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Article

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Organizational culture and innovation: exploring the “black box”

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Abstract

Purpose – This research aimed to conceptualize organizations as open and purposeful systems to study how organizational culture (OC) influences firms' Innovative Performance (IP). The authors proposed goal setting and internal integration/external adaptation paradox as central to explaining OC's mediating and suppressing effects on IP.

Design/methodology/approach – The authors collected data from 372 Costa Rican organizations and analyzed them with structural equations. This research used the Denison Model instead of the usual typology-based approaches.

Findings – The mission had a direct and high impact on IP. The mediated effect via adaptability was also elevated, as well as the suppressor effect through consistency. There was no effect on IP of involvement. According to these results, the Open and Rational Systems Framework emerge as the main theoretical explanatory concepts.

Originality/value – Disaggregating the OC through a performance-oriented dimensional model makes it possible to study the dynamics between the elements that compound it and facilitate integrating these findings with other research streams.

Keywords Organizational culture, Innovation, Denison organizational cultural model, DOCS

Paper type Research paper

1. Introduction

Competition and globalization make innovation essential for an organization's survival (Mendoza-Silva, 2021; Murswieck, 2021; Tian *et al.*, 2021). Furthermore, the market's insertion

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into global value chains depends on the firm's competitiveness and Innovation (Mendoza-Silva, 2020). It is also essential for countries' development (Zeb *et al.*, 2021).

Organizational culture (OC) is an vital antecedent of innovation (Dani and Gandhi, 2021; Garza and López, 2020; McCausland and McCausland, 2022; Mendoza-Silva, 2021, Xu *et al.*, 2021). Schein's most widely accepted definition characterizes it as a shared pattern of beliefs, values, assumptions and norms learned by groups, allowing them to solve internal integration and external adaptation (Chatman and Choi, 2022).

Innovation can be considered a dynamic capability (DC) as long as it enables firms to integrate, build and reconfigure internal and external competencies to address rapidly changing environments (Parashar and Singh, 2005; Wang and Ahmed, 2005). Following the above and along the lines of the organizational development process perspective (Montreuil *et al.*, 2021) and the Oslo manual (OCDE, 2005), we defined innovation as the firm capability to adopt new or substantially improved products and services, manufacturing processes, work organization and marketing methods. Consequently, we measured Innovation from its outputs; therefore, we call it Innovative Performance (IP).

Empirical research identifies various OC types that influence IP. Adhocratic (external orientation, flexibility, risk-taking) and Clan cultures (internal cohesion, people development, high morale, long-term orientation) boost IP (Büschgens *et al.*, 2013; Mendoza-Silva, 2020; Montreuil *et al.*, 2021; Neiva *et al.*, 2017; Tian *et al.*, 2021). Nevertheless, it is not well-established that Clan culture could harm IP because it promotes a homogeneous, comfortable and stable environment (Tian *et al.*, 2021). On the other hand, hierarchical culture (internal control) erodes IP (Büschgens *et al.*, 2013; Montreuil *et al.*, 2021).

Researchers describe a broad scope of innovative culture (IC) characteristics (Garza and López, 2020). To Dani and Gandhi (2021), IC stimulates creativity, autonomy, emotional intelligence, cognitive ability and risk-taking. Montreuil *et al.* (2021) indicated the following characteristics of an IC: creativity, collaboration, a challenging environment, risk-taking, teamwork, decision-making ability, learning, external orientation, and long-term vision. To Mendoza-Silva (2020), IC impulses openness, creativity and market orientation. Garza and López (2020) empirically identified the following highly relevant and prevalent IC characteristics in literature: market orientation, strategy, organizational learning, risk-taking, autonomy, resources and organizational structure.

Two methodological strategies prevail in studying the impact of OC on IP (Neiva *et al.*, 2017), contributing to these gaps. The first explores the impact of universal typologies (dominant archetypical culture (Janićjević, 2011)) on IP. It has the risk of stereotyping OCs and assigning them a moral valence (Jung *et al.*, 2009). These types are antagonistic in some ways (Morente *et al.*, 2018), making it difficult to research how specific archetypes influence others. The second category focuses on IC characteristics making it difficult to differentiate between IC and IP. Indeed, the same IC elements can characterize innovative orientation and innovation (i.e. Dobni, 2010). This approach has been criticized for lack of objectivity, making inputs and outputs too similar (Bladier, 2016), and studying only the fun part of IC (Pisano, 2019).

To overcome the abovementioned problems, we used a universalistic performance-oriented dimensional model in which organizations differ in the same dimensions (Janićjević, 2011). It allows us to assess and compare positive and negative impacts on IP and more complex relations. Furthermore, these models have a more distant content from Innovation than IC. Consequently, this research avoids the problem of the input becoming the output (Bladier, 2016) and studies only the funny part (Pisano, 2019). The use of universalistic dimensional models to study the OC-IP relationship is scarce, and the existing ones only evaluate the aggregate impact of all dimensions (e.g. Botelho, 2020) or

the direct effects on IP of each factor (i.e. [Abdullah et al., 2014](#)). Therefore, we intend to respond to the following research questions (RQs).

- RQ1. What is the effect, whether positive or negative, that each dimension of the OC has on the IP?
- RQ2. What is the magnitude of these effects?
- RQ3. What are the most relevant relationships between OC's dimensions in explaining IP?
- RQ4. What is the direction and the magnitude of effect on IP of these relationships among OC's components?
- RQ5. What is the effect of IP on OP in a developing country?

By answering these questions, we hope to contribute to advance in the understanding of the black box of OC's effects on IP.

This study is novel in disaggregating the dimensions of a universalistic model. It allows us to study and compare each component's positive and negative impact on IP and facilitate the integration of results. Also, it permits testing fundamental mediation and suppression relationships between cultural dimensions (based on the open and rational system framework, goal setting theory (GST) and behavioral analysis (BA) [1]) to address the paradox of internal integration/external adaptation highlighted by other approaches (i.e. ambidexterity and hybrid strategies) and central in the OC's definition.

2. Theoretical framework

2.1 Open systems with purpose

Organizations are systems because they are more than the sum of their parts ([Kast and Rosenzweig, 1972](#)). They are also rational systems because they are collectivities pursuing a purpose and possessing structure ([Scott and Davis, 2015](#)). However, rationality does not refer to the purpose; instead, it relates to the attempt to achieve it ([Blaschke, 2008](#)). Also, it helps organizations deal with chaos ([Hurth, 2017](#)).

