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Linking business analytics affordances to corporate strategic planning and decision making outcomes

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Abstract

Business analytics is considered in research and practice as a promising approach to support organizations in the increasing complexity and dynamics in the strategic planning and decision making, which arise for example through the integration of product-service systems. However, literature is lacking a comprehensive analysis to what extant business analytics supports the strategic planning and decision making. Thus, coming from the affordance and socio-technical system theory, we are linking business analytics affordances to strategic planning outcomes. In doing so, we identified 20 affordances which we have assigned to the dimensions of the socio-technology system theory. Based on this, we have derived implications and propositions for research and practice. The results can be used as guidelines for practice and directions for future research.

Keywords Business analytics · Strategic planning outcomes · Affordance theory · Socio-technical system theory

1 Introduction

Business analytics (BA) systems are becoming increasingly important, especially in the information system and operations research literature as well as in practice (Yin and Fernandez 2020; Bange and Lorenz 2021). In this context, BA with the key aspect of decision-making (Vidgen et al. 2017, p. 3) is seen as a promising solution in multiple areas and thus also in strategic planning (Laursen and Thorlund 2017, pp. 17–44). Thereby, “[...] analytics serves planning by guiding the goals, decisions,

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and performance metrics of an organization with facts and data" (Troilo et al. 2016, p. 74). A more specific example in the context of strategic planning is the simulation of different scenarios (Sharma et al. 2014, pp. 438–439; Lepenioti et al. 2020; Rabia and Bellabdaoui 2022), which is becoming more and more important in the increasingly dynamic and complex environments and high volumes of data, such as from product-service systems (Klatt et al. 2011, p. 31; Delen and Ram 2018; Sakao and Neramballi 2020, p. 3). This application is supported by a survey of Bange and Lorenz (2021, p. 11) who indicated that decisions in companies are increasingly based on data with the aim of improving decisions, optimizing processes and reducing costs. Furthermore, the value of BA is comprehensively discussed and investigated in several studies. For example, as described by Ashrafia, et al. (2019), many studies deal with the relationship between BA and firm performance, agility, information quality, innovation capability and environmental turbulence (Côte-Real et al. 2017; Richards et al. 2019; Duan et al. 2020; Anton et al. 2021). Against this background, studies found a positive relationship for example between the use of BA in strategic planning and the firm performance and therefore financial results (Miller and Cardinal 1994; Klatt et al. 2011; McAfee et al. 2012; Cao and Duan 2015; Aydiner et al. 2019).

However, the integration of BA is associated with challenges. Thereby, the organizational integration is one of the biggest challenges addressed in the literature (McAfee et al. 2012; Vidgen et al. 2017). Furthermore, as the works of for example Vidgen et al. (2017) and Bange and Lorenz (2021, p. 20) show, companies struggle in creating value from BA and the literature does not show clear results in which way BA creates value (Ashrafia et al. 2019, p. 1). Rather, as pointed out previously, past research has focused strongly on the effect of BA on the firm performance (Wolf and Floyd 2017, pp. 7–9) and show a limited consideration of the outcomes of strategic planning (Cao and Duan 2015; Kunc and O'Brien 2018). At the same time, the results of Cao and Duan (2015) and Kunc and O'Brien (2018) indicate that the interrelationships between the opportunities provided by BA and the influencing factors that lead to an increasing dynamic capability and organizational performance are very complex. In this context, the data-driven culture, collaboration and integration of BA experts are important building blocks (Tim et al. 2020; Cao and Duan 2015). Against this background, for example Abbasi et al. (2016) derived the questions "How can big data analytics improve business processes?" and "How do organizations/individuals/groups actually make decisions in the big data environment?" in their elaboration of a research agenda. Furthermore, research is calling for more qualitative research on BA affordances and their impact on strategic decision making (Cao and Duan 2015).

Since, to the best of our knowledge, the current literature does not provide a comprehensive overview of affordances of BA applications in the context of strategic planning and to what extent these support the organization, we see a research gap. Coming from the results of for example Cao and Duan (2015), Wolf and Floyd (2017) and Kunc and O'Brien (2018), we follow the affordance theory which is currently often used in Information System research (Dremel et al. 2020; Strong et al. 2014). The affordance theory provides a framework to analyse the relationship between technical objects and the social environment (Volkoff and Strong 2013).

At the same time, the application of the socio-technical system theory (STS) further supports the analysis of the effects of an object on an organization (Seidel et al. 2013). Thus, based on the results of a systematic literature review, we conduct a qualitative analysis to derive affordances and cluster them according to the framework of STS. In doing so, we aim to answer the following research question: To what extent can business analytics support the corporate strategic planning and decision making? Thus, we support the organizational integration of BA in the context of strategic planning and decision making.

The remainder of this paper is organized as follows. First, the background information regarding the business analytics, strategic planning as well as the affordance theory and STS. Afterwards, the related research and points out their limitations against the background of the research gap identify above are presented. Furthermore, the following section contains a description of the applied research method in order to answer the research question. Following, we present the results of our research and finally, a discussion and conclusion are provided.

2 Background

In general, the literature contains large communities dealing with strategic planning and business analytics. At this point, we would like to provide the relevant background on these focused topics as well as on affordance theory and STS applied in this work.

2.1 Business analytics

In a nutshell, it can be noted that BA supports the strategic planning and decision making process with insights and knowledge based on data (Phillips-Wren et al. 2021, p. 2). However, as Yin and Fernandez (2020, p. 288) and Phillips-Wren et al. (2021) conclude in their study, Business intelligence (BI) and Decision support systems (DSS) as well support the strategic planning and decision making. The authors further state in their work that at this point no valid definition and distinction between the IT artifacts "decision support system", "business analytics" and "business intelligence" exists. Nevertheless, Phillips-Wren et al. (2021, p. 9) come to the conclusion that BI and BA are a subfield of DSS, which aim to convert data into more deeper insights. Looking into the past, according to Chae (2014), BI has the primary function of generating charts and graphs for managers and BA supports prediction and optimization in complex and competitive environments. Further, it can be generally observed that the term BI emerged as early as the 1990s and BA only from 2001 (Chen et al. 2012, p. 1179). In addition to these three terms, the term "(Big-) Data Analytics" (BD) is also used in literature and practice in the similar context. Chen et al. (2012, p. 1174) classify data analytics as a technology of BA and BI, which bases among other things on data mining approaches. In the literature, analytics approaches are often divided into predictive, prescriptive and descriptive approaches (Holsapple et al. 2014, p. 132). Thereby, "descriptive analytics is able to

detect patterns that indicate a potential problem or a future opportunity for the business. On this basis, predictive analytics is able to predict whether an event will happen, when it is about to happen as well as the reason why it will happen.” (Lepenioti et al. 2020, p. 58) Lastly, the intention of prescriptive analytics is to propose the best decision options based on the predicted future (Lepenioti et al. 2020, p. 58).

