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Research Article

A research competing model of organizational culture, organizational learning, management innovation and NPD: Evidence from technology firms

Örgüt Kültürü, örgütsel öğrenme, yönetim inovasyonu ve YÜG ilişkisinde bir karşılaştırmalı araştırma modeli: Teknoloji şirketlerinden kanıtlar

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Abstract

This study aims to develop a competing model to identify the best-fitting culture type in the relationship between organizational learning, management innovation, and New Product Development (NPD) performance, and it also aims to explore the moderator role of organizational culture in this relationship. The study collected data from 661 employees through survey methods from 234 firms in Turkey and tested with Structural Equation Modelling (SEM). The research shows that, despite the acceptable goodness of fit indices for each type in comparing four culture types, the market and adhocracy culture model is the best-fitting model and performs better with the best goodness of fit. In addition to the fact that the market and adhocracy cultures have partial moderator effects on the relationship between organizational learning, management innovation, and new product development, the study explains the relationship between organizational learning, new product development performance, and management innovation within a competing model based on organizational culture. It also provides a framework for firms to prioritize new product development to decide which cultural structure to choose.

Keywords: Organizational Culture, Organizational Learning, Management Innovation, NPD Performance

Jel Codes: L2, M1, O3

Öz

Bu çalışmanın amacı örgütsel öğrenme, yönetim inovasyonu ve yeni ürün geliştirme performansı arasındaki ilişkide en uygun kültür tipini belirlemek için karşılaştırmalı model geliştirmektir. Aynı zamanda örgüt kültürünün bu ilişkide düzenleyici rolünü ortaya çıkarmaktır. Araştırmanın verileri Türkiye'deki 234 firmanın 661 çalışanından anket yöntemiyle toplanmış ve Yapısal Eşitlik Modellemesi (YEM) ile test edilmiştir. Araştırma, dört kültür türünün karşılaştırılmasında her tür için kabul edilebilir uyum iyiliği indekslerine rağmen, pazar ve adhokrasi kültürü modelinin en uygun model olduğunu ve en iyi uyum iyiliği ile daha iyi performans sağladığını göstermektedir. Ayrıca, pazar ve adhokrasi kültürlerinin örgütsel öğrenme, yönetim inovasyonu ve yeni ürün geliştirme arasındaki ilişki üzerinde kısmi düzenleyici etkileri olduğunu kanıtlamaktadır. Çalışma, örgütsel öğrenme, yeni ürün geliştirme performansı ve yönetim inovasyonu arasındaki ilişkiyi, örgüt kültürüne dayalı rekabetçi bir model içinde açıklamaktadır. Aynı zamanda, firmaların yeni ürün geliştirmek için hangi kültürel yapıyı seçeceklerine karar vermeleri konusunda bir çerçeve sağlamaktadır.

Anahtar Kelimeler: Örgüt Kültürü, Örgütsel Öğrenme, Yönetim İnovasyonu, YÜG Performansı

Jel Kodları: L2, M1, O3

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Introduction

Organizational culture is considered as the fundamental element within the organizational structure. Therefore, organizations must identify it properly before strategy formulation to adapt to the changes and sustain in the long run. Previous research showed that as long as the ideas, paradigms, beliefs, values, and norms remain unchanged, efforts to improve the organizational culture become insufficient (Schein, 1990). A system or policy not supported by the organizational culture cannot provide the organization with advantages in the long run. Based on this, organizational performance can be enhanced by integrating the organisation's main objectives and strategic orientations into the organizational culture. Cameron and Quinn (2006), in the framework of transaction costs theory and systems approach, identified and measured four cultural types: hierarchy, market, clan, and adhocracy representing the four different organizational structures from the Competing Values Model (Cameron and Quinn, 2017).

One of the stages of organizational learning, an important strategic orientation, is defined as building a collective meaning with the information obtained (Calantone, Cavusgil and Zhao, 2002). On the other hand, culture is a collective meaning model (Schein, 2010). Organizations are communities that interpret and make this culture understandable within the sharing system through organizational learning. This system, formed by cultural elements, is the basis of learning, and this cultural sharing system in organizations affects organizational learning (Cook and Yanow, 1993). At this point, it is discussed that culture is considered a knowledge resource that guides organizational learning realized through knowledge management processes. In the context of the resource-based approach, this activity is transformed into an organizational capability and enhances organizational performance. Thus, this study examines the organizational culture in resource-based and knowledge-based theories. Organizational learning is realized through the commitment of the organizational elements, which are system, team, learning, and collective memory, to the learning included in the organizational culture (Calantone et al., 2002). As a result of this active learning activity, innovation, a competitive tool in recent years, is realized in the organization with the support of the appropriate cultural background. (Porter, 1990). Innovation involves developments such as new products or services, technologies, organizational structures, and relationships (Damanpour, 1996). Therefore, innovation must be identified with organizational culture by becoming a continuous activity (Porter. 1990). Thus, by integrating innovation into the culture, it can be ensured that the organization can innovate, affecting performance outputs. Then, culture impacts the innovative product performance of the organization (Hurley, Hult and Knight., 2005). This provides a competitive advantage for the whole organization in the context of the management innovations developed within the scope of the management's innovation approach (Hamel and Breen, 2011). The nature of the organizational culture affects NPD performance since it is important for effective organizational learning and management innovation (Hurley et al., 2005). In this framework, the study aims to determine the best-fitting culture type for organizational learning, management innovation, and NPD relationship and to reveal the moderating role of culture in that relationship. Moreover, it aims to reveal that management innovation fundamentally shaped by culture mediates the relationship between organizational learning and NPD. Also, no previous research on the mediating role of management innovation in the relationship between organizational learning and NPD performance was encountered. The research guides organizations prioritising NPD to decide which cultural structure to choose. The literature has preliminary comparative model studies, including all those variables. Since culture is considered a resource that guides strategic orientation (Smircich, 1983), the study explains the relationships mentioned above based on resource-based and knowledge-based paradigms. It reveals how competitive structures are affected by changing cultural characteristics.

Literature review and hypothesis development

In the literature, the role of culture on organizational performance was emphasized based on the different paradigms within the modernist approach (Trice and Beyer, 1993; Despande, Farley and Webster, 1993; Kwan and Walker, 2004; Liao, Chang, Hu and Yueh, 2012). Culture is widely shared and considered a resource that enables organizations to adapt to environmental changes, that is, to gain sustainable competitive advantage in the context of innovation (Ogbonna, 1992; Gordon and DiTomaso, 1992). It includes the mental models underlying the behaviour (Schein, 2010), and managing the behavioural changes is inevitable without understanding the culture. Moreover, increasing uncertainty and changing environmental conditions require organisational change to increase efficiency and productivity. Managing the culture effectively and properly is the most fundamental element for successful organizational change (Kotter and Heskett, 2008).