Open systems need more energy than they expend (negative entropy ([Kast and Rosenzweig, 1972](#))). Social structures are not self-sufficient and self-contained because they need to interact with the environment; consequently, they are open systems ([Katz and Kahn, 1966](#)). They achieved negative entropy in two ways. The first is to increase the amount of incoming energy. The second is to improve internal efficiency, which requires some predictability to facilitate learning, simplification and repetition ([Wenzel et al., 2021](#)). Therefore, predictability is essential to develop event routines to deliver products and services ([Katz and Kahn, 1966](#)). These cycles are the firm's processes that produce the desired results ([Addison et al., 2009](#)). We named this coherence internal integration.

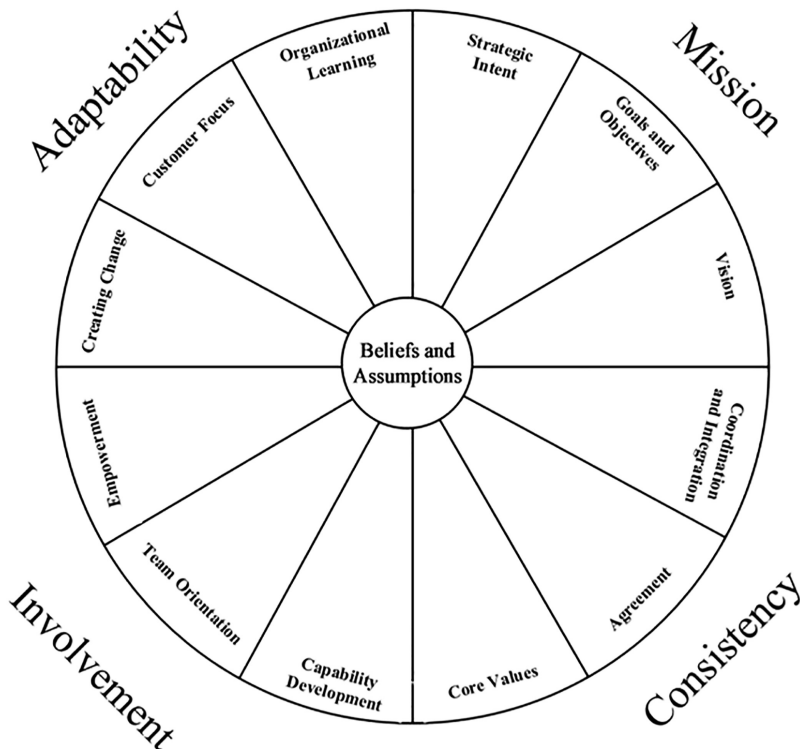
2.2 The Denison Model

There is a wide variety of OC models in the literature ([Jung et al., 2009](#)), and there is no best approach ([Calciolari and Prenestini, 2022](#)). Therefore, an additional element can always be argued ([Cameron and Quinn, 2011](#)). Consequently, [Calciolari and Prenestini \(2022\)](#) suggest considering the results' intended use. It refers to our RQs from which four criteria emerge. First, we need a model that provides a profile susceptible to disaggregating without losing measurement quality. Second, organizations face a plurality of demands (i.e. stakeholders, competing strategies and goals); consequently, a performance-oriented model enables us to study OC dimensions promoting an organization's effectiveness, even if they harm innovation. Third, Schein's definition

suggests the necessity of incorporating the firm's internal integration/external adaptation paradox. Fourth, a model that simultaneously includes all dimensions requires solving tensions through synthesis and no thorough choices between poles (Löfstål and Jontoft, 2017).

Janičević (2011) classifies OC models as idiosyncratic or universalistic. The first type considers each OC unique (Jung *et al.*, 2009). The second includes typological and dimensional approaches (Janičević, 2011). The typological view defines prototypes (Jung *et al.*, 2009). A commonly used typological performance-oriented model is the OC assessment instrument (OCAI) based on the competing value framework (CVF) widely used to study OC's influence on IP (see Büschgens *et al.*, 2013; Tian *et al.*, 2021). Four OC types emerge from the interaction of two axes (flexibility/stability and internal/external): clan, adhocracy, hierarchy and market. The types are opposing (Cameron and Quinn, 2011), competing or conflicting (Williams, 2022).

There are several dimensional models in the literature, and one of the most well-supported is the Denison Model (Ehrhart *et al.*, 2014), also known as Denison Organizational Culture Survey (DOCS). It has the same axes as CVF and from its interplay emerge four traits: mission, consistency, involvement and adaptability (Denison *et al.*, 2012) (see Figure 1). Each trait contains three indexes with five items each. The DOCS provides a profile, not a type (Tan, 2019).



Source(s): Denison *et al.* (2004)

Figure 1.
Denison model

The Mission is the external/stable pole expressing the organization's purpose. Strategic intent, goals and objectives and vision measure it. Consistency represents the internal/stable focus apprehending the organizational capacity to coordinate activities and facilitate consensus. Core Values, Agreement, Coordination, and Integration evaluate it. Involvement is the external/stable focus capturing the worker's collaboration to achieve organizational goals. Empowerment, team orientation and capability development assess it. Adaptability represents the external/flexible pole apprehending the company's capacity to translate the external demands into actions evaluated for creating change, customer focus and organizational learning (see [Figure 1](#)) ([Denison et al., 2013](#)).

The DOCS is a process-oriented perspective and requires the development of all traits to achieve high performance rather than representing antagonistic types ([Tan, 2019](#)). Furthermore, adaptability and consistency allow us to assess the internal/integration and external/adaptation paradox. Similarly, the DOCS include a firm's purpose measure. Likewise, it has a second-level factor structure of three subfactors per trait with five indicators ([Denison et al., 2012](#)) that allows disaggregating without losing measurement quality. The above makes DOCS the most appropriate OC measurement methodology for our RQs.

2.3 Paradoxes

Paradoxes refer to related factors that appear rational but generate contradictory and interrelated demands that persist over time ([Smith and Lewis, 2011](#); [Wójcik, 2020](#)). Paradoxes are consistent with the DOCS' dynamic tensions as long as successful firms must develop the four traits ([Denison et al., 2012](#)). Consequently, two paradoxes of our interest arise from DOCS: internal integration/external adaptation and stability/flexibility.

