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The Impact of Organizational Innovativeness on Firm Performance in Poland: The Moderating Role of Innovation Culture

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Abstract:

Purpose: *The study aims to examine the relationship between organizational innovativeness and firm performance, considering the culture of innovation as a potential moderator of this relationship. The present work provides important managerial insights into drivers of firm performance.*
Design/Methodology/Approach: *A survey was conducted across 121 random manufacturing businesses in Poland. A regression analysis series was used to assess the relationships between organizational innovation, an innovation culture, and a firm's performance.*
Findings: *Organizational innovativeness and innovation culture both have a substantial and positive impact on firm performance. The innovation culture played a moderating role in the relationship between innovativeness and firm performance in both high- and low-innovation cultures and across all dimensions of innovation. The moderation itself was the strongest in strategic innovativeness, whereas the market innovativeness model produced the most significant variance attributable to the moderator.*
Practical Implications: *The study speaks to the need to consider organizational innovativeness and drivers of the innovation culture when striving for good firm performance – a notion important for management practice.*
Originality/Value: *The literature provides ample evidence to substantiate the thesis that innovation positively impacts a firm's performance, though findings vary substantially across studies. Furthermore, a paucity of studies would model and empirically verify the relationship between organizational innovativeness and firm performance among industrial businesses operating in Central-Eastern Europe. There is also little research demonstrating the role of the innovation culture in moderating this relationship. This research makes an essential contribution to the existing literature by empirically examining the relationship between organizational innovativeness, innovation culture, and firm performance.*

Keywords: *Organizational innovativeness, innovation culture, firm performance.*

JEL codes: *O31.*

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1. Introduction

There is ample evidence to support the thesis that the ability to innovate has contributed to the success or failure of enterprises (Danks, Rao, and Jeff, 2017; Brettel and Cleven, 2011). To ensure sustainable innovativeness, companies require both tangible material assets and intangible intra-organizational drivers of novel developments, the latter of which are much more difficult to quantify. Innovation is supported by the assorted qualities of the organizational culture, which influence employee behavior, thus promoting employee investment in the organization's business goals and adopting its values (Büschgens, Bausch, and Balkin, 2013). The literature provides ample evidence to substantiate the notion that innovation positively impacts a firm's performance (Rubera and Kirca, 2012).

However, there is a paucity of research demonstrating the role of the innovation culture in moderating this relationship. Therefore, examining the relationship between organizational innovativeness, an innovation culture, and the firm's performance will provide important managerial insights into impacting the firm's performance. These arguments served to formulate the purpose of this study, which was to examine the relationship between firm innovation and firm performance while considering the culture of innovation as a potential moderator of this relationship.

2. Literature Review

2.1 Organizational Innovativeness

Aspects of innovativeness are among the most frequently exercised conversations relating to economic progress and prosperity (Nasierowski and Arcelus, 2012). There is no scarcity of innovation research, a comparatively small number of studies focus on innovativeness (Yusof and Abidin, 2011). There is also an apparent lack of a coherent perspective on innovativeness (Goswami and Mathew, 2005). Much like the ambiguous concept of innovation itself, organizational innovativeness has been viewed in the literature in many contexts. As such, there is no one universally accepted definition of innovativeness. In contrast to innovation, organizational innovativeness considers multiple innovations emphasizing organizational characteristics rather than specific innovation attributes (Moos *et al.*, 2010).

Innovativeness has been examined from different perspectives – both as a function of organization management (organizational innovativeness) and national/ regional economies. It has also been approached as a human personality trait and analyzed in empirical studies, mainly about customer acceptance of product innovations and qualities of individual employees or groups (teams) (Schweisfurth and Raasch, 2018). As the concepts of innovation and innovativeness are irrevocably linked, the terms have often been used interchangeably throughout the literature. The conflation, broadness, and vague nature of these terms, combined with the lack of unified

systematization and the divergent theoretical and quantification approaches, have led to difficulties in comparing findings of different empirical studies (Nawrocki, 2015).