Table 1 shows definitions of the above discussed approaches of BA, BI, DSS and BD which we apply within this work. Due to the described close relationship, we do not distinguish the approaches in our research but refer to BA as the newest approach and consider the other approaches in the keywords of the database search. At this point, it should be further noted that there are certainly other related approaches in the literature and in practice, which we will not go into further due to the focus of this work.

2.2 Strategic planning outcomes

Similar to the term business analytics, there are also a number of related terms to the term strategic planning in the literature and practice. Patria, et al. (2019, pp. 246–247) have found that in particular the terms "strategic decision-making", "strategic management" and "strategic planning" are frequently used in the literature. As described by Rusjan (2005, p. 746), strategic planning can be considered as a process for strategic decision-making. Thereby, the phases of strategic planning range from the analysis of the current situation, through the analysis and prediction of the environment, to the definition of future scenarios and finally to the definition of future paths (Rusjan 2005, p. 746). Furthermore, Nickols (2016) come to the conclusion that strategic planning is a part of strategic management. Accordingly, it can be concluded that strategic decision-making can also be assigned to strategic management. Table 2 provides an overview of the definitions of the three approaches that we use for this work.

In their review of strategic planning, Wolf and Floyd (2017) provide a comprehensive overview of strategic planning outcomes. Since past research has focused primarily on distal outcomes and specifically on firm performance, and more recent research now examines proximate outcomes that influence distal outcomes, Wolf and Floyd (2017, pp. 7–9) distinguish between proximate and distal outcomes of strategic planning. The proximate outcomes describe “the causal or processual mechanisms that explain how strategic planning influences organizational outcomes” (Wolf and Floyd 2017, p. 1760). The distal outcomes include in a broader sense side effects of strategic planning which are influenced by proximate outcomes. However, outcomes are determined by organizational contingencies like culture, firm size, age or capital intensity and environmental contingencies like uncertainty, complexity as well as national and industry context. Table 3 shows the outcomes based on Wolf and Floyd (2017).

From the perspective of **proximate outcomes**, Wolf and Floyd (2017, pp. 1767–1768) state that current research focuses strongly on integrative, coordinative, and communicative interaction between different actors in decision making than on rigid top-down processes. For example, Andersen (2004, p. 1275) describes an

Table 1 Definitions of BA, BI, DSS and BD

Term	Source	Definition
BA	Yin and Fernandez (2020)	“Business analytics is about getting useful information from business data to promote the efficiency of an enterprise and generate more business values (Shen and Tzeng 2016), and the target of business analytics is to get insight from data and support making fact-based decisions (Davenport and Harris 2007)”
BI	Arnott, et al. (2019, p. 627)	“BI systems are large-scale systems that combine information technologies, data reporting, and analytic processes in order to support decision making in an organization”
DSS	Sprague (1980)	“A DSS is a class of information system that draws on transaction processing systems and interacts with the other parts of the overall information system to support the decision-making activities of managers and other knowledge workers in organizations”
BD	Delen and Ram (2018)	“Generally speaking, analytics (or perhaps more appropriately, data analytics) can simply be defined as “the discovery of meaningful patterns – new and novel information and knowledge – in data” ”

Table 2 Definitions of strategic planning, strategic decision-making and strategic management

Term	Source	Definition
Strategic planning	Wolf and Floyd (2017, p. 1758)	"[...] a more or less formalized, periodic process that provides a structured approach to strategy formulation, implementation, and control. The purpose of strategic planning is to influence an organization's strategic direction for a given period and to coordinate and integrate deliberate as well as emerging strategic decisions"
Strategic decision making	Mintzberg et al. (1976, p. 246)	"[...] a set of actions and dynamic factors that begins with the identification of a stimulus for action and ends with the specific commitment to action"
Strategic management	Alhawandeh and Alsmairat (2019, p. 96)	"The purpose of strategic management is to contribute to finding ways to improve the organization's performance. This contributes to the strategic decision to take the direction of organization and determine its ability to keep its position in the light of the environment in which they can be predictable"

Table 3 Strategic planning outcomes based on Wolf and Floyd (2017)

Proximate outcomes	Distal outcomes
<ul style="list-style-type: none"> • Quality of strategic decisions • Strategic planning effectiveness (Capabilities) • Integration • Coordination • Strategy communication • Legitimation • Shared understanding and commitment to strategy • Strategic thinking • Planned emergence 	<ul style="list-style-type: none"> • Organizational performance/ Strategic planning effectiveness (objectives) • Adaptation • Strategic change and renewal • Realized strategy • Organizational learning • Strategic legitimacy • Dynamic capability

integrative planning process which takes into account the missions, goals, policies, plans of all levels and units of the organization. This approach is also supported by publications for example of Olson et al. (2007) and Amrollahi and Rowlands (2019) with the focus on diversity which ultimately leads to an increased understanding and commitment to the strategy throughout the organization.

In this context, the legitimization of the process and, consequently, of the decisions as an outcome of strategic planning should also be considered. Through a legitimate strategic planning, common cognitive frameworks, values and social norms are created for the implementation of the strategy (Wolf and Floyd 2017, pp. 1775–1776). Likewise, the quality of the decision is a central outcome. The quality of strategic decisions is described for example by Parayitam and Papenhausen (2018, p. 6) by the characteristics “members’ satisfaction with decisions; effect of decisions on the organization; the degree to which the decision rationale has covered a wide range of issues in the organization; and the degree to which team members’ decision rationale was expressed in depth”.

In order to explain the effectiveness of strategic planning Venkatraraan and Ramanujam (1987) describe a two-dimensional model. Since one of these dimensions can be assigned to the distal outcomes and more precisely to the organizational performance outcome according to Wolf and Floyd (2017, pp. 1767–1768), we describe the second dimension in one of the following paragraphs. The dimension of strategic planning effectiveness of proximate outcomes focuses primarily on the “means” or the process dimension and “reflects the extent of improvement in the Capabilities of the system to effectively support the key activities of strategic management” (Venkatraraan and Ramanujam 1987, p. 6).

Another proximate outcome according to Wolf and Floyd (2017, pp. 1767–1768) is the strategic thinking, as it is interrelated with the strategic planning (Wolf and Floyd 2017, p. 1770). As described by Mintzberg (1994, pp. 107–108), strategic thinking as well as the strategic planning is a separate process with its own outcomes. Thus, strategic thinking is a more intuitive and creative process and therefore produces as outcome “an integrated perspective of the enterprise, a not-too-precisely articulated vision of direction[...].” (Mintzberg 1994, pp. 107–108). The last

proximate outcome is planned emergence, in other words, the consideration of real-world and socially relevant models and scenarios (Wolf and Floyd 2017, p. 1767).