The literature indicates the relevance of the stability/flexibility paradox. On the one hand, firms do not operate in a vacuum ([Hurth, 2017](#)), needing the flexibility to adapt to an uncertain environment in pursuing their mission. On the other hand, systems require integration for their internal functioning ([Katz and Kahn, 1966](#)). In addition, according to Schein, OC permits firms to adapt continuously to the environment while facilitating their internal integration, being the integration/external adaptation paradox central in his view ([Pfister, 2009](#)). We consider these two paradoxes (stability/flexibility; internal integration/external adaptation) the expression of the same core paradox confronted by organizations as open and rational systems. As [Poole and Van De Ven \(1989\)](#) point out, organizations are a mixture of stability and change.

Consistency/adaptability represents the DOCS core and most challenging paradox since it represents the extreme poles. Indeed, firms that exploit market opportunities may need help with internal integration; on the contrary, highly integrated and controlled companies tend to be difficult to change ([Denison et al., 2012](#)). Another paradox arises from mission/involvement. The mission represents top-down communication, while involvement expresses bottom-up communication. Nonetheless, the firm's purpose has cognitive and emotional consequences as long as a well-formulated and communicated mission guides and motivates behavior at all levels ([Alegre et al., 2018](#)). A shared purpose forms an identity, guides individual actions, motivates, facilitates cooperation, creates a personal benefit and makes collective interest more salient ([Atkins et al., 2019](#)). Therefore, we do not consider the mission/involvement a fundamental paradox.

Scholars stressed the relevance of managing paradoxes. Ambidexterity is the organization's capability to exploit the present resources and simultaneously manage the exploration to secure the future ([Kumkale, 2022](#)), and it is associated with superior performance ([Kraner, 2018](#)). Likewise, companies capable of deploying hybrid strategies are more successful ([Sakavou, 2015](#)). The relevance and difficulty of developing both facets are also represented in DOCS by the concept of dynamic tensions, making this model, in our view, more consistent with the approaches mentioned above than any typological framework. Indeed, the way we frame

competing demands prescribes the response that could lead to either vicious (choosing the one over the other) or virtuous (engaging both, synthesizing) cycles (Wójcik, 2020).

2.4 Innovative Performance

We can define capability as how an organization uses resources and develops activity patterns (Datta *et al.*, 2021). The DCs allow for reconfiguring others' ordinary capabilities (Vu, 2020). Consequently, IP is a DC as long as it promotes the creation, modification and extension of firm resources and capabilities (Breznik and Hisrich, 2014). In this regard, some studies have found that higher innovation capabilities let to better profitability and survivance (Hugel, 2018). Other research also reflects various effects (favorable, adverse and none) (Shouyu, 2017). Indeed, some authors claim that research on innovation has shown mixed results (Hugel, 2018; Rousseau *et al.*, 2016). However, these results may be context-dependent (Block *et al.*, 2017).

3. Hypotheses development [2]

For Schumpeter, OC allows organizations to manage the paradox of continuity and change (Tzeng, 2009), being IP, a kind of profound craftsmanship transmitted from generation to generation. OC is an enduring element with unconscious beliefs (Williams, 2022). These no-conscious elements connect to values to guide workers' appropriate behavior. Values and norms translate into observable behaviors and attitudes (Chatman and Choi, 2022). According to Latham (2003), goal setting manifests needs and values, consequently values are the foundations or antecedents of goals (Latham and Pinder, 2005). Superordinate goals are similar to values (Höchli *et al.*, 2018).

Concerning the first three hypotheses, it is necessary to consider that rational systems have a purpose represented in the DOCS by the mission trait. The goals and objectives index is a mission essential characteristic. According to GST [3], well-defined and challenging goals motivate and guide behavior. By achieving these goals, people strengthen their self-efficacy (Locke and Latham, 2019).

The Mission also includes Vision and Strategy indexes, which are superordinate goals representing the expected future to achieve. They provide meaning and guidance, define what is relevant and promote long-term goal pursuit in many contexts (Höchli *et al.*, 2018).

For BA, the Mission constitutes verbal expressions (called rules) that connect people with the firm's desired future without learning directly through consequences (Houmanfar *et al.*, 2015). They describe how the customers select aggregate products assembled by a broad collection of interlocked behaviors (McGee and Crowley-Koch, 2021), guiding and encouraging people's behavior (Houmanfar *et al.*, 2015). Rules favor adaptation to complex circumstances; indeed, when vagueness exists, people generate their own Rules that, in many cases, are counterproductive (Mattaini and Rose, 2021). Well-formulated rules are extremely useful in shaping human behavior in organizations, even in the long run (for example, the strategy item: This organization has a long-term project and orientation) (Malott, 1993).

Following the above, Schein (2010) indicates that people's assumptions about mission are an OC's fundamental element. Consequently, mission changes trigger transformations in other OC's dimensions (Denison, 2001); therefore, questioning the organization's mission starts a crisis as long as it determines the action course (Denison *et al.*, 2012). Accordingly, we state the followings hypothesis.

H1a. Mission effect on consistency is positive.

H1b. Mission effect on adaptability is positive.

H1c. Mission effect on involvement is positive.

For GST and BA, a well-formulated mission improves operations, customer satisfaction and innovation quality (Losane, 2013) by guiding and encouraging IP-related behavior. Indeed,

Zeraatkar *et al.* (2020) found a positive correlation between mission and creativity because it provides a roadmap for implementing inventive ideas (Denison *et al.*, 2013). Also, Sadegh Sharifirad and Ataei (2012) found evidence of the impact of the mission on IP implementation. Accordingly, this research proposes the following hypothesis.

H2. Mission effect on IP is positive.

Consistency is characteristic of exploitation profiles (Datta *et al.*, 2021) oriented to improving existing products, resources and competencies (Kumkale, 2022). High consistency organizations face difficulties maintaining consumer focus and change (Denison *et al.*, 2012); therefore, high control, centralization and formal decision-making diminish Innovation (Abdullah *et al.*, 2014). Consistency enables productivity by developing standards, managerial principles and compatible points of view among workers (Denison, 2001). Denison *et al.* (2012) state that consistency is the only trait that cannot lead to IP; consequently, we propose the following hypothesis.

H3. Consistency effect on IP is negative.