Although there is no one definition of organizational innovativeness, most authors seem to view it as the ability or readiness of an organization to develop different types of innovations (Akgün, 2012; Engelen and Brettel, 2012; Ingram, 2013; Lenners, Eisend, Lieven, Brexendorf, Tomczaky, and Torsten, 2016; Sommer, Heidenreich, and Handrich, 2017). Innovativeness is an attribute of an organization that defines its ability to introduce or develop innovations or its readiness (willingness) to introduce or develop innovations (Tajeddini, Trueman, and Larsen, 2006). Innovativeness has been described as the extent to which firm markets new or improved products and invests in research and development, as well as openness to new ideas, creativity, flexibility, willingness to change, experimentation, and propensity to take risks in the firm's culture (Sommer, Heidenreich, and Handrich, 2017). El-Kot and Gamal (2011) and Wang and Ahmed (2004) consider innovativeness to be an organization's overall capability of introducing new products to the market – or opening new markets – by combining strategic orientation with innovative behavior and process. Innovativeness has also been described as an organization's capacity to introduce new processes, products, and ideas (Hult, Hurley, and Knight, 2004) and the firm's capacity to innovate, which can lead to the development of new products, services, and processes (Raj and Srivastava, 2014).

Another approach to innovativeness is that of an organization's readiness to innovate or develop new products, measured in terms of a firm's responsiveness to market change, as well as its ability to rapidly commercialize new products/services (Hsu, 2007). Theoharakis and Hooley (2008) describe it as the readiness of an organization to launch the development of new products and to engage in innovation processes to achieve intended targets, as compared against its competitors. Innovation involves a proactive pursuit of new ideas across an organization's technical and administrative segments (Santos-Vijande and Alvarez-Gonzales, 2007).

When considering organizational innovation, it bears noting that some researchers distinguish the general innovation potential and willingness to pursue innovation targets from the actual, implemented products of innovative activity. One attempt to provide a comprehensive approach to organizational innovativeness – including behavioral, market, process, product, and strategic innovativeness – has been made by operationalizing a tool called the organizational innovativeness construct, posited by Wang and Ahmed (2004). The tool developed by these researchers was based on studies that examined selected facets of innovation and identified strategic orientation as the primary determinant of an organization's innovative capacity. Wang and Ahmed (2004) identified five main areas that determine an organization's overall innovativeness. They defined *organizational innovativeness* as an organization's overall innovative capability to introduce new products to the market or open new markets by combining strategic orientation with innovative behavior and process.

Multiple authors (Ellonen, Blomqvist, and Puumalainen, 2008; El-Kot and Gamal, 2011; Akgün, Keskin, and Byrne, 2012) have used the operationalization approach developed by Wang and Ahmed (2004) to conduct studies on this variable, among others. One of the construct's advantages is the multi-dimensional view of organizational innovation, which encompasses many aspects of the variable (Yusof, Shafiei, Said, and Abidin, 2010). The authors of the present paper have also measured innovativeness using the construct posited by Wang and Ahmed (2004), which encompasses: behavioral innovativeness, market innovativeness, process innovativeness, product innovativeness, and strategic innovativeness.

Behavioral innovativeness refers to a change in the conduct or attitude of organizational members that facilitates the development and adoption of new ideas, products, or processes (Jong and Hartog, 2007). This innovativeness dimension is associated with continuous behavioral changes, which signify the commitment of organizations to innovate (Yusof and Abidin, 2011). Behavioral innovativeness, defined as: "the overall internal receptivity to new ideas and innovation that is demonstrated through individuals, teams, and management and that enables the formation of an innovative culture" (Wang and Ahmed, 2004), could be most effectively enhanced by building both interpersonal and impersonal organizational trust (Strychalska-Rudzewicz and Rudzewicz, 2014). Behavioral innovativeness may emerge at different levels: individuals, teams, and management (Wang and Ahmed, 2004). Individual innovativeness means a willingness to change, whereas team innovativeness is the team's adaptability to change (Lovelace, Shapiro, and Weingart 2001). In turn, organizational innovativeness will mean the organization's willingness to foster new management ideas and encourage new ways of doing things (Rainey, 1999; Wang and Ahmed, 2004).

Market innovativeness means the newness of approaches that companies adopt to enter and exploit the targeted market. This type of innovativeness emphasizes the novelty of market-oriented approaches (Wang and Ahmed, 2004). It is also considered the adoption of new or unique market-oriented methods to take advantage or penetrate a targeted market (Hilmi and Ramayah, 2008).