A key **distal outcome** studied and discussed in the literature is the impact of strategic planning on organizational performance, such as the financial performance of companies (Wolf and Floyd 2017, pp. 1767–1768). As explained in the description of proximate outcomes, Venkatraraan and Ramanujam (1987) describe two dimensions in order to explain the effectiveness of strategic planning. Thus, the other dimension of the outcome planning effectiveness focuses more on the "purposes" or outcome benefits of planning and "focuses on the degree to which planning objectives are met" (Venkatraraan and Ramanujam 1987, p. 6) which is why we assign it to the distal outcome "organizational performance" according to Wolf and Floyd (2017, pp. 1767–1768). The authors Venkatraraan and Ramanujam (1987, p. 26) describe the following key objectives: 1. Enhancing management development, 2. Predicting future trends, 3. Short-term performance, 4. Long-term performance, 5. Evaluating alternatives based on more relevant information, 6. Avoiding problem areas.

Furthermore, the achieved strategic change and renewal as well as the adaptation of the decision are further important distal outcomes. Thus, strategic change distinguishes the two phases of initiation and implementation of the change process, which often lead to changes at the organizational level (Dutton and Duncan 1987, p. 108). Furthermore, strategic planning offers possibilities to flexibly adapt to corresponding conditions (Wolf and Floyd 2017, p. 1768).

In this context, Wolf and Floyd (2017) go one step further and describe the dynamic capability (adaptability to new circumstances) of an organization and the organizational learning as distal outcomes. Accordingly to the legitimization of the process as a proximate outcome, strategic legitimacy is an important distal outcome of strategic planning (Wolf and Floyd 2017, pp. 1775–1776). Strategic legitimacy extracts organizations according to Suchmann (1995, p. 576) "from their cultural environments and that they employ in pursuit of their goals." Thus, the strategic legitimacy approach aims to influence the perception of the organization by external actors (Suchman 1995, p. 574.576). Finally, an outcome of strategic planning is the actual strategy realized, which depends on the patterns of decision and action over time (Wolf and Floyd 2017, p. 17,767).

2.3 Affordance theory

Affordance theory is increasingly being applied in information system research for example in order to examine the effects of IT artifacts on the basis of affordances (Volkoff and Strong 2013; Dremel et al. 2020). Thus, for example, Strong, et al. (2014, p. 22) describe affordances as "what is offered, provided, or furnished to someone or something by an object ". In other words, "an actor can see different opportunities to use an artefact irrespective of what it is designed for." (Naik et al. 2020, p. 6).

Since the theory originally emerges from research of psychology (Gibson 1986) and describes the relationship between the actors and environment, researchers from IS research are adapting the theory. Thus, for example, the concept of "functional affordance" according to Markus and Silver (2008) has emerged. This concept explicitly focuses on the relationship between the users and technical objects (Markus and Silver 2008, p. 622). Against the background of the relationships between technologies and social actors, affordance theory is often combined in research with STS (Engel et al. 2020; Dremel et al. 2020). Furthermore, the IS literature distinguishes between basic and higher level affordances (Volkoff and Strong 2013; Cao and Duan 2015). According to Volkhoff and Strong (2013, p. 829) "[...] basic affordances arise from the relation between role-based individuals working to achieve role-based goals and the deep and surface structures of the artifact." Higher level affordances are based on the basic affordances (Volkoff and Strong 2013).

2.4 Socio-technical system theory

The STS considers the technical system and the social system as two linked sub-systems of an organization (Bostrom and Heinen 1977, p. 14; Dremel et al. 2020, p. 3). As Dremel, et al. (2020, p. 3) summarize, there are inherent recursive relationships between these technical and social systems, as the users influence the technology and the technology in turn influences the usage of the technology. A consideration of these relationships is therefore necessary to ensure the successful integration of a technical system into an organization. Against this background, the development of knowledge and overviews, as in this paper, is of importance for research and practice.

Through the four views task, technology, structure and actor of the STS according to Leavitt (1965), a framework is created with the help of which for example can be examined how information systems affect the organization (Seidel et al. 2013, p. 8). As Dremel, et al. (2020, p. 5) describe are actors "[...], among other things, characterized by capabilities and a shared culture, structures are characterized by project organizations and institutional arrangements, technology by tools and technological platforms, and tasks by the processes which are required to fulfil work or the delivery of services". Figure 1 provides a schematic illustration of the STS.

3 Related work

Based on a literature review and to the best of our knowledge, we found two related works focusing on the application of BA or related approaches and their relationships to constructs of strategic planning or in particular on BA affordances in a general context of strategic planning. First, Cao and Duan (2015) test hypotheses using questionnaire survey of UK enterprises to investigate the impact of BA on strategic decision making and organizational performance. The authors use the affordance theory with focus on decision-making affordances provided by BA through a data-driven culture. Thus, the authors come to the conclusion that BA supports the

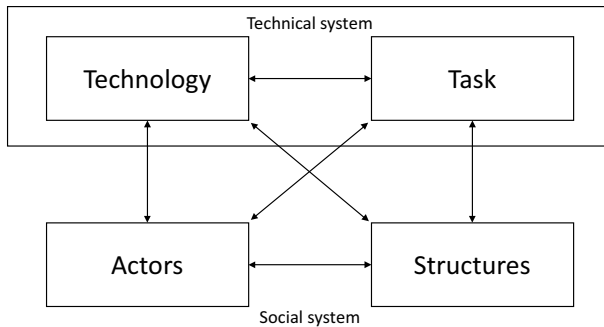


Fig. 1 Socio-Technical System Theory based on Dremel, et al. (2020, p. 3)

development of a data-driven culture. The data-driven culture should at the same time strengthen BA's impact on the decision-making affordances. At last, the data-driven culture and the decision-making affordances should have a positive effect on the strategic decision making and thus on the organizational performance. Furthermore, Cao and Duan (2015) found that BA supports the rational decision-making and concluded that there is a relationship between data volume and intuition in decision-making. Accordingly, Cao and Duan (2015) do not provide an overview of the affordances of BA but focus instead on decision-making affordances. However, they do not provide a more detailed analysis of these affordances either. Rather, the authors offer the finding that BA supports organizational performance and the rationality of decision-making as part of legitimization, which are according to Wolf and Floyd (2017) two of 16 outcomes of strategic planning.