There is extensive evidence of the Adhocratic culture's (external orientation, flexibility, openness and risk-taking) positive impact on innovation (i.e. Büschgens *et al.*, 2013; Montreuil *et al.*, 2021; Tian *et al.*, 2021). Denison *et al.* (2013) recognize the positive effect of adaptability on innovation because it promotes flexibility, taking a risk, focusing on customers and organizational learning. Sadegh Sharifirad and Ataei (2012) found evidence of adaptability's positive effect on the propensity to innovate. According to the open systems view, adaptability constitutes a cultural mechanism allowing firms to monitor the environment, learn and generate changes to respond effectively. Therefore, we propose the following hypothesis.

H4. Adaptability effect on IP is positive.

For Denison *et al.* (2013), involvement cultivates IP because it promotes employee autonomy, responsibility, teamwork and empowerment. Büschgens *et al.* (2013) and Mendoza-Silva (2020) found a positive relationship between Clan Culture (high group morality, cohesion and personnel development) and innovation. Furthermore, innovation begins with persons' or groups' creative ideas and impulses them beyond initial propositions (Amabile *et al.*, 1996). Also, environments with high participation reinforce knowledge exchange and promote IP (Jiménez and Sanz, 2005). Thus, we propose the following hypothesis.

H5. Involvement effect on IP is positive.

Firms are open systems with a purpose. Also, robust scientific theories (i.e. GST and BA) and empirical findings support the mission's influence on workers' behavior (H1 to H4). Based on the previous, we proposed mediation instead of moderation relationships. While the former refers to how an effect occurs (underlying effect mechanism), the latter establishes when/whom an impact occurs (Rasoolimanesh *et al.*, 2021). Concretely we are interested in how the perception of the strategic claims (goals and rules) emphasizes particular behavioral repertoires (consistency, adaptability, involvement). However, consistency and adaptability represent contradictory behavioral repertoires for IP. We mentioned earlier the central role of internal integration/external adaptation paradox in open systems and OC frameworks, something that ambidexterity and hybrid strategies have highlighted.

Consequently, we consider this paradox fundamental to understanding the OC's impact on IP. Therefore, we propose mediating effects of opposite signs that align with RQ1 and RQ2. Accordingly, we proposed that the organization's strategic actions encouraging the internal and stable focus harm IP.

H6. The specific indirect effect of the mission on IP through consistency is negative.

Complementary, the organization's strategic actions devoted to boosting the flexible and external pole drive innovation.

H7. The specific indirect effect of mission on IP through adaptability is positive.

Involvement is considered an innovation's driver. So, the firms' strategic actions directed at increasing the worker's involvement positively affect IP.

H8. The specific indirect effect of mission on IP through involvement is positive.

Organizations can improve competitiveness by stimulating Innovation in products, services, processes and marketing strategies (Al Naqbia *et al.*, 2020). Through innovation, enterprises improve their product and service offerings (VU, 2020). Firms that engage in more collaborative and innovative activities outperform others in new products and services (Hu *et al.*, 2017). Also, Innovation in processes and management practices fosters cost savings by increasing efficiency, productivity and profitability (VU, 2020). As long as different types of innovations have complementary effects on OP (Hugel, 2018), we proposed the following hypothesis.

H9. IP effect on OP is positive.

4. Methods

4.1 Participants

The informer's low ability, lack of experience, and poor motivation for the topic are potential sources of common method bias (CMB) (MacKenzie and Podsakoff, 2012). Therefore, we only included senior professionals and managers with more than one year of working for their firms.

The sample had 372 participants from a framework of 2000 organizations registered in the central business chambers of Costa Rica. 49.7% were women, and the age average was 38.3 years (standard deviations (SD) = 10.6). Most participants had postgraduate studies (57%) or university degrees (31%). Economy and Management (54%) were the primary education fields, followed by Engineering (18%). The majority worked for manufacturing companies (39%), with an equal proportion for commerce and service companies (31% each). 37% came from small firms, 27% for medium-sized (31–100 employees) and 36.5% from large companies. The mean of years working for the firm was 7.81 (SD = 7.85).

We contacted one key informant per organization to capture more interfirm variability. In line with James *et al.* (2008), we considered OC a system-level phenomenon. Therefore, it is advisable to approximate this characteristic from the report of key informants due to their macro perspective of the organization's activities and culture (Hogan and Coote, 2014). This approach is widely used to study the OC-IP link (i.e. Abdullah *et al.*, 2014; Naranjo-Valencia *et al.*, 2011).

4.2 Instruments

Seven interval response scales are optimal according empirical results (Krosnick, 2018); therefore, we used it for all the scales.

For OC, we adapted the 60 items DOCS developed for Spain by Bonavia *et al.* (2009). We modified the anchors to a 7-point Likert scale: 1 = disagree, 4 = neither agree nor disagree and 7 = agree. We wrote four items to evaluate each innovation type of the Oslo manual (OCDE, 2005) (a. Product, b. Service, c. Marketing, d. Work methods). We incorporated an additional item dedicated to measuring the use of the organizational resources devoted to innovation (see items in Table 3). We used a 7-point Likert scale with the following anchors: 1 = minimum company commitment, 4 = medium company commitment, 7 = high company commitment.

There is very little public economic information about Costa Rican firms; consequently, it was necessary to use subjective OP measures. We consider it a proper choice because there is

enough evidence of its validity (see [Dess and Robinson, 1984](#); [Singh et al., 2016](#); [Wall et al., 2004](#)). The most common OP measures in innovation research are profitability, sales and market share ([Sethibe and Steyn, 2016](#)). Therefore, we translated the items of [Marcoulides and Heck \(1993\)](#) (market share and profits) and [Robinson and Pearce \(1988\)](#) (sales growth) to Spanish, plus a fifth dedicated to evaluating the level of compliance of the company's financial projections in the previous year. We used a 7-point Likert scale with three anchors as follows, 1 = low; 4 = medium and 7 = high (see items in [Table 3](#)).

Satisfactory item quality is the primary strategy to mitigate the CMB ([Podsakoff et al., 2012](#)). Accordingly, we followed the recommended guidelines of [Krosnick \(2018\)](#), including avoiding negative items except for the DOCS, which already had eight. We used different anchors to prevent CMB ([MacKenzie and Podsakoff, 2012](#)). Also, we conducted fifteen cognitive interviews to ensure appropriate writing.

4.3 Procedure

A trained assistant contacted each company of the sample frame four times at maximum. With a response, she explained the research purpose. The anonymity and confidentiality of the information were guaranteed. The applicator contacted the informer, emailed the instruments and made a maximum of four reminder calls, resulting in 18.2% of responses.