Process innovativeness is considered an organization's capability to marshal, integrate, and leverage organizational resources to improve or create new processes (Das and Joshi, 2012). It entails developments in processes, systems, and reengineering activities (Khazanchi, 2007) and encompasses technology innovation and radical and continuous changes in production methods (Baer and Frese, 2003; Yusof and Abidin, 2011).

Product innovativeness can be defined as the novelty and meaningfulness of new products introduced to the market quickly (Wang and Ahmed, 2004). It refers to the novelty or distinctiveness of products (Yusof *et al.,* 2010). Innovation can be analyzed from either the producer or the consumer, as the two can differ in what they perceive and evaluate as new. A novelty is a product created using new designs, raw materials,

or manufacturing technologies for the producer. Environmental familiarity and project-firm fit, and technological and marketing aspects are proposed as dimensions of product innovativeness within the firm's perspective (Danneels and Kleinschmidt, 2001). In contrast, a consumer identifies novel products as those that address new needs or satisfy existing needs in a novel manner (Szymanski, Kroff, and Troy, 2007) and perceives innovation attributes, adoption risks, and change levels in the established behavior patterns as forms of product newness.

Strategic innovativeness means a push towards introducing radical changes in managing an existing business, which broadens the scope of the organization's operations and thus increases its competitive advantage (Wang and Ahmed, 2004; Besanko, Dranove, and Shanley, 2007; Yusof and Abidin, 2011). As Wang and Ahmed (2004) pointed "strategic innovativeness highlights an organization's ability to identify external opportunities in a timely fashion and match external opportunities with internal capabilities in order to deliver innovative products and explore new markets or market sectors."

2.2 Innovativeness vs. Firm Performance

The literature usually distinguishes between four metrics of firm performance: financial performance, know-how, tangible/intangible benefits, and balanced scorecard (Lee and Choi, 2003). Rubera and Kirca (2012) have outlined several performance outcomes, including firm value, market position, and growth rate. Lee and Choi (2003) have presented a method to measure performance based on Deshpande, Jarley, and Webster (1993) and Drew (1997), which was used to assess the values of the metrics. The tool enables assessing organizational performance against the firm’s most significant competitors, using metrics such as market share, profitability, growth rate, innovativeness, success, and firm size.

Enterprises implement innovations to reap the resultant benefits. Taking this into account, the study aimed to examine the impact of innovativeness on firm performance. Although the relation between organizational innovativeness and firm performance has been studied, there is little empirical evidence to support this perspective in manufacturing enterprises. There is a wide variability of results across studies (Sorescu and Spanjol, 2008; Rubera and Kirca, 2012). For example, Werlang and Rossetto (2019) have stated that organizational innovativeness does not significantly influence organizational performance, whereas Rhee, Park, and Lee (2010) have found that innovativeness has a significant effect on firm performance. Thus, it is clear that the available research provides conflicting findings, with some studies showing a positive correlation between the variables (Li and Atuahene-Gima, 2001; Guo, Baruch, and Zhou, 2005; Leal-Rodríguez, Luis, Roldan, and Leal-Millán, 2015), some failing to find a link between innovation and organizational performance (Birleyi and Westhead, 1990; Heunks, 1998), and others even showing a negative impact of innovation on firm performance (McGee, Dowling, and Megginson, 1995; Vermeulen, 2005).

Organizations develop innovations to boost market performance and improve their long-term financial standing. Innovativeness and firm performance are critical drivers of firm growth, economic growth, and competitiveness (Kelly and Kumar, 2009; Ruberam and Kirca, 2012). Thus, we have adopted the view that a positive relationship exists between innovation and firm performance, based on the notion that fostering innovativeness produces better firm performance. Similarly, a culture that supports innovativeness can better prepare organizations for dealing with an uncertain environment and maintain a long-term competitive advantage. In the light of the above reasoning, we formulated the following research hypothesis:

H1: *Organizational innovativeness has a positive impact on firm performance.*

2.3 Innovation Culture

To ensure sustainable innovativeness, companies require both tangible material assets and the more intangible intra-organizational drivers of novel developments, the latter of which are much more difficult to quantify. Innovation is supported by the qualities of organizational culture, which influence employee behavior and thus promote the adoption of the organization's values and investment in its business goals (Büschgens, Bausch, and Balkin, 2013). According to Martins and Terblanche (2003), the organizational culture can be defined as the sum of the main assumptions which employees of the organization adopt. The innovation culture is expressed in relatively stable modes of thinking, behavior, and social organization, orientated towards modernization and development, based on shared values (Jucevičius, 2009).