The assumption that organizational culture is related to performance is based on the fact that culture is considered a resource for organizations to gain competitive advantage (Barney, 1991). According to

Hurley and Hult (1998), the organizational culture, the basis for learning, can create a competitive advantage by defining the organisation's strategic decisions to facilitate individual interaction and realizing organizational learning at optimal levels due to information processing. In this context, it is emphasized that widely shared and strongly held values minimize the scope of undesirable consequences by affecting the right decision-making and learning development (Ogbonna, 1992). Successful organizations are distinguished by their ability to reveal and support cultural values consistent with their chosen strategic orientation (Schein, 1990; Peters and Waterman, 1982). Here, it is seen that culture as a resource benefits the organization in developing skills. The effect of knowledge, among an organization's valuable, rare, inimitable, and non-substitutable resources, on organizational performance is investigated in the context of knowledge-based theory (Hatch and Cunliffe, 2006). Thus, the role of culture as an organizational resource and its effects on the learning process, innovation, and NPD can be addressed in the context of knowledge-based and resource-based approaches (Simirch, 1983). Knowledge-based theory associates organizations' long-term existence with their ability to manage knowledge more effectively than they manage other organizational resources (Kogut and Zander, 1992). According to the resource-based approach, resources are transformed into talent and provide a competitive advantage by ensuring that cultural knowledge is embedded in the organizational memory (Barney, 1991).

While it is emphasized that organizational learning and innovation increase the organisation's future capacity, it is stated that it will lead to innovation, which can be the only source of sustainable competitive advantage (Stata 1989). Therefore, the learning capabilities of an organization play a very important role in innovation management (Sinkula, Baker and Noordewier, 1997). Moreover, developing new ways and behaviours by using knowledge effectively and quickly is important in engaging in innovation (Nonaka and Takeuchi, 1995). The concept of innovation in organizations is discussed in five dimensions: product, process, market, behavioural and strategic. The integration of these dimensions has revealed the concept of organizational innovation. In the literature, the novelty that product and process innovation provides to the organization is considered a firm innovation (Wang and Ahmed, 2004). Hamel (2006), on the other hand, explained process innovation in two sub-dimensions consisting of operational process innovation, which includes activities such as customer service, logistics or procurement, and managerial process innovation, which includes strategic planning, project management or policy applications. Hamel (2006) highlights that neither innovation type should be evaluated equally, and management innovation becomes prominent for creating higher levels of value and providing competitive defence among all types of innovation. According to Hamel, management innovation is at the top when innovation types are ranked in a hierarchy typology in terms of gaining and maintaining competitive advantage (Hamel and Breen, 2011). Management innovation; represents the change in administrative systems. It includes practices and approaches that motivate and reward organizational members, improve the strategic structure of tasks and units, and change the organisation's management policies (Daft, 1978). Management innovation is related to core business activities. It affects the management systems of the organization. Innovation in management enables the organization to be successful in a systematic change that will ensure the appropriate disposition of information resources (Damanpour and Evan 1984). Management innovation is a type of innovation that concerns the entire organization. It provides a value creation capacity that is difficult to replicate, assuming that each activity performed is based on the management function. Creating a change in management requires a serious contradiction because the change in management means a change in basic principles, values and beliefs in management (Hamel and Breen, 2011).

Lin (2003) argues that organizational learning directly affects technological and management innovation. According to Stata (1989), management innovations are closely related to organizational learning and management practices are often the primary obstacle to an organisation's progress. Integrating organizational learning into internal system dynamics is necessary to develop management innovation. Based on this, hypothesis H1: There is a significant positive relationship between organizational learning and management innovation, was developed.

Management innovation is studied based on rational, institutional, modern, and cultural paradigms in the literature. Considering the cultural perspective, it is thought that managerial practices not supported by the culture hinder management innovation. Based on these approaches, Birkinshaw, Hamel and Mol (2008) list the factors that ensure management innovation: organizational structure, management practices, management processes, and self-managing teams. Organizational structure characterizes a variety of phenomena, including organizational culture, that can lead to management innovation, from the employees' way of doing business to the beliefs underlying their behaviours. Management processes are important in ensuring performance by transforming decisions into routine actions. Therefore, the driving force of new product and service innovations is the diverse demands of customers and the

ability of managers to create new services and products, leading to management innovations (Damanpour and Gopalakrishnan, 2001). Also, management innovation is described as the main type of innovation that paves the way for NPD in the organization (Hamel and Breen, 2011). In this context, the hypothesis H2: There is a significant positive relationship between management innovation and NPD performance, was developed to investigate the effect of management innovation on NPD.

Hult, Snow and Kandemir (2003) stated that cultural knowledge directs the dimensions of learning, namely system, team, collective memory, and learning orientations. Knowledge acquired through learning is potentially an organization's most productive resource and is a key source of competitive advantage (Barney, 1991). An organization's stock of knowledge is created and expanded through the learning process (Huber, 1991). Weiling and Kwok (2006) also emphasized that effective learning depends on a culture of openness and mutual trust. According to Hurley and Hult (1998), organizational learning and a higher understanding of innovation in the organizational culture lead to engaging in competitive advantage and innovating further. Innovativeness is a part of the learning process, which is an innovation pioneer. Organizations that adopt the understanding of innovation in their organizational culture increase their capacity to innovate through organizational learning (Hurley et al., 2005). Through learning activities, organisations develop their employees' capabilities to make them perform their tasks and create new ideas (Ivanov and Avasilcăi, 2014). Awwad and Akroush (2016) and Olivera and Argote (1999) found a positive relationship between a learning-oriented understanding, a dimension of organizational learning, and NPD success. Similarly, Stata (1989) argues that due to organizational learning, organizations make innovations that will provide them with a competitive advantage. Hsu and Fang (2009) also revealed that organizational learning ability positively affects NPD performance. Based on this, hypothesis H3: There is a significant positive relationship between organizational learning and NPD performance, was developed.

