS) which we divided into two variables (trust and trustworthiness). We adopt the unidimensional view of trust and distrust at the start of the experiment and later assess whether we can separate the two constructs using the multidimensional scaling (MDS) technique known as ALSCAL procedure [28,33]. The ALSCAL procedure facilitates detailed analysis of the underlying dimensions and clusters using the multidimensional scaling technique. Based on the MDS results, we provide recommendations for further research on trust, trustworthiness, and distrust in the river basin management context.

The paper is structured as follows. Section 2 introduces the Conceptual Framework and explains the research methods and materials which include the experiment design, the materials used in the quasi-experiment, the process of data collection, and the methods used to analyze the data. Section 3 contains the findings based on the in-game data, the initial descriptive statistic results, the Chi-square goodness of fit test results, and the MDS ALSCAL procedure. The subsequent section discusses the findings and explains the limitations of the study. The final section provides concluding remarks and proposes future research.

2. Materials and Methods

We divided the materials and methods section into three parts, first the conceptual design, then the description of the game and finally the methods used to analyze the game data. We used three methods to analyze the pre-game and post-game assessment results. First, the Principal Component Analysis (PCA), followed by the Chi-Square test for goodness of fit, and finally the multidimensional scaling using the ALSCAL procedure. For the in-game data, we extracted the results of all the trading rounds and assessed them using Tableau professional edition version 10.2.3.

2.1. The Nzoia WeShareIt Game Conceptual Framework

The Nzoia WeShareIt conceptual framework (Figure 1) was developed to incorporate trust, trustworthiness, and cooperation, in the policy game. It combines three design approaches the: Klein (1993) Recognition-Primed Decisions (RPD) model [47,48], the input-process-output model of serious game design developed by Garriss, Ahlers, and Driskell (2002) [49], and Landers (2014) theory of gamified learning model [50]. Onencan (2018) [11] explains how the design approaches were incorporated in the Nzoia WeShareIt game (see supplementary information S1).

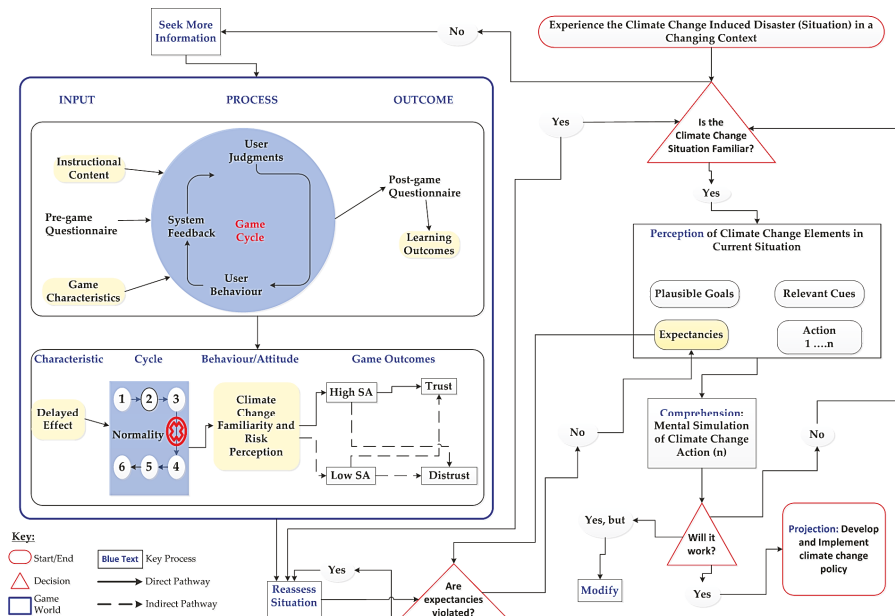


Figure 1. Recognition-Primed Decisions (RPD), Expectancy and Input-process-output model of Nzoia WeShareIt Game. The arrows indicate the causality path. Adapted from Klein [48], Garriss, Ahlers, and Driskell [49], and Landers [50]. The game outcomes on situation awareness (SA) are discussed in Onencan [10]. The first three-game cycle rounds represent the status quo (normality). In the fourth round, the player’s food and energy resources are halved due to a slow-onset disaster in the form of drought, thus disrupting the status quo.

The Garriss, Ahlers, and Driskell (2002), input-process-output model and the Recognition-Primed Decisions (RPD) model [47,48], informed the design of the Nzoia WeShareIt game steps and cycles to ensure structured game design and participant learning. Each cycle provides an opportunity for the players to learn through interactions with other players and Real-time feedback through performance graphs, leaderboard, and in-game reflections [49].

Landers (2014) theory of gamified learning model was adopted to influence behavior and attitudinal change. Since the input-process-output model is designed to influence direct learning, we incorporated the Landers (2014) theory of gamified learning model to influence players behaviors and attitudes, indirectly through the delayed effect game mechanic in the form of climate change-induced disasters (drought) [50]. Drought increases climate change risk perception and is expected to contribute to cooperation ultimately.

2.2. Experimental Design

The game was designed for policymakers in the Nzoia river basin in Western Kenya. The basin comprises six country governments, namely, Busia, Bungoma, Kakamega, Siaya, Trans Nzoia, and Uasin Gishu. Each county government has different resources and different targets. Some counties (Trans Nzoia and Kakamega) have higher food productivity capacity, and others (Uasin Gishu and Bungoma) have higher hydro-electric energy productivity capacity. Some county governments (Busia and Siaya), cannot produce the bare minimum of food and energy for their residents, without compromising economies of scale, the environment, and future generations. Downstream counties (Busia and Siaya) that have lower food and hydro-electric energy productivity capacity could stop food and energy production. Upstream counties could choose to focus on only food or energy production, based on their comparative advantage and stop the production of food (in the case of Uasin Gishu and Bungoma) or energy (in the case of Trans Nzoia and Kakamega).

In the game, riparian county governments are generally faced with three basic policy decision options: Maximize, Limit or Stop food and energy (hydro-electric energy) production. The Maximize decision option is generally based on comparative advantages centered on their food and energy productivity levels and the amount of available water. The Limit decision option requires the riparian governments to minimize their energy and food production especially in the areas where the productivity levels are low. The Stop decision option requires riparian governments to stop energy and/or food production and buy the energy and/or food shortfall from other riparian governments.

The players are united by the shared goal to manage the river basin sustainably. To meet the shared goal, players must communicate their needs and negotiate with county governments to help them meet their needs. Also, players may strategize on winning together. The joint strategy requires a higher level of trust that the other players will keep their promise and not act to their detriment.

We held the game sessions in July 2016. There were seven (7) game sessions played by five (5) policymakers (total of 35 policymakers). Amongst the 35 participants, 12 were female, and 23 were male. The participants were mainly in the 25 to 34 (11 participants); 45 to 54 years (10 participants), and 35 to 44 (7 participants) age ranges. The highest levels of education were a Bachelor's degree (20 participants) and a college diploma (7 participants). The sessions were conducted first in Busia, then Kakamega, followed by Bungoma and finally Trans Nzoia county government. Onencan et al. (2018) provide a detailed description of the game design, participants profiles and the sessions [11].

2.3. Materials

The assessment contained 18 questions from the Propensity to Trust (PTS) scale. The PTS scale is context-specific, it measures the underlying behavior of a person based on the simulated state [17,27,51]. Ten of the questions assess trust and eight assess trustworthiness. For each question, the respondent assessed the accuracy of the statement, according to their perception. The scores were from 1 to 5, one meaning "very inaccurate" and five meaning "very accurate."

The original PTS scale has 21 questions. We adopted the PTS scale from Evans and Revelle (2008), with a few modifications. Appendix A encompasses a description of the modifications made and Table A1 in Appendix B lists all the questions asked in the pre-game and post-game questionnaire. Supplementary Materials S2, contains the raw data we used to extract the results.

2.4. The Methods

2.4.1. Method 1: Principal Component Analyses (PCA)

Using the respondent's responses, we first conducted a PCA of the two sub-scales to assess the underlying structure of the two PTS sub-scales psychometrically. The purpose was to check whether the two sub-scales had sufficient loadings before undertaking further analyses [27]. A detailed explanation of the PCA results is in Appendix B.

The trustworthy factor loadings were stable and significantly higher than the trust factor loadings in both the pre-game and post-game stages. Therefore, we concluded that the trustworthy sub-scale measures one construct.

The trust sub-scale was very unstable and seemed to be measuring more than one construct. Though the trust sub-scale passed the goodness of fit test at the post-game level, its loadings are not high, and the underlying structure was not straightforward. Thus there was the need for further analyses, as explained in the subsequent sub-sections. The loadings per item for the two subscales are in Appendix B (Table A1).

2.4.2. Method 2: Chi-Square Test for Goodness-of-Fit for PTS

The Chi-Square goodness-of-fit test was used to compare an observed distribution with a theoretical distribution. The Chi-Square test for goodness-of-fit null hypothesis is: there is no significant difference between the post-game results for the PT sub-scales (trust and trustworthiness), and the pre-game results (H_0). The Chi-Square goodness-of-fit test alternative hypothesis is: there is a significant difference between the post-game results for the PT sub-scales (trust and trustworthiness), and the pre-game results (H_1). We reject the null hypothesis if $\text{Sig.} < 0.05$.

2.4.3. Method 3: The Multidimensional Scaling (MDS) ALSCAL Procedure

Multidimensional scaling (MDS) is a technique used to visualize the level of similarity of the individual objects in a dataset [52]. It places these objects in an n -dimensional space, the coordinates of which are formed by a series of hidden or underlying attributes [53]. The purpose of MDS is to identify those attributes, compute the coordinates of each object and represent the objects in space [52]. The primary purpose of conducting MDS was to compute the distances between objects and group them in clusters, based on their similarities [52]. Afterward, we labeled each dimension according to the characteristics of the object in each class. The MDS procedure starts from a single object attribute to discover the underlying dimensions behind that attribute [53].

3. Results

In this section, we present the findings on the WeShareIt Game trade exchanges (3.1), the PT sub-scales responses findings based on the Chi-Square goodness-of-fit test (3.2) and the MDS (3.3). Appendix C explains the results of the pre-game and post-game descriptive statistics. The standard deviations and means for each PTS sub-scale item, are contained in Table A2.

3.1. Cooperation Outcomes: Nzoia WeShareIt Game Results

Using Tableau, we visualized all the trades conducted by the five county governments (Figure 2). The exchanged resources are food, energy (hydroelectric power), and money [11]. In-game trade data was extracted to visualize the exchanges between County Governments starting with hydro-electric energy, then food, and finally money. There were numerous trade transactions; some can be grouped as 'short-term opportunistic' transactions, that did not develop long-term engagement while others were grouped under strong long-term oriented relationships [54] (p. 338).

However, the short-term opportunistic transactions are minimal compared to the long-term oriented and repeated transactions. Due to the repeated transactions, a network of buyers and

sellers seemed to be emerging based on comparative advantages. Uasin Gishu is the sole provider of hydro-electricity energy for the basin. Trans Nzoia and Kakamega are the food providers. However, Trans Nzoia provides more food than Kakamega. The primary consumers that ensure that the excess food and energy are utilized are Bungoma and Busia. The primary consumers that ensure that the excess food and energy are utilized are Bungoma and Busia.

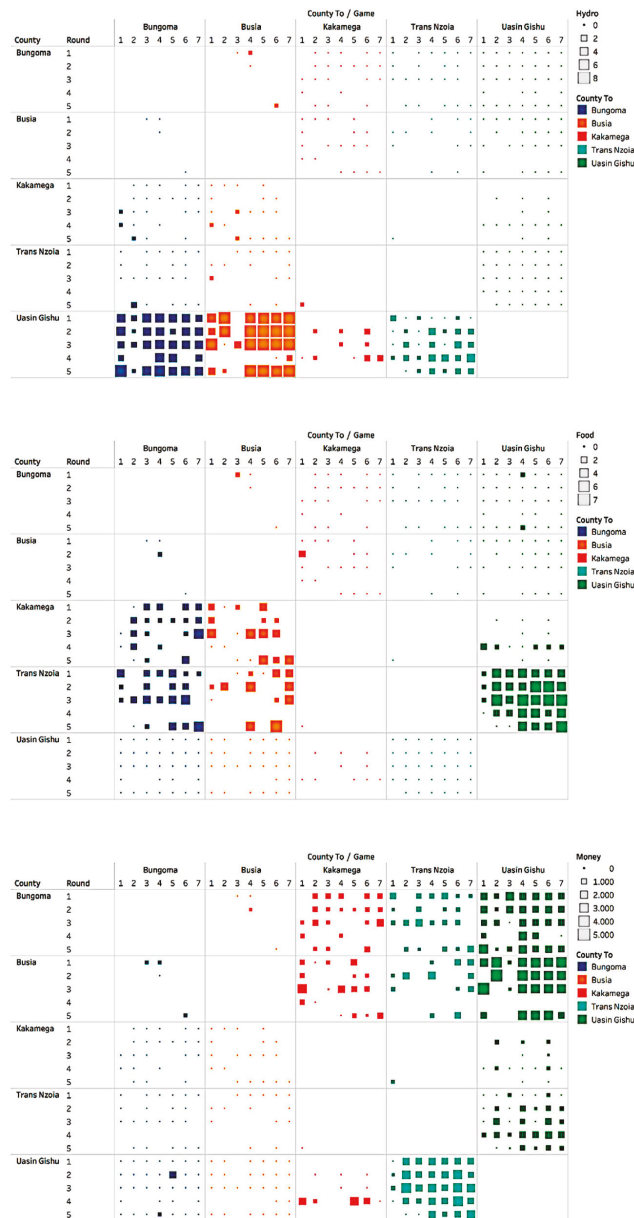


Figure 2. Exchanges between County Governments: (a) Hydro-electric energy, (b) food, and (c) money.

3.2. Chi-Square Test for Goodness-of-Fit for PTS

The goodness-of-fit results indicate statistical differences in the trustworthy sub-scale for all the eight variables. Based upon the observed frequencies it appears that there was a significant increase or decrease in trustworthiness between the pre-game and post-game results. The p -value for all the eight variables is lower than 5% (Sig. < 0.05). Hence, we reject the null hypothesis: there is no significant difference between the post-game results for the trustworthiness sub-scale, and the pre-game results (H0). Hence, there is an enormous variance between the post-game results for the trustworthiness sub-scale, and the pre-game results (H1).

The results for the trust sub-scale are varied. Based upon the observed frequencies, it appears that there was a significant increase or decrease in trust between the pre-game and post-game results in six variables (T1, T2, T3, T4, T7, and T10). The p -value for all the six variables is lower than 5% (Sig. < 0.05). Consequently, we reject the null hypothesis: there is no significant difference between the post-game results for the trust sub-scale, and the pre-game results (H0). As a result, there is a significant difference between the post-game results for the trust sub-scale, and the pre-game results (H1). Additionally, there was no significant increase or decrease in trust between the pre-game and post-game results in four variables (T5, T6, T8, and T9). The p -value for all the four variables is higher than 5% (Sig. > 0.05). Therefore, we maintain the null hypothesis: there is no significant difference between the post-game results for the trust sub-scale, and the pre-game results (H0). The results of the trustworthy sub-scale Chi-Square test for Goodness-of-fit are in Table A3 and for the trust sub-scale in Table A4 (Appendix D).

3.3. Multi-Dimensional Scaling (MSD) Using the ALSCAL Procedure

To be able to assess the multiple dimensions of the PTS, we performed a multidimensional scaling (MDS) using the ALSCAL procedure. Appendix E describes the ALSCAL procedure. To assess the consistency of the model we considered the scatterplot of linear fit (Figure 3). Since the points in the chart tend to gather around the chart diagonal (straight line), the model's consistency is confirmed.

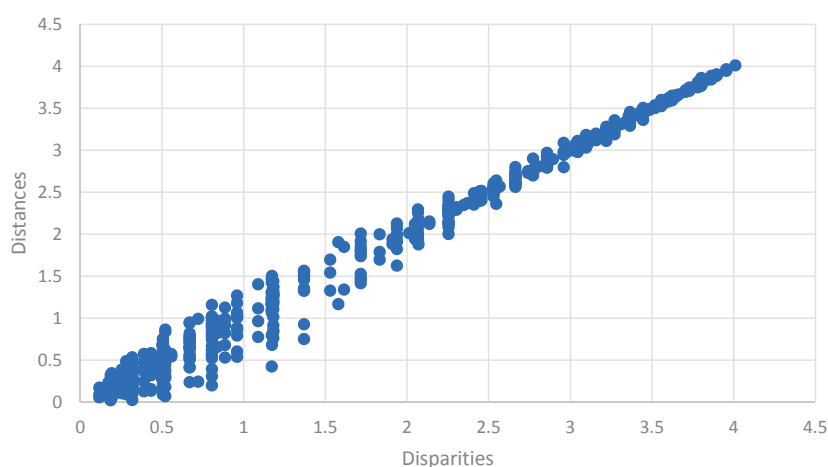


Figure 3. Scatterplot of linear fit from the Euclidean, distance model.

Based on the scatterplot of linear fit that was derived from the Euclidean distance model, there was more extensive space for disparities than distances. The disparities ranged from slightly above 0 and 4. However, the distances were narrower than the disparities because the responses seemed to gather around the chart diagonal. As the disparities increased, the distances decreased. There were more considerable distances on the lower side of the Y-axis where the disparities were less compared

to the upper side of the Y-axis. Figure 4 visualizes the distances and disparities separately based on the 36 observations/stimuli.

After that, we assessed the stimulus coordinates, configured in a two-dimensional space. There were 36 observations or stimuli (18 results from the pre-game questionnaire on trust and 18 results from the post-game questionnaire on trust). For each of the 36 observations, the model computed two coordinates (Dimensions 1 and 2) and grouped the 36 observations into clusters. Figure 5 plots the two-dimensional solution obtained for the pre-game and post-game individual dissimilarity scores for the trust and trustworthiness sub-scales, grouped in two dimensions.

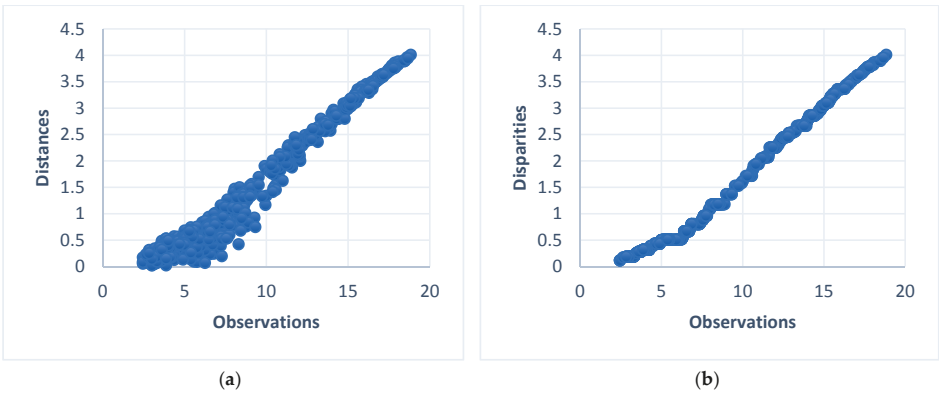


Figure 4. Scatterplots based on the 36 observations/stimuli: (a) Scatterplot of Nonlinear Fit from the Euclidean, distance model; (b) Transformation scatterplot from the Euclidean, distance model.

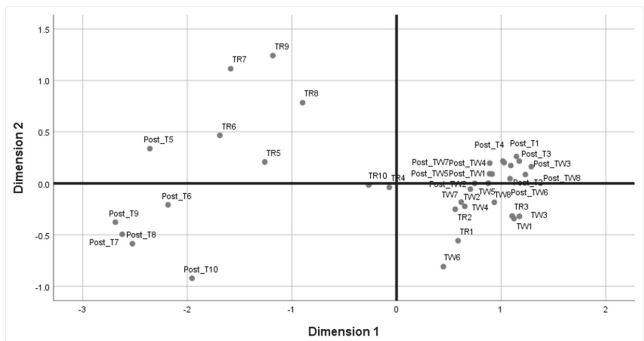


Figure 5. Conceptual Map of the Derived Stimulus Configuration from the Euclidean, distance model.

We clustered the conceptual map results into four groups. Figure 6 and Table A5 (Appendix E) contains the clustering of the 36 trust and trustworthy observations based on the derived stimulus configuration from the Euclidean distance model into four clusters, under two dimensions. To understand the components of the four clusters, we first assessed the features of each of the 18 variables within the PTS. All the 12 variables in the first cluster assessed the respondent’s positive perceptions, beliefs, and actions (trust). The four clusters mainly contain the results of the 12 positive, trustworthy PTS sub-scale in one cluster and the results of the six negative trust sub-scale in another. Based on the respondent’s score, high scores indicated a high disposition to trust. Low scores indicated a low disposition to trust. The last six variables were grouped in the second cluster that assessed the respondent’s negative perceptions, beliefs, and actions (distrust). Based on the respondent’s score, high scores indicated profound distrust and low scores indicated low distrust. The other two clusters

differentiate the pre-game results from the post-game results. Particularly, two variables did not fit into the four clusters: T10 and T4.

After that, we interpreted the two dimensions and gave suggestive labels for each dimension: (1) Dimension 1 represents uncertainty, and (2) Dimension 2 represents complexity (Figure 6). The first dimension refers to the level of uncertainty with two values—low and high—and the second dimension denotes to the level of complexity with two values—low and high. We were guided by the elements of trust as highlighted by Gambetta [13] (p. 218) when determining the labels for the two dimensions. The first element relates to trust being a “threshold point, located in a probabilistic distribution.” In this threshold, the values range from 0 to 1, with 0 representing complete distrust and 1 representing complete trust. At the midpoint of these values (0.50) is uncertainty. From the graph, the midpoint of trust and distrust is located along Dimension 1, justifying our interpretation that Dimension 1 represents uncertainty. Secondly, trust is principally relevant when there is deep uncertainty and high complexity. Luhmann [25] explains that a critical element of trust is the reduction of complexity. Thus, Dimension 2 represents complexity.

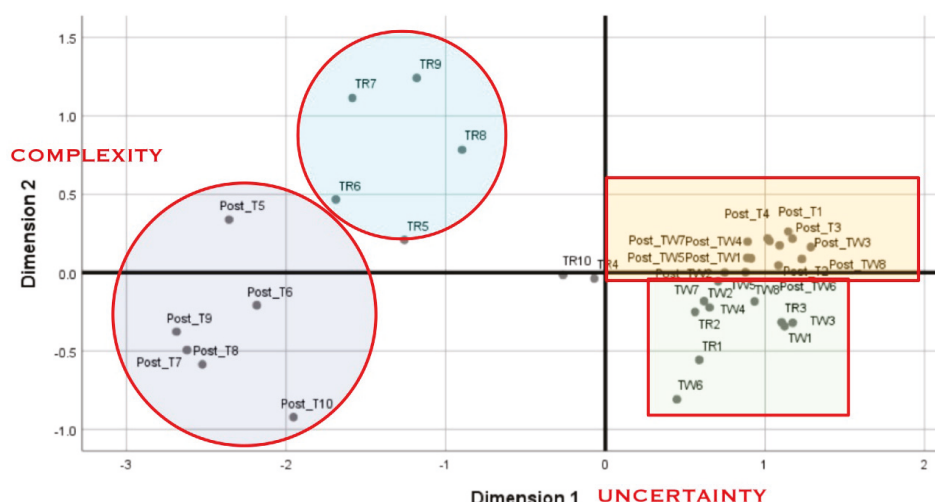


Figure 6. Clustering of the Conceptual Map based on the two dimensions. Dimension 1 represents the impact of high and low uncertainty on the levels of trust and distrust, with the positive impacts on the right side and negative impacts on the left side. Uncertainty had a mixed marginal impact on trust and a distinct negative impact on distrust. Dimension 2 represents the impact of high and low complexity on the levels of trust and distrust, with trust increasing and distrust decreasing.

4. Discussion

The first four parts of the discussion are centered on the four research questions, as highlighted in the Introduction section. The fifth part discusses the limitations of this particular study.

4.1. Cooperation and Competition

Cooperation and competition increased throughout the game. The results support the findings by Gambetta [13] (p. 215) that competition and cooperation should not be perceived as alternatives because they coexist throughout the game sessions. Water cooperation was evident in the game, and at the same time, the participants chose not to stop unproductive food and energy production, as a safety net. None of the county governments decided to make 100% of their food and energy and not engage in any trade relations with the neighboring counties. Based on the debriefing sessions, the respondents stated that it was not wise to completely trust the neighboring counties to produce their food or energy.

Therefore the small production, though under unproductive conditions, was a safety net, intended to protect them from the 'increased vulnerability' that emerges from a trust relationship [54] (p. 338). Competition and cooperation coexisted due to decisions not to stop unproductive food and energy production. The primary challenge in the game was finding a healthy balance between cooperation and competition [13] (p. 214).

4.2. Trust and Trustworthiness

Apart from the eight trustworthy variables, there were 12 trust variables. Within the 12 trust variables, four assessed the respondent and six assessed other players in the game. Therefore, there were three groups of constructs being measured: trustworthiness (8 variables TW 1-TW8), cooperative nature of the respondent (4 variables—T1–T4) trust (6 variables T5–T10). All these 18 variables comprise the PTS/DTS.

The game had a significant positive impact on individual perceptions of their trustworthiness. The players exhibited high trustworthiness, and high ability to cooperate. All the respondents had positive perceptions of their trustworthiness and this perception increased significantly after the game sessions.

The players' assessments indicated a low perception of the trustworthiness of other players. Trust levels declined consistently after the game sessions. The trustee (B) was reciprocating (based on the in-game results) with clear evidence of distrust by the trustor (A).

The trust results were not complementary to trustworthiness because the ratings of B by A worsened after playing the game (except the self-assessment PTS ratings, namely T1–T4). In the case of the Nzoia WeShareIt game, the trust-trustworthiness relationship was not complimentary. The initial Chi-Square test for goodness-of-fit test results indicates contrary findings to previous research regarding the complementarity of the relationship between trustworthiness and trust [27,34,39].

According to Reiersen [34] (p. 4) the trust problem is the lack of knowledge by the trustor that the trustee is trustworthy and B is the solution. To overcome the trust problem, B has to convince A, that B is trustworthy. The 35 Bs, in the case of the Nzoia WeShareIt game, did not manage to convince the 35 As, that they are trustworthy. The consistent poor rating of other players indicated that the interactions between the players led to conflicts over the shared water resources, that could not be retracted, leading to low B trustworthiness ratings [28,55]. Increased competition, exclusive dealing, price fixing, refusal to trade with others, and absorption of a competitor led to unfair trading practices. Though cooperation improved, there was also augmented competition, at the expense of B's trustworthiness.

There are various explanations of these contrary findings. First, in the initial game rounds, cooperation was not based on trust, leading to conflicting results. Disposition to trust was consistently built throughout the game because there were repeated actions that proved that cooperation works. Reiersen [34], explains that cooperation based on repeated interaction "is just pure calculation and maximization of long-term self-interest." Therefore, the initial cooperative actions were not grounded on trust and this may be one of the reasons for the contradictory results [34], Trust is one of the elements that enable cooperation, and we could not assume that because there were cooperative actions, trust was established at the initial stages of the game.

Second, Ben-Ner and Halldorsson [26] explain that trustworthiness is embedded in norms. Reiersen (2018) adds that "trustors trust because they are aware that trustworthiness is rooted in norms." Hardin [18] (pp. 25–29) explains some difficulties experienced when seeking to measure trustworthiness in various societies. The first difficulty is framing of the question: different societies frame the same question differently leading to varied responses. The different frames are mainly due to different institutional structures or variation in time. Another difficulty is individuals with a background of untrustworthy relations. It is harder for such individuals to undertake the risk of perceiving someone else as trustworthy and thus they cannot easily develop a trusting relationship.

Third, changes in the game led to instances of incentive incompatibility that reduced B's level of trustworthiness. If B is a producer of food or energy, X refers to four things:

1. B will make the relevant water allocation to produce excess energy and/or food on behalf of A;
2. B will sell the excess production to A before considering other competing buyers;
3. B will not insist on high fixed prices, even when there is high demand; and
4. B will strive to keep the promise made to A, even under unforeseen circumstances (droughts).

Based on the game design, there is a high likelihood that B will not fulfill all the Xs in every round. In the drought round, B loses half of their resources, and even though they fulfilled the first X, they cannot fulfill the last X because the game rules require B first to ensure that its residents have sufficient food and energy before selling to others. Therefore, though B's actions are perceived untrustworthy, it was challenging for B to convince A that they are trustworthy when achieving specific game rules competed with an act of trustworthiness. The drought round indicates that there are times when B's interest does not encapsulate A's [16,18] thus, B had no interest in being trustworthy. Consequently, the post-game questionnaire assesses a summation of all the interactions and does not take account of the moments, when B's interest did not encapsulate A. In these instances, trust and trustworthiness were not complimentary. Incentive incompatibility and competition led to consistent low ratings for B's trustworthiness. Thus confirming the statement by Hardin [18] that trust is "heavily limited and conditional." X is a critical component of trust and B's interest must encapsulate A, before a complementary and cyclical relationship is established.

4.3. Trust and Distrust

The trust–distrust relationship is bi-dimensional [28,31,32], within the context of the Nzoia WeShareIt game. The results imply that a single dimension analysis of trust of the overall level of PTS may be potentially misleading because the respondents were measuring other constructs, not envisaged when developing the assessment tool. The distances between the variables indicate that the respondents measured multiple constructs. Disposition to trust variables all clustered into one big group, while another group clustered on the left side of the graph. The vast distances between these two groups confirm that the multidimensional scale separated the two constructs. Though the trustworthy sub-scale was not affected, the trust sub-scale measured different constructs leading to conflicting results.

The results confirm that trust and distrust are distinct concepts. Some constructs were being measured, namely, trust in others, distrust of others, a sense of trustworthiness of others, and a self-assessment of trustworthiness. There were high scores for self-assessment of trustworthiness and distrust of others. The respondents were facing a difficult time being trusted by other players. Each player considered him/herself highly trustworthy, but that perception was not mutual neither was it a collective perception. The general perception was that none of the players could be trusted. Based upon the vast distances between all the distrust results on the conceptual map, there was no significant change in distrust levels at the start and the end of the game for all the six variables.

4.4. Trust, Distrust, Complexity, and Uncertainty

Increased complexity and uncertainty led to increased trust. Based on Figure 6, trust is located in the area in the graph representing deep uncertainty and high complexity. The research results indicate that trust levels increased as uncertainty and complexity increased.

Moreover, trust is excluded in circumstances where a trust relationship will not affect the decision made. In the graph, trust is excluded from the left side of the graph, where there is low uncertainty and low complexity because in this case trust is not needed to make a decision [13,25,56]. It is also excluded from the upper left of the graph where there is low uncertainty and high complexity, where efforts to understand and address the complexity are needed, instead of trust. Klinke and Renn [23] (p. 1086) support this finding by stating that "it does not make sense to incorporate . . . perceptions,

or any other social aspects into the function of resolving (cognitive) complexity. Charnley [57] adds that when there is deep complexity, social solutions can be used if the specific community has certain knowledge that is critical for reducing complexity. Therefore, community knowledge replaces trust thus reducing complexity, where the situation is certain and unambiguous. Klinke [23] proposes technical solutions in the form of cost-effective methods to address deeply complex problems that are unambiguous and certain.

Reduced complexity and uncertainty led to a decrease in distrust. The conceptual map indicates a decrease in distrust between the pre-game and post-game findings, though the decrease was not significant. The decrease occurred when complexity and uncertainty were reduced. Therefore, under familiar conditions (when the players were more familiar with the risk and the other respondents), complexity and uncertainty are reduced leading to a decrease in distrust.