Second, Kunc and O'Brien (2018) provide a mapping of tools of business analytics and activities of the strategy process from an operations research perspective. Therefore, the authors applied a literature review focusing on research of management and only to a limited extent on disciplines like computer science and information systems Kunc and O'Brien (2018, p. 5). Furthermore, the applied keywords are limited to analytics, strategy and business analytics. However, Kunc and O'Brien (2018, pp. 9–10) find that business analytics has the potential to support the strategy process and thereby often combines different approaches. On the one hand, BA is intended to support the strategy implementation and, on the other hand, especially the optimization of operational efficiency. Furthermore, at the beginning of the strategy process, BA offers a data basis for making decisions through real time information of the environment and issues of the organization. In addition, predictive analytics methods can be used to develop, test and compare different scenarios. Finally, the authors conclude that BA should consider both fact-based and experience-based information in the strategy process. Besides the limited data base, the work of Kunc and O'Brien (2018) does not focus on affordance theory but rather offers implications from which affordances can be derived.

In contrast, this paper provides a comprehensive overview and detailed analysis of the affordances of BA for strategic planning and decision making. By applying the STS framework and linking affordances to strategic planning outcomes, implications

and propositions for research and practice are further derived to demonstrate the extent to which BA supports the strategic planning and decision making.

4 Research method

With the aim to understand how BA can support strategic planning, this paper applies the affordance theory and combines it with the STS. As required by for example Cao and Duan (2015), we build on the body of literature on BA and strategic planning and conduct a systematic literature review to derive affordances on an organizational level from the identified literature. Therefore, we followed the guidelines provided by Tranfield et al. (2003). In order to answer the research question, the derived affordances are assigned to the outcomes of strategic planning according to Wolf and Floyd (2017) which are influenced by the corresponding affordance.

For the identification of the relevant literature, the Elsevier's Scopus and Thomson Reuters' Web of Science database was searched in April 2022. Therefore, the following search string (1) was used to search the title, abstracts and keywords: (affordance* AND ("business analytic*" OR "data analytic*" OR "business intelligence" OR "decision support system" OR "predictive analytic*" OR "descriptive analytic*" OR "prescriptive analytic*")). The keywords are chosen according to the research aim and are based on the background provided in the background section.

The initial search revealed 112 hits. After the duplicates were removed, 95 hits remained for further screening. As recommended by Tranfield et al. (2003), the inclusion and exclusion criteria (see Table 4) were used to search the titles, abstracts, and the entire text in order to reduce the large number of publications to the relevant ones. Accordingly, the hits were reduced to 35 after screening the title, 22 hits after screening the abstract and eleven after screening the full text. In addition, we performed a backward and forward search using Elsevier's Scopus database. Ambivalent to the initial database search, we also searched keywords in the title, keywords and abstract. However, with the exception of the publications already screened, no other relevant publications could be identified after screening the title and abstract according to our inclusion and exclusion criteria.

In addition to the direct search for the affordances of BA, we searched the databases again using the following search string (2): ("business analytic*" OR "data analytic*" OR "business intelligence" OR "decision support system" OR "predictive analytic*" OR "descriptive analytic*" OR "prescriptive analytic*") AND ("strategic planning" OR "strategic decision making" OR "strategic decision-making" OR "strategic management"). Thus, the focus was not directly on the affordances of BA but on the application of BA in the strategic planning and decision making. The keywords are chosen according to the research question and topic and are based on the explanations in the background section. As in the first database search, the search was limited to the title, abstracts and keywords. In addition, to narrow down the search to the relevant publications, the search was filtered to the topics computer science, business management and accounting, decision science, economics, econometrics and finance.

Table 4 Inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
Study focus	<ul style="list-style-type: none"> Studies providing affordances of BA systems in context of strategic planning in an industrial business environment relevant for the corporate management level Studies providing generally valid or cross-sector insights Studies describing use-cases of BA systems in their findings or discussion in context of strategic planning** Publications with thematic focus on computer science, business management and accounting, decision science, economics, econometrics and finance** 	<ul style="list-style-type: none"> Studies not providing affordances* Studies not focusing on an industrial business environment like security, public administration, healthcare, education and sports or not provide generally valid or cross-sector insights Studies with department-specific focus like marketing, design, supply chain management and engineering not relevant for corporate management level Studies not providing affordances of BA systems in context of strategic planning* Publications with other thematic focus than computer science, business management and accounting, decision science, economics, econometrics and finance**
Publications source	All sources	/
Publication type	<ul style="list-style-type: none"> Peer-reviewed journal articles and conference proceedings* Publications in English Publications from 2017** 	<ul style="list-style-type: none"> Books and book chapters** Bachelor's and master's theses and presentation slides Publications in languages other than English Publications published before 2017**

*only relevant for the 1st search string

**only relevant for the 2nd search string

The second database search resulted in 387 initial hits. Without duplicates, 316 publications were considered relevant for the screening process. The screening of the titles and abstracts using the inclusion and exclusion criteria of Table 4 resulted in 109 respectively 70 publications. After screening the full texts, 22 publications were included in the final database. Due to the broad focus of the second search string a supplementary backward and forward search was omitted. Thus, the two-step data collection process results in 34 relevant publications. Figure 2 illustrates flow diagram of the screening processes.

We performed a qualitative analysis of the focused publications in order to extract relevant affordances. Thus, with regard to the descriptions in Sect. 2.3, we searched for affordances – i.e. the possibilities to use BA in strategic planning and decision making. In this context, we followed the stepwise approach of Mayring (2000):

- Definition of the research question
- Definition of aspect of analysis respectively criterion of selection
- Working through the text and derivation of categories
- Revision of the categories and formative check of reliability
- Final working through the texts and summative check of reliability
- Interpretation of the results

If possible, the affordances were taken directly from the text in a first step. In a second step, the use-cases of BA systems described in the publications that are relevant for strategic planning and decision making were extracted. In a third step, affordances were derived from the use-cases. At last, the derived affordances were combined and simplified if they were similar in terms of topic and content.

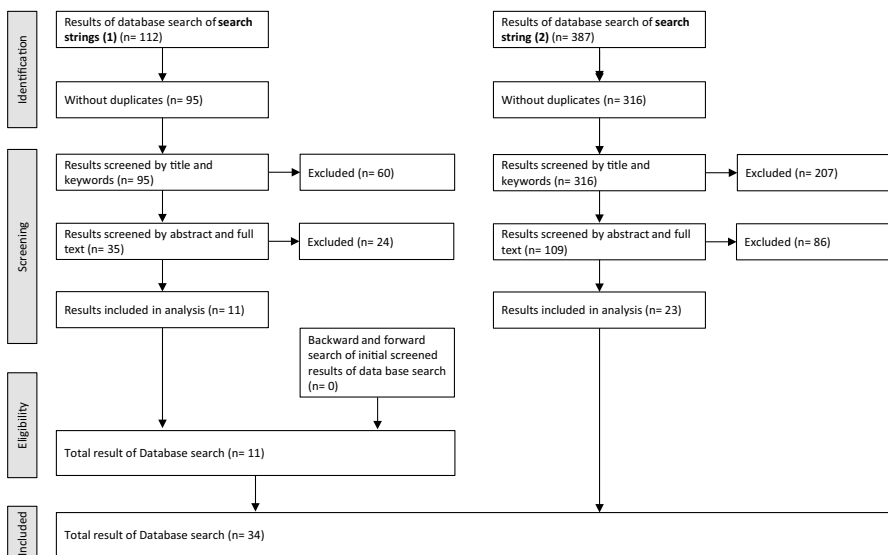


Fig. 2 Flow diagram based on Page, McKenzie and Bossuyt (2021)

Afterwards, the derived affordances were classified as basic or higher level and assigned to the dimensions according to the STS as well as to the outcomes of strategic planning according to Wolf and Floyd (2017).