Organizations generally respond to new customer needs and expectations more flexibly and faster than their competitors through organizational learning activities (Slater and Narver, 1995), which can be considered evidence that innovation is realized as a result of organizational learning. Among the indicators related to NPD performance, innovations made at the senior management level are an important factor affecting NPD success (Felekoglu, Maier, and Moultrie, 2013). Making decisions and motivating efforts that will provide behavioural changes in organizations and ensuring the management functions perform with integrity are the main objectives of management innovation (Hamel and Breen, 2011). It is accepted that as long as the learning action does not support the understanding that it will change the management culture, it becomes difficult to innovate in management (Vaccaro, Jansen, Van Den Bosch and Volberd, 2012). In this context, hypothesis H4: Management innovation has a mediating effect in the relationship between organizational learning, and NPD performance was developed.

Despande et al. (1993) found that innovative organisations display superior performance. Additionally, the study revealed that organizations with adhocratic culture as a determinant of innovation and performance outperform those with the clan and internally-oriented hierarchical cultures. In other words, organizations with a market culture that aims to offer new products to the market faster by prioritizing customer needs and expectations and a dominant adhocratic culture that adopts continuous innovation and change by emphasizing entrepreneurship show better market performance compared to organizations with a clan culture that gives importance to commit to work and hierarchy culture that gives attention to the rules (Deshpande et al., 1993).

The role of culture as a factor that both encourages and limits innovation is noteworthy. The adhocracy culture emphasizes flexibility and change and is often seen in organizations operating in a dynamic context and willing to be pioneers in their markets. Key values in an adhocratic culture are creativity, entrepreneurship and risk-taking. Clan culture emphasizes flexibility but is internal-oriented. Teamwork, employee involvement and commitment are the dominant characteristics of the clan culture. On the other hand, market culture prioritizes control and stability and is external-oriented. The core values of this culture are goal achievement, consistency, and competitiveness. Finally, the hierarchy culture is control-oriented but focused on the internal organization. While prioritizing efficiency is closely tied to norms, rules, and regulations (Sanz-Valle, Naranjo-Valencia, Jime´nez-Jime´nez, and Perez-Caballero, 2011; Cameron and Quinn, 2017). The four culture types affect innovation, NPD, and performance differently. The literature argues that the adhocracy culture stimulating the entrepreneurial mindset, initiative-taking, creativity, and risk-taking of leading organizations in product innovation affects performance. For example, Calori and Sarnin (1991) found that organizations that care about adaptation are likely to set ambitious goals, prioritize customer satisfaction, and try new ideas. It is observed that such values and practices are closely related to growth in organizations. In

general, research findings provide evidence that adhocracy culture has a positive effect on innovation, market, and financial performance (Naranjo-Valenciaa, Jiménez-Jiménez and Sanz-Valle, 2015; Chan, Shaffer and Snape, 2004; Deshpande et al., 1993; Gordon and DiTomaso, 1992). Based on the discussion above, the following hypothesis was developed: H5: Market and adhocracy cultures have a better fitting effect than clan and hierarchy cultures in explaining the relationship between organizational learning, management innovation, and NPD performance.

A learning-oriented organization shows its willingness to appreciate and absorb new ideas. It is argued that the dimensions of organizational learning can emerge embedded in the organisation's culture, strategy, processes, structure, and behaviours. Learning orientation, considered the dimension of organizational culture, is conceptualized as an innovation pioneer (Hurley and Hult, 1998). Culture is the antecedent of the market and learning orientation, providing a basis for learning (Schein 2010). Kululanga, Edum-Fotwe and McCaffer (2001) see organizational learning as a catalyst for implementing an organizational learning culture and state that learning culture improves organizational learning. While the organization can be seen as a stock of information with storing and processing capabilities, organizational learning is important in ensuring that the stock of information is constantly renewed and updated to respond effectively to changes in the competitive environment (Lemon and Sahota, 2004). Janz and Prasarnphanich (2003) suggested that organizational culture positively affects organizational learning. According to Bates and Khasawneh (2005), transferring knowledge into cultural memory through organizational learning creates significant differences in organizational innovation. Popper and Lipshitz (2000) also emphasize that an organizational culture that supports organizational learning provides productive organizational learning. In other words, a normative learning system embedded in the organizational culture can be said to increase the productivity of organizational learning.

From a slightly different approach to the relationship between learning and market orientation, Slater and Narver (1995) emphasize that a market-oriented culture will not positively affect performance without the ability to use knowledge and act on it. That is, market orientation promotes organizational learning and affects market and financial performance by increasing the organization's learning ability performance. It is argued that market culture supports innovation positively with the organization's rapid learning of information in the market by keeping up with the fluctuations (Chen, Huang, Liu, Mi and Zhou, 2018). Another study revealed that the market culture, which aims to introduce new products faster by prioritizing customer needs and expectations, shows better market performance (Deshpande et al., 1993). It was proved that the market culture, which adopts a learning approach by better collecting the information in the market, supports the relationship between organizational learning and NPD (Chan et al., 2004; Chen et al., 2018; Naranjo-Valenciaa et al., 2015). Accordingly, by claiming that market culture will affect learning, management innovation, and NPD, the following hypotheses were developed: H6: Market culture has a moderator effect on the relationships between organizational learning, management innovation, and NPD performance; H6a: Market culture has a moderator effect in the relationship between organizational learning and management innovation, H6b: Market culture has a moderator effect in the relationship between management innovation and NPD performance, H6c: Market culture has a moderator effect in the relationship between organizational learning and NPD performance.

Studies to explain the sustainable superior financial performance of globally successful organizations focused on the managerial values and beliefs embedded in the culture of these organizations (Peters and Waterman, 1982). When these organizational core values, which increase innovation and flexibility in organizations, are associated with management control, they lead to sustainable superior financial performance (Liao et al., 2012). Kotter and Heskett (2008) state that the best-fitting culture for organizations pursuing long-term innovation and performance in a dynamic environment is a culture that learns, adapts, encourages, and nurtures innovation. As Muffatto (1998) argues, creating an innovative climate in the innovation process and supporting relevant professional knowledge and skills through innovative activities affect innovation positively. According to Lee and Kang (2007), innovative and supportive cultures significantly positively affect managerial and technical innovation. The capacity to further innovate emerges when the tendency to adopt innovation in the organizational culture is combined with other resources and capabilities. Thus, an insight into innovation in organizational culture enables one to gain a more competitive advantage. Higher levels of innovation in organizational culture are associated with greater adaptability and innovative capacity. In addition, the relation of higher levels of innovation with cultures that emphasize learning, development, and participatory decision-making is advocated (Hurley and Hult, 1998).