4.5. Limitations of the Study and Future Research

The research study approach faced three main limitations. First, it was not possible to include the X in the pre-game questionnaires, which led to the assessment of generalized or social trust, at the start of the game. Hardin defines general trust as “trust in random others or social institutions without grounding in specific prior or subsequent relationships with others [18] (p. 23).” However, based on the nature of the questions (apart from T5–T10 that needed reverse coding), the response, whether in the real world or a game environment, would not make a huge difference since this was one’s subjective assessment of their level of trust and trustworthiness. Therefore the comparison we made between the pre-game and post-game questionnaires is justified because the questions were a subjective assessment of the trustor (A), save the six questions that focused on the trustee (B). However, the effects of this limitation were not considered immense, since there was no significant difference between the distrust scores before and after the game.

Second, the post-game questionnaire was designed to assess a summation of all the interactions. Though this is a convenient and less cumbersome approach, it did not take account of the moments, when B’s interest did not encapsulate A.

Third, we adopted both the ‘belief-based [58]’ and the ‘behavioral-based [59,60]’ approaches to trust without integrating the two in one assessment tool. Bauer [40] (p. 21) points out that one of the biggest challenges of measuring trustworthiness is the inability to yield credible answers. To address this, we used in-game data to measure trustworthiness actions and asked indirect behavioral questions using the pre- and post-game questionnaires to measure attributes that influence trustworthiness. It was not clear from the in-game data whether the cooperative actions were grounded purely on trust or there was another factor that contributed to the cooperative actions.

5. Conclusions

Trust is a critical element that enhances water cooperation within a shared river basin. Trust establishes a healthy balance between cooperation and competition with the aim of increasing the benefits that riparian governments can derive from the shared water resource. To be able to tap into the positive aspects of trust, it is imperative that trust concepts and collaborative processes that relate to water resources management are better understood.

Little is known of the relationship between trust and trustworthiness. There is limited literature on trustworthiness and how it relates and contributes to a trusting relationship. Moreover, the belief that distrust and trust are unidimensional has led to limited research on the relationship between trust and distrust. Additionally, there is established literature that affirms that trust reduces complexity by limiting the number of possible future options to one: action X by B. However, very little is known regarding the impact of changing levels of uncertainty and complexity on the levels of trust and distrust.

In this paper, we offer a game-based approach that can be replicated in any river basin, to assess trust and collaboration processes. The model is supported by pre-game, in-game, and post-game data

that measure both the ‘belief-based’ and the ‘behavioral-based’ approaches to trust. After that, the paper discusses some interesting and potentially important results, namely, that:

1. Cooperation and competition coexisted and increased throughout the game;
2. In the Nzoia WeShareIt Game context, trustworthiness, and trust were not complementary;
3. Trust and distrust are bi-dimensional and operated simultaneously in the game due to the multiple and mixed conditions, leading to varied complexities and uncertainties; and
4. Increased complexity and uncertainty led to increased trust whereas decreased complexity and uncertainty led to a decrease in distrust.

We recommend that future researches focus on deepening understanding of the relationship between trust, trustworthiness, and distrust in the context of river basin management. Also, there is a need to improve existing measurements of trust so that trustworthiness and distrust are correctly measured. These studies should aim at increasing water cooperation within a shared basin and contribute to complexity and deep uncertainty studies. Finally, there is a need for more research on how to establish a healthy balance between cooperation and competition, once the attributes of (dis)trust are better understood.

Supplementary Materials: S1: The game design concept report is found in the TU Delft Repository: (<http://doi.org/10.4233/uuid:3a1f1e27-274b-4459-8a14-ba3068a9cb4a>). S2: The doi of the dataset used to conduct the PCA, Chi-Square tests, and the MDS are found in the 4TU repository (<http://doi.org/10.4121/uuid:299e8297-b026-47fb-ad49-728c0744f786>).

Author Contributions: A.M.O. Conceptualized the article, customized the Trust and Trustworthy questionnaire for the Nzoia river basin, designed the Survey Monkey questionnaire, conducted the game sessions, collected the data, undertook the in-game performance measurements analysis and the SPSS analyses in the context of Trust, Distrust and Trustworthiness, wrote the original draft and was actively involved in the draft preparation, content visualization, draft improvement and the incorporation of comments from the second and third authors and the reviewers. B.E. was actively involved in the policy game design and the game-testing sessions, improved the initial conceptualization, methodology, was actively involved in the validation process, and was also responsible review and editing, and formal analysis. B.V.d.W. was actively involved in the policy game design, mobilized the financial and technical resources to design and implement the policy game, was actively involved in the validation process, and was also responsible for resources, review and editing, supervision, project administration, and formal analysis.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Modifications Made to the PTS Scale

First, the original PTS had 21 questions [27]. We deleted three PTS questions, namely:

1. Stick to the rules (No. 6);
2. “Return extra change when a cashier makes a mistake [61]” (No. 10);
3. Retreat from others (No. 15).

We deleted question 6 because the players easily confused it with question 7 (believe the laws should be strictly enforced). One was measuring the *act* of sticking to the rules (No. 6) and the other the *belief* that laws should be strictly enforced. The player might have the belief but not stick to the rules. However, we decided, based on the responses received when testing the questionnaire, that the construct should be deleted to reduce confusion. We also deleted question 15 because it was similar to question 18 (avoid contact with others) and would lead to confusion when the players were providing their responses.

Additionally, we deleted question 10 because in the game there was no cashier and change. Also, money transfers between the players were electronically calculated with a very low probability of cheating or avoidance to make payments. We made deductions during the particular round, in predetermined stages. For instance, we deducted the payment of a penalty at the close of the trading round. Therefore, the players had no chance to evade payment or pay less than what was required.

After adopting the remaining 18 questions, the language was modified to reflect a policy game context. For instance, question 19: we transformed it to believe that most people would lie to get ahead so that it was relevant to the game. The revised question read: believe that most people (players) would lie to get ahead (T8). Another example is: would never cheat on my taxes. We transformed it to never cheated (TW6).

Appendix B. Principal Component Analysis (PCA) Results

We conducted a PCA using XLSTAT. The PCA results are in Table A1.

Table A1. A table containing the PTS items for the pre-game and post-game questionnaires. Changes made to the original questions are in brackets. A principal component analysis was undertaken to assess the underlying PTS structure. The table also contains factor loading of PTS items for both the pre-game and post-game results. The trustworthy sub-scale has high loadings. There were low loadings for the first four trust items at the pre-game stage and high at the post-game stage, though negative.

Questions/Sub-Scale/Factor Loading of PTS Items	Sub-Scale	Pre-Game		Post-Game	
		TW	Trust	TW	Trust
N = 35		37%	27%	72%	46%
1. Listen(ed) to my conscience (TW1)	Trustworthy	0.63		0.89	
2. Anticipate(d) the needs of others (TW2)	Trustworthy	0.42		0.72	
3. Respect(ed) others (TW3)	Trustworthy	0.44		0.84	
4. Gets (got) along with most people (T1)	Trust		0.14		−0.73
5. Always been (Was) completely fair to others (TW4)	Trustworthy	0.60		0.86	
6. Believe that laws (game rules) should be strictly enforced (TW5)	Trustworthy	0.63		0.82	
7. Have (had) a good word for everyone (T2)	Trust		-		−0.67
8. Value(d) cooperation over competition (T3)	Trust		−0.28		−0.60
9. Would never cheat on my taxes (never cheated) (TW6)	Trustworthy	0.41		0.84	
10. Follow(ed) through with my plans (TW7)	Trustworthy	0.84		0.89	
11. Believe(d) that people (players) are (were) basically moral (T4)	Trust		0.34		−0.62
12. Finish(ed) what I start (ed) (TW8)	Trustworthy	0.74		0.91	
13. Filled with doubts about things (was filled with doubt) (T5)	Trust		0.78		0.49
14. Feel short-changed in life (Felt short-changed) (T6)	Trust		0.75		0.56
15. Avoid contact with other(s) (players) (T7)	Trust		0.71		0.83
16. Believe that most people (players) would lie to get ahead (T8)	Trust		0.58		0.77
17. Find it hard to forgive others (players) (T9)	Trust		0.61		0.82
18. Believe that people (other players) seldom tell you the whole story (T10)	Trust		0.32		0.64
Valid N (listwise)	32				

Based on the findings, three items were identified not to have sufficient loadings (higher than 0.30), at the pre-game stage, namely:

1. Gets (got) along with most people (T1), factor loading of 0.14
2. Have (had) a good word for everyone (T2)
3. Value(d) cooperation over the competition (T3), factor loading of −0.28

We did not discard these three items because they had very high factor loadings (above 0.60), at the post-game stage. However, these factor loadings were negative leading to the weakening of the VSS. We did not discard any item because the scale and its sub-scales had already been tested and approved by Evans and Revelle (2008), as the goodness of fit for the VSS. However, we noted that Items T1, T2, T3, and T4 might not contribute high loadings for the trust sub-scale.

Appendix C. Pre-Game and Post-Game Trustworthy and Trust Descriptive Statistics

For each of the PTS sub-scales, we computed a two-way contingency table, that cross-classifies the PTS subjective rating before the game and after the game session. The pre-game variables were assigned two different labels: T for trust and TW for trustworthiness. Subsequently, we numbered each variable. For trust, the variables ranged from T1 to T10, and for trustworthiness, the variables ranged from TW1 to TW8. We assigned the numbers based on the numbering in the online questionnaire.

For the post-game labels, we used the same labels, and added the word post, to differentiate the findings from the pre-game findings.

Table A2. Pre-game and post-game descriptive statistics.

Pre-Game and Post-Game Descriptive Statistics		Pre-Game		Post-Game	
		Mean	Std. Deviation	Mean	Std. Deviation
TRUSTWORTHY SUB-SCALE	1. Listen(ed) to my conscience	4.8	0.4	4.5	0.8
	2. Anticipate(d) the needs of others	4.4	0.8	4.4	0.7
	3. Respect(ed) others	4.8	0.4	4.7	0.8
	4. Have always been (Was) completely fair to others (players)	4.3	0.6	4.4	0.8
	5. Believe that laws (game rules) should be strictly enforced	4.5	0.9	4.4	0.9
	6. Would never cheat on my taxes (never cheated)	4.2	1.1	4.6	0.9
	7. Follow(ed) through with my plans	4.4	0.6	4.5	0.8
	8. Finish(ed) what I start (ed)	4.6	0.6	4.7	0.8
TRUST SUB-SCALE	1. Get (Got) along with most people (players)	4.3	0.95	4.6	0.8
	2. Have a good word for everyone	4.1	1.0	4.6	0.8
	3. Value cooperation over competition	4.8	0.4	4.7	0.8
	4. Believe that people are moral	3.7	0.97	4.5	0.8
	5. Filled with doubts about things (Was filled with doubt)	2.9	1.2	2.1	1.3
	6. Feel short-changed in life (Felt short-changed)	2.6	1.3	2.3	1.5
	7. Avoid contact with others (other players)	2.3	1.3	1.9	1.4
	8. Believe that most people would lie to get ahead	3.1	1.3	2.1	1.5
	Post-game—Believed that most players lied to get ahead				
	9. Find it hard to forgive others (found, other players)	2.5	1.4	1.9	1.4
	10. Believe that people (Players) seldom tell you the whole story	3.5	0.8	2.5	1.5

From each of the contingency tables, we computed the mean and standard deviation scores to assess the difference between the pre-game scores and the post-game scores, for each variable (dissimilarity matrix). The difference between the mean scores indicated whether there was positive change (increase in the mean score), a negative change (decrease in the mean score) or no change at all.

Based on the findings, there was an increase in the PT in four variables within the trustworthiness subscale (TW4, TW6, TW7, TW8). The increase in TW4, TW7, and TW8 was marginal (0.1). TW6 was reported to have the highest increase (0.4). There was no change in PT in TW2. However, there was a slight decline in the standard deviation for TW2 (0.1). There was also a decline in PT for three variables (TW1, TW3, and TW5). The decline was marginal for TW3 and YW5 (0.1). The decline in PT for TW1 was the highest (0.3).

According to the initial findings, there was an increase in the PT in three variables within the trust subscale (T1, T2, and T4). None of the increases were marginal (0.3, 0.5 and 0.8). T4 was reported to have the highest increase (0.8). The standard deviations for the trust subscale were much higher than the trustworthiness subscale. The highest standard deviation for trust was 1.5, and for the trust, it was 1.1. There was a decline in PT for seven variables (T3, T5–T10). The decline was marginal for T3 only. The decline in PT for T8 and T10 were the highest (1.0).

Appendix D. Chi-Square Test for Goodness-of-Fit for PTS Results

The use of raw cell frequency to assess whether there was trust formation or not, can be misleading. From the raw cell frequencies (expressed as mean and standard deviation), T8 had the highest mean difference between the pre-game and post-game results (1.0) and standard deviation (1.5). In the non-parametric Chi-Square test for goodness-of-fit for the trust sub-scale, the results for T8 were not significant. Additionally, the trustworthy mean differences between the pre-game and post-game results were marginal compared to the trust sub-scale with much lower standard deviations. On the contrary, all the trustworthy Chi-Square tests for goodness-of-fit results were significant.

Table A3. Pre-game and post-game trustworthy Chi-Square test statistics.

		TW1	TW2	TW3	TW4	TW5	TW6	TW7	TW8
PRE-GAME	Chi-Square	11.765 ^a	25.000 ^b	12.600 ^c	13.086 ^d	29.800 ^b	21.114 ^b	12.057 ^d	17.200 ^d
	df	1	3	1	2	3	3	2	2
	Asymp. Sig.	0.001	0.000	0.000	0.001	0.000	0.000	0.002	0.000
POST-GAME	Chi-Square	16.171 ^a	24.314 ^b	63.171 ^b	14.629 ^a	24.588 ^c	43.971 ^b	15.314 ^a	31.771 ^a
	df	2	3	3	2	3	3	2	2
	Asymp. Sig.	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
PRE-GAME	a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 17.0.								
	b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.8.								
	c. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 17.5.								
	d. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 11.7.								
POST-GAME	a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 11.7.								
	b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.8.								
	c. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.5.								

Table A4. Pre-Game and Post-Game Trust Chi-Square Test Statistics.

		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
PRE-GAME	Chi-Square	32.000 ^a	25.143 ^a	12.600 ^b	27.714 ^a	6.571 ^a	5.714 ^a	11.588 ^c	3.714 ^a	7.143 ^a	17.059 ^d
	df	4	4	1	4	4	4	4	4	4	3
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.160	0.222	0.021	0.446	0.129	0.001
POST-GAME	Chi-Square	23.029 ^a	20.800 ^a	57.686 ^b	16.294 ^c	18.647 ^d	16.000 ^e	36.857 ^e	29.879 ^f	23.647 ^g	10.571 ^e
	df	2	2	3	2	4	4	4	4	3	4
	Asymp. Sig.	0.000	0.000	0.000	0.000	0.001	0.003	0.000	0.000	0.000	0.032
PRE-GAME	a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 11.7.										
	b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 17.5.										
	c. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 6.8.										
	d. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.5.										
POST-GAME	a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 11.7.										
	b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.8.										
	c. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 11.3.										
	d. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 6.8.										
	e. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 7.0.										
	f. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 6.6.										
	g. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.5.										

Raw-cell frequency used to assess whether there was trust formation or not, can be misleading, as explained in Appendix D. From the raw cell frequencies (expressed as mean and standard deviation), T8 had the highest mean difference between the pre-game and post-game results (1.0) and standard deviation (1.5). In the non-parametric Chi-Square test for goodness-of-fit for the trust sub-scale, the results for T8 were not significant. Additionally, the trustworthy mean differences between the pre-game and post-game results were marginal compared to the trust sub-scale with much lower standard deviations. On the contrary, all the trustworthy Chi-Square tests for goodness-of-fit results were significant. It appears that there are hidden attributes in the data that cannot be visualized with the use of raw cell frequencies, which emphasizes the need for further investigation. Also, based on the high standard deviations in the trust sub-scale, the respondents seem to measure more than one variable, that may not be known to the researchers. Therefore we conducted an MDS to shed more light on whether there was trust formation.

Appendix E. Multi-Dimensional Scaling (MDS) Using ALSCAL Procedure

There are two ways of conducting the MDS procedure: ALSCAL and PROXSCAL [53]. The ALSCAL procedure involves recording individual scores given by the respondents for every object in the set. Based on these scores, the program computes the distances between objects [52]. We chose the ALSCAL procedure of recording individual scores given by the respondents because the data was individual scores based on the 18 item PTS. There were no distances in our data. Therefore, the variables that we were comparing between the pre-game and post-game results were the differences in the individual PTS scores. The PROXSCAL procedure of collecting the data is recording the distances between objects,

as the respondents perceive them. In this case, the algorithm presents the respondents with all the possible pairs of comparisons [52].

The ALSICAL procedure uses the dissimilarity or discrepancy matrix. The individual scores were aggregated by summation or by computing their average, and:

- If the higher scores correspond to similar objects, and the lower scores correspond to dissimilar objects, then we get a similarity or proximity matrix.
- If on the contrary, the higher scores correspond to dissimilar objects, and the lower scores correspond to similar objects, then we get a dissimilarity or discrepancy matrix [52].

The ALSICAL performed resulted in a dissimilarity matrix, and the chosen model was Euclidean distances with the minimum dimensionality of two, and the maximum dimensionality of two. The SPSS program computed the Euclidean distances between the scores. We chose a two-dimensional model to get one model with two dimensions for ease in the visualization of the conceptual map and interpretation. The maximum model iterations were 30.

The first pieces of information we analyzed were the: (1) model stress; and the (2) stress and squared correlation (RSQ) in distances. They are both indicators of model efficiency. The model stress also called the 'phi' statistics, is the most important. The lower the stress, the better is the model. The critical values to assess model quality are:

1. Stress (phi) *lower than 0.10*, it means that the model quality is *excellent*;
2. Stress (phi) *between 0.10 and 0.20*, it means that the model quality is *good*; and
3. Stress (phi) *greater than 0.20*, it means that the model quality is *poor*.

SPSS computed two values, one proposed by Young (Young's S-stress formula 1) and the other proposed by Kruskal (Kruskal's stress formula 1). Young's S-stress value for the model is 0.0495, and it stopped at the 4th iteration because the S-stress improvement was less than 0.001. Because the value is lower than 0.10, our model is excellent. As for Kruskal's stress, the values were 0.068. Therefore, since both stress values are very low and below 0.10, our model is of excellent quality.

After that, we assessed the RSQ value. RSQ value is "proportion of variance of the scaled data (disparities) in the partition (row, matrix, or entire data) which is accounted for by their corresponding distances" [62]. The RSQ value for the model is 0.98748. Since the RSQ is above 0.95 and close to 1, it confirms that the model is of excellent quality.

Table A5. Clustering of the 36 trust and trustworthy observations based on the derived stimulus configuration from the Euclidean distance model into four clusters, under two dimensions.

Obs. Label	Question/Stimulus Coordinates	Pre-Game Component		Post-Game Component	
		1	2	1	2
TW1	1. Listen(ed) to my conscience	1.12	−0.34	0.89	0.09
TW2	2. Anticipate(d) the needs of others	0.71	−0.06	0.75	0.00
TW3	3. Respect(ed) others	1.17	−0.32	1.29	0.16
T1	4. Gets (got) along with most people	0.59	−0.56	1.15	0.26
TW4	5. Have always been (Was) completely fair to others	0.65	−0.22	0.89	0.20
TW5	6. Believe that laws (game rules) should be strictly enforced	0.88	0.00	0.91	0.09
T2	7. Have (had) a good word for everyone	0.56	−0.25	1.09	0.17
T3	8. Value(d) cooperation over competition	1.10	−0.32	1.17	0.22
TW6	9. Would never cheat on my taxes (never cheated)	0.45	−0.81	1.08	0.05
TW7	10. Follow(ed) through with my plans	0.62	−0.18	1.03	0.20
T4	11. Believe(d) that people (players) are (were) basically moral	−0.07	−0.04	1.02	0.22
TW8	12. Finish(ed) what I start (ed)	0.93	−0.18	1.23	0.09
T5	13. Filled with doubts about things (was filled with doubt)	−1.26	0.21	−2.36	0.34
T6	14. Feel short-changed in life (Felt short-changed)	−1.69	0.47	−2.18	−0.21
T7	15. Avoid contact with other(s) (players)	−1.59	1.11	−2.62	−0.50
T8	16. Believe that most people (players) would lie to get ahead	−0.90	0.78	−2.52	−0.59
T9	17. Find it hard to forgive others (players)	−1.18	1.24	−2.69	−0.38
T10	18. Believe that people (other players) seldom tell the whole story	−0.27	−0.02	−1.95	−0.92

N: 36

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Article

How Practices of Managing Partnerships Contributes to the Value Creation—Public–Social Partnership Perspective

Aldona Frączkiewicz-Wronka ¹ and Martyna Wronka-Pośpiech ^{2,*}

¹ Department of Public Management and Social Science, University of Economics Katowice, 40-287 Katowice, Poland; aldona.fraczkiewicz-wronka@ue.katowice.pl

² Department of Entrepreneurship and Management Innovation, University of Economics Katowice, 40-287 Katowice, Poland

* Correspondence: martyna.wronka-pospiech@ue.katowice.pl

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Abstract: In this paper, the authors aim to answer the question of which model of public management—Public Administration, New Public Management, or Collaborative Public Management—is conducive to achieving better results in the public-social partnership. We understand public-social partnership as an activity undertaken in collaboration between organizations operating both in the public and social sectors. We also claim that Collaborative Public Management fosters sustainability in partnerships and should therefore be preferred in partnerships that are focused on delivering social services. In particular, we aim to find out how management practices that are used in the public-social partnership contribute to the co-creation of public value. The article brings together theoretical insights and empirical data. First, we integrate insights from different strands of literature. Next, empirical data are derived from two main sources: first, a specific case of the public-social partnership established by 18 institutions and organisations, followed by quantitative research that was conducted in 173 partnerships in Poland. Based on the presented case study, analysis of the survey results and in-depth interviews (IDIs) conducted with the 18 leaders of the organisations constituting the partnership, the observed pattern revealed the dominance of the Collaborative Public Management model contributing to the success of the partnership. It was also identified what actions were taken by the manager of the partnership in order to maintain links between the partners, build trust, and win their support and legitimisation in public space—all of which are necessary to create public value, which in turn contributes to the sustainability of the partnership.

Keywords: public management; public-social partnership; public value; co-innovation; sustainability

1. Introduction

Nowadays we can observe a gradual departure from the state monopoly in the public sector, and moving towards the search for effective solutions of delivering social services to citizens on the basis of organising the public sector in such a way that it will foster the creation of quasi-market systems and forms of networking. This means shifting research attention from individual organisations to emerging systems, which might be characterised as multi-stakeholder collaboration, such as a public-social partnership. Furthermore, multi-stakeholder collaboration is as an interesting research avenue, as in practice it fosters better results achieved by entities that are engaged in social services delivery and it is conducive to attaining cohesion, competitiveness, and sustainability. The importance of partnerships in general applies both to theory and practice of public management due to European Union (EU) directives promoting social innovation as an organisational concept of public service delivery. However, this kind of collaboration is successful only when the partnership is correctly

designed and managed, resources of organisations constituting the partnership are complementary and the logic behind how individual organisations and their leaders operate is in line with the needs of the local community.

Organisations demand a creative network and relationships to enable innovation, which also refers to public organisations. That is why notions such as ‘co-creation’ and ‘co-innovation’ often appear in the context of innovation activity in the public sector. The core of co-innovation includes engagement, co-creation, and compelling experience for value creation. Following this thought, the paper defines partnership as a social innovation, while co-innovation as a way partnership is managed by various partners, so it can achieve public value being the main goal of its existence. One of the most important factors that improve the efficiency of social services delivery are managerial practices [1]. Organisational reality tends to confirm the observation that an important factor determining the effective use of available resources is the ability of leaders to use appropriate managerial practices allowing them to succeed in their activities. Therefore, not focusing on one management model but rather combining practices creating the desired value for the local community.

Adding to the above considerations, this paper aims to answer the question of which model of public management—Public Administration, New Public Management, or Collaborative Public Management—is conducive to achieving better results in the public-social partnership. Therefore, which of them contributes most to the fact that objectives of the partnership, being a desired public value, are achieved and, in turn, encourages its sustainability. We combine novel theoretical insights with empirical data from Poland. The structure of the paper is as follows. After an introduction, we present a discussion of the underlying theoretical assumptions about collaborative innovation, value creation in public and social services, and partnerships. Second, the research design is discussed. Research results are presented in the fourth section, while the last part of the paper summarises theoretical and practical contributions, addresses research limitations, and points to future research directions.

2. Theoretical Background

2.1. Collaborative Innovation as an Emerging Concept to Co-creation a Value

From the beginning of 21st century, significant changes have been observed regarding the provision of social services [2–8]. These changes manifests itself in three dimensions that are associated with a new-social-aspect of (self)organisation, being:

1. forms of cooperation between people—as everyone is able to change rules of the game and have an impact on the surrounding reality (irrespective of individual authority or significance);
2. the emergence of the collaborative economy and/or collaborative network built upon dispersed networks connecting individuals, groups, or communities—these collaborative networks are co-created by the community of people sharing similar needs or interests and involve the maximum use of available resources and potential for collaboration; and,
3. the revival of neighbourly and community life allowing the creation of one’s own identity facilitated and confirmed through social ties [9].

The above-mentioned social phenomena, together with such developments as crowdfunding, crowdsourcing, the concept of shared value, and the shift from value chains to value flows, are superimposed on the traditional community mechanisms (local communities and categorical communities), which are also undergoing a significant evolution [10]. Moreover, the difference between the producer and the consumer is blurring as users become co-creators and the idea of co-creation goes far beyond the idea of user involvement. Now, it is more about transferring the responsibility and resources from professionals to users as well as about involving people in designing and executing services for themselves. It is connected with the belief that both individual and collective satisfaction is best achieved through mutual assistance. Therefore, the subject of innovation attracts

the attention of a wide spectrum of both individual and organisational actors, representing the world of science and business.

Co-innovation (short for collaborative innovation) relates to the innovation processes that systematically integrate the users' knowledge and experiences to ensure that innovation creates substantial value [11]. Depending on the perspective, co-innovation can be understood quite narrowly—as one of the options of the development strategy of modern organisations [12], more widely as a new concept in the field of innovation management [13], or, finally, as a new paradigm in the approach to innovation and innovation management [14–16]. It requires collaboration among various organisations, actors, levels, or segments [17]. As Romero and Molina [18] suggest, co-innovation provides a competitive advantage by combining the best skills or core competencies and resources of two or more organisations, as well as end-user knowledge of a product or a service to co-create or co-produce a value proposition that is more compelling and relevant to the consumers' needs and expectations. Beelaerts van Blokland et al. [16] understand co-innovation as the creation of a partnership between companies and/or institutes and/or customers on sharing knowledge, costs, and benefits in order to create unique value for the customer. The limitation of this definition lays in the fact that it narrows the audience (end-users) of newly created value to customers only. Additionally, it refers to the concept of value co-creation focusing on increasing value for the customer [19], while recent literature on the topic has identified the need for a multi-stakeholder perspective on value co-creation processes, the effect of which should be increasing the value for all (or almost all) involved and/or interested parties [20]. According to Bonney et al. [13], co-innovation is the situation when two or more companies in the value chain collaborate to innovate in product, process, raw material inputs, markets, or governance to improve the efficiency and/or effectiveness of delivering value to consumers and overall sustainable competitive advantage of the whole chain. This approach indicates the need to focus on creating value for the customer, but it also emphasizes the orientation of the organisation towards creating competitive advantage, as suggested also by Romero and Molina [18]. However, it limits collaboration processes to inter-organisational collaboration, thus excluding collaboration with individual stakeholders, such as customers, communities of interest, or affinity groups. The broadest definition defines co-innovation as an approach that is based on the on-going and continuous use of internal, external, collaborative, and co-creative ideas that can be converged to create organisational and shared value [14] (p. 818). It can also be understood as a platform where new ideas or approaches from various internal and external sources are applied differently to create new value or experience for all stakeholders, including consumers [21]. Both definitions indicate the involvement of different external actors along with resources at their disposal. Besides, the definitions refer to the joint creation of innovation under the assumption of creating value for all participating stakeholders (i.e., suppliers, partner organizations, outside collaborators, customers, and the general public at large) and for the organisation itself.

In order to fully understand the concept of co-innovation, it is necessary to define the external actors participating in the joint creation of innovation and the process of value co-creation. Two approaches regarding this area can be identified in the subject literature. The narrow approach takes into account only one type of external entities, i.e., other organisations [12,22] or customers [23,24]. The other approach, so called 'horizontal co-innovation', takes into account various types of wide external partners, such as competitors, non-competitors, institutions and research institutions, universities, and customers [13,15,25], but also other potential stakeholders, even if they are not directly associated with the product supplied by the organisation to the market [26]. To date, much has already been written on co-innovation in the private sector. Therefore, it is no surprise that the topic attracts attention of researchers interested in the public sector, especially because nowadays the role of government and its entities is not only to ensure stability, resilience, and continuity, but also to embrace a strategic and systematic effort to manage emergence and create positive change [27].

2.2. Value Creation in Social Services Delivery

Public sector innovation stems from the need of governments to increase and enhance the responsiveness of the provided services with the purpose of sufficiently meeting the needs of end-users, both individual and collective. This involves improving services, reaching out to public expectations, containing costs, and improving efficiency levels, leveraging the potential of information and communication technologies [28,29]. The need for governments to become more open, accessible, responsive, collaborative, and demand-oriented is reflected in the recent European Commission report, according to which the innovation paradigm in the public sector should be based on four principles:

1. co-design and co-creation (with other parts of government, businesses, the non-profit sector and citizens),
2. adopting new and collaborative service delivery models,
3. embracing creative disruption from technology (social media, big data), and
4. adopting an attitude of experimentation and entrepreneurship [30].

In order to fulfil these principles, especially the first two of them, it is crucial for public sector organisations to learn how to collaborate actively with other public sector entities, the non-profit sector, business entities, and citizens themselves.

As it has already been mentioned, value co-creation is characterised as a process by which the resources of at least two organisations are combined in order to achieve goals that the parties would not be able to achieve individually [31]. Clearly, the goals of public sector organisations vary from those in the private sector, as they are driven by the objective of creating public value instead of creating private value [32]. Although public sector value is much more difficult to explain, Moore defines it as the equivalent of shareholder value or private value and highlights that public organisations aim at delivering not only value for individuals, but also value for people as citizens as a collective [32]. As traditional incremental innovation forms might be no longer appropriate, since they do not take into full account the relationships between organisations that are involved in the provision of complex services [33] (p. 2), a public sector entity opens its value chain to the stakeholders whom it serves. Stakeholders organised in communities of interest insert themselves into the public service value chain and become active participants in it. In effect, public sector employees and stakeholders, such as citizens, basically co-create the public sector value proposition [34] (p. 42). In that sense, co-innovation concept—especially in the aspects that are associated with the production and delivery of social service—is often used in relation to value creation in the public sector [35,36]. As Virtanen and Stenvall [37] (p. 102) notice, social services are not only provided by the public authorities, represented by public officials and legitimised by politicians, and ultimately by voters. They are also spaces for interaction, collaboration, co-operation, and co-creation, orchestrated by networks of the organisations providing these services. Due to the paradigm shift and changes in the environment, the form of the provision of social services needs to be transformed, as the provision of complex and innovative services requires multi-organisational collaboration, regardless of the sector that the organisation operates [38].