The extent to which an organization can be regarded as innovative will be circumscribed by its innovation culture (Dobni, 2008), although enterprises often are more concentrated on resources, processes, and measuring success which is the more easily quantified. Less attention is put to the harder-to-measure, people-oriented determinants of innovative culture (Rao and Weintraub, 2013). The existing literature provides some evidence of a relationship between the innovativeness of enterprises and their culture. For example, cultural openness is a feature that helps to recognize the need for innovation (Van de Ven, 1986; Dobni, 2008), which finally determines whether innovation initiatives are adopted or rejected. According to Hurley and Hult (1998), levels of innovativeness in an organization are associated with cultures that emphasize learning development and participative decision-making. Moreover, the antecedents of an innovation culture are like antecedents of a market-oriented culture (O'Cass and Ngo, 2007).

Multiple innovation-promoting aspects of innovation culture have been emphasized by researchers (Martins and Terblanche, 2003; Jamrog, Vickers, and Bear 2006; Dobni, 2008; Jucevičius, 2009; Danks, Rao, and Jeff, 2017; Strychalska-Rudzewicz, 2019) who have studied the issue of fostering innovativeness through organizational culture. This background has served as the basis for an in-depth discussion on the selected elements of the innovation culture that have drawn the most attention in the

literature. Elements of the innovation culture affect the attitudes of employees and their modes of behavior within the enterprise. As such, these elements of organizational culture can be considered to determine or develop innovation.

Organizational culture thus becomes the nucleus for developing and implementing innovation and a component of the employees' shared perception of reality and a meta-instrument of management. As a specific organizational element and management instrument, an innovation-friendly organizational culture endorses innovation-promoting values and supports activities that make the business more innovative. In the long term, organizational culture is a dependent variable determined by the norms of conduct, attitudes, and values produced by the elements of innovation culture.

Martins and Terblanche (2003) synthesized the creativity- and innovation-promoting cultural values and norms into an integrated, interactive model. This scheme can characterize the organizational culture in organizations and identify what components of the organizational culture influence innovation in organizations. Elements of the organizational culture affect organizational innovativeness. This effect can be broken down into five determinants of an innovation-friendly organizational culture, strategy, structure, support mechanisms, behavior that encourages innovation, and communication.

Based on a survey of over a thousand industrial companies worldwide, Jamrog, Vickers, and Bear (2006) identified the significant determinants of innovation culture, customer focus, teamwork, sufficient resources, ability to choose the right ideas, propensity to take risks, leadership, and an innovation-promoting incentive scheme. The most significant focus on innovation takes place in R&D departments, which are often compartmentalized from other departments in developing product and process innovations. The study also found that many innovative and competitive companies promote a customer satisfaction-oriented culture (Jamrog, Vickers, and Bear, 2006).

Another framework that incorporates elements of the innovation culture has been developed by Dobni (2008), whose proposal seems to be the most robust in terms of the examined elements of innovation culture. The study is based on a survey administered to a cross-section of employees working for a large Canadian financial service provider. The model incorporates the components of the 'culture-strategy-organizational context' triad. Dobni (2008) has indicated four general dimensions of innovation culture, that being, the intention to be innovative, the infrastructure to support innovation thrusts, influence, or the knowledge and orientation of employees to support thoughts and actions necessary for innovation, and an environment or context to support implementation – which invariably has inherent risk and reward tradeoffs.

Strychalska-Rudzewicz (2019) conducted a literature review to identify which elements of the innovation culture have the most substantial impact on innovativeness.

These elements were found to encompass encouragement of creativity, knowledge management, trust-building, risk appetite, cooperation, innovation-friendly leadership, participation, market orientation, and strategic approach to innovation. It bears noting that these factors are usually interlinked. Based on the results of a survey conducted in a Polish industrial enterprise, Strychalska-Rudzewicz (2019) successfully validated her innovation culture construct – which was also used in the present study - to determine the link between culture and innovation/firm performance.