5 Results

As described in research method, we analysed the relevant publications and assigned the affordances according to the dimensions task, technology, actor and structure of STS (see Fig. 1). Furthermore, we assigned them to the proximate and distal outcomes of strategic planning and distinguished between basic and higher level affordances. The result is shown in Table 5. At this point, however, it should be noted that a clear assignment is not always possible. For example, the affordance of improving the data-driven culture could also be assigned to the structure dimension. However, based on the explanations in the background section, we rather understand the data driven culture as a capability of actors that should be improved through the use of BA.

Hence, 20 affordances could be derived in total. From the perspective of the outcomes, it can be noted that the proximate outcomes have an average of eight and the distal outcomes an average of seven links with the affordances. Furthermore, it can be noted that only the affordances 1.1 and 1.7 interact exclusively with distal outcomes. In general, the five outcomes organizational performance, quality of strategic decisions, strategic planning effectiveness, adaptation and dynamic capability show the most links to affordances. Thereby, it can be noted that the outcome strategic planning effectiveness is primarily linked to the affordances of the technology and actor dimension, the outcome organizational performance to the task dimension and the outcome dynamic capability to the actor dimension. At the same time, the five outcomes strategic change and renewal, realized strategy, strategic legitimacy, strategy communication and planned emergence show the lowest number of links with the affordances.

From the perspective of the dimensions of STS, the task dimension with seven affordances shows more links with outcomes than the other dimensions. Additionally, more publications focus on the task dimension than on the other dimensions. At the same time, it can be noted that the dimensions actor and structure are in average linked to seven outcomes. This generally indicates a high importance of these dimensions for the strategic planning and decision making, although more publications focus on the task dimension. Furthermore, the actor and structure dimensions are strongly influenced by higher level affordances. Due to the focus of this work and consequently of the publications examined, the affordance of supporting strategic planning and decision making, which is linked to all outcomes, was derived. Besides the affordance of supporting strategic planning and decision making, the five affordances 1.4, 3.1, 3.5, 4.2, and 4.1 have an above-average number of links to the outcomes. However, it can be noted that only affordance 1.4 is strongly represented in the literature. In the following, the individual affordances are briefly explained.

Table 5 Affordances of BA for strategic planning and decision making

Affordances				Level of Affordance	Sum of sources	Proximate outcomes							Distal outcomes							
						Quality of strategic decisions	Strategic planning effectiveness (Capabilities)	Integration	Coordination	Strategy communication	Legitimation	Shared understanding and commitment to strategy	Strategic thinking	Planned emergence	Organizational performance/ Strategic planning effectiveness (objectives)	Adaptation	Strategic change and renewal	Realized strategy	Organizational learning	Strategic legitimacy
Technical system	Task																			
	1.1 Improve organizational performance	H	4																	2
	1.2 Support strategic planning and decision making	H	all	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	16
	1.3 Capture, store, and provide consistent, ad-hoc and previously invisible data	B	12	x	x					x	x									5
	1.4 Identify and forecast of present and future business risks/threats and opportunities on external and internal level	B	23	x	x							x	x	x			x		x	7
	1.5 Systematic and rational development, evaluation, prioritization and selection of recommendations, responses and alternatives	B	15	x	x							x	x	x					x	6
	1.6 Define strategic objectives and criteria for success	B	5						x	x	x	x								5
	1.7 Support, measure and control strategy implementation phase and success	B	3											x	x		x			3
	Technology																			
	2.1 Flexible integration of multiple systems, technologies as well as internal and external data sources	B	11	x	x	x				x					x					5
Social system	2.2 Process of structured, semi structured and unstructured data types	B	3	x	x									x						3
	2.3 Apply data mining approaches	B	4	x	x									x						3
	2.4 Enable fast and user-friendly data access as well as on demand and mobile interface access	B	8		x										x				x	3
	2.5 Process of accurate and reliable data	B	3	x	x					x	x			x						5
	Actors																			
	3.1 Improve efficiency and effectivity	H	11	x	x					x				x						5
	3.2 Improve data driven culture	H	4	x	x	x	x		x	x				x	x					9
	3.3 Improve dynamic capabilities	H	4		x							x		x	x			x		6
	3.4 Flexible and self-service data access and processing	B	7		x	x		x							x					6
	3.5 Collaborate between teams/ interest groups to create, analyse, share, comment and edit content	B	7	x	x	x	x		x	x	x						x		x	9
Structure																				
4.1 Integrate system based business processes	H	4	x	x	x	x							x	x					7	
4.2 Support development of hybrid teams	H	3	x	x	x	x				x			x	x					8	
4.3 Redefine relationship between firm and customer	H	1	x	x	x								x	x					6	
Sum				14	17	8	5	3	8	7	7	3	15	10	1	2	4	2	13	

H= Higher level affordance; B= Basic level affordance

H=Higher level affordance; B=Basic level affordance

5.1 Task (processes which are required to fulfil work or the delivery of services)

1.1 Improve organizational performance: The central higher level affordance of BA in the strategic planning and decision making is the improvement of the organizational performance, which, as described for example by Yan (2018), can affect the number of the customers, sales, revenue, cost, risk or profit of an organization. Against this background, Cao and Duan (2015) have demonstrated a positive impact of BA on the strategic planning and decision making and finally on the organizational performance.

1.2 Support strategic planning and decision making: According to the research focus of this work and the definition of BA (see background section), the higher level affordance of supporting the strategic planning and decision making through BA is obvious and is described in the core of all publications examined. The central

goal is to provide the necessary information and insights to the planner and decision maker.

1.3 Capture, store, and provide consistent, ad-hoc and previously invisible data:

Basis for the strategic planning and decision making are information and insights. Through the consistency, rapid availability and consideration of large amounts of data (big data), the decision making process and monitoring can be carried out faster and more accurately (Cao and Duan 2015; Abhari et al. 2020). Glowalla et al. (2014, p. 14) go one step further and state “[...] that a main affordance of BI systems, providing ad-hoc and flexible, but consistent data analysis [...]”. As for example Lepskiy et al. (2018) and Clark (2012) describe, new IT technologies enable the handling of large data volumes and open up more extensive possibilities of processing the information.