It is worth noticing that the intensity of changes towards the “service” direction has resulted in the term “welfare state” increasingly replaced by “social services”, better reflecting the specific organisation of the social policy system concentrated on services. The potential is also recognised in the services provided as part of a welfare society or active social policy [39–42] and the necessity of a new approach towards social policy as the policy of innovative social services—instead of the policy of redistribution of provisions (benefits) or financial resources—is emphasised. Accordingly, it is essential to invent such a form of social services delivery that would stimulate the creation of innovative solutions and at the same time have the character of social policy combining the activities of the local government and civil society entities (such as non-governmental organisations or social enterprises) with the involvement of citizens in the local community. All of that gives space for adopting a co-creation perspective on social services delivery, being all about replacing the ordinary consumer of services with the consumer who,

at the same time, is also the producer and end-user of those services, whose role is not limited only to the consumption of services, but also includes participation (to a lesser or greater extent) in the process of their production. To simplify, this participation may occur in the phase of service development and/or during its delivery. Such co-creation of social services delivery may be addressed to various actors, e.g., (1) socially excluded, marginalised or at risk of marginalization, (2) local government and its entities that are responsible for providing social services, (3) non-governmental organisations interested in providing social services, and (4) social economy entities. Obviously, creating value through joint activities and working beyond the boundaries of a traditional, autonomous company or legal entity involves the necessity of working systemically with stakeholders, but it results in cost reduction, performance improvement, enhanced service levels, and increased stakeholder satisfaction, which are achieved by listening to citizens and customers [43] (p. 161). Besides, using a citizen-centric approach while executing complex projects is also essential to reduce the risks of failure (as risks associated with it are shared) and boost adoption [29]. Lastly, with the co-creation, the final success of social services delivery increases (measured by the degree to which citizens' needs are satisfied), citizens can participate in public life more actively, and the new type of relationship is created—direct, real, and based on cooperation between the state and citizens. As services are related “with” and developed “by” users, instead of being delivered “to” and “for” them, they often lead to new forms of management, better forms of community activity, improved integration, and better participation of end-users.

As it was already mentioned, adopting a co-creation perspective allows various actors with a shared vision to collaboratively create an environment for innovation and action. Co-creation can be seen as the form of a temporary alliance (partnership) composed for a specific project, with high levels of partner interdependency for the duration of the project. The external partners strengthen the authority's (leader organisation) competence base and innovation processes with the inflow of expertise, competence, experiences, and resources. However, adopting the co-creation perspective in the public sector raises specific challenges. First of all, public sector entities tend to be large and complex, and their leaders typically manage them from the top down. Hence, it may be difficult for them to adopt an organisational model relying heavily on the bottom-up engagement of employees, customers, and other stakeholders [34] (p. 42). Secondly, the ability to manage such collaborations efficiently is likely to be difficult because there are no mutual liabilities, especially at the early stages of the collaboration [13,44,45]. As various organisational actors have very little knowledge of each other, time is necessary in order to understand the corporate cultures and strategies of every organisation involved in the partnership [42]. Therefore, what is crucial for the success of this temporary alliance (partnership) is the transformation in how the authority (leader organisation) manages the development process, especially in how the authority sources complementary external partners for development and organises the service development process [46] (pp. 367–368). If this is done in the proper way, it may lead to a ‘win-win’ situation for all involved parties.

2.3. Partnership as the Way for Co-creation in Social Services Delivery

A growing awareness of the complexity of social issues contributes to the intensive search for new ways of providing social services and creating public value. Organisations providing social services reach out towards solutions crossing over their individual boundaries and create organisational projects that are based on cooperation between partners from different sectors [47,48]. In this sense, interorganisational cooperation becomes interaction fields populated by autonomous but interdependent actors, where alignments of interests institutionalized through formal collective actors and informally through issue-based nets criss-cross the established order of economic exchange relationships [49]. Less or more institutionalised cooperation between organisations is a way to earn an innovation and relational rent [50] (p. 10). The ultimate outcome of the actions that were taken should be the success measured with created value, as evaluated by individual beneficiaries, organisations forming the cooperation network, a partnership as a whole, and the local community. Relationships

that are developed within a partnership can be perceived as voluntary links between the systems, organisations, and individuals who are involved while maintaining their autonomy. Entities operating in such a structure may remain in strong relationships with each other or such connections may be weak, yet still driven by the vision of what to strive for and how to achieve it [51,52]. In structural terms, partnerships are new organisational projects that can be treated as metaorganisations. Their emergence raises the necessity for seeking rules and routines that will ensure the success of a partnership when applied in their management. Participants of partner initiatives are organisations that, cooperating with each other in formulating and implementing local development programs, are more active than others and feel the need to shape local development. Their task is to represent the interests of both the entire community and institutions crucial to the community. In order for the partnership to bring the greatest results, it is necessary to develop the mechanisms for communication, decision-making, and implementation. Therefore, agreements are concluded between the partners—formal or not. The combination of resources, knowledge, and competencies of individual participants makes them dependent on one hand, which may cause certain tensions and problems, but on the other hand, such cooperation is a way to an innovative and relational rent.

One example of cooperation started between organisations operating in different sectors is public–social partnership. In principle, metaorganisations of this kind aim to develop novel ways of providing social services that are indispensable in solving problems related to i.e., the social exclusion of devalued social groups. The phenomenon of collaborations means that the involved organisations may be perceived as structures building a particular form of operation, or rather co-operation of public and social entities, or as forms that are new structures created by these entities in their endeavours to achieve a common goal [53]. The common feature of these new structures is the fact that the organisational actor (i.e., the organisation forming part of the metaorganisation that is a public–social partnership) is where control and coordination mechanisms are based. In order to better understand this type of project, the concept that was developed by Fjeldstad et al. [54] may be used. The researchers propose that research orientation adopted to diagnose management rules and routines inside the initiated collaboration (e.g., a partnership) should be changed from understanding such collaboration in terms of organisational structures to perceiving them as the rules the adoption of which allows for actors to perform their organisational roles and relations. This change in the approach offers a dynamic perspective of an organisation and its related partnership adjusting to a constantly evolving environment. They also claim that the approach that is based on organisational actors can be used universally [54]. In our opinion, the actor-based orientation is particularly suited to entities dealing with unstructured or poorly structured problems, which, due to political implications, are characterised by a high degree of uncertainty as to their actual goals and desired outcomes. This is especially relevant for public–social partnerships.

Due to significant volatility, dynamics, and unpredictability in the environment of public–social partnerships, changing organisational actors need to accommodate each other so that predictions about an unknown future can be made, optional scenarios of effective intervention in a dynamic and uncertain environment can be created, and chosen strategies can be implemented effectively and efficiently [55]. One can risk a supposition that an actor-oriented scheme is an administrative technology—the way in which the leader performs its role [56]. If this new technology follows the route of “disruptive innovation” [57,58], it may become a dominant organisational structure. This, however, does not put an end to hierarchy. In order for actors to hold authority that is needed to allocate and use resources, hierarchical contractual relations may be necessary. Therefore, it appears that where hierarchy will emerge, it will be used mainly to control, not to coordinate.

In order to achieve the sustainability of a partnership it is necessary to understand how a given partnership is managed, as how its leader manages its constituent organisations in order to achieve success and create desired public value. The literature review regarding public management models [59–82] allowed for us to come up with managerial practices undertaken as part of management in public–social partnerships, belonging to one of three management model paradigms: Public

Administration, New Public Management, or Collaborative Public Management (see Table 1). Public Administration (interchangeably in subject literature: centralised management or hierarchical management) is based on the use of bureaucratic mechanisms where the implementation of public tasks in accordance with the law is the only course of action in the organisation. The basic principles of this model are the pursuit of rational organisation of administration, separation of staff from ownership, separation of policy from administration, hierarchy of power, and restrictive allocation of tasks to be carried out. From the point of view of management, a remote possibility of a manager to interfere in the scope of tasks and the methods of financing. New Public Management (decentralised management or market-driven management) assumes the use of market mechanisms and the supremacy of efficiency criteria. The functioning of the public sector is based on rules that are similar to the functioning of the private sector, where the citizen becomes a consumer of public services. From the point of view of management, the attention of the manager is focused on launching competition in the provision of public services between public agencies, companies, and non-governmental organisations, replacing administrative and hierarchical organisational culture with the entrepreneurial and market one, as well as control that is focused on recognizing the effectiveness and efficiency. In Collaborative Public Management (governance, network-based management), the emphasis is placed on the relations with stakeholders understood as citizens, non-governmental organisations, or entrepreneurs. The main rules of exercising authority are participation and consultation, openness, transparency, accountability, and sustainable development. From the point of view of management, the manager must undertake actions that will provide him with stakeholders support.

Table 1. Characteristics of managerial practices depending on the public management model.

Managerial Practices	Management Model Paradigm			Managerial Practices Literature Source
	Public Administration	New Public Management	Collaborative Public Management	
1. Efficiency	The degree of political objectives accomplishment	The degree of economic objectives accomplishment	The degree of social objectives accomplishment	[60,61]
	Allocation structure	Economic results	Outcomes	
	Inability to achieve individual organization objectives	Limited by contract terms, opportunities to achieve organizational objectives	Ample opportunities to achieve organizational objectives stimulated by partnership agreement	
	Rigid, not negotiable goals	Objectives modification, as a direct consequence of fluctuations in the economic environment	Objectives modification, as a direct consequence of fluctuations in the social environment	
2. Public liability	Political	Individual of an entrepreneur	Divided across partnership	[62,63]
	Small possibility to negotiate with local authorities about problems affecting the society	Possibility to negotiate with local authorities about problems affecting the society	Organizational capability to direct resources and attention to upcoming social problems	
	Poor information flow outside the system of power about the objectives and results of operations	Objectives and results of main organizational activities available within the system of power and contracting parties	Objectives and results of main organizational activities available within partnership and stakeholders	
	Obtained results monitored only for the purpose of authorities	Obtained results monitored as a part of system of power and for the contractors needs	Obtained results monitored as a part of system of power and for the dialogue with stakeholders	
	Penalties under the system of power	Penalties according to contract agreement	Penalties within partnership and external environment	

Table 1. Cont.

Management Model Paradigm				
Managerial Practices	Public Administration	New Public Management	Collaborative Public Management	Managerial Practices Literature Source
3. Engagement of community/ Building social capital	Community members treated as suppliants	Community members treated as clients	Community members treated as citizens	[64,65]
	Exclusion of citizens from active participation	Creation of dialogue mechanisms, ex. market research	Creation of enhancing participation mechanisms	
	Same rules for all	Same attitude for dissimilar problems, no individual consideration	Individual consideration	
	Individual connections and relationships used in operations	Contractors connections and relationships used in operations	Wide coalition, actions designed to stimulate development of social capital	
	Proper implementation of political objectives	Analysis in terms of economic opportunities to support public policy objectives	Contribution to local strategies and solutions in solving social problems	
4. Values	Righteousness	Entrepreneurship	Mutuality	[66,67]
	Impartiality	Visionary	Innovation	
	Consequence	Dedication	Legitimization	
	Equality	Flexibility	Authorization/validation	
5. Leadership	To minimize risk	Risk management	Risk-taking	[68]
	Resulting from tenure and individuals usefulness	Resulting from usefulness and time dedicated to meet the economic objectives	Resulting from the recognition of knowledge and qualifications	
	Transactional	Transformational	Facilitating	
	Magisterial	Consultative	Participating	
	Leader focused on solving political problems	Leader focused on solving economic problems	Leader focused on solving social problems	
6. Employee relations	Obscurantism	Economic realism	Innovativeness	[69]
	Standardized system of pay checks	Remuneration linked to effectiveness	Remuneration linked to effectiveness and role within partnership	
	Stable career path	Career path associated with efficiency	Inter-organizational career path	
	Role specialization	Task specialization	Multitask work	
	Appraisal by a supervisor	Self-assessment and appraisal by a supervisor	Self-assessment, appraisal by a supervisor and partners opinion	
	Human resources management	Intensive human resources management	Soft human resources management	
7. Management responsibilities	Trainings in accordance with organizational needs	Actions designated to stimulate employee development	Organizational learning	[70,71]
	Control of the system	Performance management	Process management	
	Detailed operational planning	Strategic planning	Identification of aspects which requires intervention	
	Organizing	Contracting	Activating	
	Staffing	Scout for effective contractors	Scout for useful partners	
	Management and coordination	Mobilizing	Culture management	
	Maintaining the core business	Report requirement	Reporting	
	Budgeting	Generation of revenue	Scout for additional resources	

Table 1. Cont.

Management Model Paradigm				
Managerial Practices	Public Administration	New Public Management	Collaborative Public Management	Managerial Practices Literature Source
8. Decision making	Incremental	Rational	Based on proofs	[72]
	Political	Managerial	From stakeholders perspective	
	Experience	Assessment of economic options	Trust/ Agreement	
	Top-down	Reactive	Overtaking	
	Embedded in the political environment	Embedded in the economic realities	Embedded in the social environment	
9. Structure	Hierarchical	Market base structure	Networking	[73]
	Centralization	Decentralization	Pluralism	
	Monopolization	Disaggregation	Fragmentation	
	Bureaucracy	Contract related relationship among many organizations	Community characterized relationship among many organizations	
	Horizontal supply chain	Outsourcing	Permeable borders—the value chain	
10. Processes	Formalization	Contracting	Contract/agreement	[74,75]
	Instructions	Costing	Allocation of tasks according to available resources	
	Following the procedures delineated by law	Audit	Evaluation	
	Centralized detailed budget	Project budget	Combined budget	
11. Change	Structural	Cultural	Experimental	[76,77]
	Top-down occurrence	Top-down process	Bottom-up	
	Slow adaptation	Fast anticipation	Continuous improvement	
	Focused on new control structures creation	Focused on economic value creation	Focused on social value creation	
12. Relationships with stakeholders	Reporting during the planning stage of the project	Consultations in the planning stage of the project	Cooperation in the planning stage of the project	[78,79]
	Reporting during the implementation stage of the project	Consultations in the implementation stage of the project	Cooperation in the implementation stage of the project	
	Reporting during the implementation process	Consultations during the implementation process	Cooperation during the implementation process	
	Reporting about the results and project evaluation	Consultations about the results and project evaluation	Cooperation during results and project outcome figures obtaining	
13. Communication within the organization	Unilateral	Bilateral	Multilateral	[75,80]
	Top-down	Vertical and horizontal	Exceeding the boundaries of partnerships and participating organizations	
	Used to control resources	Used to improve efficiency	Used for proper resource allocation and formulation of goals	
	Instrument to realize political goals	Instrument to realize economic objectives	Instrument to realize social goals	
	Single resource defined/identified	Significant amount of resources defined/identified	All partners are potential source of information	

Table 1. Cont.

Management Model Paradigm				Managerial Practices Literature Source
Managerial Practices	Public Administration	New Public Management	Collaborative Public Management	
14. Organizational culture	Relations based on mutual allocation of tasks	Relations based on willingness to make an effort	Relations based on shared values	[81]
	Meritocracy	Entrepreneurship	Creativity	
	Acceptance of role	Openness to achievements	Openness to visionary	
	Good implementation of assigned tasks	Good process organization	Elastic adaptation	

Source: own elaboration on the basis of subject literature. [59,82]

Taking into consideration the very nature of a partnership, being multi-stakeholder collaboration, we claim that that using managerial practices typical of Collaborative Public Management foster sustainability in partnerships and should therefore be preferred in partnerships focused on social service delivery.

The main value of the managerial practices that are presented in Table 1 is that it facilitated coding, analysing, and comparing managerial practices within public management models, serving as a framework for transparent distinctions in managerial behaviour. The proposed typology also contributes—through reflective revision—to controlling the subjective assessments of the researcher, while facilitating the theory building [83] (p. 194). Obviously, our proposition is not perfect, as some compromises were required in order to make sure that it is neither too reductionist in minimizing complexity, nor too deterministic in adjusting data to predetermined categories. However, since no typology is able to adequately describe all phenomena, management practices do not always exactly match the predetermined categories, and as such final selection and evaluation depend on the researcher.

3. Materials and Methods

3.1. Research Design

The literature review regarding public management models allowed for the formulation of the research goal as exploration, categorization, and interpretation of how the leaders of organizations included in the public–social partnership managed established partnership and how manager of the partnership managed it. Consequently, we posed the following research questions:

- 1. How do managers engaged in a public–social partnership operate?
- 2. Which model of public management—Public Administration, New Public Management, or Collaborative Public Management—is conducive to achieving better results in the public–social partnership?

In response to the questions raised, first we integrate insights from different strands of literature. Next, empirical data are derived from two main sources, one specific case—the public–social partnership established by 18 institutions and organisations, followed by quantitative research that was conducted in 173 partnerships in Poland.

The partnership we have focused our research attention on was established to design and revive institutional support for people marginalized or at risk of marginalization in the City of Rybnik, Śląsk, Poland. Researched partnership consisted of 18 entities—six public organisations and 12 social organisations. The longitudinal study involved the close and intensive analysis of the context and dynamics of collaboration within the partnership, which resulted in the identification of management practices and contributed to the determination of the implemented management models and the formulation of conclusions.

The first stage of our research, being data gathering process, started at the end of 2011 and it has taken the form of participant observation in the process of partnership formulation as well as document analysis. As pointed out by R.E. Stake [84], the choice of a particular case to study is often determined by the individual interests and preferences of the researcher rather than by methodological reasons. As the researcher chooses the organisational reality that is fascinating for him and that he tries to explore, hence the selection of research techniques is secondary and dictated by pragmatism. Indeed, the authors' hands-on experience in facilitating the launch of partnerships has equipped them with an opportunity to carry out a longitudinal study, allowing for successful data collection, on one hand, and facilitating communication within the partnership on the other hand. This approach is in line with Van de Ven's [85] engaged scholarship, which emphasizes the co-production and co-ownership of the research process and challenges visions of academics as the sole knowledge producers and drivers of academic inquiry [86]. In the period of time 2012–2014, the researchers have also made c.a. 200 h of observation and participated in networking meetings for organisations forming the partnership. In addition to the data collected in the course of the study, the researchers also used their own experiences and personal notes from the period of time when they had been working with the partnership as facilitators and evaluators. This is in line with Eisenhardt [87] and Yin [88], who value the possibility of the joint use of different data collection techniques. In order to support evidence from field research, secondary data were used as well (the partnership website, newspaper articles, and annual reports).

These steps were next supplemented with the information that was elicited from in-depth interviews (IDIs). The targeted participants were 18 leaders of the organisations constituting the partnership. Within the period of two years (2015–2016) the researchers have conducted 18 interviews—one in each organisation. Each interview lasted between 50 and 150 minutes and was recorded for content analysis purposes. We have asked participants to describe management practices used in their organization, and used by the manager of the partnership.

Subsequently, we showed respondents the description of 14 managerial practices in relation to the public management model provided by literature (Collaborative Public Management, New Public Management, and Public Administration—see Table 1) and asked to indicate the statements that characterize his or her style as well as manager of the partnership style. The key to the systematic qualitative analysis [89] was the compilation of the characteristics for 14 management practices. It was assumed that when a respondent chose the characteristics of a particular management practice and discussed the reasons for his choice, it would be possible to make conclusions about the occurrence of behaviours representative of one of the three ideal models of public management. The value of the developed typology rested in the fact that it facilitated the coding, analysing, and comparing of management practices within the models, as it acted as a tool providing the framework for clear distinctions relating to managerial behaviours and seeking relationships between a management method and achieved results. The features described for each public management model have been numbered, e.g. for managerial practices in terms of efficiency, the numbering is as follows: the degree of political objectives accomplishment (Variable 1), allocation structure (Variable 4), inability to achieve individual organization objectives (Variable 7), rigid, not negotiable goals (Variable 10), the degree of economic objectives accomplishment (Variable 2), economic results (Variable 5), limited by contract terms, opportunities to achieve organizational objectives (Variable 8), objectives modification, as a direct consequence of fluctuations in the economic environment (Variable 11), the degree of social objectives accomplishment (Variable 3), outcomes (Variable 6), ample opportunities to achieve organizational objectives stimulated by partnership agreement (Variable 9), and objectives modification, as a direct consequence of fluctuations in the social environment (Variable 12). The data was analysed jointly by both authors using a timely and rigorous process, starting with a detailed analysis of each IDI. Each interview was first transcribed and carefully analysed, the following stage of data analysis was interpretation and the final stage was the analytical discussion, engaging existing literature to provide theoretical explanation for the identified managerial practices.

In order to acquire a complete picture of managerial practices in the examined partnership, cluster analysis based on the hierarchical method [90,91] was used to identify the relations between variables. The distances were determined using Ward's method, which defines the dissimilarities between objects as mean squared distances between cluster centres:

$$d_{AB} = \frac{n_A n_B}{n_A + n_B} d^2(\bar{x}_A, \bar{x}_B) \quad (1)$$

The optimal number of clusters makes the highest quotient of between-group variance to within-group variance. The criterion is known as the Caliński and Harabasz [92] index.

Following the proposed methodology, we looked for similarities in terms of the subjective assessment of the management practices applied within the partnership. Cluster analysis, which aims to identify objects in a set that are similar to each other and group them into clusters, was used to interpret the elicited responses. At the start, we assume that each element forms a separate group, and then we gradually weaken the criterion of recognizing objects as the same, which allows for grouped similar objects. As the criterion is further weakened, more and more objects are group together and they aggregate to form larger clusters that are increasingly different from each other. Finally, in the last stage, all objects are grouped together. As a result, the method yields a dendrogram that is a binary tree diagram, where nodes represent clusters, while leaves—classified objects. The analysis of all objects (14 management practices) allowed for the grouping and creating of a set of classes containing similar opinions in terms of aggregated subjective judgments. Based on its results, a measurement tool was designed for the quantitative study (diagnostic survey).

In the second stage, the questionnaire-based survey was carried out. The market research company contacted by telephone leaders of public–social partnerships from randomly selected 300 partnerships operating throughout Poland. The data were gathered by between September and December 2015. Respondents declared if they are willing to participate in the research and answered to a screening question: are you a leader of public–social partnerships? If respondent agreed to participate in the research and answer to the first question was positive, the questionnaire was sent prior to telephone contact by an interviewer (CATI). Next, the dataset was reviewed for incomplete responses, outliers, and uniform responses across all scale items. From the original, contacted by the telephone research sample, we gathered 201 completed questionnaires, of which 173 were included in the research. These procedures yielded an effective response rate of 57.6%. The survey used a 58-question questionnaire. Most questions adopted a seven-level Likert scale and the respondents were asked to evaluate each characteristic on a scale representing different degrees of approval for a given statement (1—lack of approval for a proposed version of a response, 7—total approval for a proposed version of a response). The remaining questions offered cafeteria-style checklists, which were exhaustive in terms of the responses that could be given to a particular question. It is important to note that this paper presents only one of many studied aspects, namely the connection, declared by the leaders, between the public management model applied in a particular partnership and the success in creating public value (questions 51, 57).

3.2. Empirical Findings

3.2.1. First Stage—Research Results

The following section contains a description and analysis of the management practices categorized based on the public management models provided by literature (see Table 1), being a result of 18 conducted IDIs. In this section, management practices that are used in the researched partnership are broken down into 14 components (from 1—efficiency to 14—organisational culture). Each of the managerial practices was illustrated with specific dendrogram. The obtained responses regarding each managerial practice have been individually interpreted and summarized.

In the examined partnership, the management practices that affect the organisation's **efficiency** combine the instruments typical of Public Administration, New Public Management, and Collaborative Public Management models with a slight advantage of the last one. The partnership is an organisation of high complexity in terms of its organisational form, so one of its features affecting efficiency is a variety of interdependencies between its constituent organisations. The respondents emphasized the particular attention that the manager attached to the stimulation of community mechanisms, the conciliatory redefinition of goals as a result of changes occurring in the task-related environment, the effective information policy, the involvement in the dialogue with stakeholders, and, finally, the management of relationships within the established collaboration scheme.

The combination of Public Administration, New Public Management, and Collaborative Public Management models—with the strongest presence of management practices typical of the New Public Management model—was indicated as the way to implement management practices related to the aspects connected with public liability. In the case study, the manager of the partnership builds the cooperating organisations' awareness of the role that they have undertaken and of the fact that the quality of the pursued initiatives contributes both to their individual image and the overall image of local political authorities. The respondents stress that the manager's awareness that the effective implementation of the partnership's goals is to create desired outcomes for the local community and the participation of partner organisations legitimises their operations and contributes to increased social approval and a prolonged political mandate.

The cluster that emerged for management practices related to engagement of community/building social capital clearly favoured management practices typical of the Collaborative Public Management model. This implies that the manager of the partnership is perceived as a one who appreciates the significance of local community involvement for the success of the partnership's initiatives. The manager understands and collaborates organisations that recognise that the partnership, as a structure operating in a given local environment, has to cooperate with it, building relationships both with individuals and organisations. Relationships are developed in more or less organized structures, constantly evolving in a particular environmental context. The success of the partnership based on common good creation, responsibility, and transparency contributes to building the stronger norms of trust, boosting the social capital necessary to pursue the adopted goals.

The distribution of the responses relating to the management practices in the area of values indicates that the management practices that are adopted combine the instruments characteristic of Public Administration, New Public Management and Collaborative Public Management models. The management practices that were upheld strongly by the manager are the norms of mutuality, legitimization, validation, and innovation. Although one of the most difficult challenges facing the partnership's manager is to build a coalition that is based on shared values, the respondents underline that it has been successfully achieved in this partnership. The member organisations constituting a newly created structure contributed their own ethics, which occasionally meant the lack of neutrality in terms of the values created in the network. In the process of creating the partnership's mission, the manager confronted the expectations of the member organisations with the partnership's goals and initiatives, aiming to achieve compromise.

The survey results show that the respondents from the partnership claim that, in the area of leadership, the manager combines the instruments typical of Public Administration, New Public Management and Collaborative Public Management models. Managing the partnership is perceived as a complex process, because the manager has to be able to skilfully merge the different logics of partner organisations. The joint management structure acts as an integrating system, which results in the institutionalised leadership that allows for the nominal manager and leaders of the member organisations to connect substantially different parts of the partnership. The permeable boundaries of the partnership further increase its complexity, and, as a result, cause the emergence of conflicts, which are resolved by the nominal leader, striving to strengthen the platform that is shared by the organisations.

In the area of management practices concerning employee relations, cluster analysis points to dominance, however, weak, of practices related to the New Public Management model. The respondents emphasise that the solutions that are adopted in the field of employee relations have to comply with the current legislation, which tends to regulate HRM procedures in a relatively inflexible manner. The manager understands that human resources management is the key to effectiveness irrespective of the management model and he seeks to boost this aspect in the partnership. Employee relations, and—more broadly—human resources management, are the key to creating added value in the public–social partnership, because, as stressed by the respondents, these organisational structures by nature do not have a more important resource than their employees.

Based on the responses to the questionnaire, the clusters generated for management practices in the area of management responsibilities point to the combination of the instruments typical of the Public Administration, New Public Management and Collaborative Public Management models. The respondents indicated that the manager of the partnership effectively activated and motivated the representatives of all partner organisations to build and develop the network and boosted efficiency through seeking and raising resources ensuring the improved quality of services delivered. The leaders in the constituent organisations make a concerted effort working to achieve mutual benefits stemming from their initiatives. The manager recognises that the contribution and individual competences of each partner are compatible and he uses his knowledge to raise such resources from partner organisations that are needed at a particular moment.

The analysis of the clusters that emerged for the management practices in decision-making reveals the combination of the instruments typical of the Public Administration, New Public Management, and Collaborative Public Management models. The respondents claim that the manager attaches importance to the decision making process, so that the decisions taken can be based on the shared evaluation of the needs and threats relating to each service user, which stimulates the development of alternative solutions, which would otherwise remain unconsidered. The manager's pursuit of synergy involves maximizing the mechanism of the identical assessment of all partners as an important aspect of conducted activities. Cumulative and sequential operations build a coherent programme of creating socially desired value. Conflicts seldom emerge and if they do, their resolution does not entail inadequate use of power.

The clusters acquired for the structure-related management practices confirm the emerging pattern that the manager of the partnership can combine and counterbalance the management practices of all the three models, choosing the solution that is the most suitable for a particular situation. This opinion was formulated by the respondents based on the observations of changes in the make-up of interorganisational collaboration, the way of choosing new members or eliminating those who did not allocate sufficient resources for the common good. The partnership in question is a heterogeneous structure, with a number of partners and imperfect communication between the strategic party (leader) and the operational parties (organisations constituting the network) that have varied motivation to initiate actual action. The group that holds real managing authority consists almost exclusively of the employees of the public organisation and operates as a system with permeable boundaries and closed membership. The proposed structure of the partnership reflects the need to overcome weaknesses that are inherent both in the hierarchy and are typical of market reliance on individual organisations and specialization. It also reveals the tension between the social need of a still higher-level specialist professional expertise and the individual need expressed by the consumer or the customer to receive a holistic, accessible service.

The distribution of clusters grouping the opinions on the process-related management practices shows that the respondents do not opt for a strong dominant management model. Yet, clusters for the Collaborative Public Management and Public Administration models are slightly stronger. The preference for the collaborative management dimension is manifested in highlighting the fact that the leaders of the partner organisations invest time and energy to ensure learning in the co-participation contexts, which allow for hidden knowledge and experience to be transformed and diffused, bringing

benefits for the entire partnership. Power is used interactively and dynamically through social network relations that are embedded in mutual co-dependencies. Protocols are process standards, designed to build up trust by creating obligations between partners. Such formalization, however, does not always result in the emergence of more significant relations on a strategic level, where trust from peripheral organisations is lower. The respondents opine that official supervision or passive submissions are not sufficient to achieve positive outcomes in the collaboration.

The distribution of clusters for the management practices relating to organisational change shows a slight dominance of the Collaborative Public Management model adopted in the partnership. The manager of the partnership plays the key role in implementing institutional changes, initiating them based on the information about such a need acquired from the collaborating organisations. The respondents see the actions taken by the manager in this respect as the approval for bottom-up initiatives, proposing adjustments to the complex goals that are pursued by the partnership. This means that all partners are fully recognised as legitimate participants in the process and their opinion on the need to make adjustments and reviews is taken into account. It is essential that all partnership members support the mechanisms that are used to initiate steps aiming at continuous improvement and seek such goals that carry significant value for a local community. The manager approves of the need to respond to changing internal and external objectives. He prefers, however, incremental changes, introduced on a small scale, due to the fear of the reduction in the partnership's social capital.

The examination of the clusters reveals that the respondents perceive the management practices in the area of stakeholder relationships as the combination of the Public Administration and Collaborative Public Management models. The respondents emphasise that managing the partnership cannot be separated from stakeholder relationships, since the key to success is to identify and reinforce the strategic ability to create maximum value for major interested parties at reasonable costs. In the times when resources that are allocated to satisfy public needs are being limited, social expectations are growing, people are becoming increasingly sceptical about public institutions, and pressure on delivering quality is becoming stronger, the provision of services at a level that would be satisfactory for stakeholders is becoming a difficult task. Hence, it is particularly important to maintain relationships with stakeholders during the entire strategic management process, because "success" of the partnership—and its survival—depends on satisfying key stakeholders according to their definition of value.

The analysis of the clusters indicates that the dominant management practices in the area of communication within the organisation are the practices using the instruments typical of the Collaborative Public Management model. The respondents stress the active role of the manager in building synergic communication patterns. The typical behaviour of the manager is crossing over the boundaries of the organisation in order to use the resources available from organisational actors in an appropriate way. The organisations joining the partnership are aware that not all of the partners are equally engaged in the initiatives launched and express criticism towards this lack of involvement. The manager, however, attempts to facilitate the information flow between organisations. An important aspect of the communication process, as emphasised by the respondents, is the influence of the knowledge acquired by the manager about the state and structure of the resources in the partner organisations and the fact that all partners are treated as potential source of information.