According to Strychalska-Rudzewicz (2019), the components of the innovation culture include the extent to which employees cooperate and participate in decision-making without fear of reprisal and the fostering of creativity on the part of the management, their availability, and openness. Equally important are knowledge sharing, integrity, and trust within the firm. The innovation culture also includes the knowledge of values and norms and how well they are followed. Market orientation in the innovation culture refers to the ongoing monitoring of customer satisfaction, awareness of customer needs, swift response to market changes (especially about consumer behavior), and competition activity.

Other important factors include the appetite for innovation-related risk and the priority and strategic importance of innovation (forward-planning on innovation). In this regard, it should be determined how much tangible or intangible assets are used and whether the organization treats know-how as an asset for building a competitive market advantage. The innovation culture is also shaped by how employees acknowledge that the organization makes good use of their creativity and provides opportunities for growth through creativity. Finally, it is essential to verify how open the employees are to change and whether the changes translate to promotion opportunities.

As mentioned, culture is one of the determinants of a firm's success, in which the top management of a firm adopts a specific entrepreneurial orientation in a particular environment (Covin and Slevin, 1988). Organizational culture has been recognized as one of the essential drivers of better firm performance (Chan, Shaffer, and Snape, 2004; Hammer, 2004; Govindarajan and Trimble, 2005; Uzkurt, Kumar, Kimzan, and Eminoglu, 2013). On this basis, the following hypothesis was formulated:

H2: *Innovation culture has a positive impact on firm performance.*

Quandt, Bezerra, and Ferraresi (2015) developed a theoretical model to represent the organizational conditions that facilitate innovation and support innovativeness. These authors concluded that innovative organizations with a well-developed organizational culture, leadership, and learning processes attain better results. Literature sources also indicate that the organizational culture is an essential determinant of firm innovativeness (Lemon and Sahota, 2004; Hartmann, 2006; Strychalska-Rudzewicz, 2016). Cultivating an innovative organization is thus synonymous with fostering

appropriate organizational culture, supporting the ongoing development of innovation in the enterprise. Given these arguments, the third hypothesis was put forward:

H3: *The relationship between innovativeness and firm performance is positively moderated by innovation culture.*

3. Research Methodology

The survey was conducted among manufacturing enterprises operating in Poland and funded by the research project "Organizational culture as a determinant of innovative processes in industrial businesses." The HBI commercial database of national commercial entities served as the sampling frame. The company datasets provided in the database were robust enough to enable the grouping of firms by section/area of business (according to the PKD/Polish Classification of Activities) and employment size. The sampling frame was prepared by creating two sets of medium-high and low technology enterprises employing at least 50 persons. The study was initially set to also include high-tech companies – however, in the pilot study encompassing 20 enterprises, the prospective subjects refused to respond to protect critical information. As a result, this business sector was excluded from the main study.

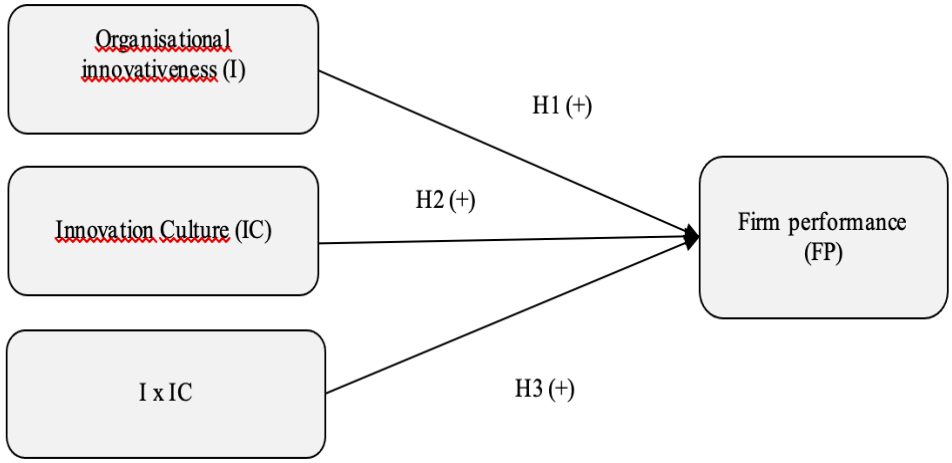
The complete set of facilities and units covered by the study (the population) consisted altogether of 1511 medium-high-tech firms belonging to PKD section C (industrial processing) and 1502 low-tech firms belonging to PKD section C (industrial processing). One hundred twenty-one fully completed questionnaires were obtained. Sixty-three medium-high tech firms participated in the survey (52.1% of the total sample) and 58 low-tech firms (47.9% of the total sample). In addition to telephone interviews, copies of the survey instrument were sent out via e-mail and post. Respondents were selected based on their participation in innovation development, with the assumption that professionals so involved would be the best equipped to make statements on the organizational culture of the business, as they could also judge how the leadership contributed (as an element of innovation culture) to promoting innovation in the organization.