Weerawardena, O'Cass and Julian (2006) examine the role of industry structure and organizational learning on innovation and brand performance, showing that organizational learning positively affects

innovation and increases the market performance of products. Additionally, Akgun, Byrne, Lynn and Keskin (2007) emphasized that organizational learning is effective in NPD by carrying out the planning and leading functions simultaneously in management, and it changes the beliefs that make up the organizational culture by adopting an innovative approach. They also found that improvisation in project teams and accepting learning by abandoning established beliefs and behaviour patterns affect NPD team success (Akgun et al., 2007). Liao et al. (2012) argued that managerial innovation practices that increase organisational innovation and flexibility lead to superior sustainable performance. In another study, Naranjo-Valenciaa et al. (2015) emphasized that the fit between the adhocracy culture and the innovation strategy that includes NPD strategies provides superior innovation and increases performance. In other words, it is argued that the adhocracy culture predicts innovation and performance. In this direction, the following hypotheses were developed: H7: Adhocracy culture has a moderator effect in the relationships between organizational learning, management innovation, and NPD performance; H7a: Adhocracy culture has a moderator effect in the relationship between organizational learning and management innovation, H7b: Adhocracy culture has a moderator effect in the relationship between management innovation and NPD performance, H7c: Adhocracy culture has a moderator effect in the relationship between organizational learning and NPD performance.

Research methodology

Research method

Questionnaire forms were used as the data collection method. First, a pre-test was performed to ensure that there was no ambiguity in understanding the scale items, so the face validity of the questionnaire (Hair, Black, Babin and Anderson, 2010) was satisfied. The first part of the questionnaire explains the research's variables and purpose, and the second part includes demographic questions about the organization and the participant. The third part contains measurement scales for the variables included in the study. To test the validity and reliability of the factor structure of research variables, exploratory and confirmatory factor analyses are performed. Hypotheses are tested with structural equation modelling in the AMOS package program. In order to determine the fitting effects of culture on organizational learning, management innovation, and NPD relationship, a comparison is made on the goodness of fit indices. Then the moderator effect of the culture is investigated.

Research sample and the unit of analysis

The level of analysis is organizations, and the unit of analysis is middle and senior-level employees. The sample includes 250 organizations from technology firms in Turkey selected through a simple random sampling method. Some questionnaire forms were excluded from the analysis for various reasons, and the research is based on data from 661 middle and upper-level employees employed in 234 organizations. Changing customer expectations and demands in recent years have made it necessary for all organizations to consider innovation and NPD. For this reason, the research was carried out on organizations that develop new products and services and have the potential to do that in all industries. The study data were collected before January 1, 2020, so an ethics committee is not required.

Measurement scales

We use the organizational culture measurement scale developed by Cameron and Quinn (2006) by transforming it into a 5-point Likert-type scale. The scale defines four types of culture: dominant characteristics, organizational leadership, employee management, organizational commitment, strategic importance, and success criteria. Twenty-four questions in total, including all six dimensions, are included in the survey. The organizational learning scale is adapted from a 17-question scale developed by Hult et al. (2003), consisting of team orientation, system orientation, learning orientation, and collective memory orientation. The management innovation scale is adapted from the 6-question scale Vaccaro et al. developed (2012). Items 1 and 2 contain changes in management practices, that is, the establishment of new rules and relevant procedures that managers perform as part of their work in the organization. Items 3 and 4 cover the factors of management processes. It is based on how the work is done and the changes in the routines that guide employees' jobs are organized. Articles 5 and 6 are related to the structure. The 6-item scale that Awwad and Akroush (2016) adapted from Chan and Ip (2011) is used for the NPD scale. Scale items of NPD market performance relate to the design, quality, performance, packaging, and competitiveness of new products that encourage customers to make purchases and the NPD marketing strategies adopted by the organization to maintain customer loyalty and satisfaction (Chan and Ip, 2011). To measure NPD financial performance, the 5-item scale adapted by Awwad and Akroush (2016) from Wong and Tong (2013), Menguc and Yannopoulos (2014) and Healy et al. (2014) and including sales revenue, net profit, cash flows, and similar financial indicators

were used. The market and financial dimensions of the NPD performance were aggregated in the analysis.

Demographic data on employees and organizations

A total of 661 participants from 234 organizations participated in the research. 94% of the participants have a bachelor's degree at least. On average, 48% of the participants are top-level managers, 34% are middle-level managers, and 18% work as an operational manager. 78.5 % of the employees stayed in the organization for five years or more. The rate of male participants is 61.3%, whereas the rate of females is 38.7%. The energy, chemistry, and mining sectors have a share of 47.5%, the automotive and machinery sectors have 33.9%, and the food, beverages, and pharmaceutical sectors have a distribution rate of 12% in all sectors. The data were aggregated and analysed at the organizational level.

Analysis and findings

In order to reveal whether the theoretically assumed propositions of the research variables are gathered under the correct factor structure, Exploratory Factor Analysis (EFA) was performed using Principal Component Analysis and the Promax rotation method. Confirmatory Factor Analysis (CFA) was performed using the Maximum Likelihood Estimation Method to confirm the results of the Exploratory Factor Analysis and to analyse the Validity and Reliability of the research scales. In line with the Maximum Likelihood Method (Hox and Bechger, 1998), which is the most preferred in Structural Equation Modelling (Hair et al., 2010), it is found that the sample size of 234 is reasonable, the scale used consists of continuous data and the normal distribution indicator, based on the Skewness- Kurtosis Values, satisfies normal distribution since it takes values between +2 and -2 (Garson, 2012).

To test the adequacy of the data set for factor analysis, the Kaiser-Meyer-Olkin (KMO) sampling adequacy test and Bartlett's test of sphericity were conducted. As a result, it was found that the KMO value was 0.959, above the desired level of 0.90, at a perfect level (Field, 2007), and the Bartlett test was statistically significant at a $p<0.001$ significance level. Then, the diagonal values of each variable in the 'anti-image correlation matrix, which determines the sample adequacy, were examined, and it was seen that these values were above 0.5, as required. Accordingly, it was concluded that the sample data fit for factor analysis (Hair et al., 2010).