The analysis of the clusters characterising the management practices relating to the development of organisational culture reveals that the manager uses the combination of the instruments from all the three models. A slight preference—in terms of the uniformity rather than strength of the cluster—is detected in the case of the Collaborative Public Management model. The manager of the partnership skilfully controls the organisational actors by defining the mission clearly and focusing energy and resources, coming from partner organisations, around this mission. Additionally, has developed specialist operational strategies and crisis intervention methods. The partnership has a dominant task-driven culture with a certain tendency to cross the organisational boundaries. This culture promotes behaviours that are oriented towards collaboration opportunities. The manager is not interested in ensuring the positions of individual organisations, but concentrates on the legitimization

stemming from joint undertakings. The respondents underline that good relationships with the partners and orientation towards collaborative effort decrease entrepreneurship and innovativeness, which raises concerns that the benefits generated are lower than expected by the partner organisations. The positive aspect, on the other hand, is the atmosphere of cooperation and a sense of self-esteem that the managers of the collaborating organisations can develop.

Findings regarding the most frequently used managerial practices by both the manager and leaders of organisations constituting the researched partnership are presented in the discussion part.

3.2.2. Second Stage—Research Results

The distribution of the responses to the question about the dominant public management models in the 173 partnerships surveyed was almost equal as the results obtained in the first stage of our research. 38.2% of the leaders pointed to the New Public Management model as the dominant one, while the practices typical for the Collaborative Public Management and Public Administration models received similar ratings—30.6% and 31.2%, respectively (see Table 2). The evaluation of the outcomes and a sense of achievement are particularly important for the existence and growth of the partnership and its sustainability. The positive evaluation will ensure continued participation in the established collaboration network and encourage new entities to join the network. The distribution of the responses reveals that nearly half of the respondents assess the achieved outcomes as average. It is not a result that speaks well of the effectiveness of the actions initiated. On the other hand, 1/3 of the managers of the partnerships perceive the outcomes as good or very good, while only 1/5 of the respondents—as poor or very poor.

Table 2. Public management models and subjective perceptions of success as evaluation of collaboration outcomes—cross table (N = 173).

Evaluation of the Success	Management Model Paradigm					
	Collaborative Public Management		New Public Management		Public Administration	
	%	frequency	%	frequency	%	frequency
Very low	1.9	1	0	0	1.9	1
Low	7.5	4	7.6	5	13.0	7
Average	41.5	22	51.5	34	61.1	33
High	39.6	21	36.4	24	22.2	12
Very high	9.4	5	4.5	3	1.0	1
Total	100.0	53	100.0	66	100.0	54

The comparison of the management model indicated by the leader with the perceived success of collaboration reveals that the perception tends to be better or much better in the partnerships with the dominant model of Collaborative Public Management. Similar results were achieved for the partnerships that adopted the New Public Management model, whereas the Public Administration model tended to correspond with poor or very poor perceptions of the partnership’s outcomes (see Figure 1).

The fact that the respondents claimed that the most effective partnerships were the partnerships whose managers mostly used the techniques characteristic of the Collaborative Public Management model highlights the importance of co-production for public value creation as a way of achieving sustainability of a partnership. We should bear in mind, however, that the success of the partnership means the achievement of positive outcomes that could not be achieved if partner organisations operated separately, and the outcomes concern the partner organisations, the partnership as a metaorganisation, and the entire local community [93]. It means that in order to achieve goals and create value, the manager of the partnership, apart from adjusting management practices to a situation, has to be able to integrate the intraorganisational perspective with the context in which a newly created structure operates.

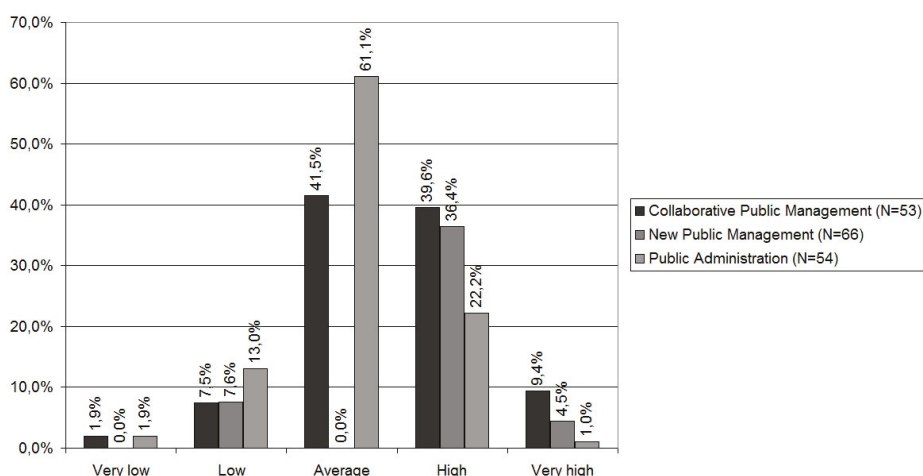


Figure 1. Public management models and subjective perceptions of success as an evaluation of collaboration outcomes (N = 173).

4. Discussion

Based on the presented case study, analysis of the survey results and IDIs conducted with the 18 leaders of the organisations constituting the partnership established in Rybnik, the observed pattern revealed the dominance of Collaborative Public Management model contributing to the success of the partnership. It was also identified what actions were taken by the manager of the partnership in order to maintain links between the partners, build trust, and win their support and legitimisation in public space—all of which is necessary to create public value, which in turn contributes to sustainability of the partnership. Although it might seem that in order to generate maximum value, a public-social partnership needs to be managed using management practices that are typical of the Collaborative Public Management, as it allows for better integration of the resources and goals of each partner organisation, it is not always the case. The research results lead to the conclusion that the three models treated as the paradigms of public management—Collaborative Public Management, New Public Management, and Public Administration—are present in the management practices of the partnership leader in different proportions (see Table 3). It should be noted, however, that the Collaborative Public Management model manifests a slight dominance, which reveals the orientation towards preference for bottom-up mechanisms and participation.

The images of the clusters (dendrograms) for particular managerial practices support the conclusion that the significance of Public Administration management model as a dominant discourse is decreasing. The focus is being shifted towards the instruments that approach collaborating organisations from a holistic perspective, seeking mechanism that would allow for each partner organisation to pursue its own growth within the partnership. As proven by our research results, leaders—according to the situation and possibilities—use managerial practices specific to different management models, and so does the manager of the entire partnership. Therefore, the consistent and homogenous management model is not the factor that unequivocally leads to the success of partnership and its sustainability. This in turn leads to the need to reflect on what actually is the factor deciding whether the partnership achieves its objectives. The observed practice shows that what leads to success is the fact that leaders use managerial practices that are better suited for running a partnership and this way they achieve better outcomes. The management of a partnership using a wide range of managerial practices is what is expected in the holistic approach to leadership, namely the application of general management skills to specific problems. The research results indicate that the difference rests in the details and subtleties concerning conscious choices made by leaders and

manager to adjust their practices to take into account the partners' perspective and solve problems through mediation and negotiation. Time, resources, and skills are invested in interpersonal relations, because leaders know how to build and maintain a successful partnership, which will be perceived as trustworthy by partners, i.e., organisational actors and communities. Although the Collaborative Public Management model dominates—slightly, but still—in the researched partnership, the features of the remaining two models are also present in weaker forms. Answering the question why this is the case, we could risk a conclusion that none of the models corresponds fully with the complexity of management practice, so different instruments located in different management models should be incorporated and used. The study also leads to the thesis that leaders of organisations constituting the partnership perform their tasks through the adoption, adjustment, and rejection of particular aspects of management theory and practice, the development of new management methods that are better suited for the expected outcomes in the area of improving the quality of life in a local community, which makes them aligned with the concepts of the architecture of collaboration [54]. Building and maintaining involvement require managerial skills of leadership and influencing, readiness to rely on others, and qualifications and energy to indirectly hold practitioners accountable, which is a difficult and thankless task. Supervision over management practices facilitates increased efficiency as a result of the synergism of managers' and practitioners' interest and the balance between practitioners' autonomy and liability.

Table 3. The identification of public management models in the selected management practices.

Dimension	Primary Cluster	Secondary Cluster
1. Efficiency	Combination of models	Collaborative Public Management
2. Public liability	Combination of models	New Public Management
3. Engagement of community/building social capital	Collaborative Public Management	Combination of models
4. Values	Combination of models	Collaborative Public Management
5. Leadership	Combination of models	New Public Management
6. Employee relations	New Public Management	Collaborative Public Management
7. Management responsibilities	Combination of models	New Public Management
8. Decision making	Combination of models	Combination of models
9. Structure	Combination of models	Collaborative Public Management
10. Processes	Public Administration/Collaborative Public Management	Collaborative Public Management/Public Administration
11. Change	Collaborative Public Management	Combination of models
12. Relationships with stakeholders	Public Administration/Collaborative Public Management	Public Administration/Collaborative Public Management
13. Communication within the organisation	Combination of models	Collaborative Public Management
14. Organisational culture	Combination of models	Collaborative Public Management

The overall conclusion from the study is that a partnership is a process that is embedded in a context that dynamises and conditions the relationship between partners. If the relationship is to yield expected outcomes, leaders of organisations constituting partnership and the manager of the partnership have to be able to build the architecture of collaboration, as this architecture connects the constituent entities, i.e. organisational actors, into a public–social partnership. Its development and striving for its sustainability requires skill and leadership. The quality of leadership is the factor that is probably of greatest significance for the created structure of success [88,89].

5. Conclusions

Collaboration between partner organisations develops in response to revealed social problems and its organisational form is an architectural reaction to their existence. The necessity to build a structure in response to the identified needs causes that organisational effort is made to design such a functional structure—in other words, the architecture of collaboration—that the initiatives that are in demand in a given local community can be effectively consumed as a result of applying such methods for reaching goals that allow for collaborating organisations to achieve success. Paradoxically, it is the limitations that shape the way of organising and the solutions applied in operation. This is a slightly simplified model of defining collaboration as an organisational response to challenges arising from the social reality, but although it is not as rare as it might seem, it often ensures success and the achievement of goals. A variety of organisations that have to form a partnership, diverse resources, and, above all, the human factor make such a partnership unique. When considering the diversity of goals that partnerships are created to pursue, this becomes a significant value, but in terms of scientific analysis, partnerships elude simple classifications, hence a significant difficulty in identifying patterns and principles that regulate them. However, it is necessary to bear in mind that building a metaorganisation requires a new innovation culture, strategic vision, courage, direction, and sense of urgency. As Lee et al. [14] notices, the road to co-innovation is neither smooth nor easy and organisations do not have much choice but to join the race to become an effective value-creating organisation for competitive advantage.

The study proved that a partnership is something more than a fixed set of relationships—it has a visible logical structure, which can be referred to as the architecture of collaboration. The fact that a partnership does not normally have one dominant management model means that, as an organisational structure it is characterized, on one hand, with a degree of institutionalisation, and, on the other hand, a constant pursuit of the formula that will allow partners to design a partnership in such a way that will let them create desired public value and achieve sustainability. Such metaorganisation consisting of collaborative organizations, which are “simultaneously innovative and efficient, agile and scalable” [94] focuses on knowledge production through both internal and external collaboration. Shared values and goals are more important for the success of a partnership than strict formal rules or resources characteristic of the institutionalization of connections between the organisations constituting a partnership. The manager of a partnership and the leaders of its member organisations should be able to freely cross organisational boundaries and apply their transdisciplinary knowledge to create the vision of what may be achieved as a result of collaboration and ensure the survival of this innovative organisational structure. The complex nature of the collaboration processes needs to be analysed from a variety of research perspectives.

The research results come with a number of limitations that stem mainly from the known shortcomings of qualitative and quantitative research conducted with a survey method. First, the assessments of all the variables examined are based on the respondents’ subjective opinions. This might cause a bias due to the respondents’ tendency to reply positively to questions that are related to success. The inclusion of objective measures could reinforce the conclusions of this study. Limitations are also connected with the fact that we have interviewed only one respondent in each organisation. In order to decrease the risk of bias during the design and administration of our research, we assured respondent confidentiality. This is aimed at reducing common method bias by making respondents less likely to modify their answers due to social desirability or how they think that others may expect them to answer. The authors are also aware that the nature of this paper in explanatory and the research approach that is adopted in this paper does not give the right to generalization. However, it is believed that the triangulation of the data sources and longitudinal data collection process increased the level of the rigor of drawing conclusions. In general, the study should be seen as a justification for the need for future, more in-depth studies on the conditions for the functioning of public–social partnerships, and the factors determining the effectiveness of providing social services.

Accordingly, in future studies, the success of the partnership could be analysed through the prism of the impact that the partnership has on the community, its value for particular organisations that joined the partnership, the actual costs that were incurred, and the benefits that were generated as a result of the collaboration. Another interesting research avenue could be connected with capturing the multi-level nature of both cooperation and competition in partnerships, as well as looking at it through the prism of trust and distrust. Future research could also be conducted into the structure and conditions of organisational projects in order to identify emerging connections and to provide their accurate interpretation so that theoretical knowledge about the complex organisational life can be effectively used by managers working for public organisations to improve the outcomes of their initiatives. It is also necessary to focus research attention at dark sides of cooperation as those surely exist. Although we have moved from old Public Administration to New Public Management and networked environment typical of the Collaborative Public Management model, it has to be noted that the values, practices, and approaches of each paradigm still exists and influence the decision making model.

Establishing collaboration is an element of the process—according to Wood and Gray [95], a kind of “black box”—that aims to design such a structure that will ensure the achievement of goals. The process involves collaboration occurring as continuing formal interactions and recurrent informal sequences in negotiations, obligations, and their fulfilment. Accommodation is the result of the continuing process of “trial and error”, completed when the participants in an organisational project achieve significant net benefits [96] (p. 8). Game theory supports the assumption that the whole process is oriented towards collaboration that is defined as the process aiming to design and implement the architecture of collaboration that is adequate for an organisation’s goals. Collaboration in a partnership is a process in which autonomous actors influence each other through formal and informal negotiations, jointly developing rules and structures of governing (regulating), and their relationships, methods of operation, or decisions concerning issues in which they have a shared interest (by which they are integrated). It involves the division of norms and mutual favourable interaction [97]. The architecture of collaboration is the concept, which correspond particularly well with the practice of establishing public–social partnerships, because it attributes the success achieved by multi-entity organisational undertakings to the selection of actors based on their resources and values ensuring self-organisation. It favours a community within which the actors raise and share resources, while existing protocols and relations allow for the cooperation between numerous actors [98]. All of the elements together create organisational contexts as well as operate within them. These contexts involve different connections of transparency, shared values and norms of mutuality, trust and altruism [98,99]. The source of control and coordination is direct interaction between actors, and not hierarchical subordination.

Bringing our considerations to an end, we would like to stress the cognitive value of the study, as it provides information on the operationalisations of management practices in the three management models, while at the same time it reveals the growth potential of public management in partnerships, in particular, following the logic that allows for the adoption of the concepts relating to the architecture of collaboration. The results show that the architecture of collaboration may be of significant importance for the practice of managing partnerships and it contributes to the public value creation, and, as a consequence, advances public management theory by incorporating other researchers’ works and supplementing them with new observations. To sum up the issues raised in the paper, we conclude that, in the public sector, managing public programmes aiming to deliver social services through partnerships has become a norm rather than an exception in many EU member states. For public sector organisations, open collaboration is crucial to change the focus of innovation from internal administrative processes towards new services and improved results for society [100]. This is the consequence of the increasingly popular view, which is shared both by practitioners and researchers, that services integrated within a multi-entity collaboration network—due to their lower fragmentation and increased coordination—offer the way to create a more effective system, and, as a result, better outcomes, customers receive higher individual benefits and collaborating organisations grow [47,101].

Therefore, nowadays, the only way that governments have to deal with complex problems in society (commonly referred to as ‘wicked problems’) are through the use of collaborative structures that involve other non-state stakeholders [102]. This model of thinking about the architecture of collaboration as a peculiar metaphor of organisation can be referred to the rules inside partnerships, or, in other words, collaboration launched between public and social organisations that aims to create public value, which seems to offer a new and interesting research area.

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Article

The Impact of Trust on the Approach to Management—A Case Study of Creative Industries

Joanna Radomska ^{1,*}, Przemysław Wołczek ¹, Letycja Soloducho-Pelc ¹ and Susana Silva ^{1,2}¹ Wrocław University of Economics, ul. Komandorska 118/120, 53-345 Wrocław, Poland;

przemyslaw.wolczek@ue.wroc.pl (P.W.); letycja.soloducho@gmail.com (L.S.-P.); ssilva@porto.ucp.pt (S.S.)

² Católica Porto Business School, Rua de Diogo Botelho, 1327, 4169-005 Porto, Portugal

* Correspondence: joanna.radomska@ue.wroc.pl

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Abstract: Companies operating in the creative industries are struggling with the simultaneous pressure to be innovative and creative, which requires access to unique resources (such as knowledge and creative potential), but also means they must be effective in actions taken. To find a balance between those tensions, they are using the networking approach. Therefore, it seems that networking is becoming a high priority and that being involved in networks is a crucial part of such companies' business models. Nevertheless, their competitive advantage is based on creative potential, which means that they are rooted in building and maintaining internal relations. As a result, in creative industries, relationships with internal and external stakeholders are crucial, but are strongly based on trust. Thus, the main aim of this paper is to investigate whether trust is the main factor influencing the approach to management. Moreover, we tried to understand the impact of trust on the managerial actions taken. We used the multiple case study research method to examine the role of trust in cooperation, as well as in shaping internal relations in companies operating in the creative industries. To achieve that goal, 10 companies from Poland and Portugal (5 from each country) were investigated in order to find any regularities. By analyzing the research results, it was possible to identify consistencies among the sample and present the main findings. Therefore, four approaches distinguished by the degree of trust were identified. When the level of trust is low, companies are operating within their network based on close relationships, as well as using collective participation where the team is perceived as a key success factor. On the other hand, when the level of trust is higher, companies move towards cooperative management (where the role of competitors is crucial) as well as individual participation (where an employee is engaged in the creative, as well as the decision-making, process). As a result, a theoretical model is proposed that includes the level of trust and the external and internal stakeholders' perspective. Based on our research, trust can also be added as a fourth 'T' to the '3T' (talent, tolerance and technology) concept proposed by Florida (2003).

Keywords: trust; creative industry; networking; stakeholders

1. Introduction

Although we can find different definitions of the creative industries [1], in most research that sector has been investigated mainly based on specific characteristics: high pressure to achieve creativity, high need for permanent adjustment, and high importance of a networking approach [2]. On the other hand, the sector seems to have an impact on the growth of the economy in various countries.

As stated by Chaston and Sadler-Smith [3] (p. 415):

The inception and growth of creative industries is a matter of theoretical concern for business venturing and entrepreneurship researchers (Henry, 2007) and of practical concern for nascent entrepreneurs and the managers of small businesses in the creative sector (Foord, 2008); it is also important in the debates regarding social policy and economic development (Oakley, 2006).

The importance of this sector within the field of entrepreneurship and management thus seems to be unquestionable for both academics and managers. Also, from the policy maker’s point of view, this subject appears to be relevant [4]. Therefore, investigating managerial practices seems to of high importance.

Moreover, in literature describing the creative industries many studies have used the macro perspective—that is, analyzing the activities of the whole creative industry—while relatively few have considered the micro perspective—referring to strategic or operational measures taken by the companies within that sector [5]. This reinforces the idea that more research is necessary to unveil the management profile of small and medium-sized enterprises (SMEs) operating in the creative industry, considering that most researchers so far have focused mainly on frameworks that consider how creativity influences social systems or the economy [6]. Furthermore, many studies have considered the phenomenon of creativity, while few have aimed to develop theory in creative industry management [7]. This also represents a research gap that we want to address. Therefore, we can say that even though larger firms in this sector have been the focus of more research compared to SMEs, it would be interesting to identify the approaches to management in SMEs, bearing in mind that trust seems to be considered a means of support for creativity. For this reason, we believe that it is worth investigating managerial practices, especially the level of trust in management held by external and internal stakeholders, from the perspective of small companies in the creative industries—an area that is gaining relevance in Poland and Portugal, as well as in Europe overall.

Based on the above, this paper investigates the managerial practices and approaches to management represented by companies operating in creative industries. We focus on the perspectives of Poland and Portugal, mainly because of their comparable level of revenues reported in the creative industry, but different data on gross domestic product (GDP) and employment. The figures are briefly presented in Table 1.

Table 1. Creative industries—comparison between Poland and Portugal

	POLAND	PORTUGAL
Level of revenues	€6235 m.	€6358 m.
% of GDP	1.25	1.4
% of employment	1.75	1.4

Source: [8] (p. 2).

Only in some European countries can we find contributions above 3%. As we can see from Table 2, only a few display higher contributions for value added than for jobs. Overall, and according to Tera Consultants [9], the sector accounts for 6.8% of European GDP (approximately €860 billion) and 6.5% of European employment (approximately €14 million); however, the consultants’ study, conducted in 2011, foresaw job destruction in the sector in the coming years.

Table 2. Economic weight of the creative industries in the main European markets (2011).

	UK		FRANCE		GERMANY		ITALY		SPAIN	
Creative industries	VA (%)	Jobs (%)	VA (%)	Jobs (%)	VA (%)	Jobs (%)	VA (%)	Jobs (%)	VA (%)	Jobs (%)
Core	5.8	5.4	5.1	3.7	3.9	4.1	3.9	3.7	3.4	3.4
Interdependent & support	3.2	3.6	2.7	2.6	2.1	2.9	2.2	2.5	1.7	2.2
Total creative industries	9.0	9.0	7.9	6.3	6.1	7.0	6.1	6.2	5.0	5.6
Creative GDP (billion €)	159		152		159		95		53	
Creative employment (million)		2.6		1.6		2.8		1.4		1.0

Note: VA = value added. Source: [9] (p. 6.).

According to the report “Creative Economy Employment in the EU and the UK, a Comparative Analysis”, from a British organization [10], the creative industries are responsible for around 11 million jobs in

Europe, which accounts for 5.21% of all jobs in the continent. These figures surpass those presented in 2006 by KEA, which estimated 3.1% of jobs in this sector in Europe; that is, 5.8 million (UE25). From 2011 to 2013, the forecasts of Tera Consultants have not yet been verified; indeed, there was a small increase of around 393,000 jobs created from 2011 to 2013, as we can see in Table 3.

Table 3. Evolution of new jobs in creative industries in Europe (UE28), 2011–13.

	Total	% of Total Economy
2011	11,005,000	5.10
2012	11,252,000	5.23
2013	11,398,000	5.31
Average 2011–13	11,218,000	5.21

Source: [11].

The comparison between Poland and Portugal is based on the growing potential for job creation and the impact on the labor market [12], as well as the support for professionals possessing distinctive abilities [13]. In both economies, the sector is perceived as strategic and influencing regional development, as well as sustainable economic growth [14], and providing some spillover effects [15].

It is hoped that our findings will provide deeper understanding of the impact of trust on companies’ relationships with their external, as well as internal, stakeholders, and on the involvement of stakeholders in managerial decisions. To obtain this goal, first, we discuss the impact of trust on the approach to management, as well as the degree of participation and the importance of networking in the creative industries. Subsequently, we present the data collection process and the results of our case research. Finally, we discuss our findings and contributions.

2. Theoretical Background

Theory recognizes that, in areas where an entrepreneurial approach is more evident—as is the case for the creative industries—managerial cognition is at play. This means that managers seem to be more able to recognize complex constellations of cues that comprise potential business venture opportunities, while others fail to recognize them or overlook them [16–18]. However, even though this characteristic can be seen as promising for entrepreneurial activities, the concentration on opportunities that may emerge limits the managerial capacity to focus on planning, as creativity is ‘blocked’ in a variety of ways, including deep-seated beliefs about the world [19]. This may mean that the ‘alertness’—invoked by Kirzner [20] as a positive characteristic of entrepreneurs—is hindered by the obligation to plan according to certain guidelines. Managers are forced to find a balance between creation and rationality, defined as the pressure to accomplish economic and financial indicators. It also reveals a need for more creativity in the formulation of strategy [21]. These guidelines cover the networking perspective, which involves a high level of trust as well as internal interactions and relations that affect the final outcome of the strategy executed.

2.1. Trust as a Factor Influencing the Approach to Management

Starting from 1980, we may observe a growing number of papers that analyzed the issue of trust [22–28], as confirmed in research included in the Web of Science database. Between 1998 and 2018, 15,142 articles containing the word ‘trust’ in the title were published (see Figure 1).

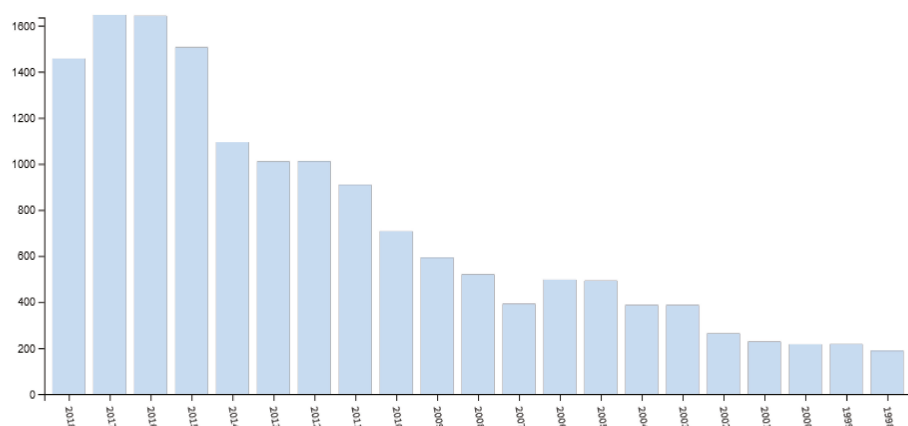


Figure 1. Number of articles containing the word ‘trust’ in the title (1998–2018). Source: Authors’ elaboration based on the Web of Science database (between January 1, 1998 and December 01, 2018).

Based on the literature, it can be stated that trust is a subject of research in various disciplines, such as sociology, psychology, anthropology, philosophy, history, medicine, economics and management. As a result of this wide research spectrum, the concept of trust has different interpretations in the psychological, social, economic and cultural sense [29]. Furthermore, studies show that trust is not limited only to human beings, but may also be applied to social or organizational systems. It can therefore be concluded that trust concerns various entities: individuals, groups, social entities, and relations between people, as well as relations between groups [30].

Scientists who deal with the issue of trust have proposed many definitions that were developed in response to the requirements of individual scientific disciplines. Furthermore, the subjective nature of the perception of trust reduces the possibility of introducing a universal explanation of this problem [26,31,32]. The complexity of the concept of trust in the organizational dimension can be illustrated by the following statement: “Trust (. . .) tends to be somewhat like a combination of the weather and motherhood; it is widely talked about, and it is widely assumed to be good for organizations. When it comes to specifying just what it means in an organizational context, however vagueness creeps in” [33] (p. 497). Based on our analysis of the literature, we can state that the term ‘trust’ has not been precisely defined and there is no universal definition accepted by all researchers. In addition, it is difficult to find unanimity about the nature, features, types and models of trust [34–40]. As indicated by Dietz and Den Hartog [36], we may distinguish three perspectives from which trust has been analyzed: trust within the organization (an intra-organizational perspective where the relation between employees and board, supervisors and co-workers is important), trust between organizations, and finally trust between organizations and clients.

However, in the last few decades there has been growing interest from researchers in the role of trust in organizational management, and in its impact on the approach to management [41–50]. The research has indicated various factors that influence, as well as positive consequences of introducing such an approach [51]. According to Möllering, Bachmann and Hee Lee [52], trust is used as a mechanism that allows increasing organizational openness, thereby reducing uncertainty and increasing competitiveness.

It can be assumed that the growing importance of trust in management results from the increased risk assumed by organizational management, especially in terms of collaboration between people and organizations [53–60]. Trust is considered an alternative mechanism for controlling collective organizational activities, especially in environments with a growing level of uncertainty and complexity.

A control mechanism based on trust is more effective than governance resulting from the hierarchy and the use of standard monitoring and control methods [50,61,62].

Studies have shown that trust has a positive effect on the operations of organizations [63,64], as well as maintaining a strategic competitive advantage by reducing costs, increasing profits and accelerating the achievement of goals. Arguments for incorporating trust in managerial practice include higher flexibility manifested by openness towards changes [65]. Therefore, we may formulate the thesis that trust has become a tool used to change organizations' management approach [66,67].

2.2. Impact of Networking in Creative Industries

For companies in the creative industries operating within networks is very important, because these companies are facing specific types of tensions. On the one hand, there is a need to build, maintain and expand their creative potential [68], while at the same time we may observe a growing pressure on cost efficiency [69]. Therefore, finding a balance between those two pressures is highly recommended [70] and may be achieved by networking and operating within networks.

In fact, as reported by Starkey et al. [2], networking is a common managerial practice observed in creative organizations. This is mainly because businesses in the creative industries are exposed to more complex, changing and unpredictable conditions [71], which require, above all, that businesses function—and continuously build relationships—based on operating within networks [2]. This is extremely important in small companies, where external networks help to introduce new or varied design perspectives but also to identify creative potential [72]. Being part of a network may require some adjustments in the decision-making process, but also more complex changes in managerial approach, which could even result in changing the business model [73]. As a consequence, while building a competitive advantage strongly focused on relationships, managers in creative industries must find a balance between competition and cooperation, which can be manifested by a co-competition strategy wherein an advanced form of inter-organizational cooperation is necessary [74]. As indicated by Reiersen [75], a cooperation strategy is easier to implement when there is mutual trust. The opposite behaviors, based on distrust and control, are costly, time-consuming, and less effective. This is the reason for changes in existing business models applied to the creative industries, where, in addition to internal factors, it is necessary to include external interactions with other entities as a basic development priority [76].

The networking perspective should also include relations with internal stakeholders, mainly because creative potential is based on the flow of knowledge rooted in the relationships between employees [77], where constant social interaction and trust are essential [78] because knowledge transfer and absorption are influenced [79]. As observed by O'Reilly and Tushman [80], building internal networking structures would require combining the independence of employees with the knowledge-sharing process and organizational learning. All these factors require the building of a culture based on trust [25], which is also perceived as a factor reducing risk [81]. Lack of trust between subordinates and supervisors is a significant barrier to open communication and reduces employee willingness to participate in the decision-making process [82]. In addition, the quality of relations between clients and employees is strongly based on trust [83].

2.3. Trust as a Factor Influencing the Approach to Participation

Research on employee participation has covered various dimensions: theoretical, empirical, and ideological. According to the "100 Best Companies to Work For" ranking published by *Fortune* magazine [84], the success of these companies is built on a favorable environment where employees are empowered and managerial practice is focused on supporting and trusting employees. Nowadays, employees should have access to the company's knowledge and experience, because they have to make the majority of decisions themselves; hence, trust becomes a critical factor. Internal relations within the organization seem to be significant, because they are based on the knowledge and potential of employees. This should be reflected in actions taken to support

employee involvement and to build a culture of trust and support. For this reason, it is important to have interpersonal contacts, internal relations, and informal communication, the usefulness of which has been confirmed by the results of many studies [85]. Such social proximity has been identified as a notable tendency for informality in managerial actions [86].

Building commitment based on trust requires a culture of openness, along with strengthening employees' sense of value and their responsibility for the final result achieved [87]. Such commitment is important, especially when employees have a significant influence on strategy [88] and contribute to achieving the company's goals [89], which stimulates creativity and builds learning potential. Therefore, the management style implemented is an important factor in successful empowerment [90]. According to Park [88], organizations should combine two types of participation: involvement in the decision-making process and financial participation. As a result of such a combination, the engagement of employees is clearly increasing.

Although in the majority of empirical studies trust is treated as a collective issue, in particular relations there is a specific type and level of trust involved [91]. That is mainly because competencies, relations, and cooperation are related to interpersonal trust [92]. Therefore, trust is considered a prerequisite for participation, although the economic perspective is also considered. As a result, trust determines different levels of participation [93]. According to Grimmelikhuijsen and Meijer [94], participation affects trust; however, as stated by Scherer and Wimmer [95], this impact is not automatic.