The questionnaire used a 7-point Likert scale with one neutral response, "neither disagree nor agree," so that the respondents do not feel compelled to answer any question they may not be sure about. The study scales were adopted from existing literature on organizational innovativeness, innovation culture, and firm performance. The construct by Wang and Ahmed (2004), relatively often cited in the literature, was used as the first survey instrument to assess innovation. The tool developed by these researchers encompasses a comprehensive synthesis of five dimensions of organizational innovativeness – behavioral, market, process, product, and strategic innovativeness – and was an outgrowth of previous studies on selected facets of innovation that included strategic orientation as a significant determinant of an organization's innovative capacity. The construct posited by Wang and Ahmed (2004) has been used by numerous researchers (Ellonen, 2008; El-Kot and Gamal, 2011;

Akgün, 2012). The second construct used in the study – firm performance, was measured using the operationalization put forward by Lee and Choi (2003). The operationalization of performance measurement may be considered a variation of the balanced scorecard method. One of its advantages is that it enables a comparison of firm performance against its primary competitors. The research construct used for operationalization of the innovation culture was that of Strychalska-Rudzewicz (2019), successfully validated by its author with a survey conducted in a Polish industrial enterprise.

The relationships between variables are presented graphically as a research model (Figure 1).

Figure 1. *Research model*



Source: *Own study.*

The organizational innovativeness research construct (independent variable) consisted of 20 concepts, firm performance (dependent variable) consisted of 5 concepts, and innovation culture (moderator) consisted of 45 concepts. A regression analysis series was used to test for correlation and examine the moderator's effect as a determinant of the direction or strength of the link between two variables. The data were analyzed through SPSS.

4. Results

Innovativeness proved to be a significant and positive predictor of firm performance t=8.221; β=0.749; p<0.01. High levels of innovativeness exhibited a strong correlation with good firm performance. Variance in innovativeness accounted for 56.0% of variance in firm performance R^2_{FP}=0.560. This substantiated the first of the hypotheses ***H1:*** *Innovativeness has a positive impact on firm performance.*

Table 1. *Results of the regression analysis innovation culture impact on firm performance*

Relation	Results of regression	Hypothesis confirmed
	R^2_{FP}= 0.560	
H1: I → FP	0.749***(8.221)	Yes

**** p < 0.001, ** p < 0.01, * p < 0.05, ns: not significant.*
Source: *Own study.*

Innovation culture proved to be a significant and positive predictor of firm performance t=10.656; β=0.797; p < 0.001. High levels of innovation culture exhibited a similarly strong correlation with good firm performance. Variance in innovation culture accounted for 63.6% of the variance in firm performance R2FP=0.636. This substantiated the second hypothesis ***H2:*** *Innovation culture has a positive impact on firm performance.*

Table 2. *Results of the regression analysis of innovation culture impact on firm performance*

Relation	Results of regression	Hypothesis confirmed
	R^2_{FP}= 0.636	
H2: IC → FP	0.797*** (10.656)	Yes

**** p < 0.001, ** p < 0.01, * p < 0.05, ns: not significant.*
Source*: Own study.*

In order to investigate the moderating effect of innovation culture on the relationship between innovation and firm performance, a model was developed with an independent variable and a moderating variable, as well as a model that included both these variables, as well as a moderator calculated by multiplying the independent variable by the moderating variable. Standardized loadings of variables were used to calculate the moderating effect in order to avoid the multicollinearity problem. After introducing the moderator, the model showed that firm performance was indeed affected – though at the limit of statistical tendency – by innovativeness t=2.002; β=0.220, innovation culture t=4,922; β=0.536; p < 0.001, and the moderator t=3.654; β=0.277; p < 0.01. The model variables accounted for 84.8% of the variance in firm performance. Based on the f2 = 0.192, the moderation can be said to be fairly strong (Table 3).