In this study, with a data sample number of 234, the lower limit of factor loadings and the communality values were accepted as 0.5 in the exploratory factor analysis (Hair et al., 2010). Variables that did not satisfy these values or were not loaded into the theoretically predicted factor structure were excluded from the scale in a way that would not disrupt the factor structure. In the factor analysis performed at the end of these stages, the variance explanation rate of the variables was found to be 80.73%. As a result of the confirmatory factor analysis, variables with low factor loading and HieCult_4, ClanCult_6, MarCult_2, and NPD_MarPerf_1 variables with high standardized residual covariance values were excluded from the scale to improve the goodness of fit indices of the model. In addition, the goodness of fit indices was examined, and error values with high modification values in the same factor were covaried. In this case, the fit index values became $\chi2= 2279.615$, df= 1211, $\chi2\backslash df= 1.882$, CFI= 0.917, SRMR= 0.063, RMSEA= 0.062. Therefore, the findings revealed that the fit indices were at the desired level. (Hu and Bentler, 1999; Schumacker, Lomax, 2012; Hair et al., 2010).

Table 1: Confirmatory Factor Analysis

Constructs	Items	β	Factor Loadings	t	p
Clan Culture	ClanCult_1	1	0.779		
	ClanCult_2	1.143	0.904	15.803	***
	ClanCult_3	1.129	0.899	15.851	***
	ClanCult_4	1.109	0.888	15.587	***
	ClanCult_5	1.116	0.876	15.123	***
Hierarchy Culture	HieCult_1	1	0.744		
	HieCult_2	1.05	0.864	13.778	***
	HieCult_3	1.073	0.905	14.519	***
	HieCult_5	1.042	0.881	14.085	***
	HieCult_6	1.076	0.862	13.733	***
Advocacy Culture	AdoCult_1	1	0.883		
	AdoCult_3	0.921	0.844	17.699	***
	AdoCult_4	0.95	0.884	19.463	***
	AdoCult_5	0.952	0.878	19.178	***
	AdoCult_6	0.938	0.842	17.608	***
Market Culture	MarCult_1	1	0.783		
	MarCult_3	1.044	0.848	16.883	***
	MarCult_4	1.106	0.917	15.539	***
	MarCult_5	1.008	0.806	13.336	***
Team Orientation	TeamOry_1	1	0.812		
	TeamOry_2	1.012	0.81	17.057	***
	TeamOry_3	1.027	0.863	15.524	***
	TeamOry_4	0.917	0.807	14.119	***
	TeamOry_5	1.104	0,878	15,925	***
Learning Orientation	OgrOry_1	1	0.904		
	OgrOry_2	0.972	0.937	23.149	***
	OgrOyr_3	0.838	0.763	15.113	***
	OgrOry_4	0.945	0.808	16.818	***
System Orientation	SysOry_1	1	0.789		
	SysOry_2	1.096	0.857	14.59	***
	SysOry_3	1.086	0.854	14.525	***
	SysOry_4	1.012	0.818	13.726	***
Collective Memory Orientation	ColMemryOry_1	1	0.849		
	ColMemryOry _2	1.029	0.886	17.166	***
	ColMemryOry _3	1.044	0.858	16.352	***
Management Innovation	ManInnov_1	1	0.815		
	ManInnov_2	1.072	0.904	16.827	***
	ManInnov_3	1.098	0.895	16.601	***
	ManInnov_4	0.909	0.684	11.382	***
	ManInnov_5	0.925	0.764	13.197	***
	ManInnov_6	0.94	0.801	14.103	***
NPD Market Performance	NPD_MarPerf_2	1	0.881		
	NPD_MarPerf_3	1.112	0.885	19.565	***
	NPD_MarPerf_4	1.044	0.892	19.943	***

	NPD_MarPerf_5	1.013	0.863	18.57	***
	NPD_MarPerf_6	1.034	0.834	17.346	***
	NPD_MarPerf_7	1.095	0.84	17.586	***
NPD Financial Performance	NPD_FinPerf_1	1	0.942		
	NPD_FinPerf_2	1.048	0.95	30.058	***
	NPD_FinPerf_3	1.025	0.911	25.631	***
	NPD_FinPerf_4	1.002	0.887	23.46	***
	NPD_FinPerf_5	0.954	0.849	20.745	***

X^2= 2279.615, df= 1211, x^2/df= 1.882, CFI= 0.917, SRMR= 0.063, RMSEA= 0.062

***; refers to statistically significance at p < 0.001 level ß; refers to standardized factor load.

Confirmatory factor analysis results are given in Table 1. The existence of convergent and discriminant validity of the factor structure shows that construct validity is also provided in the research measurement model. Therefore, as a result of all analyses, the validity and reliability of the factors were found to be at the desired level.

Cronbach's Alpha model was used for reliability analysis. In this study, Cronbach's Alpha value of each factor was above 0.70. Accordingly, the factor structures are said to have internal consistency. In this study, AVE (Average Variance Extracted) (Fornell and Larcker 1981) and SCR (Scale Composite Reliability) (Bagozzi and Yi, 1988) values were used for Validity and Reliability tests of factor structures.

All factor loadings are statistically significant in the theoretically predicted factor construct (Bagozzi *et al.,* 1991). The mean factor loadings per construct are higher than 0.7. AVE value is above 0.5, and the CR value is above 0.7 (Bagozzi and Yi, 1988). The convergent validity and model goodness-of-fit indices were at good levels. Therefore, one-dimensionality was confirmed. The discriminant validity was examined by comparing the Average Variance Extracted (AVE) values' square root values in the diagonals and the correlation coefficients on the horizontal-vertical axis. Since the square roots of the AVE values for each factor are higher than the correlations on the horizontal-vertical axis, it can be said that the factors have discriminant validity (Hair *et al.,* 2010). All correlations (Hair et al., 2010) are statistically significant at p <0.001. In addition, a correlation coefficient of less than 0.8 implies no multicollinearity problem between the variables (Field, 2009). However, although a high correlation value was not found in the correlation analysis, these values were still examined, and the VIF values were observed to be less than 10. The tolerance values were greater than 0.2. Correlation coefficients are given in Table 3. *** p<0.001 - The diagonal value is the square root of the AVE value of the relevant variable.