3. Materials and Methods

3.1. Data Collection

To describe and explore the research problem, a descriptive approach is used. Exploratory research tends to follow this approach, as the objective is to select a sample with a particular purpose in mind, rather than to produce statistical generalizations of findings [96]. The appropriateness of this research method for the present work is supported by Yin [97]. We will present a case study using semi-structured interviewing and document analysis and provide details about the context and specific factors that are considered in the decision-making process. The effectiveness of such a case study approach was confirmed by Parry et al. [98]. We have chosen the creative industries mainly because of their characteristics and the importance of networking and relations in the process of building a long-lasting and sustainable competitive advantage based on creativity and knowledge. As the research aims to investigate managerial practice, the study of particular companies is appropriate. As pointed out by Yin [99], there is no one definition of a 'sufficient' number of cases; however, it is assumed that there should be between 6 to 10 cases in a multiple-case study. We used the snowball sampling method [100], which is often used in quantitative research in which interviews are conducted [101]. The empirical basis for this investigation comprises case studies of five Portuguese and five Polish firms that operate in the creative industries. The companies were located in Porto and Wrocław, respectively, and were selected based on the following conditions: (1) the firms should be registered in Portugal or Poland and owned by Portuguese- or Polish-based interests; and (2) the firms should belong to different sectors in the creative industries and be of different sizes. The case study firms' characteristics are summarized in Tables 4 and 5.

Table 4. Portuguese case firms' characteristics.

	PT1	PT2	PT3	PT4	PT5
Sector	Advertising, communication and consulting	Cinema and audio-visual	Online communication	Audio-visual production	Architecture and consulting
No. of employees	8 (+13 interns)	1 (+freelancers)	5	3	1 (+freelancers)

Source: Authors' elaboration.

Table 5. Polish case firms’ characteristics.

	PL1	PL2	PL3	PL4	PL5
Sector	Movie industry, film production (advertising and promotional films)	Artistic and entertainment, production of artistic performances in theater and television	Advertising industry, digital printing of banners and flags	3D printing and design services	Design and fashion
No. of employees	15	11 (+ freelancers)	25	55	15

Source: Authors’ elaboration.

3.2. Research Design

As our intention was to present the dominant “replication logic” [102], we used the multiple case study method, which is an appropriate approach in social science and management studies, as pointed out by Chetty [103], because it applies exploratory research and provides descriptions, and is increasingly used in such research [99]. The multiple case study method provides a good basis for formulating theory and makes it possible to derive a complete theoretical description of the phenomenon. It also allows for the replication of cases, which gives the possibility of “pattern” recognition [104–106]. In each company, we traced the decision-making process using extensive structured interviews with the executives of each firm. In all cases, the interviewee was one of the founders, and currently a chairperson, of the firm. The questions concentrated on facts and events, but in some cases the respondent’s interpretation was also important. For that reason, we used open questions that covered topics pertaining to the formal and informal aspects of management (i.e., collecting information about the market; tracking competitors’ activity, including competitors in the planning process; capturing feedback from employees; implementing policies to foster creativity; and the importance of external relations and their contribution to strategy and empowerment). The full interview protocol is available from the authors. Each interview lasted an hour on average. The interviews were recorded and later transcribed for content analysis. We followed several rules for within-case analysis [102]. For example, we used the ‘24-hour rule’ so that detailed notes and our personal impressions were recorded within one day of the interview. We also separated our interpretations from the respondents’ stories but tried to get a deeper insight into the data collected. The interview transcription ensured consistency of analysis. Reliability was ensured concerning the constructs extracted, as all respondents had the same sequence of entry and exit procedures, as well as the same questions. The validity was enhanced by using the multiple case research design, which entailed cases from the same industry that were relatively similar in size. We also used the ‘pattern matching’ data analysis method recommended by Yin [102]. One of our main goals was to investigate managerial practices, and for that reason no quantitative data was analyzed. We believe that this research perspective enabled us to investigate several foundations of the approach to management. As a result, we were able to draw some inferences regarding managerial decisions of companies in this environment [107]. Another research goal was to present propositions that summarize the observed uniformities between the variables described (the internal and external stakeholders, as well as the level of trust). Therefore, we wanted to answer the research question: How does trust influence companies’ relationships with internal and external stakeholders, and the management approach?

4. Results

4.1. Relations with External Stakeholders

As reported by the research results, in the creative industries external networking is extremely important, as confirmed by one of our respondents (PL1): “We are not able to produce the whole project, having external partners is the main element determining our success.” In many cases, relations are the basis of marketing activities and having close relationships is the main goal. This is mainly

because partner companies collaborate, generating leads and recommendations for each other. This is connected with the specific character of the creative industries, where companies are project oriented and thus joined within a network, and being able to win clients depends on connections with other partners. Besides being another source of leads and referrals, the partner network and the relations with external companies are seen as creating a pool of skills that can be reached out to and that therefore contribute to the growth of the company. The importance of maintaining and evaluating the level of relationships was confirmed and clearly stated (respondent PT1) as follows: "External relations are crucial. We're always seeking good partners. We value partnerships that bring us innovation and quality to our projects. We establish measures to maintain the level of our partnerships." Those relationships are often treated as an investment, as confirmed by one of our respondents (PT3): "For a company to survive, especially with the recent economic crisis, it was important to invest in relationships. That investment was important for us to be able to include ourselves in networks capable of generating businesses in the short term." Close relationships with clients and suppliers were also mentioned as one of the pillars of our companies' identity, also because a cyclical connection between partnerships and the number of customers was revealed, as can be seen in the following statement (respondent PT1): "We need to establish good relationships, not only with our clients but also with our partners. We try to deal with them equally because they are equally important. Without clients we don't build partner relationships, and without partnerships, we don't have clients so it's a virtuous circle."

The approach towards competitors was also investigated. We identified some cases where the level of trust was high and therefore the relation with the competitor was close. This is confirmed in two statements from respondents PL4: "There is no strict competition, rather co-competition. We know informally about their actions"; and PL5: "In many cases we cooperate within one project so I get the information about their actions directly." Moreover, we were able to identify examples of co-competition, where close cooperation with a competitor was revealed (respondent PL4): "In my industry we know each other, we meet very often with competitors. There is a whispered marketing so we recommend each other when there is a need (from the client) that we can't fulfil." Such an approach is reflected even in strategic decisions: "We consider the possibility to cooperate while creating every budget."

4.2. Relations with Internal Stakeholders

Regarding the creative process, and strategic decisions concerning a project, the majority of companies involve the team in creative development. Such involvement can take various forms, starting from gathering information, ideas and suggestions from team members in order to build the final idea. Various different tools are used, as mentioned by respondent PT1: "We are in a digital transformation phase, so our strategy is to focus more on digital businesses. For that reason, we've been developing numerous brainstorming sessions about how to approach the client, what projects do we want to develop and what areas do we want to go in." Some respondents called such a practice co-creation, and they believe that in the context of the creative process this is very important. We also identified some examples of collective empowerment, where employees participate in the decision-making process. This was confirmed in the following statement (respondent PT5): "I involve them in the decision-making process: they are co-responsible for the project. I keep them informed at all times." In order to make this work, respondents declared that they have a 'meeting culture', where a huge part of their time is spent in meetings. As we tried to find the roots of that culture, the attitude towards employees was investigated. Our respondents reported a high level of either trust in employees, or trust of employees in the company, flexibility and positive feedback between managers and employees. This is manifested in the following opinions, starting with respondent PT1: "I always try to assess, informally, the feelings and the relationship between my colleagues and our organization. But we're a small company so it's easy." Respondent PT5 stated: "I don't like people that agree with everything I say or do: I like them to give suggestions and I like when they surprise me. I also learn with my employees. For example, I learn a lot with experts in other areas of knowledge."

Regarding the attitude towards employees, the following comment from respondent PT5 is a prime example: "I show them my appreciation. I love when they present me solutions that go well beyond little lights on the ceiling. I like that they surprise me with good solutions and I express it."

As was already mentioned, flexibility and informality are crucial in relations, especially with young employees, which was confirmed by respondent PL4: "Our industry is very dynamic and rapidly changing. We have to change our approach very quickly and that's why we are trying to have more formalized decisions. But as our employees are mainly millennials, they are allergic to plans." Although flexibility was observed, our respondent outlined that in order to maintain the business, a clear definition of individual and collective goals is very important.

Our research revealed that in some cases (especially in the case of the cinema, audio-visual, and film industries) the interviewees mentioned that the creativity policy is very much centred on the figure of the creative director and the process itself. Therefore, in order to foster creativity and innovation, but also to achieve strategic goals, the empowerment of an inspiring director was used as a way to simultaneously support creativity and keep the level of operational effectiveness high. However, as outlined by our respondents, such participation required a high level of trust.

5. Discussion

From the data analysis presented, we can conclude that both external and internal relationships are influenced by the level of trust, which changes the approach to management. Based on this, our research contribution lies in our finding that internal relationships with employees are important in the decision-making process and strategy: in smaller companies it is usual for everyone to contribute with an opinion; in larger companies, it is normal to gather a set of only a few people who contribute. Whether by capturing feedback or getting employees involved in creative, as well as strategic, decisions, in general there is a feeling that empowering employees is a good practice that contributes to the quality of projects and the long-term success of the company. All of the interviewees mentioned some form of feedback capturing, either in formal project meetings or informally. These meetings occur when planning a project or at the end of it. Regarding the creative process and strategic decisions concerning a project, the majority of companies also involve all of the team, or at least part of it, in creative development. When companies are smaller, all members are involved in the process. However, when companies are larger, there is a chosen group who contribute. When the level of trust is higher, the participation of one person (a director) was observed. Concerning informal policies to foster creativity, there is also a clear distinction in the approaches of the cinema, audio-visual, and film industries. The interviewed companies mentioned that creativity is mainly nurtured by the creative director and by the creative process itself. The creative director is also responsible for formulating, as well as achieving, strategic goals, which requires access to sensitive information. In that case the level of trust is important, as it is strongly connected with the source of competitive advantage (which is knowledge and creative potential) and the fear of that resource being used by other companies. Regarding internal relations, it is apparent that the majority of companies try to establish a good working atmosphere, providing perks such as flexible working times and having regular meetings to maintain communication among co-workers, as well as, in some cases, organizing team building and other activities to foster close relationships. Moreover, the involvement of employees in project planning and decision making is another way to nurture internal relationships and networking.

In the case of external relationships, we confirmed the importance of networking and close relationships within a network, which influences strategy or marketing, but also the number of clients and projects realized. Therefore, we may conclude that being a part of network with external stakeholders is perceived as part of the business model in creative industries. Moreover, we were able to identify certain cases where a close relationship with competitors was revealed. This was manifested by practices such as cooptation and joint strategy, or even included cooperation with a competitor while creating the budget.

Our findings enable us to propose a framework to explain the influence of trust on the approach to management; this is presented in Figure 2.

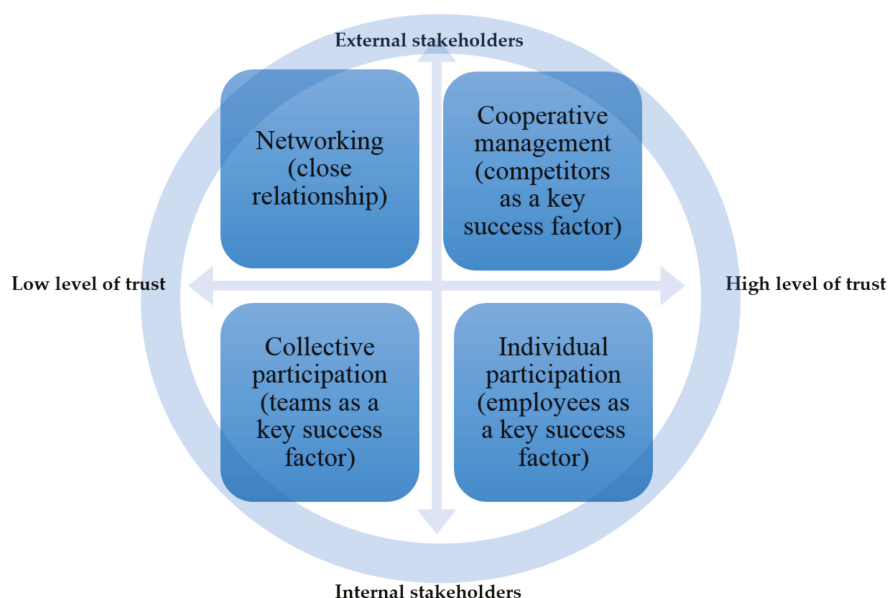


Figure 2. Theoretical framework explaining the influence of trust on the approach to management.
Source: Authors' elaboration.

The basic assumption derived from the literature and confirmed by our study is that the approach to management is highly influenced by the level of trust. In the case of relations with internal stakeholders, trust influences the approach towards participative management. When the level of trust is lower, we may observe collective participation, which evolves towards individual empowerment where, besides the team, one employee (not the owner, but the director) is either involved in the creative process or responsible for decision-making areas. This requires access to sensitive data, as well as taking responsibility for the final outcome. In the case of external stakeholders, the level of trust changes the attitude towards the competitive posture. When the level is lower, although we may observe close relationships within the network, there is still some space for unique resources that are not shared with other partners. However, when the level of trust grows, we may observe cooptation, where a close relation with competitors is crucial. Our research shows that trust is an extremely important factor for building and maintaining a competitive advantage in the creative industries. The theoretical framework represents an avenue for future research, in that it should be further investigated to verify whether it effectively explains the main impact of trust on changes in managerial practice, as reflected in the approach to management.

6. Conclusions

This research aimed to understand the managerial practices that enable us to identify how the level of trust influences the approach to management. We found that the impact of trust differs depending on the external and internal stakeholders' perspective. In order to achieve the research goal, we used evidence from Portuguese and Polish companies operating in the creative industries, and as a result identified level of trust as a factor that influences the managerial actions taken. To address the research problem, 10 case studies were analyzed and several approaches applied. The practices identified enable us to formulate the conclusion that the level of trust has an impact on the approach

to management in the area of relations with external stakeholders. Even though different types of relations are revealed in the creative industries, focusing simultaneously on different partners seems to be crucial. That is manifested in the business model of cooptation. Such a perspective was confirmed by Fernández-Pérez et al. [108], who outlined the desired outcome of external networking, which concerns the development of new organizational capabilities and is even perceived as ambidextrous [109]. In the case of relationships with internal stakeholders, we confirmed the research results found by Chang and Lin [110] that internal relations are strongly based on knowledge sharing and aimed at supporting the learning process [111], which is strongly based on trust. For that reason, managerial practices vary and are rooted in specific internal environments, as confirmed in our study. Nevertheless, our study also confirmed the results presented by Tyler [112], who considered trust as a crucial factor for enhancing cooperation within and outside of the organization. Moreover, our results support arguments by Greenwood and Van Buren [113] that trust is a fundamental aspect of the moral treatment of stakeholders, and in shaping the relationship between the organization and its stakeholders, as well as being endemic to top management orientation and values.

The approach to management did not vary across the Portuguese and Polish companies in our sample. This may be due to the specific characteristics of the creative industries, where skills, talents, and creativity from individual and collective perspectives, as well as intellectual property, are the core competencies. Florida [114] referred to the “creative class”, which is people working in the creative sector who are characterized by three core values: talent, tolerance, and technology (‘3Ts’). Based on our research, we can also add trust as a fourth ‘T’. This represents our main contribution.

As noted above, because of the specific characteristics of the creative industries, where a free and unlimited flow of new ideas is essential, the basic approaches to management are quite similar (more trust, fewer restrictions) across our sample, and do not differ between countries. Our additional contribution is the theoretical approach proposed, which entails an influence of trust on the approach to management. We assume that the growth of trust enhances the willingness to implement cooperative management, where close relationships with competitors are crucial and enable introduction of a culture of participative management, in which individual employees are involved.

The major limitation of this research is the small number of case studies, which should be increased in future studies to guarantee reliability (a rather difficult process considering the sensitive information needed). In addition, more detailed data could be collected in order to facilitate the use of quantitative research methods, which might yield additional insights and practical implications.

It would also be useful to observe, from a financial point of view, the performance results in companies utilizing the approaches described to compare the results achieved. It would be interesting, moreover, to take a more focused research perspective, where only a particular type of activity is analyzed.

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Article

Smart DAG Tasks Scheduling between Trusted and Untrusted Entities Using the MCTS Method

Yuxia Cheng ¹, Zhiwei Wu ¹, Kui Liu ¹, Qing Wu ^{1,*} and Yu Wang ^{2,*}

¹ School of Computer Science and Technology, Hangzhou Dianzi University, 1158 Baiyang No. 2 Street, Hangzhou 310018, China; yxcheng@hdu.edu.cn (Y.C.); wzwttime@163.com (Z.W.); m17730390391@163.com (K.L.)

² School of Computer Science, Guangzhou University, 230 Wai Huan Xi Road, Guangzhou Higher Education Mega Center, Guangzhou 510006, China

* Correspondence: wuqing@hdu.edu.cn (Q.W.); yuwang@gzhu.edu.cn (Y.W.)

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Abstract: Task scheduling is critical for improving system performance in the distributed heterogeneous computing environment. The Directed Acyclic Graph (DAG) tasks scheduling problem is NP-complete and it is hard to find an optimal schedule. Due to its key importance, the DAG tasks scheduling problem has been extensively studied in the literature. However, many previously proposed traditional heuristic algorithms are usually based on greedy methods and also lack the consideration of scheduling tasks between trusted and untrusted entities, which makes the problem more complicated, but there still exists a large optimization space to be explored. In this paper, we propose a trust-aware adaptive DAG tasks scheduling algorithm using the reinforcement learning and Monte Carlo Tree Search (MCTS) methods. The scheduling problem is defined using the reinforcement learning model. Efficient scheduling state space, action space and reward function are designed to train the policy gradient-based REINFORCE agent. The MCTS method is proposed to determine actual scheduling policies when DAG tasks are simultaneously executed in trusted and untrusted entities. Leveraging the algorithm's capability of exploring long term reward, the proposed algorithm could achieve good scheduling policies while guaranteeing trusted tasks scheduled within trusted entities. Experimental results showed the effectiveness of the proposed algorithm compared with the classic HEFT/CPOP algorithms.

Keywords: DAG scheduling; trusted entities; heterogeneous; MCTS

1. Introduction

Modern organizations are increasingly concerned with their trust management. As the cloud computing paradigm prevails, more and more data security and trust issues are arising due to the public cloud infrastructures being under control of the providers but not the organizations themselves [1,2]. Therefore, a practical solution for addressing these trust issues is to deploy security sensitive tasks in the trusted entities (IT infrastructures privately managed within organizations) and those security non-sensitive tasks in the untrusted entities (IT infrastructures such as public cloud). Scheduling security sensitive and non-sensitive tasks between the trusted and untrusted entities is one of the research challenges in the trust management. Particularly, when these tasks have sequential and parallel connections, the scheduling problem becomes further complicated in distributed heterogeneous computing systems.

In distributed heterogeneous computing systems, a variety of computing resources are interconnected with high speed networks to support compute-intensive parallel and distributed applications [3,4]. In these systems, efficient task scheduling is critical for improving system performance. Especially, as the modern hardware technology evolves rapidly, diverse sets of computing

hardware unit, such as CPU, GPU, FPGA, TPU, and other accelerators, constitute a more and more complex heterogeneous computing system. Modern high performance computing applications typically use the Directed Acyclic Graph (DAG) based compute model to represent an application's parallel compute tasks and their dependencies. How to schedule DAG tasks in the distributed heterogeneous computing system is an open research question.

Most parallel applications, including high performance computing (HPC) applications, machine learning applications [5] etc., use the DAG tasks model in which nodes represent application tasks and edges represent inter-task data dependencies. Each node holds the computation cost of the task and each edge holds inter-task communication cost. To improve system efficiency, the goal of DAG tasks scheduling is to map tasks onto heterogeneous computing units and determine their execution order so that the tasks' dependencies are satisfied and the application's overall completion time is minimized.

Previous research [6] has shown that the general tasks scheduling problem is NP-complete and it is hard to find an optimal schedule. Researchers [7] theoretically proved that the DAG tasks scheduling problem is also NP-complete and is more complex in practical scheduling system. Due to its key importance, the DAG tasks scheduling problem has been extensively studied in the literature.

Many traditional heuristic algorithms have been proposed, such as list scheduling algorithms [8], genetic and evolutionary based random search algorithms [9], task duplication-based algorithms [10], etc. These algorithms are mostly heuristic in restricted application scenarios, and lack generality in the adaptation of various heterogeneous hardware and rapid changing application demand [11]. The machine learning based method is a reasonable way of adapting to the ever-changing hardware and software environment by learning from past scheduling policies.

However, previous research lacks the consideration of scheduling tasks between trusted and untrusted entities. Restricting trusted tasks within trusted entities increases the scheduling complexity, and most of the previously proposed scheduling algorithms cannot be easily adapted to this scenario. Therefore, it is important to study the practical way of integrating trust management into the DAG tasks scheduling algorithm in distributed heterogeneous computing systems.

Reinforcement learning [12] could be used for learning smart scheduling policies from past experiences. Recent research has proposed task scheduling and device placement algorithms based on reinforcement learning. However, existing approaches either greatly simplify the scheduling model [13,14] that are unpractical or need a great amount of computing resources [11,15] to train the scheduling policies that are inefficient for most application scenarios.

Monte Carlo Tree Search (MCTS) [16] could be used for searching tasks scheduling policies that meet the requirement of trust management. MCTS combines the precision of tree search with the generality of random sampling. MCTS is an any-time search method that is efficient in terms of computation resource usage. To the best of our knowledge, MCTS methods are mostly developed in game domains. A few studies have been published in addressing the scheduling problems, but the trust management in the scheduling is not well studied yet.

In this paper, we propose a trust-aware adaptive DAG Tasks Scheduling (tADTS) algorithm using deep reinforcement learning and Monte Carlo tree search. The scheduling problems are properly defined with the reinforcement learning process. Efficient scheduling state space, action space and reward function are designed to train the policy gradient-based REINFORCE agent. The MCTS method is proposed to determine actual scheduling policies when DAG tasks are simultaneously executed in trusted and untrusted entities. Leveraging the algorithm's capability of exploring long term reward, we could achieve better scheduling efficiency. Experimental results showed the effectiveness of the proposed tADTS algorithm compared with the classic HEFT/CPOP algorithms. The main contributions of this paper include:

- (1) We propose an accurate and practical DAG tasks scheduling model based on reinforcement learning. To the best of our knowledge, this is the first work to address the static DAG tasks scheduling problem with the reinforcement learning process. Previous research has proposed a similar model [14],

but oversimplifies the problem with assumptions of restricted machine performance, cluster status, and task classification.

(2) We designed efficient representations of state space, action space and reward function. Too large state space and action space without careful design will make the algorithm training time-consuming or even unable to converge. The reward function design also plays an important role in the reinforcement learning process.

(3) We proposed a trust-aware single-player MCTS (tspMCTS) method integrated with the DAG tasks scheduling algorithm. The proposed tspMCTS method is flexible and scalable to schedule tasks among multiple trusted and untrusted entities. The additional trust management does not increase the time complexity of tspMCTS.

The rest of this paper is organised as follows: Section 2 describes the related work. Section 3 presents the Adaptive DAG Tasks Scheduling (ADTS) algorithm design. Section 4 shows the experimental results. Finally, Section 5 concludes this paper and discusses future work.

2. Related Work

Previous research proposed different scheduling algorithms based on the characteristics of tasks computation and communication, their dependency relationships, as well as the heterogeneity of hardware. Depending on the techniques, the scheduling algorithms can be classified as traditional heuristic based algorithms and machine learning based algorithms.

DAG tasks scheduling in the distributed heterogeneous computing environment has been extensively studied. The DAG tasks scheduling algorithms could be typically divided into static and dynamic scheduling. In static scheduling [17], the tasks' runtime and data dependencies are known in advance, and the scheduling policy is determined off-line. In dynamic scheduling [18], the tasks are assigned to processors at their arrival time and the schedule policy is determined on-line. Most DAG tasks scheduling algorithms belong to static scheduling.

Traditional static DAG tasks scheduling algorithms mainly include: (1) List scheduling algorithms [8,19]. The key idea of list scheduling algorithm is to order the scheduling tasks priority list and select a proper processor for each task. (2) Clustering based algorithms [20,21]. The key idea of clustering based algorithm is to map DAG tasks to a number of clusters. Tasks assigned to the same cluster will be executed on the same processor. (3) Genetic and evolutionary based random search algorithms [9,22]. The key idea of this group of algorithms is to use random policies to guide the scheduler through the problem space. The algorithms combine the results gained from previous search with some randomizing features to generate new results. (4) Task duplication based algorithms [10,23]. The key idea of these algorithms is to duplicate some of the tasks in different processors, which reduces the communication overhead in data-intensive applications.

These DAG tasks scheduling algorithms are heuristic and mainly designed by experts, which are carefully adapted to different application scenarios. However, with the rapid development of heterogeneous hardware and ever changing applications, traditional DAG tasks scheduling algorithms cannot fully exploit system performance [11,15]. To design adaptive algorithms, researchers proposed machine learning based algorithms. In this paper, we refer to the traditional scheduling algorithm (no machine learning techniques are used) as heuristic algorithm. However, strictly speaking, the proposed algorithm also belongs to the heuristic algorithm. To distinguish between human expert experience-based algorithms and machine learning based algorithms, we denote the former as traditional heuristic algorithms.

Zhang et al. [12] first proposed using classic reinforcement learning to address job-shop scheduling problem. However, the job-shop scheduling is different from the DAG tasks scheduling problem, where DAG tasks have more complex dependencies and data communication cost. Mao et al. [13] proposed using deep reinforcement learning to solve a simplified tasks scheduling problem. The policy gradient based REINFORCE algorithm is used to train a fully connected policy network with 20 neurons. However, the scheduling problem is over simplified that treats the compute cluster as a single

collection of resources, which is unpractical in real systems. Orhean et al. [14] proposed reinforcement learning based scheduling approach for heterogeneous distributed systems. This approach has additional assumptions such as machine performance, cluster status, and tasks types, which can not be easily applied in real DAG tasks scheduling. Mirhoseini et al. [11,15] proposed using reinforcement learning method to optimize device placement for TensorFlow computational graphs. These methods require a large amount of hardware to train policy network. The state space and action space definitions cannot accurately reveal the DAG and hardware topologies, which results in many invalid placement trials. Though previous research has these shortcomings, the reinforcement learning based approach has demonstrated its benefits in terms of adaptiveness and better scheduling quality.

The Monte Carlo Tree Search (MCTS) method [16] combines the precision of tree search with the generality of random sampling. MCTS received significant interest due to its success in difficult games like computer Go [24]. Single-Player MCTS [25] was first proposed in the SameGame. Y. Björnsson and H. Finnsson [26] investigated the application of standard UCT [27,28] to single-player games. The MCTS method was also developed in the scheduling [29,30] and planning [31,32] applications. S. Matsumoto et al. [29] proposed a single-player MCTS method to address a re-entrant scheduling problem that managed the printing process of the auto-mobile parts supplier. A. McGovern et al. [30] proposed a basic block instruction scheduler with reinforcement learning and rollouts. However, how to leverage MCTS method to design tasks scheduling with trust management still needs further investigation.

Previous research demonstrated that DAG tasks scheduling belongs to the class of strong NP-hard problems [33]. Hence, it is impossible to construct not only a pseudo-polynomial time optimization scheduling algorithm but also a fully polynomial time approximation scheme (PTAS) unless $P=NP$ [34,35]. To the best of our knowledge, H. Kasahara et al. [36] designed the constant-factor $(1+\epsilon)$ approximation algorithm for multiprocessor scheduling. However, the constant-factor approximation algorithm assumed homogeneous processors and did not consider the communication costs between tasks, which is far beyond reality in modern computer system. We plan to design a more realistic constant-factor approximation algorithm based on the branch and bound algorithm in our future work.

Unlike previous research, we proposed a new reinforcement learning based trust-aware scheduling algorithm with MCTS that defines more accurate scheduling model using DAG graph structures and efficient state/action space representations. The similarities between reinforcement learning and classic machine learning algorithms is that they both need large volumes of training data to train a model. However, unlike supervised learning that requires pre-labelled training data, the training data of reinforcement learning is obtained via online interaction with the environment and the reward function determines the label signal. The goal of our proposition is to maximize long term reward while the classic machine learning method usually minimizes the prediction error. The proposed tADTS algorithm can be used in practice in the same way as traditional static DAG tasks scheduling algorithms. This paper is an extended version of previously published conference paper in the 18th International Conference on Algorithms and Architectures for Parallel Processing (ICA3PP 2018) [37].

3. Trust-Aware Adaptive DAG Tasks Scheduling Algorithm Design

In this section, we present the trust-aware Adaptive DAG Tasks Scheduling (tADTS) algorithm design. First, the DAG tasks scheduling problem is defined. Second, we formulate the reinforcement learning process and present the design of three key elements of RL, the state space, the action space, and the reward function. Then, we proposed the trust-aware single-player MCTS method. Finally, we show the policy gradient based training algorithm and the policy network architecture design.

3.1. Problem Definition

We leverage the definition of DAG tasks graph in distributed heterogeneous system [8]. The scheduling model consists of three parts:

(i) **An application represented by a DAG tasks graph**, $G = (V, E)$, where V is a set of v tasks in the application, and E is the set of e edges between tasks.

- edge $(i, j) \in E$ denotes the precedence constraint such that task n_j must wait until task n_i finishes its execution.
- $data_{i,j}$ denotes the amount of data to be sent from task n_i to task n_j .
- Each task n_i has a flag that denotes whether this task is a security sensitive or non-sensitive task.

Figure 1 shows an example of DAG tasks graph. The bold task nodes (tasks 1, 2, 9, 10) represent the security sensitive tasks that must be executed inside trusted entities.

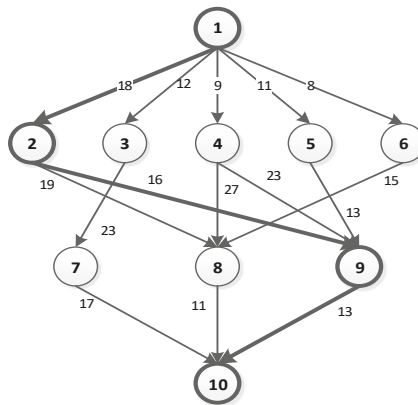


Figure 1. An example of DAG tasks graph.

(ii) **A distributed heterogeneous computing system**, which consists of a set Q of q heterogeneous processors with a fully connected topology.

- W is a $v \times q$ computation cost matrix, and $w_{i,j}$ denotes the execution time of task n_i on processor p_j .
- B is a $q \times q$ matrix of the data communication bandwidth between processors, and $B_{m,n}$ denotes the communication bandwidth between processor p_m and processor p_n .
- L is a q -dimensional vector that denotes the communication initialization costs of processors, and L_m denotes the initialization costs of processor p_m .
- $c_{i,j} = L_m + \frac{data_{i,j}}{B_{m,n}}$ denotes the communication cost of edge (i, j) , which is for the cost of sending data from task n_i (running on p_m) to task n_j (running on p_n).
- Each processor has a flag that denotes whether this processor resides within a trusted entity or a non-trusted entity.

(iii) **Performance criterion for scheduling.** Before presenting the final scheduling objective function, we first define the *EST* (Earliest Start Time), *EFT* (Earliest Finish Time), *AST* (Actual Start Time), and *AFT* (Actual Finish Time) attributes.

- $EST(n_i, p_j) = \max \left\{ avail[j], \max_{n_m \in pred(n_i)} (AFT(n_m) + c_{m,i}) \right\}$ denotes the earliest execution start time of task n_i on processor p_j , where $avail[j]$ is the earliest time at which processor p_j is available for execution, and $pred(n_i)$ is the set of immediate predecessor tasks of task n_i . The inner max block returns the time when all data required by task n_i has arrived at processor p_j .