4.4 Analysis

We employed covariance-based Structural Equations Modeling (SEM) with EQS 6.4 and Mplus 8.6. A DOCS' negative wording factor (NWF) with the Harman test (sensitive with adequate reliabilities ([Fuller et al., 2016](#))) evaluated the CMB. We used two kinds of control variables. The first was the number of workers, a proxy of firm size, and the second corresponded to the informers, specifically education and years of service. For mediation analysis, we followed [Nitzl et al.'s \(2016\)](#) three-step recommendation.

5. Results

All models exhibited the absence of multivariate normality (Mardia Index>5.99); consequently, we calculate robust indices ([Kline, 2016](#)) [4]. Model 1 evaluated the psychometric properties of DOCS items. It showed a poor global fit ([Kline, 2016](#)) (see [Table 1](#)). The positive wording items (52) had good loadings ($\lambda = 0.53$ to $0.90, p < 0.05$), while the negative ones (7) exhibited unsatisfactory saturations ($\lambda = -0.03$ to $0.90, p > 0.05$).

	SB χ^2	DF	p SB χ^2	CFI	RMSEA	IC 90% RMSEA
Model 1: All the 60 DOCS items	2533.19	1692	0.001	0.88	0.038	[0.035; 0.041]
Model 2: All the 60 DOCS items plus NWF ^a	2307.42	1685	0.001	0.91	0.033	[0.029; 0.036]
Model 3: DOCS (52 items)	1745.02	1256	0.001	0.92	0.03	[0.029; 0.037]
Model 4 ^b : Freely correlated model with the substantive factors (DOCS, IP, OP) and NWF ^c constrained	551.87	308	0.001	0.94	0.048	[0.042; 0.055]
Model 5 ^b : All constructs freely correlated	300.12	174	0.001	0.96	0.046	[0.037; 0.055]
Model 6: Structural model	559.14	238	0.001	0.93	0.060	[0.054; 0.067]

Note(s): ^aNegative wording factor

^bDOCS with parcels plus IP and OP

^cThe NWF allows the evaluation of the common method bias

Source(s): Elaborated by the authors

Table 1.
Models fit indexes

Model 2 included the new NWF in which we loaded the negative items. We also loaded them with their respective trait no longer being congeneric. The model fit improved substantially, the positive wordings item's saturations remained satisfactory ($\lambda = 0.54$ to 0.90 , $p < 0.05$), and the loadings of the negative items with the NWF were high ($44\text{--}56$, $p < 0.05$). In contrast, the saturations of these negative items with the traits were very low (-0.03 to -0.26 , $p < 0.05$), indicating that the poor fit of Model 1 was due to the unsatisfactory performance of the negative items (see Table 1). Kam (2018) suggests that the negative wording effect may be scale specific, but as far as we know, the literature about DOCS does not report something similar. So, it may be related to de Costa Rican context. Accordingly, we eliminated the negative wording items.

Model 3 was a DOCS measurement model without the NWF. It fits satisfactorily, despite the high number of items (52 positive statements) (see Table 1). The OC's high order factors (HOFs) (mission, consistency, involvement and adaptability) loadings on the subdimensions [5] were high ($\lambda = 0.73$ to 0.95 , $p < 0.05$). The average extracted variance (AVE), compound reliability (CR), and α were adequate (Hair *et al.*, 2019) (see Table 2). The HOFs' correlations were high ($r = 0.81$ to 0.93 , $p < 0.05$). The first-order factors loadings with its correspondence items were higher than the lowest acceptable (0.50) (Hair *et al.*, 2019) ($\lambda = 0.50$ to 0.93 , $p < 0.05$). The CR and α were adequate (see Table 2). The AVEs were good, with only capability development and agreement narrowly lower than required (0.50) (Hair *et al.*, 2019). The results above suggest an adequate 52-item DOCS performance enabling us to use parcels, which is more appropriate with our hypothesis' conceptual analysis of OC (traits level) (see Williams *et al.*, 2009).

To examine the CMB Model 4 included OC's subdimension as parcels of each trait to assemble a freely correlated of all substantive factors (DOCS, IP, OP) plus NWF as a market construct (Williams *et al.*, 2010). Therefore, NWF items had cross-loading to the substantive constructs. The model fits satisfactorily (see Table 1). The substantive construct's saturations were adequate ($\lambda = 0.51$ to 0.95 , $p < 0.05$). Correlations between the cultural

	Model 3 ^a			Model 5 ^b		SM		
	CR	AVE	α	CR	AVE	CR	AVE	α^c
<i>Involvement</i>				0.88	0.71	0.89	0.72	0.92
Empowerment	0.81	0.41	0.74					0.78
Team Orientation	0.85	0.53	0.83					0.85
Capability Development	0.79	0.48	0.81					0.80
<i>Consistency</i>				0.90	0.73	0.90	0.74	0.88
Core Values	0.80	0.51	0.75					0.80
Agreement	0.77	0.46	0.72					0.80
Coordination and Integration	0.82	0.53	0.80					0.82
<i>Adaptability</i>				0.88	0.71	0.89	0.72	0.93
Organizational Learning	0.79	0.50	0.82					0.93
Customer Focus	0.87	0.57	0.84					0.87
Creating Change	0.87	0.57	0.82					0.82
<i>Mission</i>				0.91	0.78	0.92	0.80	0.96
Vision	0.86	0.60	0.77					0.86
Goals and Objectives	0.92	0.70	0.91					0.92
Strategic Directions	0.90	0.67	0.88					0.89
<i>Innovative Performance</i>				0.91	0.59	0.91	0.58	0.87
<i>Organization Performance</i>				0.85	0.58	0.85	0.58	0.84

Note(s): ^a Based on 52 DOCS items

^b Based on DOCS parcels plus items of Innovative Performance (five statements) and Organizational Performance (four statements)

^c This value is identical in both models (Model 5 and SM) because they are estimated based on the same items

Source(s): Elaborated by the authors

Table 2.
Composite reliability
(CR), extracted
variance (AVE) and
cronbach's alphas (α)
of the main models

Table 3.
Principal models' loadings (λ), constructs averages (ME) and standard deviations (SD) for both samples, as well as, structural model's variance decomposition