1.4 Identify and forecast of present and future business risks/threats and opportunities on external and internal level:

One way to process data with BA systems is the identification and forecasting of present and future business risks/threats and opportunities. Examples are the identification and forecasting of new products, services, competitors, suppliers, markets, regions, technologies or production demand (Wieneke et al. 2016; Côte-Real et al. 2017, pp. 385–386; van Rijmenam et al. 2019, p. 10; Ozemre and Kabadurmus 2020; Dremel et al. 2020) but also of risks and impacts due to an exogenous shock (Chen et al. 2022, p. 7). In this context, Clark (2012, p. 4202) describe the approaches of diagnostic and interactive control. Thereby, the diagnostic control focuses rather on high performance core processes and the iterative control on uncertain environments and knowledge creation.

1.5 Systematic and rational development, evaluation, prioritization and selection of recommendations, responses and alternatives:

As Sim et al. (2019, p. 128) and Abhari et al. (2020) describe, BA systems use internal and external data in many cases as a basis for the development, evaluation, prioritization and selection of recommendations, responses and alternatives. This includes for example proposals for new products and services, price adjustments or adoption of technologies (Côte-Real et al. 2017; Dremel et al. 2020; Tim et al. 2020).

1.6 Define strategic objectives and criteria for success:

A further basic affordance is the general development of corporate strategies and goals respectively the strategic objectives and criteria for success. In this context, as described by Cao and Duan (2015) and Alnoukari (2021, p. 43), BA supports the quantification of corporate objectives and to develop realistic strategies.

1.7 Support, measure and control strategy implementation phase and success:

In addition to the identification or understanding of internal and external data (see Affordance 1.4), BA systems are also used for the direct control of implemented strategies. In this context, BA systems are primarily afforded for the comparison between actual and target (Alnoukari 2021, p. 44).

5.2 Technology (tools and technological platforms)

2.1 Flexible integration of multiple systems, technologies as well as internal and external data sources: The flexible integration of multiple systems, technologies as well as internal and external data sources is a central field of application of BA of the technology dimension (Goede 2021, p. 692). As described by Sim et al. (2019, p. 128) and Ahmad and Miskon (2020, p. 17), one objective is to bundle internal data from ERP, SCM, HRM and CRM. Additionally, as described by Kunc and O'Brien (2018) and Rueckel et al. (2018), BA systems aim to integrate individual experiences of actors. Thus, the overarching goal is to "provide a holistic view of the business and leads to better decision-making." (Alnoukari 2021, p. 41).

2.2 Process of structured, semi structured and unstructured data types: As described by Alnoukari and Hanano (2017, p. 9) and Alnoukari (2021, p. 41), structured, semi structured and unstructured data are necessary for the database of BA systems. In particular, the processing of unstructured data, such as emails and social media postings, by BA systems provides more extensive and complete insights for the strategic planning and decision making.

2.3 Apply data mining approaches: An analysis by Yalcin et al. (2022) shows, that the BA components data mining, text/web mining and machine learning are the most frequently applied BA components. This finding is confirmed by the results from interviews of Alnoukari (2021) and Capurro, et al. (2022, pp. 280–282) which show that the data from the web become a strategic variable for firms. Thus, the strategic planning and decision making profits from the processing of unstructured data.

2.4 Enable fast and user-friendly data access as well as on demand and mobile interface access: As identified for example by Glowalla et al. (2014, pp. 14–15), Ilyés and Szekeres (2017, p. 49), Tona and Schultze (2018) and Goede (2021, p. 692) are the speed, ease of deployment, ease of use and mobile on-demand capabilities to explore and share data important enabler for the use of analytic tools especially for decision makers.

2.5 Process of accurate and reliable data: Besides the speed and user-friendliness, Glowalla et al. (2014, pp. 14–15), Kościelniak et al. (2017) and Goede (2021, p. 692) further describe the basic affordance of processing of accurate and reliable data. Especially against the background of increasing data volumes and more complex data sources, BA systems support organizations through the integration and standardization to provide accurate and reliable data for the strategic planning and decision making.

5.3 Actor (capabilities and a shared culture)

3.1 Improve efficiency and effectivity: Not at least through the possibility of the increasing flexibility, speed and accuracy of the data access, organizations aim to

improve the efficiency and effectiveness of the strategic planning and decision making. As described by Davern et al. (2012, p. 289) and Kościelniak et al. (2017, p. 72), for example the time for the development of a spreadsheet can be reduced and the turnaround time to get an answer for preparation or individual decision making since users are able to gather the relevant information by themselves. The effectiveness and efficiency can also be further improved through the automation of processes (Ilyés and Szekeres 2017, p. 47; Haddadi et al. 2018).

3.2 Improve data-driven culture: The higher level affordance of improving the data-driven culture is central for organizations in order to integrate data based strategic planning and decision making (Wang et al. 2020). Kiron et al. (2013, p. 18) define the data-driven culture as “[...] a pattern of behaviour and practices by a group of actors who share a belief that having, understanding and using certain kinds of data and information plays a crucial role in the success of their organizations.”

3.3 Improve dynamic capabilities: Another higher level affordance is the improvement of the dynamic capabilities of an organization defined as “[...] the firm’s ability to integrate, build, and reconfigure internal competences to address, or in some cases to bring about, changes in the business environment.” (Teece 2018, p. 40) The foundation for the dynamic capabilities is the knowledge developed in the strategic planning and decision making process (Côte-Real et al. 2017, p. 385; Yan 2018). Furthermore, the dynamic capabilities are positively influenced by the speed, agility, and blurring boundaries between actors and organizations through BA systems (Capurro et al. 2022, p. 286).

3.4 Flexible and self-service data access and processing: As stated by Davern et al. (2012, p. 287), the cognitive style respectively the “[...] individual’s approach to information acquisition, analysis, evaluation, and interpretation” is important for many users when using BA systems. Furthermore, against the backdrop of high and dynamic data volumes the creation of traditional spreadsheets is becoming increasingly complex and time-consuming. Hence, companies afford self-service and flexible interfaces, as well on mobile devices, that are used not only for data research, but also for the preparation of reports and spreadsheets (Davern et al. 2012, p. 289; Glowalla et al. 2014, pp. 14–15; Kościelniak et al. 2017, pp. 70–72; Tona and Schultze 2018).