- $EFT(n_i, p_j) = w_{i,j} + EST(n_i, p_j)$ denotes the earliest finish time of task n_i on processor p_j .
- $AST(n_m)$ denotes the actual start time of task n_m when it is scheduled on a processor p_j to execute.
- $AFT(n_m)$ denotes the actual finish time of task n_m after it is scheduled on a processor p_j and finishes execution.

The EST and EFT values can be computed recursively from the entry task n_{entry} , where $EST(n_{entry}, p_j) = 0$. After all tasks in a graph are finished execution, the AFT of the exit task n_{exit} is named the schedule length (also named *makespan*), which is defined as:

$$makespan = \max \{AFT(n_{exit})\} \quad (1)$$

The objective function of the DAG tasks scheduling is to determine the assignment policies of an application's tasks to heterogeneous processors so that the schedule length is minimized.

3.2. Reinforcement Learning Formulation

Once the scheduling problem is defined, we propose to address the scheduling problem with the reinforcement learning method [38]. Figure 2 shows a brief diagram of the reinforcement learning based scheduling model. At time t , the scheduler observes the environment and receives an observation O_t . Depending on O_t , the scheduler determines an scheduling action A_t . After A_t is executed, the scheduler receives a reward R_t . The scheduler continues this process $(\dots, O_t, A_t, R_t, O_{t+1}, A_{t+1}, R_{t+1}, \dots)$ until the end of schedule (task n_{exit} is scheduled). The observation O_t typically could be denoted as a state S_t .

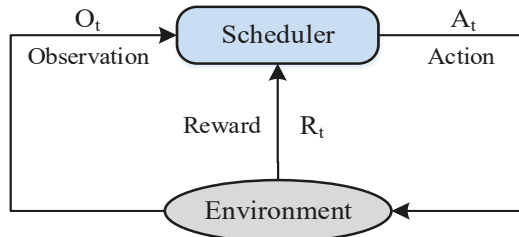


Figure 2. Reinforcement Learning Based Scheduling Model.

We use the policy gradient method to optimize the scheduling actions so that the expected total reward could be maximized. The optimization objective function is defined as:

$$J(\theta) = E_{A \sim \pi(A|G;\theta)}[R(A)|G] \quad (2)$$

where θ denotes parameters of the policy network; A denotes the scheduling policy (a sequence of actions); $\pi(A|G;\theta)$ denotes the probabilities of scheduling policy A produced by policy network (defined by parameters θ) given the DAG tasks graph and heterogeneous system G ; $R(A)$ denotes the total reward under the scheduling policy A ; $J(\theta)$ denotes the expected reward of the scheduling policy A .

In the reinforcement learning, the design of the state space and action space representations as well as the design of reward function are important for the algorithm's overall performance. We describe the three key elements as follows.

State space. The state space of the scheduling problem could be very large, which would include the state of the DAG tasks graph and the state of the distributed heterogeneous computing system. We design an efficient and compact representation of the state space, which is defined as:

$$S_t = [n, EST(n_i, p_1), \dots, EST(n_i, p_q), w_{i,1}, \dots, w_{i,q}] \quad (3)$$

where S_t is the state (observation) at time t . n denotes the number of tasks that are not scheduled so far (listed in a waiting queue). $EST(n_i, p_j)$ is the earliest start time of task n_i on processor p_j , task n_i is the current task to be scheduled. We use the task's EST on all processors (from processor 1 to processor q) to represent the state of the current system. The EST as described in Section 3.1 contains both the information of processor's load and the communication cost. Based on the Markov property, the current task's ESTs can be used as the state to summarize the previous situations before task n_i . $w_{i,j}$ is the computation cost of task n_i on processor p_j . To preserve the tasks precedence relationship in DAG, we adopt the upward rank [8] to list tasks in the waiting queue so that tasks with higher rank values are scheduled before tasks with lower rank value. Note that other task list methods are possible provided that the task precedence constraints are satisfied.

Action space. Once the state space is defined, the action space of the scheduling problem is straightforward. The action space is defined as:

$$A_t = \{p_i | p_1, \dots, p_q\} \quad (4)$$

where A_t is the scheduling action at time t . p_i denotes that the scheduler assigns processor p_i for the current task in the head of the waiting queue. The possible action at each time step is to assign one of the processors (range from processor p_1 to processor p_q) for the task to be scheduled.

Reward function. The design of reward function could impact the scheduling policies, which is critical for the policy training. The reward at each time step should help guide the actual scheduling actions, and the accumulative long term reward should also reflect the final scheduling objective. Based on the above understanding, the reward function is defined as:

$$R_t = \max\{EST(n_{i+1}, p_j) | j=1..q\} - \max\{EST(n_i, p_j) | j=1..q\} \quad (5)$$

where R_t is the immediate reward at time t . Task n_{i+1} is the task in the head of waiting queue after task n_i is scheduled with action A_t at time t . The reward R_t is obtained by calculating the increment of current schedule length after task n_i is scheduled. The current schedule length is represent by $\max\{EST(n_i, p_j) | j=1..q\}$.

3.3. Trust-Aware Single-Player MCTS Method

Monte Carlo Tree Search (MCTS) typically has four basic steps as shown in Figure 3. The DAG tasks scheduling process can be mapped as a single-player MCTS process. We describe the four steps in detail and how each step is designed to address the trust-aware DAG tasks scheduling problem.

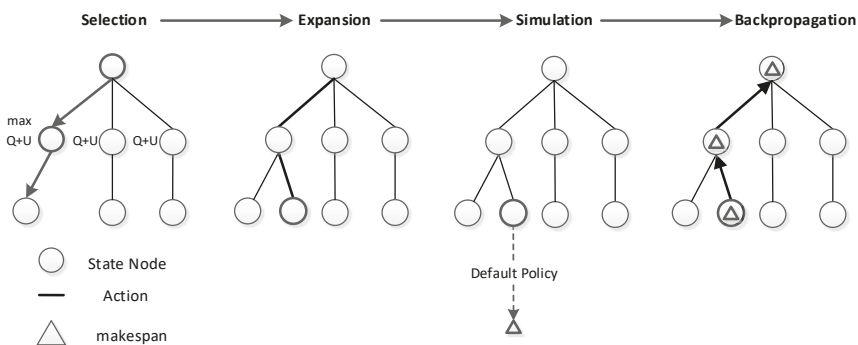


Figure 3. Basic steps of Monte Carlo Tree Search.

In the MCTS tree structure, the root node represents the beginning state of the DAG tasks scheduling, which is the initial state of the first task to be scheduled. The subsequent nodes represent the possible states reached after MCTS selects possible actions. The edges in the MCTS tree represent the scheduling actions, which are many possible combinations of actions mapping ready tasks to certain processors. The four steps of progressively building a single-player MCTS tree are described below.

Four steps are applied for each search iteration:

(1) Selection: From the root node, a child selection policy is recursively applied to descend through the MCTS tree until an expandable node is reached. An expandable node denotes a non-terminal state and has unvisited children. The child selection policy is based on the UCT algorithm [39], which selects the maximum value of UCTs among its child nodes.

$$UCT = \bar{Q}_j + 2C_p \sqrt{\frac{2 \ln n}{n_j}} \quad (6)$$

Equation (6) shows the UCT calculation that addresses the exploration-exploitation dilemma in MCTS. The first term \bar{Q}_j in Equation (6) represents exploitation, which is the mean makespan value of the simulated scheduling policies that visited $node_j$ so far. The second term $2C_p \sqrt{\frac{2 \ln n}{n_j}}$ represents exploration, where n is the number of times the parent node has been visited, n_j is the number of times child $node_j$ has been visited and C_p is the constant parameter that controls the exploration.

(2) Expansion: According to the available actions, child nodes are added to the expandable parent node. The available actions are determined online based on the ready tasks available after the expandable parent node is visited. The ready tasks are determined depending on the ordering relations in the DAG tasks graph. The number of available actions equals the number of ready tasks multiplied by the number of allowed processors. Due to the restriction that security-sensitive tasks must be scheduled onto trusted processors, the number of allowed processors are limited for each ready task.

(3) Simulation: Starting from the leaf node, a simulation is run based on the default policy to generate subsequent schedule actions. The default policy is the output of the policy network trained in the reinforcement learning. The training of policy network $\pi(a|s, \theta)$ is described in Section 3.4. In the simulation, security-sensitive tasks are strictly limited to the trusted entities.

(4) Backpropagation: After simulation finishes, the MCTS agent obtains simulation result (the makespan of DAG tasks). Then, the simulation result is backpropagated through previously visited nodes in the MCTS tree to update their statistics (average makespan \bar{Q} and visit count n). The updated node statistics are used to inform future node selection in the MCTS tree.

The decision structure helps the selection of scheduling actions at each time step during training. The online scheduler only uses the trained network to output scheduling actions. Therefore, the algorithm is similarly efficient for big trees and small trees as the MCTS tree structure is used for online reference on the top layer of the tree. However, it costs a larger number of simulation times to construct a big tree rather than a small tree. In the training phase, big trees hold many more Monte-Carlo simulation trials than small trees that could provide more accurate scheduling action selection. The advantages of the MCTS tree structure are its efficient simulation and “any-time” property that could stop simulation at any-time depending on computing resource budget. The limitations of MCTS tree structure are that it is hard to set an optimal parameter C_p to balance the tradeoff between exploration and exploitation under limited computing resources.

3.4. Training Algorithm

We train an adaptive DAG tasks scheduling agent with the REINFORCE algorithm [40] and MCTS method. The training algorithm is based on the policy gradient methods with many Monte-Carlo trials. The algorithm input consists of a differentiable parameterization $\pi(a|s, \theta)$ and the training step size α . Initially, the policy parameters θ are a set to random numbers. During the training process, we generate

N number of episodes to train the policy network. Each episode represents a complete schedule of DAG tasks, which starts from the entry task state S_0 , action A_0 , and the corresponding reward R_1 , to the end of the exit task state S_{T-1} , action A_{T-1} , and the final reward R_T . For each step of an episode, the algorithm calculates the long term reward G with an discounted factor γ . The policy parameter θ is updated in every step with $\nabla \ln \pi(A_t|S_t, \theta)$, which equals the fractional vector $\frac{\nabla \pi(A_t|S_t, \theta)}{\pi(A_t|S_t, \theta)}$ named the *eligibility vector*. Previous research [41] has proved the policy gradient theory used for the function approximation in the reinforcement learning.

As shown in Algorithm 1, the generation of an episode is based on the MCTS tree selection and the default policy simulation. Inspired by AlphaZero [42], we combined the reinforcement learning with MCTS for the DAG tasks scheduling problem. Algorithm 1 incorporates lookahead search inside the training loop that results in rapid improvement and precise and stable learning. MCTS uses the policy network to guide its simulations, which is a powerful policy improvement operator. In turn, the generated simulation episode is used to train a better policy network. Then, the better policy network is iteratively used to make the MCTS search even stronger. The iteration terminates when the number of episodes reached a predefined threshold. Thanks to the efficient exploration and exploitation structure of MCTS, the algorithm could simulate a small number of Monte Carlo trials to construct asymmetric tree structure that guides the selection of scheduling actions. Therefore, the stop criterion of N is usually set to thousands to tens of thousands depending on the scale of the scheduling problem. The detailed settings are described in Section 4.1.

Algorithm 1 REINFORCE with MCTS: Monte-Carlo Policy-Gradient Control for π_* .

Input: A differentiable policy parameterization $\pi(a|s, \theta)$; Algorithm parameter: step size $\alpha > 0$;

- 1: Initialize random policy parameter $\theta \in R$;
 - 2: Loop for N episodes:
 - 3: Generate an episode $S_0, A_0, R_1, \dots, S_{T-1}, A_{T-1}, R_T$,
 following MCTS tree selection and the default policy $\pi(a|s, \theta)$ simulation;
 - 4: Loop for each step of the episode $t = 0, 1, \dots, T - 1$:
 - 5: $G \leftarrow \sum_{k=t+1}^T \gamma^{k-t-1} R_k$
 - 6: $\theta \leftarrow \theta + \alpha \gamma^t G \nabla \ln \pi(A_t|S_t, \theta)$
-

The reward function outputs reward R_t at each time step t . R_t is an immediate reward that is obtained by calculating the increment of current schedule length after task n_i is scheduled. Therefore, R_t is dynamically generated following different scheduling actions (policies). In the training algorithm, R_t is used to accumulatively calculate the long term reward G with a Monte-Carlo trial. Then, G is used to update the neural network parameter θ with gradient ascent.

Compared with random search, the UCT algorithm applied in the MCTS is more efficient, which has theoretical guarantee [43] of the upper confidence bound to an expected logarithmic growth of regret uniformly over n without prior knowledge regarding the reward distributions.

4. Experiments

In this section, we evaluate the proposed tADTS algorithm comparing with the classic baseline algorithms. The DAG tasks graphs are generated using the graph generator [8] to represent the real world applications. First, we present the experiment settings and the performance evaluation metrics. Then, the comparative experimental results are described in the following subsection. Note that the proposed training algorithm is under implementation, the combination of reinforcement learning and MCTS is not tested in this experiment. The following experiment shows the individual ADTS algorithm performance result.

4.1. Methodology

The experiment hardware platform is configured with two Intel Xeon E5-2600V3 processors, four NVIDIA TITAN Xp GPUs, 64 GB DDR4 memory, and 4 TB hard disk. The server is connected with S5150X-16S-EI high speed switch. The software platform is configured with ubuntu 16.04, Tensorflow 1.5, python 2.7, cuda9.1 and cudnn7.7. We generate a total of 1000 DAG tasks graphs using the graph generator [8], and simulate the DAG tasks scheduling process with a in-house simulator. The distributed heterogeneous system is configured with 3–7 heterogeneous processors with fully connected communication networks.

In the ADTS algorithm, the parameters used in the reinforcement learning are described as follows. The policy network architecture is configured with 3–5 layers of sequence-to-sequence neural networks with each layer having 10–50 neurons. The scale of policy networks depend on the problem space of DAG graphs and the heterogeneous hardware configuration. The learning rate step size α is 0.0005 and the discounted factor γ is 0.99. The number of Monte-Carlo training episodes N is configured with 2500.

In the comparative evaluation, we use the following three performance metrics.

- **Schedule Length Ratio (SLR).** The key performance metric of a scheduling algorithm is the schedule length (makespan) of its schedule policy. As the sizes of DAG graphs are different among applications, we normalize the schedule length to a lower bound, which is named SLR. The SLR value is defined as

$$SLR = \frac{makespan}{\sum_{n_i \in CP_{MIN}} \min_{p_j \in Q} \{w_{i,j}\}} \quad (7)$$

where the CP_{MIN} denotes that the critical path of a DAG graph is based on the minimum computation costs.

- **Speedup.** The value of speedup for a given graph is the ratio of the sequential execution time to the makespan. The speedup is defined as

$$Speedup = \frac{\min_{p_j \in Q} \{\sum_{n_i \in V} w_{i,j}\}}{makespan} \quad (8)$$

where the sequential execution time is obtained by scheduling all DAG tasks to a single processor that minimizes the overall computation costs (denoted as $\min_{p_j \in Q} \{\sum_{n_i \in V} w_{i,j}\}$).

- **Running time of the Algorithms.** A scheduling algorithm's running time is its execution time of producing the output schedule policy for a given DAG tasks graph. This metric represents the cost of the scheduling algorithm.

The DAG tasks graph generator uses the following parameters to quantify the characteristics of the generated DAG graphs, which is similar to [8].

- * $SET_V = \{20, 40, 60, 80, 100\}$
- * $SET_{CCR} = \{0.1, 0.5, 1.0, 5.0, 10.0\}$
- * $SET_{\alpha} = \{0.5, 1.0, 2.0\}$
- * $SET_{out_degree} = \{1, 2, 3, 4, 5, v\}$
- * $SET_{\beta} = \{0.1, 0.25, 0.5, 0.75, 1.0\}$

where SET_V denotes the number of tasks in the graph, SET_{CCR} denotes the set of parameter values of the Communication to Computation Ratio (CCR), SET_{α} denotes the set of parameter values of the graph shape parameter α . SET_{out_degree} denotes the set of values of out degree of a task. SET_{β} denotes the set of parameter values of the range percentage of computation costs on processors (β) that quantifies the heterogeneity of the processors.

4.2. Performance Comparison

In this subsection, we show the performance comparisons of four DAG tasks scheduling algorithms, the proposed ADTS algorithm, the classic HEFT algorithm and CPOP algorithm [8], and the RANDOM algorithm. The Heterogeneous Earliest Finish Time (HEFT) algorithm selects the task with the highest upward rank value at each scheduling step and assigns the selected task to the processor that minimizes its earliest finish time. The Critical-Path-on-a-Processor (CPOP) algorithm uses the summation of the upward rank and downward rank to denote a task's priority and the selected tasks with the highest priority is assigned to the critical-path processor; otherwise, it is assigned to a processor that minimizes the earliest finish time. The RANDOM algorithm selects random tasks and random processors while satisfying tasks precedence constraints. Note that we ran the RANDOM algorithm for as long as our proposed algorithm did and selected the smallest makespan among many runs.

The ADTS algorithm is non-deterministic, we show the average value of 10 individual runs in the experiment. The DAG tasks graphs are generated using the parameters listed in Section 4.1. As modern big data and machine learning based applications are mostly data-intensive, the DAG graphs are generated with a higher portion of CCR value.

Figure 4 shows the comparison of the average schedule length ratio between the ADTS, HEFT, CPOP, and RANDOM algorithms. The SLR metric represents the schedule quality of each algorithm (lower is better). The closer the SLR value to one, the better the scheduling policy. As the normalization uses the theoretical minimum computation costs, the SLR cannot be less than one.

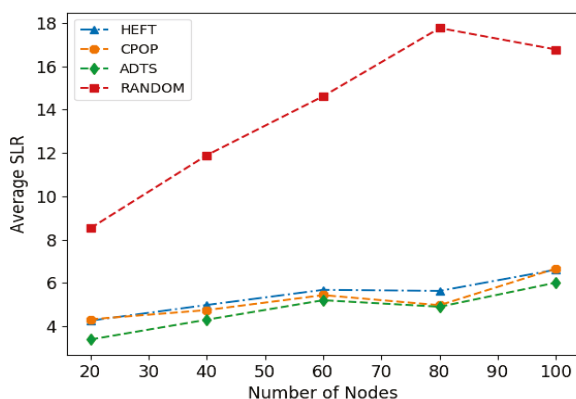


Figure 4. Comparison of the Schedule Length Ratio (SLR).

As can be seen from Figure 4, the ADTS algorithm outperforms both the HEFT and CPOP algorithms. In the 20 tasks DAG graph, the average SLR of ADTS algorithm is 3.391 and the average SLR of HEFT and CPOP are 4.262 and 4.323 respectively, which has 25% reduction of the average SLR. Similarly, in the 40, 60, 80 and 100 tasks of DAG graph scheduling experiments, the SLR of ADTS is consistently lower than both HEFT and CPOP algorithms. The lower SLR achieved by the ADTS algorithm demonstrates that the reinforcement learning could better explore the long term reward, which leads to the better scheduling policies than the traditional heuristic algorithms. Obviously, the RANDOM algorithm has the largest SLR across all settings.

Figure 5 shows the comparison of the average speedup between the ADTS, HEFT, CPOP, and RANDOM algorithms. The average speedup represents the algorithm's ability of scheduling tasks to explore parallel performance (higher is better). Note that the speedup value is calculated via dividing the sequential execution time by the makespan. The sequential execution time is represented by assigning all tasks to a single processor that minimizes the cumulative computation costs. If selecting

the processor that maximizes the cumulative computation costs, the value of speedup will be higher. As can be seen from Figure 5, the ADTS algorithm achieves better speedup than HEFT and CPOP algorithms. In the 20 tasks DAG graph experiment, the speedup of ADTS algorithm is 1.087, while the speedup of HEFT and CPOP algorithms are 0.879 and 0.886 respectively. The ADTS algorithm could achieve more than 20% speedup improvement compared with HEFT and CPOP algorithms. The average speedup of the RANDOM algorithm is around 0.4 in all tested DAG graphs.

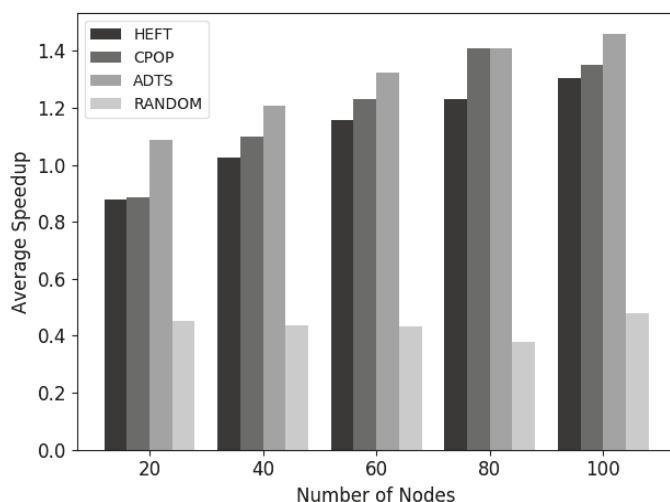


Figure 5. Comparison of the average speedup.

Figure 6 shows the comparison of the average running time of the ADTS, HEFT, CPOP, and RANDOM algorithms. The average running time of a scheduling algorithm represents the average computation costs of executing the algorithm. As can be seen from Figure 6, the ADTS algorithm has higher running time compared with the HEFT and CPOP algorithms. This is because the ADTS algorithm involves the deep neural network reference computations to produce the scheduling policy, which has higher overhead compared with the HEFT and CPOP algorithm. The CPOP algorithm has higher running time compared with the HEFT algorithm. The time complexity of both the CPOP algorithm and the HEFT algorithm is $O(e \times q)$, where e is the number of edges in the graph and q is the number of processors. The time complexity of the ADTS algorithm depends on the policy network architecture. If the neural network reference computation cost is defined as c , then the time complexity of the ADTS algorithm is $O(c \times v)$, where v is the number of tasks. As the RANDOM algorithm uses naive policy and only satisfies task precedence constraints, its time complexity is $O(n)$. However, to demonstrate that the RANDOM algorithm could not progress towards better results as the number of trials increases, we ran the RANDOM algorithm many times, which corresponded to (or even exceeded) the time spent in our proposed algorithm.

4.3. Discussion

From the above comparative performance evaluation, we observe that the reinforcement learning algorithm could achieve better scheduling policies than the classic HEFT and CPOP algorithms. However, as the deep reinforcement learning involves neural network parameters training and inference computation overhead, the running time of the ADTS algorithm is somewhat higher than the traditional heuristic greedy-based algorithms. Fortunately, the ADTS algorithm is designed for static DAG scheduling, which is acceptable for the relatively high running time considering its

better schedule quality. What is more, the ADTS algorithm is non-deterministic. In some cases, the training process could not successfully converge to obtain the good policy network model. The reinforcement learning parameters tuning and the network architecture design need some trials to obtain a robust algorithm.

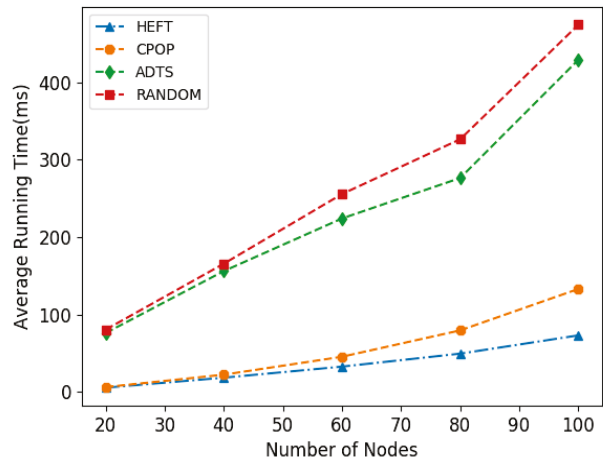


Figure 6. Comparison of the average running time.

Figure 7 shows a learning curve of the ADTS training algorithm under the 20 tasks DAG scheduling environment. As can be seen from the learning curve, the algorithm learns very fast within 400 episodes and gradually exceeds the classic HEFT algorithm after 500 episodes of training. In our experiments, some of the DAG graphs cannot be successfully trained to surpass the classic algorithms. We infer that this problem is due to the unsuitable parameters and the neural network architecture configurations. This unstable training problem needs further investigation and remains as future work.

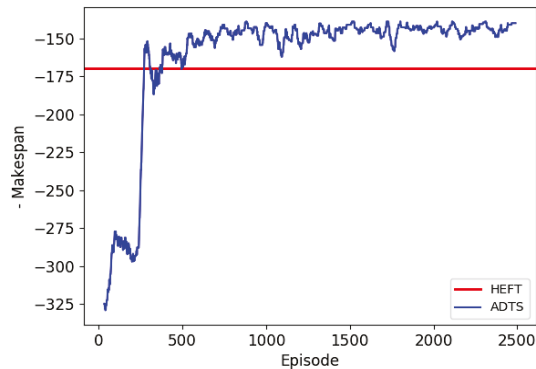


Figure 7. The learning curve of the Adaptive DAG Tasks Scheduling (ADTS) training algorithm.

5. Conclusions

In this paper, we proposed a trust-aware Adaptive DAG tasks scheduling (tADTS) algorithm using deep reinforcement learning and Monte Carlo tree search. The efficient scheduling state space, action space, and reward function were designed to train the policy gradient-based REINFORCE agent. Using the Monte-Carlo method, a large amount of training episodes were generated in a

scheduling simulator and the policy network parameters were updated using the simulated episodes. Experimental results showed the effectiveness of the proposed tADTS algorithm compared with the competitive HEFT and CPOP algorithms.

In future work, we plan to investigate the method of hyperparameters tuning to achieve more stable performance of the proposed algorithm. As different hyperparameters will significantly affect the performance of the reinforcement learning and MCTS [44], it is important to find an efficient and automatic way to tune hyperparameters and study their effects in addressing the DAG tasks scheduling problem. As the proposed method is quite general and could be adapted to many applications, future works for applications of this method may include: (1) the implementation of smart task scheduler in heterogeneous high-performance computing or deep learning framework (such as TensorFlow, PyTorch) with hardware constraints, (2) the application of this method used for both online and offline usage scenarios, and (3) the variants of time-sensitive task scheduling with hard or soft deadlines.

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Article

The Role of Trust in Sustainable Heritage Management Networks. Case Study of Selected Cultural Routes in Poland

Ewa Bogacz-Wojtanowska, Anna Góral * and Marek Bugdol

Faculty of Management and Social Communication, Jagiellonian University, 4 Łojasiewicza Street, 30-348 Cracow, Poland; ewa.bogacz-wojtanowska@uj.edu.pl (E.B.-W.); marek.bugdol@uj.edu.pl (M.B.)

* Correspondence: anna.goral@uj.edu.pl

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Abstract: Currently, the most common way of managing cultural heritage in a sustainable manner takes the form of cultural routes. The phenomenon of cultural routes mainly results from their innovative organisation, different from the previously adopted institutionalised and formalised heritage management structure that did not align with the contemporary discourse around cultural heritage, which currently constitutes one of the bases of sustainable development. The novel idea focuses on the active involvement of many diverse entities in heritage management: not only public sector organisations with their statutory appointment for this purpose, but, first and foremost, entrepreneurs who create heritage products, tourists visiting sites on the route, or people who create this heritage. Thus, the cultural route acquires the characteristics of a network-points (nodes) that are shaped depending on the needs of the region and its inhabitants, their knowledge, experience, current ideas about a given place, and the way in which specific communities would like to be perceived. The undertaken research problem explores what features cultural route networks have and how they are managed, as well as what values, including trust, are manifested in the mutual relations of route-related entities. An original concept of shaping trust within the network of cultural routes has also been proposed based on the research results.

Keywords: cultural routes; trust; cooperation networks; cultural heritage management

1. Introduction

Culture as the basis of social life is considered to be one of the four pillars of sustainable development [1–4]. One of the major elements of culture is cultural heritage, which is understood not only as a collection of monuments and other products of human activity, but also as a carrier of values that are important for specific social groups, a source of building local and collective identity, as well as a sense of belonging [5–7]. Currently, more and more organizations operating on various levels (international, national, and local) undertake activities for the benefit of cultural heritage, primarily in the area of conservation and the sustainable use of resources [8,9].

One of the tools supporting the preservation of the cultural heritage and sustainable development of the areas connected with it is the cultural route. The cultural route is a mapped out and marked material route, which connects heritage organisations, sites, and places that are selected according to a set thematic criterion, which constitute a unique and representative example illustrating the broadly understood cultural heritage of a region, community, ethnic group, minority, or nation [7,10]. Through the presentation of the material heritage, the route enables discovering, understanding, and popularising the intangible heritage, which treats both of these areas as an inseparable whole [11]. Nowadays, cultural routes are considered as an important step in the development of the concept of cultural heritage and in the recognition of its diversity [12].

Cultural routes, being understood as an idea, a public policy tool, and a form of inter-organisational collaboration, have been spreading across the world since the 1980s, especially in Europe, where the route trails cross practically all European cities and regions. Cultural routes are mostly considered in the context of the functions and competences of routes [10], particularly in the aspect of geographical space; the importance of local, regional, and transnational tourism for the sustainable development [13–15]; the area of cultural, social, and civic activity [8,16]; ways of understanding routes in local communities [17]; the promotion of sustainable tourism development, including cultural tourism [18]; and, sustainable development of infrastructure [19]. Cultural routes are also considered as a priceless element of cultural heritage [20], not only because, once destroyed, it can never be reconstructed, but above all due to the role that it plays for particular individuals and their communities. However, much less frequently, they are subject to an analysis from the organisational and management point of view. The research refers mainly to the engagement of stakeholders [21,22], principles of effective management [22,23], certification, and evaluation of the effectiveness of cultural routes in local communities [21,24]. There are also studies raising the issue of cultural routes as a network of collaboration between various entities, which create network structures and network management methods [22,25]. These studies enabled the identification of a clear research gap in the area of the features of route networks, in particular with regard to the shared values that connect the entities—elements of the route network. This is why the undertaken research problem explores what features cultural route networks have and what methods are used to manage them, as well as what values, including trust, are manifested in the mutual relations of route entities. Based on the research results, we have also proposed an original concept of shaping trust within the network of cultural routes. Tackling this problem is important from the perspective of sustainable development of local and regional communities, where cultural heritage and its organisation in the form of cultural routes is one of the significant elements of economy, tourism, and shaping of the local identity [15]. Moreover, heritage and cultural routes remain the bases of sustainable development that are still relatively empirically unexplored. The recognized scientific discourse is mainly theoretical and there is a lack of research demonstrating what sustainable management of a cultural route looks like in practice.

What is important from the point of view of the discussion that is presented in this article, in their disputes, contemporary heritage theoreticians with increasing frequency evoke the necessity of adopting an integrated approach to the issue of cultural heritage, departing from perceiving this issue through the prism of specific structures and mainly focusing on the social and economic impact of such resources on regions' development and looking closely at the ecosystems that they create [25,26]. Therefore, when designing the research that is presented in this article, we assumed that the reflection on the phenomenon of heritage requires looking at it through the lens of its function in local communities, and the ways in which it is used (intentionally or not) in shaping the social and economic development of these communities. This is also the reason why, in order to more closely examine the role of trust in sustainable heritage management on the example of cultural routes, it was necessary to draw from various academic disciplines: heritage studies, tourism studies, and trust research. Crucial in our considerations was adopting as a point of departure the assumption of the existence of significant interrelations between three fundamental pillars of heritage: its creators, producers, and recipients, who interact with one another at all stages of the cultural heritage process [27]. Thus, the environment of cultural routes was described as “complex, immersed in the dynamic climate of interconnections that shape relations between heritage creators, producers, and recipients” [27]. This assumption allowed for us to create a model showcasing the theoretical connection between the fields of study applied in the conducted analysis. The centre of this model comprised of people and particular artefacts that represented their cultural heritage. These people share specific values that constitute a base for forming bonds and networks aiming at the use of heritage for the development of local communities—in their social, cultural, and economic dimension. Particular attention was devoted to the issue of trust as a foundation of the sustainable management of this resource.