Table 2: Correlation Values

Construct	1	2	3	4	5	6	7	8	9	10	11
ClanCulture	**0.87**										
Hiera Cult.	0.752	**0.853**									
Adocr. Cult.	0.756	0.748	**0.866**								
Market Cult.	0.730	0.794	0.753	**0.84**							
Team Orien.	0.715	0.706	0.677	0.696	**0.834**						
LearningOrien.	0.667	0.668	0.675	0.669	0.752	**0.856**					
System Orien.	0.707	0.753	0.663	0.712	0.811	0.707	**0.83**				
Coll. M. Orien.	0.679	0.690	0.721	0.714	0.696	0.683	0.716	**0.864**			
Manage. Inn.	0.518	0.592	0.557	0.608	0.626	0.548	0.615	0.686	**0.814**		
NPD Mar.Perf.	0.521	0.673	0.595	0.643	0.643	0.540	0.611	0.661	0.657	**0.866**	
NPD Fin.Perf.	0.542	0.631	0.565	0.619	0.667	0.590	0.604	0.609	0.638	0.797	**0.908**

Testing the research model

Testing hypotheses of direct and indirect relationships

In order to investigate the direct and mediator effects between the research variables of organizational learning, management innovation, and NPD performance, structural equation modelling was used. Table 4 shows the results of the structural equation model developed to test the direct relationship hypotheses.

Table 3: Testing Hypotheses of Direct Relationships

Hypothesis	Independent Variable		Dependent Variable	Std. B	t	P
H_1	Organizational Learning	→	Management Innovation	0.720***	9.420	0.000
H_3	Organizational Learning	→	New Product Development	0.589***	6.538	0.000
H_2	Management Innovation	→	New Product Development	0.302***	3.800	0.000
	***; refers to statistical significance at p < 0.001 confidence level					
	X^2= 944.921, DF= 480, χ^2/DF= 1.969, CFI= 0.941, SRMR= 0.071, RMSEA= 0.064					

Research hypotheses developed to investigate the direct relationships; H1: There is a significant positive relationship between organizational learning and management innovation, H2: There is a significant positive relationship between management innovation and NPD performance, and H3: There is a significant positive relationship between organizational learning and NPD performance were supported.

According to the results of the structural equation modelling, organizational learning affects management innovation (β= 0.720, t= 9.420, p<0.001) and NPD performance (β= 0.589, t= 6.538, p<0.001), and management innovation affects NPD performance (β = 0.302, t= 3.800, p<0.001) positively and significantly. Accordingly, hypotheses H1, H2, H3 were supported. It is seen that the model's goodness-of-fit indices are at acceptable levels as χ2= 944,921, df=480, χ2/df=1.969, CFI=0.941, SRMR= 0.071, RMSEA= 0.064. Afterwards, the method suggested by Baron and Kenny (1986) and the method suggested by Preacher and Hayes (2008) were used together in testing the mediator effect of management innovation in the relationship between organizational learning and NPD performance.

In the context of the statistical mediation model introduced by Baron and Kenny (1986) in structural equation modelling, the method designed by Little, Card, Bovaird, Preacher and Crandall (2007) and Kalchschmidt, Nieto and Reiner (2010), and used by Akgün et al., (2014), based on the three structural equation models was used. The results of the structural equation model in which the mediating relationship is examined are given in Table 5.

Table 4: Mediator Variable Test

Relationships			Standardized B Values			
Independent Variable		Dependent Variable	Model 1	Model 2	Model 3	Indirect Effect[a]
Organizational Learning	→	New Product Development Performance	0.805***		0.589***	0.218***
Organizational Learning	→	Management Innovatıon		0.715***	0.720***	
Management Innovation	→	New Product Development Performance			0.302***	
		CMIN	569.347	456.162	944.921	
		DF	314	199	480	
		CMIN/DF	1.813	2.292	1.969	
		CFI	0.96	0.944	0.941	
		SRMR	0.044	0.081	0.071	
		RMSEA	0.059	0.074	0.064	

***; p < 0.001 refers to statistically significance at p < 0.001 confidence level

[a] 5000 Bootstrap sample level at a 95% confidence interval

In the first model, organizational learning significantly affects NPD performance positively and significantly (β = 0.805, p<0.001). In the second model, organizational learning affects management innovation positively and significantly (β= 0.715, p<0.001). In the third model in which management innovation is modelled as the mediator variable, organizational learning positively and significantly affects management innovation (β= 0.720, p <0.001) and NPD performance (β = 0.589, p <0.001) while management innovation positively and significantly (β= 0.302, p <0.001) affects NPD. When management innovation, the mediator variable, entered the model, the effect of organizational learning (independent variable) on the NPD performance (dependent variable) diminished but did not disappear.

In order to verify the probable mediation effects, the indirect effects of the independent variable on the dependent variables were investigated using the "Bootstrap" method by Preacher and Hayes (2008) at a 95% confidence interval at the 5000-sample level. According to the results, this mediation relationship was confirmed due to the indirect effects of organizational learning on NPD performance through management innovation (β= 0.218, p <0.001). It is possible to talk about a partial mediating effect since the effect of the independent variable on the dependent variable does not disappear. Still, it declines compared to the previous model without including the mediator variable. Also, it is observable that the goodness of fit indices of the mediating relationship model is also at acceptable levels. Accordingly, hypothesis H4: Management innovation has a mediating effect in the relationship between organizational learning and NPD performance, was supported.

Research competing model

For Competing Model Analysis, Bollen (1989) suggests that if the model has acceptable fit values and supports the original theory, it should be chosen as the best-fitting model. According to Liao *et al*. (2012) and Sinha *et al.* (2016), studies in the literature within the scope of the competing model, the model with the highest CFI and the lowest SRMR and RMSEA among the four cultural models in the Comparative Model Analysis is specified as the best-fitting model. The Competing or Comparative Model Analysis used chi-square, difference tests and degrees of freedom. ECVI, AIC and BIC values from the goodness of fit indices were considered (Chen *et al*., 2018). Hair et al. (2010) also argued that four goodness of fit indices is generally sufficient for model fit validity. It is observed that generally, GFI, CFI, RMSEA, SRMR, AIC, and ECVI values are taken into account (Schumacker and Lomax, 2012).