3.5 Collaborate between teams/ interest groups to create, analyse, share, comment and edit content: Besides the focus of generating knowledge through BA, organizations afford to share, create and analyse data with internal and external interest groups (Côte-Real et al. 2017; Alnoukari and Hanano 2017; Abhari et al. 2020). Thereby, not only the understanding of the business environment is supported but as well the problem solving on every level (Davern et al. 2012, p. 291; Tona and Schultze 2018). In this context, Côte-Real et al. (2017, p. 386) also refer to the competitive performance, i.e., the capability of an organization to use what they know.

5.4 Structure (project organizations and institutional arrangements)

4.1 Integrate system based business processes: The use of BA systems increases the affordance of users to adapt processes, including strategic planning and decision making, and to align them with the systems (Wang et al. 2020, pp. 4–5; Contreras Pinochet et al. 2021, p. 1417). As described by Côte-Real et al. (2017, p. 386), it is not only important to have data, but also to process it correctly and to use it in the organization in order to achieve a competitive advantage.

4.2 Support development of hybrid teams: For example Gurcan and Sevik (2019) have identified several skills with regard to the categories knowledge, analytical, technical, developer and soft skills that are necessary for the use of BA systems in the strategic planning and decision making. Thus, organizations afford to align their BA systems to support multiple perspectives and thus the development of hybrid teams, which as well promotes the use of BA systems in different departments (Tim et al. 2020, p. 647; Goede 2021, pp. 692–693).

4.3 Redefine relationship between firm and customer: Against the background of the new possibilities through BA, organizations afford to redefine the relationship with the customers in order to increase their competitive advantage. For example, the web is increasingly becoming a platform for exchanging data with customers (Capurro et al. 2022, p. 283).

6 Discussion

As Kunc and O'Brien (2018) and Cao and Duan (2015) show, our results also demonstrate that BA can support the strategic planning and decision making. In contrast to the results of Kunc and O'Brien (2018), which primarily refer to the task dimension, our analysis shows that affordances in other dimensions (technology, actor, and structure) also provide an added value for the strategic planning and decision making. Since neither the proximate nor the distal outcomes clearly show more links to affordances (MF1), we can conclude that BA influences both processes and long-term outcomes. Further, in contrast to the finding of Kunc and O'Brien (2018), we see evidence and possibilities that BA indicate a use including in the early phase of setting direction of the strategy process. This is supported on the one hand by the fact, that for example Cao and Duan (2015) describe that one affordance of BA is the definition of strategic directs and criteria for success. On the other hand, a study by Neubert and van der Krogt (2018, pp. 44–45) found that decision makers would use BA to identify for example market opportunities. These findings imply that organizations should consider BA as a support for the overall process and long-term success (MI1).

As described above, we were able to identify affordances on all dimensions of the socio-technology system theory. However, although Cao and Duan (2015) consider affordances of decision making – i.e. those of an activity – and do not focus on the

affordances of the IT artifact BA, various parallels can be identified and added to the results. For example, our results on the actor dimension show that the affordance of improving data driven culture has many links with the outcomes of strategic planning and is thus an important factor for the strategic planning and decision making as identified as well by Cao and Duan (2015). As Tim, et al. (2020) and Wang, et al. (2020) describe, in addition to the official formalization of analytics as part of the organizations and through new use cases of analytics, the value and trust should be increased in order to improve the data driven culture. Additionally to the importance of the role of a data driven culture, our detailed analysis of affordances indicates that the actor and structure dimension and especially the data driven culture are primarily driven by the basic affordances of the task dimension and that the basic affordances of the task dimension can be influenced by the basic affordances of the technology dimension (Ilyés and Szekeres 2017; Lu et al. 2021, p. 701; Wang et al. 2020, p. 4). Furthermore, Wang, et al. (2020, p. 4) point out, that the data driven culture depends on regulations, structures und processes and hence depend as well on the structure dimension. At the same time, the new tasks and the associated demands on employees result in new structures that go hand in hand with the higher level affordance of developing hybrid teams in the organization (Gurcan and Sevik 2019; Wang et al. 2020). As Tim, et al. (2020) found, analytics experts are increasingly integrated into departments, supporting the cross-learning and collaboration as well as improving the dynamic capabilities. Additionally, a hybrid team structure and the associated different perspectives support the data driven culture and the integration of BA in an organization as well (Tim et al. 2020; Goede 2021). This importance of hybrid teams is also reflected in the number of links between this affordance and the outcomes of strategic planning (**MF2**). Coming from these findings, we see a need that research and practitioners should consider the complex correlations between the affordances and dimensions when investigating affordances and implementing BA. However, the data driven culture should be considered as a central affordance which is influenced by for example the task dimension and structure dimension. In this context, the results of Cao and Duan (2015) show that one challenge results from the interaction between the integration of BA which supports the data-driven culture and the data-driven culture which supports the effects of BA. Furthermore, our findings imply that the affordances of the technology dimension are the basis for multiple affordances and especially of the task dimension. Additionally, the development of hybrid teams should be supported since they not only support the development of a data driven culture but as well support the dynamic capabilities (**MI2**).

In the other direction, our results and those of Cao and Duan (2015), indicate that the data-driven culture will ultimately improve the organizational performance. However, considering the affordance of supporting strategic planning and decision making, we identified the affordances of improving dynamic capabilities as well as efficiency and effectivity in this context. For example, Côte-Real et al. (2017) and Yan (2018) have shown that the dynamic capabilities depend on the knowledge that is collected and shared with partners. In this context, Yan (2018) refers to the process that generates knowledge and improves the dynamic capabilities. In particular, this process can improve collaboration, flexibility, data management and analysis, and ultimately the effectivity and efficiency of a BA system based process (Kunc

and O'Brien 2018; van Rijmenam et al. 2019; Wang et al. 2020) (MF2). Hence, we draw the implication that the BA system based processes have a central role to transform the knowledges generated on the task dimension and by the redefined relationship between firm and customer into the dynamic capabilities as well as efficiency and effectivity of the strategic planning and decision making (MI2).

Furthermore, we found no evidence in our research that BA dominates the strategy process and strategic decision, as highlighted by Kunc and O'Brien (2018), and thus undermines the experience of strategic planners and decision makers. Rather, our findings indicate that BA supports the planning and decision making by gathering information and opening new perspectives, for example, through the use of data mining and the analysis of unstructured data (Alnoukari and Hanano 2017; Alnoukari 2021; Capurro et al. 2022). Likewise, Cao and Duan (2015) conclude that rational and intuitive planning and decision making complement each other (MF3). In addition, BA systems support the processing of simple tasks such as spreadsheet creation (Kościelniak et al. 2017, p. 72), which provides employees more time for complex tasks such as interpreting results (MF4). Against this background, and as also suggested by Kunc and O'Brien (2018), our results suggest that BA should be used as an integrative part of the strategy process. Hence, organizations should integrate new methods in the strategic planning in order to support rational and intuitive planning. Following on from this, the new perspectives resulting from the results of BA approaches should be taken into account. (MI3) Furthermore, organizations should proactively plan how they use the time gained by the support of BA approaches. (MI4).