The article consists of the following parts: a theoretical introduction, covering the state of research in the field of cultural heritage, cultural routes in reference to sustainable development, as well as trust in networks. Subsequently, we present the methodology of the research that was conducted among Polish cultural routes and its results. Whereas, the summary constitutes a description of original concept research on trust within the network of entities creating routes.

2. Theoretical Background

2.1. *Cultural Routes as a Method of Sustainable Heritage Organisation and Management*

2.1.1. Sustainable Development in Reference to Cultural Heritage

Recent decades have illustrated researchers' growing interest in cultural heritage and its role in shaping the surrounding reality, both social and economic [8]. In addition to art historians, humanistic geography has also contributed to the study of cultural heritage. Reflecting on the "essence of the place", Yi-Fu Tuan, Edward Relph, and Anne Buttner place a human being regarded in the context of regional culture and its heritage in the centre of their interests [28–30]. In this approach, researchers perceive cultural heritage primarily as an expression of the human culture and humans' relationship with the place where they operate [31]. Laurajane Smith emphasises that heritage, as a place or places of heritage, cannot be seen only as a representation of the past, but also as places or sites that influence the current experiences and perception of the world by people. Thus, cultural heritage can be treated as an element that influences the sense of cultural identity and belonging of particular individuals or groups [17]. Cultural identity should be understood as collective self-awareness embodied and reflected by a specific group in relation to a physical environment and territory, such a group inhabits. Cultural heritage is crucial for maintaining and transferring cultural identity to future generations [32]; it constitutes the source of pride and belonging and an identifying and distinguishing feature [33]. The foundation of cultural identity, which is also connected to cultural heritage, is memory as an element of the bond between members of the group, as well as social memory, being deeply rooted in the local history, which, in turn, enables setting apart a place that is inhabited by a given group or community [34,35].

Cultural heritage is also increasingly the subject of interest of economists and representatives of management sciences who see it as an important resource from the perspective of stimulating the sustainable economic development of regions [8,9,16,36]. The aim is to develop sources of development alternative to traditional sectors of the economy, while taking into account the free development of production and creativity of their residents [36], which is in accordance with the concept of sustainable development. In a broader sense, culture is regarded as one of the four pillars of sustainable development, alongside other social domains: ecology, economics, and politics [2]. As a pillar of sustainable development, three main functions of culture are considered [11]. In the first one, which can be called "culture **in** sustainable development" [37], it plays the supporting and self-regulating role; it is a natural capital that should be protected and evenly distributed among generations [38]. In this regard, as the fourth pillar of sustainable development, culture is tangible, material, and functionally oriented [37,38]. Within its second function, as "culture **for** sustainable development", it has both material and intangible dimension and it constitutes the framework, the context and the counterbalance for the remaining three pillars of sustainable development [37]. Finally, the third function, "culture **as** sustainable development", is where culture constitutes the foundation of sustainable development that coordinates and integrates activities within this area, or rather the intangible dimension that refers to the basic principles, beliefs, and values.

Within the framework of sustainable development, one also notices the economic potential that results from the growing consumption of cultural heritage goods and services—especially in the promotion of space (territorial marketing), cultural tourism development, and economic development: the creation of new jobs, mainly in the tourism and creative services sectors, the increase in revenues of local entrepreneurs, and a general impact on the GDP [8,39–41]. The multiplicity of stakeholders that are

involved in the processes of creating and managing cultural heritage resources is also emphasised [42]. The research also pertains to the ways of organising heritage and organisational and management structures that will ensure the development of heritage-related places [43–45].

It is worth noting that, in recent years, researchers and practitioners of cultural heritage have created a discourse that perceives cultural heritage as a significant contribution to wider activities also in the creation of sustainable societies [5]. The concept of sustainable development as regards the cultural heritage also refers to the issue of local identity, where cultural heritage plays a fundamental role in the processes of creating a sense of belonging and a “sense of place” in a globalising social reality [46]. Cultural heritage is not only of value to people who own it or live in historical real estate; it can be equally valuable for the prosperity and quality of life of the community, and it can also help to mitigate the effects of cultural globalization and become an incentive for sustainable development [46,47].

2.1.2. Cultural Routes as an Example of Sustainable Heritage Management

Contemporary heritage theorists evoke the need to adopt an integrated approach to the issue of cultural heritage, focusing on its social and economic impact on the sustainable development of regions and examining the networks and ecosystems that they create [25–27]. In the course of these reflections, the idea of cultural routes was born, at first as a local grassroots initiative that, in time, grew to an international scale. According to the most classic definition, as proposed by the European Institute of Cultural Routes, the route is: “physically marked and characterised by having its own historical dynamics and [. . .] functions, showing the development of humanity as a multidimensional and continuous exchange of goods, ideas, knowledge and values within countries and regions, as well as between them for significant periods of time, causing mutual interaction of cultures in space and time, which is reflected in the material and immaterial heritage” [48]. The concept of cultural routes significantly differs from the broader notion of tourist routes, previously existing in the literature. Tourist routes are usually “(...) routes included in the general transportation network, used for tourist traffic between regions or tourist destinations” [49]. A tourist route consists of “a marked sequence of tourist sites located along open public routs on which tourists travel on their own or by means of public transport”, or it can be “a trail or path leading through an attractive touristic areas, sites, adapted to various forms of tourism” [49]. Unlike cultural routes, the main objective of creating tourist routes can be described as recreational, and tourists are their main target.

The International Committee on Cultural Routes, among the key components of the cultural route, points to the context, contents, and cultural significance, where the context refers to the space in which the route operates, and the content to the material objects that constitute the route’s anchor points and, at the same time, are a testimony to the cultural richness of the region. Researchers emphasise such features of the route as its constant recreation and rooting in memory and tradition, which obviously draws attention to the role of local communities in the functioning of routes [14,43,50,51]. The cultural route recognises and emphasises the value of all its constituent entities as significant parts of the whole. It also helps to illustrate the contemporary social concept and the value of cultural heritage as a resource for sustainable social and economic development [10,23]. By treating the cultural route as a compilation of dynamic elements of cultural communication, its cultural heritage values may be appreciated in their real spatial and historical dimension, which allows for a comprehensive and balanced approach to the preservation of the entire route [21].

Despite the fact that the concept of cultural routes refers to the social and cultural development of local communities, they are also regarded as tourist products [8,38]. Directing attention towards the economic dimension of heritage and cultural routes, as related to the development of tourism, emerge from the search for sources of the local development of cities and regions as an alternative to traditional sectors of the economy [36]. For this reason, analyses of cultural routes often emphasize their role in economic development, which often dominates the discussion on a cultural routes’ value [14,38]. Such an approach to cultural routes frequently leads to the commercialisation of this heritage product, as

evidenced by the example of pilgrimage, literature-, or film-themed routes, which shifts the focus of a route's value from its social to a purely economic dimension, which overlooks the role of local communities in their functioning. However, it should be noted that, when discussing tourism on cultural routes, researchers [14] (p. 514) emphasise that "Whatever the scale, the essence of itineraries is that they combine the opportunity for cultural consumption with points of sale of goods and services functioning around such culture and inextricably linked to it. As with the link between the historic sites and tourism in general, they encourage to continuously re-image places treating them as a kind of inspiration for development arising from nostalgia, memory and tradition related to places on the route". Although, in their discussions, these academics underline the clear impact of routes on the development of tourism, they also highlight their vital role in w constant re-imaging of the places, having roots in memory and tradition, which obviously draws our attention to the role of people, and especially of local communities, in routes' functioning. This is why, it is important to note the people who co-create them and values they share in the process of examining the functioning of cultural routes. Consequently, the main idea of the research that is presented in this paper was to depart from only perceiving a route as a tourism product, thus considering it in terms of the regional economy, but to treat it as an important site that influences (and is influenced by) local communities, in line with the conviction that the main reference group for route functioning are the people who are constantly in its immediate vicinity (inhabitants) and not entities that sporadically appear within its area, sometimes only once (tourists), though the latter cannot be left out when discussing routes either.

The approach to the route as a certain organisational structure of heritage shifts the centre of gravity in the discussion about the route from the material resources that it comprises (e.g., churches, palaces) to the people present—in various capacities—on the route, relations between them, and the values they share. Cultural routes offer their users a new model of co-creation and participation in culture, which often also constitutes a specific anchor point for understanding their identity and shaping the future, thus becoming a space for cultural, social, and civic activities [8,51]. In this way, it becomes primarily a space, a special binding agent of the ecosystem that is created by the local community, which gives it meaning through its activity.

The phenomenon of cultural routes is connected not only with a new view of heritage itself, but it is primarily the result of their innovative organisation, being different from the previously adopted institutionalised and formalised heritage management structure [23]. As heritage seems to be a cultural creation of extraordinary complexity, which is shaped by the relationship between creators, producers, and recipients of heritage [27], it requires the active involvement of many different entities in its management: not only public sector organisations with their statutory appointment for this purpose, but, first and foremost, entrepreneurs who create heritage products, tourists visiting sites on the route, or people who create this heritage [23]. When this approach to the organisation of the route is adopted, a cultural route acquires the characteristics of a network—points (nodes) shaped, depending on the needs of the region and its inhabitants, their knowledge, experience, current ideas about a given place, and the way in which specific communities would like to be perceived. These features relate not only to the form of the trail, but also to the content that it conveys [51].

The presented view on heritage management allows for one to look at the values that form the basis of the routes' functioning. The basic premise of this study was to treat the route as a network structure that is formulated by a wide group of its participants and stakeholders, in accordance with the belief that the basic reference group for the functioning of the route comprises those who remain in its immediate environment (residents) and, rarely, entities appearing in its area occasionally, and sometimes only once (tourists). An important reference point was also the research that was conducted by Bogacz-Wojtanowska and Góral [25], which showed that the structures that were adopted by cultural routes vary, starting from network relations that are fragmentary and under development, to very loose, bottom-up networks, to formalised and hierarchical permanent sites. In their research, Bogacz-Wojtanowska and Góral [25] emphasised that the type of the adopted route structure (loose, built at the grassroots level on the basis of relations between people, or more formalised, with top-down

construction and management) has a significant impact on how a route is organised and how it develops. Looser structures create more space for the activities of people who form the routes; more autonomy generated by such sites favours the genuine involvement of people in their development. In turn, more formalised structures, even though they are better at organising their internal relations and the manner in which a route operates, contribute in a natural way to the decrease in engagement and initiative of people who form a route in favour of the management, which, in the long run, may be contrary to the very idea of cultural heritage.

2.2. Trust in Networks

From the research that has been conducted so far [25], it follows that tourist routes are network-based and values have an important role in their operation. Routes are a network structure that is supported top-down by the public sector [52]. Trust plays an important role among many organisational values [53]; therefore, when examining routes, one should pay attention to the role of trust in the networks.

2.2.1. The Concept of Trust

In the literature trust is defined as: an expectation as to the outcome of interactions [54], an organisational resource [55], a state expressing positive expectations regarding the motives of other people's behaviour [56], a psychological state [57], readiness to accept the behaviour of the other side [58], an element of social capital [59], the foundation of social interactions in the organisation [60], and a bet on the future and uncertain actions of other people [61], a critical factor for each system that is built on community, cooperation, and competition [62]. The conducted review of the existing definitions allows us for concluding that trust is:

- one of the elements of social capital (alongside norms and values),
- the foundation of social interactions (it allows for cooperation and implementation of common goals, enables the development of social ties, new contacts, and business endeavours),
- the organization's resource (located in accordance with the process approach at the entry and exit of social processes, conducive to the processes of economic and social exchange), and
- expectation of individuals and groups towards the behaviour of other people or groups.

Trust is very important in maintaining heritage management networks, because, not only can it promote collaboration between many different entities and make economic exchange more efficient, but it can also mitigate the risk and reduce various costs [63]. It should be remembered that trust depends on risk—if the results of the actions undertaken were known, then trust would be unnecessary. "Trust is a critical factor for each system built on community, cooperation, and competition", and this is precisely the situation of the studied entities, i.e., cultural routes in Poland [62]. Trust fosters economic development [64] and it has colossal importance in maintaining positive relations in a group of people who are trying to do something positive together [65].

Additionally, the existing dependencies occurring between entities that form tourist routes explicitly indicate the need to apply the doctrine of sustainable development. The notion of justice is vital for this doctrine [66], and it should be remembered that this value is universally accepted as the basis of trust. The relationship between sustainable development and trust results, i.a. from the fact that sustainable development requires the cooperation of many political, economic, and social partners, and solutions are therefore needed to improve trust in partnership [67]. Trust is also of great importance for shaping and maintaining sustainable behaviour [68].

Moreover, the role of trust in decision-making processes and the fact that trust influences the sustainability of a professional learning community is observed [69]. Trust is also important in the development of competencies that are conducive to undertaking sustainable development activities [70]. Sustainability is strongly influenced by broad environmental changes, requiring trust, and self-reflection [71].

Trust shall be understood as an element of the value system while taking into account the purpose of the paper and research objectives,—alongside the sense of community and identity, justice, and engagement. By the same token, we acknowledge that, according to systemic theory, all of the values are interdependent and interact with one another. A value is an object of desires that seem to be good in itself [72].

2.2.2. Trust in the Network

Networks can be considered to be organisations with a special need for trust [73]. High social trust can foster a dense social network, which can facilitate information sharing [74].

From the point of view of the practice of conducting business activities, the issue of developing trust in social and economic networks is nothing new. For a long time, business people have been using such networks and building trust, for example, to support commerce during the American War of Independence. Using business books by Daniel Eccleston from Lancaster, covering the period from January 1780 to December 1781, Downs, Carolyn [75] showed how he had taken advantage of trust-building activities and created open networks in Great Britain and the West Indies, with a view of developing, maintaining, and diversifying his business [75].

In the recent period, research into issues related to networks and trust has focused on the following: trust in governance network [76], gender-based differences in risky environments [77], the significance of the various dimensions of trust (abilities, kindness, integrity, and predictability) in the particular phases of the trust building process [78], the significance of the various dimensions of trust in developing and managing interpersonal trust [79], the significance of network infrastructure in information markets and products [80], trust and reliability in Online Social Networks [81], the importance of the kinds of actors in building trust in networks that are created in the public sector [82], relations between the level of social support experienced by network members and the level of trust available to network members with respect to one another and with respect to the network as a whole [83], the influence of trust and social networks on wellbeing—in the relationship between social capital and income [84], the level of trust in cliques [85], expectations regarding reliability [86], the role of trust in interactions in complex social systems [87], the significance of a network of trust in career progression [88], the significance of trust in e-commerce services [89], the uses of social media in the process of managing and building trust [90], the significance of the independent thought and readiness for change in creating informal social networks [91], and the role of network openness and social capital in the information sharing process [92].

Consequently, current research on the issue of trust in networks focus on the following:

- the role of trust among network actors and participants in the building and maintenance of a network,
- the role and significance of networks in the building of trust—its complexity, structure and strength, and
- the significance of trust and networks themselves in various management processes.

2.2.3. Trust and Social Networks in Tourism

A separate but related body of research comprises studies exploring the significance of trust and social networks in tourism. Yvonne von Friedrichs Grangsjö, Evert Gummesson [93] and N. Agheorghiesei and V. Nita [94] also emphasised the need for building trust as an element of social capital and involvement in activities. The conducted research showed how trust among emigrants in another country developed in social networks [95]. It was proposed that social groups should invest in strengthening social ties, developing the abilities of local institutions, diversifying tourist products, and controlling the development of infrastructure [96]. Various analyses covered factors that affect the attitude of local authorities of tourist destinations towards sustainable planning tools in a networking context and they have indicated that more cognitive-related variables (such as prior

expertise, purposive benefits, and learning) seem to be more important than more affective-related variables (such as entertainment, trust, identification, and relations with network promoters) [97]. The research revealed tension among various entities that are involved in urban tourism. While the involvement of small local enterprises is beneficial, they are restricted in their actions by conflicts of interest, the lack of trust, limited social networks, and poor involvement in urban communities [98].

It was found that trust was of great importance in driving virtual network business relationships among economic agents towards mutually satisfactory, fair, and ethical behaviours. It was explained how virtual network relationships among newcomers and partners were formed and maintained their trust beliefs regarding the companies that they dealt with in network relationships [99,100]. Another conclusion was that the level of social capital that was held by leading tourist centres was not high and that there were no considerable differences among the leading tourist centres with respect to social capital [101]. The research that was conducted in Poland has focused, to a considerable extent, on trust as a component of social capital [102–104]. W. Czakon and K. Czernek [105], as well as W. Czakon together with P. Klimas [106], among other scholars, conducted interesting research into trust. J. Kosmaczewska found that a high level of trust created opportunities for flattening organisational structures, e.g., in business entities providing tourist services and for reducing transaction costs [104]. A. Balińska researched network tourist products in rural areas [102]. K. Czernek dealt with an interesting problem of social rootedness and found that it favoured “the building of trust in its cognitive and affective dimensions, which, in turn, supports the initiation, development, and effects of cooperation in the tourist sector” [103] (p. 199). The research that was conducted by W. Czakon and K. Czernek indicated that “transference by third-party legitimisation and reputation in the network play a vital role in the decision to enter into network cooptation. Inversely, calculative, capability-based and intention-based trust are shown to be difficult to develop and are rarely used” [105] (p. 64). W. Czakon, together with P. Klimas, analysed the three dimensions of the climate of interorganisational cooperation (trust, inclination towards cooperation, and experience in cooperation). Their results confirm the peculiarity of the climate of interorganisational cooperation in dyads, higher estimated, and standing out by confidence vis-à-vis the climate of interorganisational cooperation in networks, being relatively lower when estimated with the outstanding role of experience in cooperation [106]. Additionally, M. Maćkowiak and S. Graja-Zwolińska studied the importance of trust in the building of network cooperation in rural tourism [107]. The authors concluded that the building of trust should be a task of primary importance in organisations creating networks and that trust increases an organisation’s ability to survive crises.

3. Materials and Methods

The research problem that we attempted to solve concerns the subject of the features and attributes that cultural routes have as networks of various heritage entities/organisations, perceived, in particular, from the perspective of values that co-create these networks, especially trust as a building material of mutual relationships, within the cultural route network. Consequently, sustainable management of cultural heritage is based on values within route networks. Based on the results of the research, we also propose an original concept of trust within the network of cooperation within the cultural routes.

In response to the presented problem, the following research questions have been formulated:

- RQ1. What network features and attributes do cultural routes have and what are the main rules of managing them?
- RQ2. What are the values underlying the cooperation network in cultural routes studied?
- RQ3. How is trust in the mutual relationships between interorganisational routes manifested and how is it understood in the route organisations?
- RQ4. How to research trust in cooperation networks of organisations such as cultural routes?

We decided to adopt a specific strategy to answer the research questions, which consists of an empirical and conceptual part. The first three research questions referred to the empirical studies that

were carried out on cultural routes, while the fourth research question is of a conceptual character and it refers to proposals for the research on trust between organisations creating cultural routes.

The empirical part was plotted to include case studies. A case study is a research strategy that is focused on understanding the processes that take place within a given case or set [108,109]. Case studies may be based on a single case or on multiple cases and concern various levels of analysis [110]. Different types of case studies exist in the literature. One of the most popular typologies is the one put forward by Robert E. Stake, which includes three types of case studies [109]: intrinsic case study, instrumental case study, and, finally, collective case study, which we suggest here and that covers a few cases in order to better understand and explore the phenomena that are of interest to us. Our case studies are based on a qualitative approach with the intention of showing and interpreting the image of the world [111]. Reflective thinking accompanied the research process, which was a continuous process of examining and discussing the impressions, opinions, official documents, and statements of people who are related to routes [112].

We have selected the three largest cultural routes in Poland, which are organised to various degrees: Wooden Architecture Route in Małopolska, Silesian Industrial Monuments Route and the Piast Trail, situated across two provinces—Wielkopolska (Greater Poland) and Kujawsko-Pomorskie (Kuyavian-Pomeranian). The following issues determined this choice:

- while conducting the research on cultural routes in Poland, approximately 600 cultural routes were identified during an extensive search. For each route, a short description was prepared; this description makes it possible to identify the route and to determine the heritage area, the operator, and the level of development;
- we decided that more in-depth case studies would be carried out on the three largest cultural routes, with the highest degree of organisation, having the largest number of route points-sites, with the identity already built around regional heritage and values; and,
- none of the remaining cultural routes is organised in a similar manner or developed to such a degree. Therefore, these three routes are the best example and potential model or direction in route development.

The research was carried out in 2016. In order to collect data, in the study of each cultural route the following four research methods were applied:

- focus group interviews with leaders of the organisations assembled on each route (three group interviews per route, between six and 12 subjects participated in each interview) carried out in the field (in places important for route functioning). The fragments of focus groups interviews used in the article are marked with the letter “F”,
- in-depth interviews with operators of cultural routes (3 interviews as part of each study), also carried out in the field. The fragments of in-depth interviews used in the article are marked with the letter “W”,
- observations on cultural routes (short participant observation), carried out during focus studies and visits to route points, and
- analysis of organisational documents that were obtained during visits to the cultural route (reports and portfolios of organisations, websites of the route and of route organisations).

The order of data collection is illustrated by the chart below (Chart 1).



Chart 1. Order of data collection. (Source: own work).

Figure 1 presents the location of the studied cultural routes on the map of Poland.

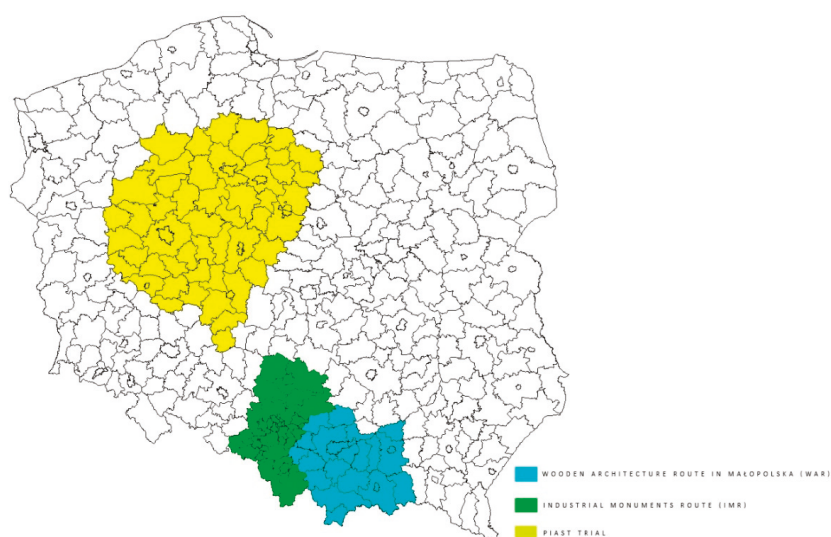


Figure 1. The location of the studied cultural routes on the map of Poland. (Source: own work).

In-depth interviews were carried out on the basis of a partly structured interview questionnaire. Moreover, when a given issue was significant for research participants, they were free to elaborate on it. Each interview lasted for at least an hour. The interviews were recorded, with the consent of research participants, and then transcribed. A scenario was used in the case of focus interviews, and interviews were conducted in accordance with the methodological principles of interviewing. They were also recorded and then transcribed. All of the available route documents, which referred in any way to the research problem, were gathered. Notes of observations that were taken during route visits, while conducting interviews and focus interviews, were also important. After the interviews have been transcribed, and the documents and notes of observations put in order, data analysis commenced. Computer programs were not used for this analysis due to a small number of interviews and documents. All of the researchers read the interviews and documents numerous times in order to identify the emerging dependencies and the holistic image of getting organised within a cultural route.

The conducted research had some limitations. Above all, the research we conducted in selected cultural routes that were focused on the organisation of routes and the values that build them. Trust was just one of them; however, during the research, our respondents referred to its role in building the network multiple times. Hence, on the basis of the conducted research and analysis of the literature, the proposition is to research the concept of trust in cultural routes in the conceptual part of the study and in answer to the fourth research question.

4. Cultural Routes in Poland—A Case Study

4.1. *Wooden Architecture Route in Małopolska (WAR)*

Wooden Architecture Route is a network of 255 sites, including churches, Orthodox churches, bell towers, old Polish mansions, wooden villas, and open-air museums, which are among the most valuable heritage sites of the material folk culture. Eight sites from the network were entered in the UNESCO World Heritage List—four wooden churches (2003) and four Orthodox churches. The basis for the functioning of this route is the protection of unique monuments, but also the sustainable socio-economic development of local communities, primarily in rural areas that operate around these monuments.

The route has been systematically developed in Małopolska since 2001 by Małopolska Province Marshal's Office, which is the official owner of the route, while its management was entrusted to Małopolska Tourist Organisation (MTO)—an association whose aim is to form and implement a policy on the promotion and development of tourism industry in the Małopolska Province. Its members include: “local authorities of the region, local government units, local tourist organisations, industry and social organisations, scientific circles, and entrepreneurs from the tourism sector” [MTO Articles of Association]. Legal entities predominate, but MTO also includes natural persons.

At first, the route was entrusted in a semi-formal way, because the Marshal's Office and MTO had not signed any formal contract. However, for the last couple of years, MTO has been participating in the annual competition for the execution of public tasks and it has been awarded a typical contract to manage WAR by the Marshal's Office of the Małopolska Province. MTO manages the network as a whole while the sites that constitute the network also have their individual owners and managers: private individuals, parishes, public institutions, and non-governmental organisations. The network of sites forming the route covers the entire administrative area of the Małopolska Province—at least one site that was included in the route structure is situated in each municipality.

At the beginning, network affiliation, followed a semi-formal procedure: application for affiliation, an entry in the heritage registry, and, of course, the structure had to be made of wood.

It is noteworthy that, since 2008, a smaller network of route subjects has been operating within the network; it is a liquid network, which is renewed every year. This is the so-called Open Wooden Architecture Route, and its sites are made available to tourists each summer. One year there are 60 sites, the next year 80, depending on the financial resources of MTO (which depend on subsidies of the Małopolska Province under the awarded contract), but UNESCO sites and the sites that accept tourists every year and specialise in providing services to them form the core. The financial aspect is important, because, under the contract, MTO employs site hosts-supervisors who receive tourists and allow them to visit the site.

4.2. Industrial Monuments Route (IMR)

The Industrial Monuments Route is a themed tourist car trail that connects 42 of the most relevant and interesting sites representing the industrial heritage of Silesia.

Work on the route started in 2004 and it was opened in 2005. It was an initiative of the province's local government that coordinates and manages the route to this day. Local authorities define the route as “(. . .) a network of industrial culture heritage monuments and a branded tourist product of the Silesia Province”. [The Regulations of the Industrial Monuments Route of Silesia Province]. The sites that are officially listed as part of the route are spread across 26 locations in the region. They are immovable properties of industrial culture that are associated with different manufacturing activities in connection with the industrial revolution and the modernisation processes that it entailed. The sites are related to the tradition of mining, metallurgy, power industry, railway, communication, textiles, water production, and the food industry. The Industrial Monuments Route includes existing museums and heritage parks, inhabited worker colonies, and running workshops. The local governments, private individuals, as well as state and private companies, own the objects. The idea of this route originated from the desire to define new directions for the development of the region, of an explicitly post-industrial nature, threatened by degradation due to the regions' increasingly disappearing mining industry and traditions that are connected with it. The creators of the trail wanted to use the region's wealth in a sustainable way, at the same time preserving its cultural uniqueness.

The Industrial Heritage Promotion Office implements the project, which is part of the Department of Culture in the Silesia Province Marshal's Office. The Industrial Heritage Promotion Office employs four people and takes advantage of public funding within an annually drawn budget.

The trail has a precisely formulated mission statement, regulations, functions, and *modus operandi*. The route is a network tourist product and constitutes “a unique selling point” for the Silesia Province among the regional tourist offers, which has substantially gained in value via synergy according to its

creators. Following the mission statement, the primary features of the Industrial Monuments Route as a networked tourist product include: *authenticity, originality, uniqueness, and attractiveness* [The Regulations of the Industrial Monuments Route of Silesia Province, 2015].

The route's network continues to expand. Aside from heritage monuments, there are other entities being anchored—organisations that provide expertise and deal in cultural heritage. The goal is to improve the project's capacity in a number of fields, such as event organisation, or influence on governing bodies and policy makers.

4.3. The Piast Trail (PT)

The Piast Trail is a tourist and historical trail that connects the most important sites and monuments that are related to the origins of the Polish State in the 10th century, Christianisation of the region, and the Piast dynasty. Unlike other cultural routes, monuments that are officially listed as part of this trail are located across two provinces: Wielkopolska (Greater Poland) and Kujawsko-Pomorskie (Kuyavian-Pomeranian).

At the initiative of Gniezno Starost Office, the work on the route officially started in 2011, much later than WAR and IMR in southern Poland, which allowed the creators to build upon the experiences of the Industrial Monuments Route and the Wooden Architecture Route. However, the first mention of the trail can be traced back to 1966, which is in connection with the millenary of Christianity in Poland. The celebration sparked revived interest in the monuments in the area; several guidebooks extolled the unique qualities of the route and marked its major walking trails [7]. They initially formed a characteristic 8-shape, which can be found on indicative maps to this day.

The existing concept of the route takes into account two main trails. The first one encompasses 15 settlements featuring objects or complexes, 30 stand-alone attractions, and four urban or local routes (Poznań, Gniezno, Strzelno-Inowrocław-Kruszwica complex, and Włocławek). The second trail encompasses eight settlements featuring objects or complexes, 17 stand-alone attractions, and two urban routes (Gniezno and Kalisz).

The trail management framework derives from a specific distribution of powers among the various entities. The first authority in question is the Piast Trail Academic Advisory Board, which was founded in May 2011 by the marshals of Wielkopolska and Kujawsko-Pomorskie provinces. The Board is composed of representatives of science, local government, and industry from both provinces, with the District Head of Gniezno as the body's chairman. The Board is responsible for strategic policies, such as the implementation of the trail's mission statement, the addition and removal of cultural sites, audit oversight, as well as study and research. Another authority—involved in the project since 2016—is the Tourist Cluster “Wielkopolska Piast Trail” (which acts as the coordinator for the Wielkopolska section of the trail). It is a product tourist organisation that was founded by 19 local government units, municipalities, and districts, which makes it a textbook grassroots initiative. Finally, we have the Inowrocław Local Tourism Office, as the coordinator of the Kuyavia section of the trail, assigned this task by the Kuyavian-Pomeranian Province. The Sports and Tourism Departments of Wielkopolska Province Marshal's Office in Poznań and Kuyavia-Pomeranian Marshal's Office in Toruń, Wielkopolska Tourism Organisation (the previous coordinator), Kujawsko-Pomorskie Tourism Organisation, as well as array of local government units and cultural sites further support the Piast Trail. Apart from the indicated entities, an extremely important role in the development of the trail is played by local organisations that manage its individual monuments while caring for their sustainable development—directly responding to the needs of the local communities centred on the monuments along the route.

The Piast Trail does not have a codified mission statement or development plans. The central document that establishes the trail and defines the objectives is a letter of intent titled “On the restoration of the Piast Trail”, which was drafted in 2012 by the province marshals. Aside from the foregoing document, the local government of the Wielkopolska Province has entered the route into various strategic documents. In particular, the Piast Trail is now considered to be one of the priority tourist

products of the region, being included in the Tourism Development Strategy for the Wielkopolska Province until 2020. It is worth noting that a similar initiative has not been undertaken in Kuyavia.