Construct	ME	SD	M5 λ	SM λ	R^{2a}
<i>Involvement</i>	5.57	1.07			-1%
Empowerment	5.62	1.1	0.85*	0.87*	
Team Orientation	5.67	1.20	0.83*	0.85*	
Capability Development	5.40	1.27	0.84*	0.83*	
<i>Consistency</i>	5.47	1.12			-12%
Core Values	5.55	1.29	0.84*	0.87*	
Agreement	5.38	1.24	0.86*	0.86*	
Coordination and Integration	5.44	1.22	0.86*	0.85	
<i>Adaptability</i>	5.53	1.01			39%
Organizational Learning	5.37	1.01	0.87*	0.88*	
Customer Focus	5.80	1.15	0.83*	0.85*	
Creating Change	5.39	1.27	0.83*	0.82*	
<i>Mission</i>	5.56	1.28			35%
Vision	5.51	1.30	0.83*	0.90*	
Goals and Objectives	5.57	1.36	0.95*	0.93*	
Strategic Directions	5.63	1.40	0.86*	0.85*	
<i>Innovative Performance^b</i>	5.60	1.26			61%
Item 1: Introduction of new products or services into the market			0.64*	0.66*	
Item 2: Use of new methods of manufacturing or service provision			0.76*	0.75*	
Item 3: Use of new methods of work organization			0.80*	0.80*	
Item 4: Incorporation of significant improvements in the forms and methods used to market products or services			0.76*	0.76*	45%
Item 5: Improvement in the use of resources devoted to the development of innovations			0.85*	0.83*	
<i>Organization Performance^b</i>	5.14	1.24			
Item 1: Growth in sales or income from service provision			0.73*	0.74*	
Item 2: Company utilities			0.85*	0.85*	
Item 3: Market share			0.67*	0.68*	
Item 4: Fulfillment of annual financial forecasts			0.79*	0.77*	

Note(s): ^aThe negative symbol indicates a suppressive effect
^bWritten in Spanish due to the was relocated in Costa Rica
Source(s): Elaborated by the authors

factors were high ($r = 0.85$ to 0.97 , $p < 0.05$). As expected, their correlations with IP and OP were lower ($r = 0.41$ to 0.78 , $p < 0.05$). Likewise, the OP/IP correlation were relevant but not very high ($r = 0.66$, $p < 0.05$). The NWF negative items saturation were good (44–56, $p < 0.05$), as well as, the α (0.64). However, the NWF constrained cross-loadings were small (0.04) and ns ($p < 0.05$) reflecting no CMB. Furthermore, we reinforce the previous results by applying the Harman test (the explained variance for the unique factor was 40%).

Model 5 was a freely correlated factor analysis with the substantive constructs. It fits very well (see Table 1), the loadings were satisfactory ($\lambda = 0.64$ to 0.95 , $p < 0.05$) (see Table 3) as well as the CR, AVE and α (see Table 2). The DOCS' correlations factors were high ($\lambda = 0.85$ to 0.97 , $p < 0.05$). As expected, the correlations between OC's traits and IP/OP were slightly more moderate ($\lambda = 0.42$ to 0.77 , $p < 0.05$). The correlation between IP/OP was 0.69 ($p < 0.05$). With an adequate measurement model, we proceeded to estimate the descriptive statistics (see Table 3).

Model 6 was the Structural Model (SM). Its fit was adequate (see Table 1) (Wang and Wang, 2020), the loadings were high (see Table 3), and the CR/AVE and α were good (see Table 2). The pattern was similar to Model 5.

The mission's effect on consistency was positive and high ($\Gamma = 0.91$, $z = 47.16$, $p < 0.05$, 95% CIs [0.87,0.94]), supporting the H1a. The mission also had a high and positive impact on adaptability ($\Gamma = 0.93$, $t = 49.94$, $p < 0.05$, 95% CIs [0.89,0.96]), supporting H1b. The mission also exerted a strong and positive influence on involvement ($\Gamma = 0.93$, $t = 44.5$, $p < 0.05$, 95% CIs

[0.89,0.97]), confirming [H1c](#). These results confirm that changes in strategic components directly affect the remaining OC factors. The mission's effect on IP was positive and high ($r = 0.62$, $t = 11.68$, $p < 0.05$, 95% CIs [0.53,0.73]), sustaining [H2](#). Consistency had a negative effect on the IP ($\beta = -0.47$, $t = -2.76$, $p < 0.05$, 95% CIs [-0.83,-0.16]), supporting [H3](#) (see [Figure 2](#)).

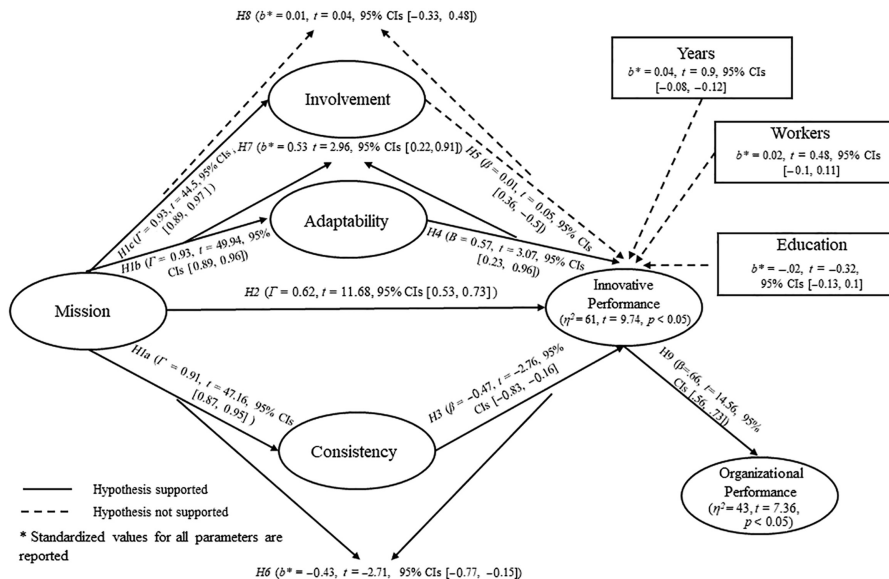
Adaptability had the most elevated positive effect on IP ($B = 0.57$, $t = 3.07$, $p < 0.05$, 95% CIs [0.23, 0.96]), supporting [H4](#). Involvement impact on IP was *ns* ($\beta = 0.01$, $t = 0.05$, $p > 0.05$, 95% CIs [0.36, -0.5]) not supporting [H5](#). It is a remarkable finding we will closer analyze later because the literature commonly claims the positive influence of Involvement on IP. All the control variables showed *ns* effects (see [Figure 2](#)).