As our results show, the actor and structure dimensions have on average many links with the outcomes. This indicates that the affordances of these dimensions strongly support strategic planning and decision making. However, the strength of the correlations between the affordances and outcomes are not measured in this study, it is possible to derive some indications. First, it can be noted that the actor and structure dimensions are mainly characterized through higher level affordances. As previously described, higher level affordances are more difficult to be influenced directly and primarily depend on basic affordances (Glowalla et al. 2014, pp. 14–15). In contrast, the technology and task dimensions have fewer links with the outcomes but are rather characterized through basic affordances (MF5). This implies that the actor and structure dimension should be influenced by the task and technology dimension. Thereby, as discussed earlier, the system based business process is a key interface (MI5). Second, our results show that BA focuses primarily on the outcomes quality of strategic decisions, strategic planning effectiveness, strategic thinking, organizational performance, and dynamic capability. Consequently, the remaining outcomes are not as strongly supported by BA (MF6). Against this background, organizations should focus on the combination of BA with other methods which support the remaining outcomes more strongly, as also suggested by Kunc and O'Brien (2018). For example, collaboration tools or agile methods might be appropriate (MI6). The main findings as well as the main implications are presented in Table 6.

Table 6 Main findings and main implications

Main findings	Main implications
To what extent can business analytics support the strategic planning and decision making?	
MF1: Affordances show a similar number of correlations with distal and proximate outcomes	MI1: Consider BA supporting all steps and layers of the process and long-term success of the strategic planning and decision making
MF2: A support of the strategic planning and decision making takes place on different levels and in all dimensions of the socio-technology system theory which are influenced by each other	MI2: Support the development of: <ul style="list-style-type: none"> - a data driven culture e.g. by formalization of analytics as part of the organization or new use cases on the technology dimension as foundation of the task dimension to support the integration of BA - hybrid teams to support the dynamic capabilities and data driven culture - a system based business process to support the link between basic and higher level affordances
MF3: BA methods such as data mining and the ability to analyse unstructured data support the knowledge and dynamic capabilities of an organization	MI3: Integrate new methods to support rational and intuitive planning and open up new perspectives
MF4: BA supports the execution of simple and repetitive tasks	MI4: Use the time gained by the support of BA for the processing of more important and more complex tasks
MF5: The actor and structure dimension are characterized by higher level affordances and have many links with outcomes but can primarily be influenced only by basic affordances such as those of the task and technology dimension, which are characterized by basic affordances	MI5: Consciously control basic affordances of task and technology dimension to improve higher level affordances of actor and structure dimension to generate higher added value
MF6: Not all outcomes are strongly influenced by affordances	MI6: Combine BA with other methods and tools to maximize the value

7 Conclusion

Coming from the affordance theory and STS, we conducted an analysis of 34 publications to identify BA affordances in strategic planning and decision making. The identified 20 affordances were linked to the outcomes of strategic planning according to Wolf and Floyd (2017) to derive the opportunities of BA in supporting the strategic planning and decision making. In this way, the question: To what extent can business analytics support strategic planning and decision making? is answered.

In addition to the general finding that BA improves strategic decision making (Cao and Duan 2015), we take a new perspective and show through our results more detailed and multi-layered relationships to the outcomes of strategic planning. Thus, based on our results, we come to the following conclusion:

- BA is a suitable approach to address the challenges of complexity and dynamics in current markets such as product-service systems in the strategic planning and decision making in order to support the processes and long-term success.

- The affordances interact with each other at different levels. The affordances of the actor and structure dimensions are particularly important for successful integration of affordances of the task dimension. Thereby, the technology dimension provides the basis.
- A specific control and consideration especially of the data driven culture and business processes as well as the combination with further methods and tools are central success factors in the integration of BA which can ultimately lead to an improved organizational performance.

Against this background, our work has multiple theoretical implications. Thus, to the best of our knowledge, we have chosen the first research approach to investigate affordance and socio-technology system theory in the context of BA in the strategic planning and decision making. We also respond to the call for qualitative research, which adds another perspective to the strong quantitative research base on the impact of BA on the organizational performance. At first, we provide an overview of affordance of BA in the strategic planning and decision making. Second, we provide an attempt to link these affordances to the outcomes of the strategic planning. Third, we assigned the affordances to the dimensions task, technology, actor and structure of the STS. Based on this, we were able to identify initial correlations between basic and higher-level affordances. Thus, we provide a framework for further research to better understand the affordances and success factors of BA in the strategic planning and decision making.

Our work also shows practical implications. First, we show how BA supports the strategic planning and decision making and contribute to the understanding that correlations exist between affordances. Furthermore, by providing an overview of the affordances and the connections to strategic planning results as well as to the dimension of socio-technical systems theory, we generate a first overview to support practitioners in gaining a first impression of the topic, on the basis of which new approaches can be developed and existing ones can be optimized. Table 6 provides an overview of the main implications and propositions.

Nevertheless, our research is not without limitations and a need for further research. Since our research is based on the literature, future research should also take into account experiences from practice by conducting single case studies or expert interviews. In particular, current literature lacks empirical evidence of the correlations and effects between affordances for example based on longitudinal studies. However, as in any literature review, there is a possibility that relevant data are missed due to the data collection and screening process. Especially since the terms in the context of strategic planning and business analytics are not clearly defined and have many common characteristics. Nevertheless, we consider our data base to be reliable and valid, as we conducted a two-step literature review with, in the first step, a narrower focus on affordances of BA and, in the second step, a broader focus on BA in the strategic planning and decision making. In combination with a forward and backward search we achieve a solid and both quantitative and qualitative data basis. Furthermore, the objectivity and validity of our research are supported by the standardized data collection process as well as the inclusion and exclusion criteria which support the research questions, the use of established frameworks and

the interrelationships to related research. Additionally, the application of the frameworks of STS and outcomes of strategic planning as well support the reliability of our research. However, the assignment of affordances to the outcomes, dimensions of STS and level of affordances is not always clearly given. One reason for the difficulty of classification is that we are the first to consider these dimensions in combination. Against this background and since our results show that the correlations between the dimensions are a success factor for realizing the potential of BA, future research could for example investigate correlations between individual dimensions of the STS in more detail. In this context, it could be useful to consider, for example, the results of Gaver (1991) who distinguishes affordances into perceptible affordances, hidden affordances, correctly rejected affordances and false affordances on the basis of the criteria of whether an affordance exists and whether perceptual information is present. Furthermore, the investigation of other methods and approaches in context of strategic planning and the analysis of the implications on the outcomes of strategic planning would provide valuable insights and further support the strength of BA.

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Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

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