It is difficult to assess the structure of the trail, as it is a work in progress (even though, as an idea at least, it is technically the oldest cultural route in Poland), while the still forming networks and affiliations between the sites and other organisations that are connected to the trail are often contradictory. The main organisations within the Piast Trail do not conduct any networking activity—no meetings, training courses, study visits, or other interactions, apart from three academic conferences that were cobbled together by the Advisory Board.

5. Research Results

5.1. The Distinctive Features of Cultural Route Networks and Management Rules in the Network

In response to the research question No. 1 (“What network features and attributes do cultural routes have and how are they managed?”), referring to the features and attributes of cultural routes as networks, it should be emphasised that the network structures that were adopted by the cultural routes studied are very diverse, ranging from fragmentary and network relationships under construction, through very loose, bottom-up networks (WAR), and ending with formalised and hierarchical permanent network structures, such as on the Industrial Monuments Route. The routes that we examined had various distinguishing features and attributes:

(a) The Industrial Monuments Route is a network structure that is permanent, formalised—functioning on the basis of regulations and admission rules [113]—and very strongly initiated and gradually built by the route coordinator, which is a public organisation [52]. There are specific tools that the coordinator uses to mobilise and activate individual entities due to formally signed agreements between the network entities, but also to enforce certain arrangements and operating standards that result from the signed contract. The route network organisations undertake joint activities, also in a very formal way. The crucial point is the execution of the route development plan, promotional activities, as well as organising joint projects that aim at the development of joint tourist products within the network. What is important, the relationships are collaborative, as the coordinator (route manager) is looking, not only for the full integration of activities, but also many activities in the route network are unified. The emerging hierarchy of entities in the network proves the stiffening of the network structure, which builds permanent structures and lasting mutual relationships. Therefore, certain nodes in the network become more important, as they subject themselves to a formalised audit that enabled the introduction of a gradual categorization of the sites that primarily serves awarding “stars”, but also mobilising weaker nodes that do not manage to uphold the route-wide standards. Moreover, receiving the “endangered site” status means the risk of public disgrace for an organisation. At the same time, the route coordinator declares that they would like to build a network of independent entities that make decisions together, while their activities create rather permanent structures—participation in decision-making is practically limited, and there are no validating tools within the network. As a result, the Silesian route is already a largely institutionalised network; it also reflects a certain ordering of the industrial heritage that it explains. Therefore, the network of this particular cultural route is rather informative in nature and the social bonds within it are weak. However, the certain stability of this network should be highlighted—it is a route where the expansion is heading rather towards knowledge acquisition and expert network development. Other entities are being anchored, in particular, those that can contribute their expert knowledge, and are, at the same time, organisations that are devoted to cultural heritage. This is supposed to also serve the expansion of opportunities, especially in organising various undertakings, as well as enhancing its influence on various public decision makers.

(b) The Wooden Architecture Route is a twofold structure, which is managed by a non-governmental organisation. There are two networks: the first one wide and semi-formal (its members were included in the route network based only on their declarations, the necessary condition

for a site to be incorporated into the route is the status of a wooden architecture that encompasses all entities of the route. The second, much smaller, is of a formal nature (contract), and it covers about 1/3 of the route entities-organisation, where the coordinator performs certain cohesion-enhancing actions, delegates certain tasks, and introduces minimum standards. The annual appointment of the route coordinator by the Voivodeship Marshal's Office also reinforces the semi-formal character of the route, which results in a planning perspective for joint route activities that only span one year. However, overall, most of the route activities are done outside the management organisation, thanks to the activity of the route operators themselves, often very closely connected with the wooden architecture site. The mutual exchange of information, mutual non-formal contacts, recommending and helping in activities around the route heritage are factors within the network that are even more significant than the coordinator's activities. The network of informal relations between guides working on route sites should also be highlighted. Their cooperation is often based on the friendship between people connected to the route and their willingness to offer assistance. It is manifested, among others, through mutual recommendations of nearby sites and services of guides who work there, or opportunities to join projects that are organised in the region, which also stems from the belief in mutual benefits that such cooperation might yield. As a result, this route's network has a stronger social than formal dimension. The social and cultural capital of the Małopolska (Lesser Poland) Province is important in building the route, the methods, and instruments of network or route management from the coordinator's side, should be less favourably assessed. The strong non-hierarchy of the route, the developmental scope of action [113], and the cooperative relationships between the entities should be emphasised. Moreover, exclusion from the network, or any form of "disciplinary" action rarely occurs. There are no established standards of functioning within the network, apart from the initial conditions. Fragmentation of a large network (over 250 entities) reflects the existing economic and social structure, which is historically shaped in the province (small economic entities and agricultural entities operating within various interconnected networks).

(c) The Piast Route is a fragmentary network, which is still under construction (even though it is the oldest of the studied routes), with a few management centres (mainly from the non-governmental sector)—at least five entities coordinating cooperation within the route, including the three strongest ones, can be identified. This network can be labelled a technocratic network, since the Programme and Scientific Council has the strongest influence on its shape. The coordination situation is made more difficult by the fact that only the Programme and Scientific Council is an organisation with a reach above the provincial level. Other entities only operate in their own provinces, usually only voluntarily contacting others for joint actions. Initially, the idea and concept of the route, created before the formal restitution of the route, which was not implemented due to the lack of a single network coordinator, was strong and well crystallised. The current networks of the links between the entities of the route are rather built on grass-roots, neighbourly relations, community of values, and the importance of common heritage, which were also formed much earlier, before the formal establishment of the route. Relationships within the network are diverse, being sometimes community-based on relying on social relations, and also competitive—networks and links between sites or organisations on the route often have completely opposite directions. The route's geographical extent and the inclusion of two administrative units exacerbate the fragmentation or incoherence of the links within the network. Particular management centre entities undertake their own activities for the selected nodes of the route and initiate specific projects without a shared vision or a network development strategy. Particular route entities protest the homogeneity through the Programme and Scientific Council, and there is no consensus in terms of the responsibility of particular entities or the scope of coordination. During the research, certain respondents underlined that it is precisely this diversity of perspectives, ideas, and concepts, and not striving for unity, which determines the beauty of this route.

All routes studied, which are understood as network structures, are also differently managed. In general, usually one organisation manages (or only coordinates the activities). In the case of the Wielkopolska (Greater Poland) route, attempts are also made to introduce such a solution that is

difficult, because the route is located in two provinces and formal and legal reasons make it difficult to establish a single public sector coordinator. Therefore, it can be concluded that route networks are managed through a leading organisation [114,115]. The organisations-route points in the provinces of Silesia and Małopolska expect that the lead organisation will take management actions and they usually are able to submit to the procedures and management methods that they apply, seeing their benefits. Meanwhile, the formation of the Piast route network is partially forced. The informal network of the trail was built on the idea, and subsequent management and ordering activities gradually triggered resistance, competition, and the emergence of different organisations to coordinate the route activities.

Formal, strong, and often also hierarchical networks are created, where the public sector is the route coordinator. Perhaps the explanation is the organisational isomorphism or functional linking [116], especially the mimetic isomorphism, because, in the light of G. C. Homans' theory, cooperating individuals tend to become similar to each other in order to achieve greater benefits within the relationship. Non-governmental organisations that coordinate the activities of the routes in Lesser Poland, and Greater Poland are less formally building the formal networks, leaving networking to the route organisations, grassroots leaders, or even local communities.

5.2. The Values around Which Routes Are Built

In responding to the second of the research questions posed ("What are the values underlying the cooperation network in cultural routes studied?"), it is necessary to pay attention to the motivations that underlie the decision of the creators of cultural routes to create them. For the route creators, the basic point of reference in the sustainable heritage management process from the very beginning has been people who build a specific narrative that is based on the things retained from the past, memories, and stories that form the surrounding ecosystems [26,27]. Hence, the key value appearing in the context of all routes has been man, both seen from a historical perspective, as the creator of the heritage, as well as a contemporary individual trying to develop it creatively and in a sustainable way. In this sense, one should also note the symbolic dimension and the value given to the routes by residents and local route communities that can be treated as an indicator of emotional ties that exist between residents and a given site, organisation, or landscape dominant. Local people remember many of the route's sites, e.g., as working establishments. After closing and converting, they became leisure spaces that often require additional efforts to convince former employees and their families that the change was sensible, and to acquire them as customers and sometimes even "ambassadors" of these sites. Cultural routes, which are also one of the forms of protecting heritage sites, often serve to preserve those elements of the past that allow for local communities to take root in the present and referring to the words of Lowenthal [117] (p. 5), as referred to in the introduction, are used to build the "here and now" of the region's inhabitants, inspiring them to undertake new business activities.

In all of the studied cases, the intentions of the route creators focused on: (1) the will to boost the sustainable region's economic development in the area of tourism, especially rural and post-industrial areas, (2) strengthening cultural heritage awareness among residents and tourists visiting the region, and (3) activating local communities. Hence, both utilitarian values that are related to the economic development of the route region and economic activation of its inhabitants, as well as the values related to local identity appeared in parallel among the routes studied. Hence, there is often a sense of synergy between the various values that reveal the cultural route built around the heritage: "Recognizing the Route as "material wealth of both provinces" they define goals of synergy and achieve mutual benefits resulting from the popularisation and development of the Route" [Szlak Piastowski 2012]. It was clearly emphasised during the research that the route functions as a reconstruction and creation of identity, not only local, but also national. It is an important element of history, but also a way to build social cohesion—the route and its values, and the contents that it brings, connect generations, as well as people with different material status. Importantly, the local awareness of heritage, pride, and a sense of connection with the place and heritage are also on the rise.

Although each route had a manager (or managers), each access to the network of individual sites and their managing entities has had a voluntary character; hence, it can be stated that the routes are built primarily on local cultural and social capital, which gives them of unique character. The result of such an assumption is the conviction of the respondents that in case of the routes “there is no possibility of tough management. Here you have to work out the values together” [F5]. This is why it is important to mutually negotiate and agree on what is present in the relationships of the route entities. The values that are the driving force of the routes regulate the mutual relations between people and organisations that create the route and route managers, and influence the dynamics of network development within cultural routes.

Observing the way of organising the routes studied, it seems that the key to the sustainable development of their idea of routes was the commitment, willingness to cooperate and develop understood in the perspective of individual sites, as well as the trail as a whole. The participants of our research drew attention to the question of emancipation, which accompanied the processes of creating the routes. Its level was different in the case of the routes that were studied—in highly formalised networks (ZST) and lower and more informal ones (SAD), respectively, higher. One of the respondents that works at SAD emphasises: “What I am happy about is that it is bottom-up, no attempt was made to force anything by any organisation. It is not easy to build guest houses” [F2].

On the Piast Route, it was emphasised during the research that “We have such a situation, we all work together, we like each other, we act together. It is important to try to make more” [F1]. For this reason, it is worth emphasising how significant informal relations between the guides working at the sites situated on the route are for route organisation; in fact, route organisation develops on the basis of such relations. This proves that a route is a community of persons whose cooperation is usually based on friendship between “route attendants” and on the willingness to help one another. It is visible in e.g., recommending to one another the sites nearby and the services of guides working there or the opportunities to get involved together in projects that are organised in the region, which also stems from the conviction that both parties may benefit from such cooperation, which, among others, is strongly developed outside of the organisational structures on WAR and TPT.

Regional sustainable development that is based on the idea of cultural routes is understood by its stakeholders in various dimensions: in social, economic, and cultural terms, as manifested in activities that aimed at sustainable tourism development and activating residents (e.g., by including them in the activities on the route: “There are no eggs, so we go to a neighbour who will also earn” [F1]) and develop their cultural competences by expanding the cultural offer available to them, as evidenced by the cycle “Muzyka Zaklęta w Drewnie” (“Music Enchanted in Wood”), regularly organised at the SAD or the Industriada festival, which is the flagship project that was carried out every year at the PCT. The Stakeholders of the route, satisfying their diverse needs through the use of cultural heritage resources along the route, have a significant impact on their preservation and development, and at the same time these resources significantly affect the stakeholders themselves, their development, and relations with the environment. In this way, the interaction between the resources of cultural heritage and its participants within the routes takes the form of a dialogue based on values such as human rights, cultural democracy and diversity and mutual understanding, and cross-boundary exchanges, the role of which in building the routes, and the European Institute of Cultural Routes emphasises the communities creating them [10].

Finally, the last value that occurred in the opinions of the studied representatives of trails was dignity. The respondents did not directly mention it, but it occurred in the words of the representatives of both the Wooden Architecture Trail and the Technology Monuments Trail. What is meant here is dignity understood as a value that the local community has, in a way, been deprived of, either through the deprivation of cultural heritage, as with industrial facilities, or through forgetting or peripherisation of the heritage of wooden architecture in small villages. These places and buildings, before the trail was created and started, were often forgotten and doomed for demolition or gradual degradation. Building a trail network gave them the new value, but it also brought dignity back to its users and inhabitants.

Accordingly, it happens with mines and industrial facilities within the Technology Monuments Trail, where former employees, strongly connected to them, discover their places, show their relatives their workplaces: “Only several years ago these industrial facilities were only a tie, not prepared to anything, and no one knew what to do with them [...] now inhabitants come to us—their self-esteem once so low grows, people did not recognize that Silesia is so valuable. They now bring their guests; friends and their feeling of pride increases” [W-1]. They regain their dignity thanks to the trails, and their past becomes important not only for them, but the local community and tourists.

5.3. *The Manifestations of Trust in Relationships on Cultural Routes*

Answering the third of the research questions posed (“How is trust in the mutual relationships between interorganisational routes manifested and how is it understood in the route organisations?”), there are several expressions of trust in the relationships between individuals and organisations that create the studied cultural routes.

First of all, it should be emphasised that the community is an extremely important value for the “route-goers”. Relations between the “route-goers” are based, on the one hand, on the sense of the region’s heritage community, but, on the other hand, they also clearly have a interpersonal character, where individual leaders cooperate, not only in formal relationships. In turn, relationships between route managers and the individual entities creating them are diverse—the strongest are within a smaller network, i.e., those that are based on a formal contract and making the site available to tourists. In a wider network, there is no hierarchization of entities, exclusion outside the network, as well as any “disciplining”, are quite rare. A who works on the SAD emphasises that the “Route certainly integrates people, I can talk to people who are on the route, people get to know each other” [F4]. The degree of tightening community relations between people and organisations on the routes studied is different—being clearly higher on the SAD and the Piast Route, where the degree of formalization of relations between the manager and objects on the route is smaller, and interpersonal relationships are based on friendship and the willingness to help each other. The conviction regarding the strength of the community on the routes is the basis for their development. Exchange of ideas, conviction about a common role in the preservation, and development of local heritage are the driving force for people who co-create routes are associated with this possibility of joint action. “I observe a certain integration in myself, people start to see some sense in that there is a point on the route, that it makes sense” [F5].

People who co-create the routes are convinced of the strength of joint action, which is manifested in sharing ideas for activating and developing routes. Guides working on the SAD emphasise that “(...) there have been many competitions now, so we are networking. I can’t, Agata can’t, but a friendly foundation can” [F5]. People that are connected with the SZT think similarly about the routes “... We have advertising brochures, we advertise, we do something together—not only Industriada. Also, between individual sites, such a bottom-up operation” [F3]. They do not perceive each other as competitors fighting against each other, e.g., for tourists or for financial means for further activity, and instead perceive opportunities that result from cooperation. The manifestations of cooperation can be found, among others, in a willingness to recommend sites on the route, which is a common practice among “route-goers”.

The sense of community, gradually strengthening the relationship and cooperation between entities belonging to a network of trails is a manifestation of trust as—according to B. Misztal [118]—trust creates the sense of community. Trust is the basis for building not only relationships within a network of trail entities, but also for creating sub-networks within local communities:

“Building a very strong network of cooperation, yet not based on such pyramidal or hierarchical management, but a junctional network, that is, many junctions within a network, which in turn have their subnetworks built, and they are very strongly anchored to local communities, that is, these facilities should have, should be important centres of the local life and for these communities they are to be perceived as attractive places for leisure time”.
[w-1]

Building the culture of trust [119] can also be observed within trails, which are based on a clearly identified structural source of this culture, that is, cultural heritage.

In the relationships between cooperation networks, justice also comes as a value that is particularly expected from coordinators of such a trail, but also between entities in the network. First of all, behaviours of coordinators are to a large extent negotiated based on the value of justice, particularly with reference to the principles of joining a trail network, creating common working standards for a given trail, the employment of people cooperating at this trail, or the organization of joint projects. To strengthen justice in the mutual relationships, coordinators search for support, particularly from expert organizations that may validate their decisions:

“Cooperation with them [experts] is very important for us to the extent in which we have an external expert on cultural heritage and this dispenses us a little from the burden of whether we have any affection or dislike towards a given facility”. [W-5]

However, it is essential to negotiate “just” behaviours as for “expert” justice, as imposed by members of a trail network, the feeling of injustice, and the lack of understanding for the needs of some entities in the network occurs. Such was the situation with the Piast Trail, where, after an audit carried out, the Scientific Council of experts deleted some organizations from the trail: “The trail was narrowed down, some facilities were deleted, of course the major ones remained but some from the area are missing because they did not match the new idea” [W-4]. With some representatives of the trail entities this evoked the feeling of a lack of understanding and of injustice: “When managing a cultural trail, one needs to consider the variety of perspectives and stakeholders, which means no changes should be made without looking at the needs” [W-2]. As a consequence, some saw the deficit of integration and, to some extent, loosening of the community: “We would like to have more integration at the basic level, integration, so that both centres, the whole trail, act together based on synergy, with mutual benefits” [W-1].

Secondly, relationships between certain entities in the network also refer to justice. It is clearly visible with the Wooden Architecture Trail, where mutual cooperation and responsibility not only for one’s own facility, but also the whole trail network are emphasised. Hence, the feeling of justice is linked to the necessity to increase professionalism and learning from each other.

The third value that also manifests a certain level of trust in a trail network is involvement. Coordinators took various actions to increase involvement of network participants in each of the trails studied, whereas their effectiveness is visible if the trail entities clearly see the benefits of being involved in a trail:

“The involvement came upon realization that there are benefits of being on a trail. These are marketing issues, a “trail day”—this is what boosts imagination most. Joint promotion is also a benefit”. [W-6]

At the beginning, when forming a trail (for the Piast Trail this phase is still ongoing in some fragments of the network), working on increasing the involvement of all entities is in the hands of the coordinators. However, more and more entities in a network see the real benefits of being involved, and the coordinators support any activity and joint projects within a trail:

“The coordinator forces some facilities to take activities. For example, my gallery works from one exhibition to another. We are encouraged to constantly do something. What works here is imitation, the motivation that others act as well. We act, cooperate with neighbouring facilities within a trail”. [W-1]

As some representatives of trails say, involvement is the essence of the existence in a trail network, and it should be the basis for building mutual relationships, but also excluding uninvolved entities from the network.

In summary, the studied routes have both material (mostly historical monuments, but also interesting sites and spaces) as well as intangible resources (e.g., knowledge regarding the management

staff, social norms, values). Therefore, not only do they inform, but also generate culture. Based on the conducted research, it is possible to state that cultural routes include constituting relationships that determine the scope of responsibilities and rights of particular members, associative relationships that are created as a result of peoples' and communities' decisions, and personal relationships that are formed in the process of interactions. It can be assumed that associative relationships were initially dominant, and entities were expressing their readiness to cooperate; therefore, trust also existed. The cooperation become formalised, a constituting relationship was formed that served as insurance for this trust. In the course of cooperation, a personal bond also developed. Entities gain a sense of relative security due to this relationship. These values can support maintaining and developing trust.

In the studied routes, the process of self-organisation plays a significant part. This process assumes the presence of trust between given entities that are able to overcome obstacles to the joint activity when their contacts are well developed and they share a history of cooperation. Self-organisation is the process of shared understanding that requires collective interaction and communication, which results in the creation of a structure that is based on objectives shared by all members of a given system [120] (p. 105).

However, local government agencies or employees of public administration offices manage the featured routes. For that reason, the self-organisation process itself is secure; we can even venture a statement that it is supervised and shaped from the outside. It is executed through the already known mechanisms: creating strategic frameworks, developing self-organisation monitoring procedures, through joint result assessment, offering support and assistance, by providing appropriate information, legal counsel, meeting places and financial support, or by designing institutional environment where self-organisation occurs. José Nederhand and Victor Bekkers described these mechanisms in detail [120].

6. The Concept of Studying the Role of Trust in Cultural Routes' Development

The starting point for answering the fourth of the research questions posed (How to research trust in cooperation networks of organisations such as cultural routes?) was the conviction that there are many methods, techniques, and tools for studying trust, as well as that the research approach that is presented here did not give satisfying results. Various questionnaires are used (some of them were developed for the study of trust between employees, between organisations, and a part of them to study trust in relations with clients). A significant part of the researchers uses experiments. The methods, techniques, and tools used so far can be a rich source of new research concepts. However, our proposals, aim at creating research assumptions that can be used to study trust in networks that are composed of various entities creating cultural routes. Four assumptions constituted the basis for the formulation of the proposal.

6.1. Assumption 1-network types, trust and values

The routes that we present are examples of social and calculative networks. Trust plays an important role in both types of networks, but the calculative network is regulated by meeting the economic expectations of their members [121]. Taking into account the network characteristics made, and, in particular, the types of entities comprising the network—their values, formalization degree, as well as motives of action, goals, and interests, it can be assumed that trust plays an important role in their functioning:

- anticipatory, resulting from the conviction that “beneficial actions of other people will be also in relation to us once we have established relations with them” [61] (p. 100),
- rational-collective—resulting from rational decisions and the collective nature of the network [122],
- based on knowledge—resulting from the possibility of predicting behaviour based on the history of interactions (the better we know someone, the better we anticipate their behaviour and predictability increases trust) [123], and

- a system of values (ethical, autotelic, and other) agreed and accepted by network members influences the perceived trust. Therefore, in this case, we can talk about trust that is based on values. The conducted research shows that, among the entities (people and organisations) that co-create cultural routes, **a sense of identity, belonging, and “common roots” prevail.**

Our assumption is that, in the studied networks, we are dealing with a relational nature of identity.

This feeling is agreed on and maintained in the processes of interaction [124]. An important role in maintaining the sense of identity is played by the network leaders, who must work for cooperation, participation, and promotion of a common sense of identity among the network’s members [125], the information exchange process [126], and what the respondents pointed out in our research: “We have this situation, we all work together, we like each other, we act together. It is important to try to make more” [F2]. Researchers point out that a sense of belonging is a “behavioural” guarantee that the network will work well [127].

Thus, the operation of the network is dependent on the interaction between them, which, in turn, is dependent, among other things, on the sense of belonging to the network. Moreover, the sense of belonging plays an important role in the information sharing process [128].

Common roots, a system of values, and a sense of belonging are the main determinants of the community—as a specific human group [129–131]. Common roots are the motive for creating networks, but, above all, this concept is related to the awareness of network members (that something links them, encourages them, mobilises them to cooperate).

6.2. Assumption 2-connections with justice

Justice is widely recognised as a superior value and it can therefore be considered as a basis of trust. The relationship between trust and different types of justice were demonstrated in various earlier studies in various disciplines [132–134].

Distributive justice dominates the studied networks—according to which each participant of the network should be treated as equal to others [135], and interactive justice (in which a sense of justice is felt in relationships with other entities forming the network).

6.3. Assumption 3-connections with commitment

The full commitment of network participants plays an important role in creating and maintaining trust. The relationship between trust and commitment has already been studied [136–138].

W. Czakon [139] drew attention to the problem of commitment in networks. Trust and commitment are essential for any process of exchanging, maintaining, and developing mutual relationships [140].

A specific role should be attributed to value-based commitment given the nature of the networks that are described and the types of trust identified—resulting from the impact of identified and accepted organisational values. This commitment may be stronger than economic engagement—based on material and calculative exchange. The level of which is dependent on the comparison of costs and profits. Simplified relations between particular values are shown in Figure 2—Relations between trust and other values.

6.4. Assumption 4—research approach

We recognise that three basic research approaches are possible.

The first, process-based approach assumes that common roots and a sense of identity and belonging create a network. There is an initial anticipatory trust that is influenced by specific types of commitment and justice. Economic commitment is less important than value-based commitment. The level of trust depends on interactional and distributive justice, whether the subject of distribution is information, promotion, image, and possible economic benefits. The sense of belonging and identity is also the result. Their quality depends on how trust develops during cooperation. The sense of identity is transformed (as pointed out by E. Goffman). It may turn out that the egoistic attitudes of individual

entities will lead to network fragmentation and it will weaken trust. Trust itself is both the input resource and the product of this process.

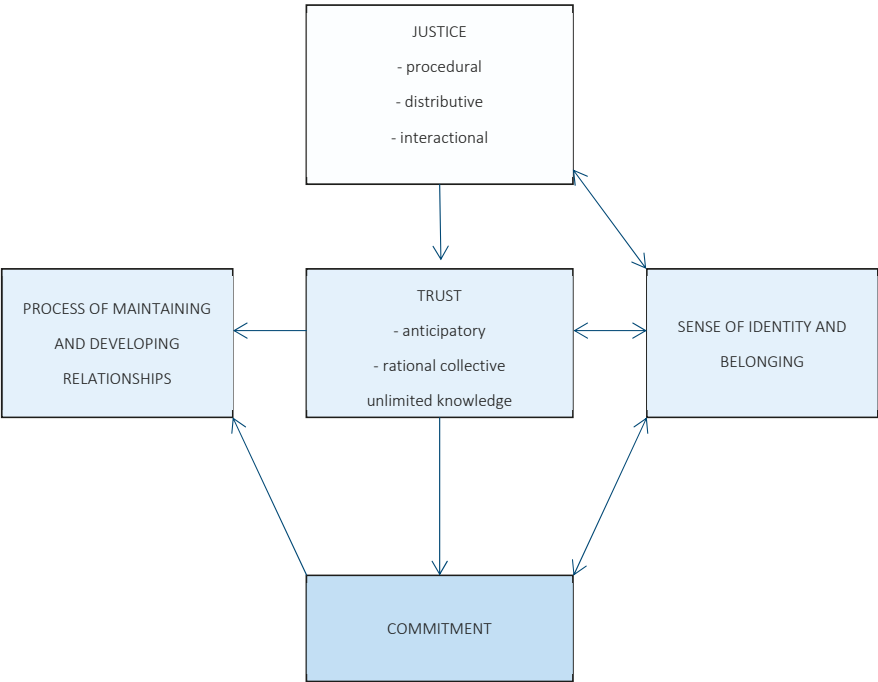


Figure 2. Relations between trust and other values. (Source: own work.)

The second, system-based approach assumes that there are relationships between particular types of values. For example, a strong relationship exists between a sense of belonging and commitment. Interactive justice has strong links with the sense of belonging to the network, since it shapes the information exchange process and, because it plays an important role in the information sharing process, it affects trust-based knowledge. Similar relationships exist between all values described.

The third approach, when is based on relational agreements, consists in studying objectives pursued by individual entities. These goals may be both intangible and tangible, but they do not necessarily have to be integrated and known to network participants. Their method of implementation undoubtedly influences commitment and trust and, consequently, the sense of interactional and distributive justice.

7. Final Conclusions

In conclusion, we should look at cultural routes from two perspectives. Firstly, they are constructed, shaped, and managed by, and in response to, the demands of the present, in which contemporary communities living in areas with rich cultural heritage have come to function. Thus, “a heritage route is composed of tangible elements of which the cultural significance comes from exchanges and a multidimensional dialogue across countries or regions, and that illustrate the interaction of movement, along the route, in space and time”. [12].

Secondly, as evidenced by our case studies, they are also one of the basic tools of cultural policy at the regional level, while, at the local level, they constitute an element of local policy, which is based on sustainable social and economic development, with the latter, in particular, being based on cultural tourism. Each of the studied cultural routes acts as a kind of network of monuments around which the

life of local communities is concentrated—its cultural life, since the monuments on the route constitute anchor places that allow for the inhabitants to discover and better understand their roots, and then draw from them in a sustainable way: acting as an inspiration for the development of social, cultural, and artistic activities, as well as business activity—as an incentive for the development of economic activity. It is worth pointing out that this interaction with heritage always creates a feedback loop—on the one hand, heritage inspires, and on the other hand—people who are the ‘heritage owners’, as a result of this inspiration, strive for their heritage to last and develop in a sustainable way, responding to the needs of the environment.

It should be noted that all three studied routes are built in areas where tourist activity has not been very encouraged before, although there are node points within each route that draw significant numbers of tourists (particularly route points in Krakow, and to a smaller extent in Poznań). From the perspective of regional public policies in the area of culture and tourism, creating cultural routes in the broader sense prevents the tragedy of a common pasture [141], thanks to the attempt of dispersing tourist streams towards different points on the route (which is clear in the example of the Lesser Poland route), and it prevents the excessive exploitation of cultural goods. Therefore, the value and significance of routes in this context is relatively unnoticed, and it also explains the push towards top-down building of certain route networks to cooperate for the common good—reducing the exploitation of the most popular areas of cultural heritage and enhancing areas where heritage is relatively unexplored.

Cultural routes in our understanding have the character of organisational networks of various natures, which range from fragmentary and network relationships, to very loose, bottom-up networks to formal and hierarchical permanent network structures. Network structures that create routes have different, often contradictory features, depending on the assumptions that are adopted by the creators or the coordinator of the assumptions of its functioning: a different level of formalization of activities, bottom-up or top-down, with a public or non-governmental coordinating entity, with hierarchical or opposite-non-hierarchical relationships between the coordinator and other network entities, with diverse activities and the involvement of entities within the route, as well as cooperative or collaborative relations between them.

The most important values that bind entities within the route networks were associated with people living in the route areas, as well as around the utilitarian values that are related to sustainable economic development of the route region and economic and social activation of its inhabitants, as well as values that are related to local identity. The route networks built around the value of cultural heritage were open to constant revision and change, as a source and result of social interactions, both within a specific group and between groups, artefacts that are chosen by them, and values that are assigned to them. These processes are illustrated by the example of the studied routes where the observation of their development allows for noticing different directions of network formation, as well as parallel ideas for routes that are shaped by people creating and managing them.

In light of the conducted research, trust was not a value that appeared directly in the statements of the interviewed route representatives, although, in light of current research, it is one of the key values that form the basis of the relationships within the networks. We have only identified certain manifestations of trust existing between entities or other related values linking the entities within the route.

Our research proposal, which takes into account the results of the research, has proven that trust in the network is strongly associated with various other values. While the relationship between trust and commitment or justice is well known, it is worth carrying out further research regarding the sense of belonging and identity. These are values that can be of great importance in the process of building and sustaining various cultural undertakings.

The study of trust in networks should take into account different types of networks and various types of trust, as well as the stage of life of these networks (whether they are at the stage of shaping, working out standards, effective cooperation, or at the final stage of their existence). A broad range of factors can influence the level of trust in the network, for example—informal information exchange

processes [142] and goals pursued by network participants [143,144]. Not all types of values support the development of trust. For instance, advance commitment can destroy the initial trust. To conclude, it would be advisable to also refer to critical reflections concerning trust as the “main actor” within cultural routes networks. This can be reduced to three main assumptions. Firstly, trust in the studied routes does not cover the entire network to an equal degree—it is stronger or weaker in particular areas, which stems from various reasons (e.g., frequency of interactions, interests, etc.) Therefore, with time, the inability to level these differences can contribute to the fragmentation of the network. Secondly, trust can connect various groups exhibiting unethical—or more broadly, counterproductive—behaviours. Such a situation can occur where various support groups, or interest groups (e.g., management-level employee and site owners), are forming. Thirdly, certain entities can attempt to build as many trust-based relations as possible, which may weaken the social network (one of the so-called ‘trust traps’).

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