Results support [H1](#) to [H5](#), achieving a relevant explanation of IP ($\eta^2 = 0.61$, $t = 10.63$, $p < 0.05$). However, as [MacKinnon \(2008\)](#) points out, the negative effect suppresses the total variance explained (R^2) by subtracting effects; consequently, it is essential to decompose it. [Table 3](#) shows the highest impact of adaptability followed by mission. The consistency's explanatory level is lower than the previous traits; however, it is still substantial. The R^2 of involvement is very low, but given that the coefficient of [H5](#) is *ns*, we do not consider it different from zero.

The specific indirect effect of mission through consistency is negative ($b^* = -0.43$, $t = -2.71$, $p < 0.05$, 95% CIs [-0.77, -0.15]), supporting [H6](#). Data also sustain [H7](#) ($b^* = 0.53$, $t = 2.96$, $p < 0.05$, 95% CIs [0.22, 0.91]). The direct effect of mission on Involvement was *ns*, and the specific indirect effect supported it ($b^* = 0.01$, $t = 0.04$, $p > 0.05$, 95% CIs [-0.33, 0.48]). The data do not sustain [H8](#). IP positively influences OP ($b^* = 0.66$, $t = 14.43$, $p < 0.05$, 95% CIs [0.56,0.73]) and support [H9](#). The magnitude of the explained variance is high ($\eta^2 = 0.43$, $t = 8$, $p < 0.05$), making IP a notable OP driver (see [Figure 2](#)).

[Table 4](#) summarizes the results.

We did not point out a formal hypothesis about the specific indirect effect until OP; however, it's valuable to report them (see [Table 5](#)).



Source(s): Elaborated by authors

Figure 2.
Structural model
results

Table 4.
Synthesis of
hypothesis findings

Hypothesis	Statement	Result
H1a	Mission effect on Consistency is positive	Supported
H1b	Mission effect on Adaptability is positive	Supported
H1c	Mission effect on Involvement is positive	Supported
H2	Mission effect on IP is positive	Supported
H3	Consistency effect on IP is negative	Supported
H4	Adaptability effect on IP is positive	Supported
H5	Involvement effect on IP is positive	Not supported
H6	The specific indirect effect of the Mission on IP through Consistency is negative	Supported
H7	The specific indirect effect of Mission on IP through Adaptability is positive	Supported
H8	The specific indirect effect of Mission on IP through Involvement is positive	Not supported
H9	IP effect on OP is positive	Supported
Source(s): Elaborated by the authors		

Table 5.
Standardized specific
indirect effects until OP

Effect	Parameter	95% CIs
Mission → Consistency → IP → OP	−0.28	[−0.51, 0.10]
Mission → Adaptability → IP → OP	0.006	[−0.22, 0.33]
Mission → Involvement → IP → OP	0.35	[0.15, 0.61]
Mission → IP → OP	0.41	[0.33, 0.50]
Source(s): Elaborated by the authors		

6. Discussion and conclusions

The elevated Mission's effect on the other OC's dimensions (H2, H3 and H4) strengthens the importance of viewing organizations as open and rational systems. Likewise, it supports the statement that the change in the mission leads to variations in the remains OC elements. This substantial impact is consistent with GST and BA. Also, it had an elevated effect on IP (H4) (see Figure 2). Therefore, it is a mistake to consider mission a mere formal element; on the contrary, it is a powerful tool for culture change and innovation.

Moreover, mission is a vital mechanism for motivating general worker behavior. The findings also reveal the importance of effectively integrating innovation into the strategic management of organizations. In this sense, innovative projects should be aligned with and supported by the top management of organizations to improve their chances of success.

The internal integration/external adaptation paradox represented by consistency/adaptability exhibited substantial explanatory power (51% IP's variance). These results are consistent with the literature. In this line, this paradox is essential to Schein's definition of OC and represents a central challenge for open systems, something ambidextrous organizations and hybrid strategies literature also point out. More specifically, the adaptability's positive effect (H7) is the largest, explaining 39% of IP's variance. Consequently, innovation's primary driver is the firm's ability to recognize customer needs, learn from them and translate them into changes. Our findings encourage firms and top managers to promote adaptability to achieve higher levels of performance and success in their innovation-led projects.

On the other hand, it is essential to highlight the consistency (H2) effect due to its magnitude and sign (−12%). Rather than denying a relationship between consistency and IP stated by Denison *et al.* (2012), our results move beyond to confirm a negative impact. We also should remember that consistency is a relevant dimension of efficiency (Denison *et al.*, 2012).

Mission's effects through adaptability and consistency are consistent with the previous paragraph. Accordingly, strategic efforts to accentuate adaptability (H9) significantly affect

IP ($b^* = 0.43$). In contrast, the mission's effect through consistency (H8) was lower but negative ($b^* = -0.20$) (see Figure 2). In other words, strategic efforts to improve customer knowledge and translate it into change have a much more positive IP impact than the negative effect of favoring a set of rules that facilitate internal agreement and integration (see Figure 2). Changing an internal and stable trait may be more complex than an external and flexible one. In this sense, it also allows firms needing to improve their Consistency to compensate for their adverse impact on IP, enhancing adaptability.

An adequate analysis of how the market behaves and evolves is essential for adaptability and mission to become the backbone of an OC conducive to innovation. However, it does not necessarily imply a radical transformation of the organization's design since most organizations perform marketing and strategic functions that help formalize external and market analysis (Trott, 2021). We are not claiming this is a simple task; the point is that it requires the development of functions that most firms already perform. Nevertheless, it implies transforming these functions into a mindset of everyone at the firm.

These results, taken together, indicate that to improve innovative projects' outcomes, practitioners should overcome internal organizational and cultural barriers related to consistency while boosting the levels of mission and adaptability in their organizations. We have proved that the mission's positive impact on IP through adaptability more than counteracts the negative effect through consistency, and this finding represents a substantial theoretical contribution. However, consistency's adverse effects on innovation impose a challenge on firms because it may undermine the entrepreneurial spirit and the open-mindedness needed to carry out innovative projects. The results suggest that managers should be cautious about consistency levels to ensure that positive effects on efficiency (Denison *et al.*, 2012) are more convenient for firms than the negative ones on IP.