Table 5: Research Competing Model Analysis Fit Values

Fit Value	Market Culture	Adhocracy Culture	Hierarchy Culture	Clan Culture	Ideal Values
CMIN/DF	1.885	1.909	1.944	1.975	< 3
CFI	0.939	0.936	0.933	0.932	>.90
SRMR	0.067	0.068	0.07	0.068	<.06
RMSEA	0.062	0.062	0.064	0.065	<.07
AIC	1409.91	1499.167	1522.037	1541.607	Decreasing
ECVI	6.051	6.434	6.532	6.616	Decreasing
R^2	0.7	0.697	0.708	0.699	Increasing

In the study, four types of culture were examined. Model analysis was performed through four different models to investigate the best-fitting culture for the relationship between organizational learning, management innovation, and NPD performance. This analysis aims to develop competing research models with the types of culture and identify the competing model in the relationship between organizational learning, management innovation, and NPD. The model comparison of each culture type is listed in Table 5. Among these four types of culture, the market culture model (RMSEA = 0.062; AIC = 1409.91; ECVI = 6.051; CFI = 0.939; CMIN/DF = 1.885; R2 = 0.7) and the adhocratic culture model (RMSEA = 0.062; AIC = 1499,167; ECVI = 6.434; CFI = 0.936; CMIN/DF =1.909; R2 = 0.697) indicate a good fit.

The study also points out that the market and adhocracy culture model is more appropriate to explain the relationship between organizational learning, management innovation, and NPD compared to the clan and hierarchy culture model in analysing the four competing models. In the literature, other studies hypothesized on model fit values were taken as references (Liao *et al.,* 2012; Sinha *et al.,* 2016; Chen *et*

al., 2018). In this context, hypothesis H5: *The market and adhocracy culture has a more fitting effect in explaining the relationship between organizational learning, management innovation, and NPD performance compared to the clan and hierarchy culture,* was supported.

In order to test the related moderator relationships, Multigroup Moderation Analysis was performed. Within the scope of this analysis, the dataset was divided into low and high levels according to the median values of the relevant culture dimension with the AMOS program. The Chi-Square Difference Test was used to test whether there was a significant difference between the two groups. If the Chi-Square difference test is significant, it is concluded that there is a significant difference between the two groups. This method is widely used in the literature (Jiménez-Jiménez and Sanz-Valle, 2011; Kemper, Schilke and Brettel, 2013; Wagner, 2011).

In the model where market culture is the moderator, a significant difference in terms of groups was observed only in the relationship between organizational learning and management innovation (β_D=0.65 p<0.001, B_Y=0.74 p<0.001, $\Delta\chi_2$=8.558 p<0.01). Therefore, since the hypothesis of H_{6a}: *Market culture has a moderating effect in the relationship between organizational learning, management innovation, and NPD performance* was supported, the hypothesis of H_6: *Market culture has a moderating effect in the relationship between organizational learning, management innovation, and NPD performance* was partially supported. In the model where adhocracy culture is the moderator, in the relationships between organizational learning and management innovation (B_D=0.64 p<0.001, B_Y=0.74 p<0.001, $\Delta\chi_2$=8.324 p<0.01) and management innovation and NPD performance (B_D=0.22 p<0.001, B_Y=0.49 p<0.001, $\Delta\chi_2$=8.556, p<0.01), a significant difference was observed in terms of groups. Accordingly, since hypotheses H7a: *Adhocracy culture has a moderator effect in the relationship between organizational learning and management innovation*, and H7b: *Adhocracy culture has a moderator effect in the relationship between management innovation, and NPD performance* were supported, hypothesis H7: *Adhocracy culture has a moderator effect in the relationship between organizational learning, management innovation, and NPD performance* was partially supported. After the comparative evaluation, the final research model is given below in Figure 1.

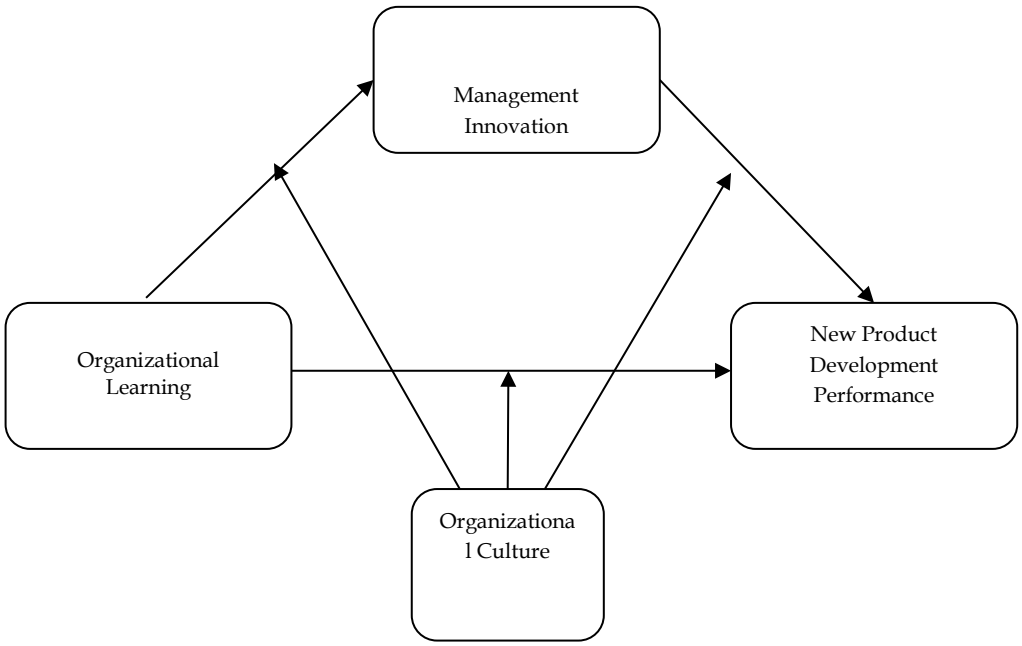

Figure 1: Research Model

Conclusion

This research examines the relationship between organizational culture, organizational learning, management innovation, and new product development within an integrated model. In the literature, the supportive or preventive effects of the organizational culture are among the important issues considered to achieve organizational goals, make the right strategic decisions, and adapt to changing environmental conditions with innovative products and management practices (Cameron and Quinn, 2017). In the context of its relationship with the organization, it is observed that culture is considered a resource that guides the organization based on a resource-based approach, which is the basis for the strategic management approach and knowledge-based theory, which emphasizes organizational

learning through effective management of knowledge (Smircich, 1983). Organizational culture studies consider culture as the basis of development in learning, innovation, and new product development activities that will provide a competitive advantage to the organization (Popper and Lipshitz, 2000; Deshpande and Farley, 2004). From this perspective, the research reveals how competitive structures are affected in the context of changing cultural characteristics.