In line with Flynn and Chatman (2001) arguments concerning differentiating conformity to a norm from its content and considering the core values subdimension, a practical way to mitigate the negative effect of consistency (without losing its benefits) could be to promote values that encourage IP. empirical results (see the review of Arieli *et al.*, 2020) indicate a positive association between the personal value of openness to change and creativity at work. Specifically, people who attach greater importance to self-direction, novelty and stimulation [6] values report higher levels of creativity at work. In contrast, values related to conservation (tradition, conformity and security) correlate negatively with creativity. Moreover, there is evidence that the values of managers influence OC; for that reason, people with personal values aligned with innovation (e.g. openness to change) must occupy these positions.

Since personal values are stable and desirable for people, they are difficult to change (Sagiv and Roccas, 2017); therefore, selection processes must consider these to make possible development of people in a direction that promotes IP. With a common framework of values related to the IP, developing an agreement, coordination and integration around innovation through training and performance management processes would be easier.

Except for the NWF, most of our findings are consistent with the academic literature. However, a remarkable exception is the involvement's absence of effect on IP (H8) (see Figure 2). This finding contradicts Sadegh Sharifirad and Ataei (2012), who found evidence of involvement's positive impact on the propensity to innovate. We proposed two possible explanations. First, involvement is more related to following behavior than disruption in the Costa Rican context. In this sense, employees' level of commitment would be more determined by complying with the status quo than by promoting change. It does not mean involvement is unnecessary, but its potential benefits do not transmit through the IP, and it could be through other mechanisms.

Second, there is a substantial difference between the DOCS conceptualization of involvement and the job involvement construct. DOCS assess three practices that foster worker involvement: a. empowerment, d. teamwork, c. capability development (Denison, 2001). Nevertheless, job Involvement alludes to the importance of work to a person's

self-concept, reflected in an attitude of being focused and concerned about one's job (Diefendorff *et al.*, 2021). While one outcome of involvement is innovative behavior (Huang *et al.*, 2019), the two constructs differ substantially. In comparison, DOCS focuses on the perception of organizational practices (system level), while job involvement in attitudes (individual level). Moreover, the antecedents of job involvement go beyond what the DOCS captures. It includes personality traits, job characteristics, leadership, organizational practices and stressors, among others (Diefendorff *et al.*, 2021).

Concerning IP's impact, results showed a substantial effect on the OP. In this sense, in the Costa Rican context, one way to improve the organization's competitiveness is to promote its IP, and the impact is considerable. The specific indirect effect on OP indicates that the best way to improve OP through IP is to boost mission ($b^* = 0.33$) and adaptability ($b^* = 0.29$). Interestingly, the strategic efforts to consolidate consistency affect IP; however, they do not impact OP significantly. Compared to the extant literature (VU, 2020; Hu *et al.*, 2017; Rousseau *et al.*, 2016), our study offers a much more refined analysis and provides critical clues on how to amplify the impact of IP over OP. However, in the future, it will be necessary to evaluate the IP impact on a broader range of performance measures to get a more comprehensive panorama.

The most reasonable way to evaluate what we know with this research we did not know before is to contrast the findings against our RQs. Regarding RQ1 (What is the effect, whether positive or negative, that each dimension of the OC has on the IP?) mission and adaptability positively affect IP. In contrast, consistency has a negative impact. Concerning to RQ2 (What is the magnitude of these effects?), adaptability has the greatest effect ($\beta = 0.59$, $t = 3.18$), followed closely by the mission ($\Gamma = 0.50$, $t = 4.14$). Consistency was the smallest and negative influence ($\beta = 0.24$, $t = -1.84$).

Contrary to expectations, the involvement did not influence the IP. These findings do not indicate that consistency is not necessary. On the contrary, we should remember that the four DOCS dimensions promote the OP. Specifically consistency is a relevant dimension for efficiency (Denison *et al.*, 2012). Its negative effect on innovation imposes a challenge to firms in order management OC.

Regarding the RQ3 (What are the most relevant relationships between OC's dimensions in explaining IP?) and RQ4 (What is the direction and the magnitude of effect on IP of these relationships among OC's components?), the impact of the goals (specific and superordinate) or rules, represented by the mission on adaptability ($\Gamma = 0.83$, $t = 29.54$) and consistency ($\Gamma = 0.83$, $t = 30.32$) is remarkably relevant. These traits mediated in opposite directions the effects [7] of the mission. The indirect impact of mission through adaptability is much higher than through consistency. Concerning RQ5 (What is the effect of IP on OP in a developing country?), the innovation effect on the economic performance of Costa Rican companies is considerable since it accounts for 47% of the OP.

On the other hand, it is necessary to point out some research limitations. Despite efforts to limit the CMB, it is crucial to promote longitudinal studies. It would be an extremely novel and pioneering approach in the field; it would definitively confirm the tentative casual links proposed in this study. Replicating the study in other geographical areas and focusing on specific sectors, such as manufacturing or services, might be fruitful. Also, it is advisable the use multidimensional reflective measures or composites (Henseler, 2021). Both strategies would increase the scope of elements included in the instruments, potentially leading to new insights.

Finally, using a universalistic dimensional approach allows us to overcome some limitations of previous literature in understanding the OC's impact on IP. Also, systems thinking with a view of paradoxes faced by organizations constitute fruitful terrain to comprehend how organizations can impulse or hinder their IP.

Notes

1. Behaviorism is a Philosophy of Science that argues that Psychology should be an experimental science focused on behavior. The application of its empirical principles is called Applied Behavior Analysis, which the authors called for clarity Behavior Analysis.
2. To explain the mediation relationships that account for the overall effect of OC on IP, we applied the segmentation approach (Rasoolimanesh *et al.*, 2021).
3. GST is a dominant motivation scientific approach (Van den Broeck *et al.*, 2019).
4. Due to the lack of multivariate normality for the measurement models, we provided z values with robust standard errors (REE). For the structural model (SM), the Mplus 8.6 software does not perform maximum likelihood estimation with REE and bootstrapping (Wang and Wang, 2020). Consequently, *p* values were estimated based on unadjusted standard errors. However, we evaluate the statistical significance of all SM parameters based on 5,000 Bootstrapping confidence intervals, which is also the advisable technique for mediation (Nitzl *et al.*, 2016).
5. They are second-level loads
6. Stimulation is a personal value related to excitement, novelty and challenge (Rounds and Armstrong, 2005)
7. The writing aims to facilitate the understanding of readers. However there is no term such as “negative mediation”. The correct term is “suppressor effect” since the specific negative indirect effects are subtracted from the total, thereby suppressing their final value.

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