First, research findings provide evidence for the relationships between organizational learning, management innovation, and NPD performance. These findings support the literature (Alegre and Chiva, 2008; Hurley and Hult, 1998; Calantone et al., 2002; Akgün et al., 2007; Jiménez-Jiménez and Sanz-Valle, 2011; Sinkula et al., 1997; Damanpour, Walker and Avellaneda, 2009). Additionally, it is found that organizational learning enhances NPD performance through management innovation. In the literature, the relationship between NPD success and top management practices is revealed; organizational learning is seen as an important part of the NPD process, and it is argued that the NPD process is also supported by innovation, which is an output of the learning activity (Awwad and Akroush, 2016; Akgün et al., 2007). However, it is noteworthy that there is a lack of empirical evidence that supports those relationships in the context of management innovation and explains them within the scope of competing models based on organizational culture. The study explores these relationships in the context of culture. Deshpande and Farley (2004), Liao et al. (2012), Sanz-Valle et al. (2011) and Popper and Lipshitz (2000), who investigate the relationship between organizational learning, innovation, NPD, and organizational culture, evaluated innovation and performance in general, and, as Schein (2010) did, they suggested that failures in organizational learning activity are closely related to the culture of the organization. However, the relationship between management innovation and NPD has been overlooked (Deshpande and Farley, 2004; Chen et al., 2018; Naranjo-Valenciaa et al., 2015). At this point, it can be said that this research has the characteristic of originality. The aim of addressing management innovation can be said to define subliminal cultural tendencies with the awareness of the conscious top management.

For the competing analysis, four different models with the relationship between organizational learning, management innovation, and NPD were created for the four types of culture. The goodness of fit indices revealed that the market and adhocracy cultures have a more fitting effect than the clan and hierarchy cultures in explaining the relationship between organizational learning, management innovation, and NPD performance. This situation proves that organizations focusing on market success with new products and adopting an innovative approach are more effective in organizational learning and innovation (Jiménez-Jiménez and Sanz-Valle, 2011). It was found that the market and adhocracy cultures have a moderating effect on the relationship between organizational learning and management innovation, and the adhocracy culture has a moderating effect on the relationship between management innovation and NPD. In the literature, it is argued that a market-oriented culture will not have a positive effect on performance without organizational learning capability (Slater and Narver 1995). Similarly, studies point out that the market culture supports NPD. It is argued that the market culture, which focuses on the change in the market and adopts an understanding of learning based on collecting the information in the market better, supports the relationship between organizational learning and NPD (Chan., Shaffer and Snape, 2004; Chen et al., 2018; Naranjo-Valenciaa et al., 2015). However, the moderator effect of neither market nor adhocracy culture in the relationship between organizational learning and NPD was found. This can be explained by the fact that moderator effects were differentiated since studies were conducted in different regions, sectors, cultures, and sample sizes. Similarly, the literature specifically states that the adhocracy culture is the best pioneer of innovation and performance, and innovative culture significantly affects organizational learning and innovation (Naranjo-Valenciaa et al., 2015; Liao et al., 2012). The study revealed that only the adhocracy culture positively affects the relationship between management innovation and NPD and organizational learning and management innovation. It also argued that market culture significantly affects the relationship between organizational learning and management innovation (Chan et al., 2004; Chen et al., 2018; Naranjo-Valenciaa et al., 2015). In the study, it is seen that the findings regarding the types of culture are theoretically consistent with the competing values model derived from the conceptual framework. It reveals the fitting and moderating effects of adhocracy and market cultures, especially in learning, management innovation, and NPD, that will provide a competitive advantage to the organization. Thus, it can be suggested that organizations consider their cultures as a resource that provides a competitive advantage. Moreover, it can be strongly recommended that organizations wishing to improve their NPD performance position their culture adhocratic and market-oriented way that supports organizational learning and management innovation.

Managerial implications

Research primarily reveals the supportive effect of organizational culture to increase NPD performance by realizing innovation in management through an organizational learning activity. Findings support that culture is the antecedent of innovation, and organizational learning guides managers in determining managerial strategies. The study states that organizational culture can improve NPD performance by realizing organizational learning and management innovation. In this context, the competitive model developed provides empirical data on how organizations gain a strong competitive advantage in the market. The research argues that organizations willing to become the market leader by offering new products should adapt the market and adhocracy culture to their organizations as the dominant culture.

Research limitations and future direction

This study only explains the sample size of the 234 units of analysis on which the research was conducted. In order to increase the accuracy of the generalizations, it may be recommended to repeat the study by enlarging the sample size. Additionally, the study was carried out on organizations operating in a particular society. It can be carried out on organizations operating in different societies in the context of comparative analysis. In the research, the data based on the perception of the individuals and obtained by the survey method were explained by statistical analysis. Ultimately, the results are based on the perception of organizational members. Based on quantitative research, this study can be methodologically tested with objective quantitative data using other research techniques.

Culture is a phenomenon trying to comprehend the basic mental processes that play a role in forming thought, perception, emotion, and belief structure. The collective unconscious formation that emerges as a function of this mental structure is expressed as culture (Schein, 2010). The existence of a supportive relationship between unconscious mental processes and conscious thought may be possible by defining unconscious processes and transferring them to consciousness. Only after then can there be a consciousness of free will. In this context, it is important to define and illuminate if an important belief and mental structure hinders development (Kandel, 2006). This reveals the requirement for supporting the effective implementation of consciously taken decisions without creating resistance within the organization and developing culturally appropriate strategies in the cultural context. In their research, Cameron and Quinn (2006) aimed to address organizations by identifying organizational culture based on a similar approach. The lack of such comprehensive diagnostic tools in the literature is an important limitation. Future interdisciplinary research can be conducted to diagnose organizational culture. Based on psychology literature, other diagnostic methods can be adapted to management and organizational research. At the same time, because the four types of culture within the scope of competitive values are based on Jung's (2003) theory of four archetypes (Mitroff 1983), it can be said that different mindsets will reveal different organizational structures in organizational terms.

Social implications

Organizations operate in a standardized environment dominated by social, cultural, political, and legal regulations. They are socially supported and sustained as they adapt to the traditions, norms, behaviours, beliefs and value systems, that is, to their environment's established structures and institutions. Organizations act as change actors who have the power to change their environment with this social support and power they gain. In this way, organizations can exhibit creative behaviours that will affect their environment (DiMaggio, 1988). They do this by making sense of their culture and enabling innovation and NPD development. According to the research findings, it can be said that culture affects NPD as a phenomenon that directs learning, management innovation, and new product development, and these outputs lead to social changes in the context of innovation.

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