Table 3. *Results of the regression analysis, with and without moderator*

Relation	Results of regression without moderator	Hypothesis confirmed	Results of regression with moderator	Hypothesis confirmed
	R^2_{FP}= 0.688		R^2_{FP}= 0.748	f^2= 0.192
H1: I → FP	0.292* (2.434)	No	0.220 (2.002)	No
H2: IC → FP	0.590*** (4.911)	Yes	0.536***(4.922)	Yes
H3: IC*I → FP			0.227** (3.654)	Yes

**** p < 0.001, ** p < 0.01, * p < 0.05, ns: not significant.*
Source: *Own study.*

The following Table 4 shows the regression analysis results of innovativeness impact on firm performance, considering high- and low-innovation culture. These results show a statistically significant and positive effect on firm performance in both cultures (i.e., for weak support for innovation at t=2.930; β=0.478; $p < 0.01$) and strong support for innovation t=5.038; β=0.732; $p < 0.001$). This leads to the conclusion that the innovation culture plays a moderating role in the relationship between innovativeness and firm performance. This confirmed hypothesis ***H3:*** *The relationship between innovativeness and firm performance is positively moderated by innovation culture.*

Table 4. *Results of the regression analysis conducted for hypothesis H3 considering cultures with strong and weak support for innovation*

Relation	Results of regression	Hypothesis confirmed
	R^2_{FP}= 0.228	
	R^2_{FP}= 0.536	
H3: I → FP (low support)	0.478**(2.930)	Yes
H3: I → FP (high support)	0.732*** (5.038)	Yes

**** p < 0.001, ** p < 0.01, * p < 0.05, ns: not significant.*
Source: *Own study.*

In the next stage, a series of moderation analyses were performed to examine the impact of the different innovativeness dimensions on firm performance with the moderating effect of the innovation culture. All moderator effects were statistically significant across all moderated results at $p < 0.05$, meaning that the innovation culture played a moderating role in the relationships between each innovativeness dimension and firm performance. The market innovativeness model produced the most significant variance attributable to the moderator (R2FP=0.791), though the moderation itself was the strongest in the strategic innovativeness model f2 = 0.273 (Table 5).

Table 5. *Results of the regression analysis, with and without moderator*

Relation	Results of regression without moderator	Hypothesis confirmed	Results of regression with moderator	Hypothesis confirmed
	R^2_{FP}= 0.653		R^2_{FP}= 0.711	f^2= 0.167
	R^2_{FP}= 0.770		R^2_{FP}= 0.791	f^2= 0.091
	R^2_{FP}= 0.677		R^2_{FP}= 0.745	f^2= 0.211
	R^2_{FP}= 0.660		R^2_{FP}= 0.720	f^2= 0.176
	R^2_{FP}= 0.656		R^2_{FP}= 0.750	f^2= 0.273
I1 (behavioral)→ FP	0.024n.s. (0.223)	No	0.121n.s. (1.175)	No
IC → FP	0.800***(7.400)	Yes	0.698***(6.770)	Yes
IC*I1 → FP			0.261** (3.391)	No
I2 (market)→ FP	0.460*** (5.149)	Yes	0.385*** (4.261)	Yes
IC → FP	0.502***(5.616)	Yes	0.474***(5.515)	Yes
IC*I2 → FP			0.182* (2.482)	Yes
I3 (process)→ FP	0.221n.s. (1.978)	No	0.155n.s. (1.538)	No
IC → FP	0.656***(5.872)	Yes	0.594***(5.909)	Yes

IC*I3 → FP			0.291*** (3.868)	Yes
I4 (product)→ FP	0.107n.s. (1.035)	No	0.151n.s. (1.595)	No
IC → FP	0.748***(7.251)	Yes	0.638***(6.476)	Yes
IC*I4 → FP			0.267** (3.498)	Yes
I5 (strategic)→ FP	0.080n.s. (0.736)	No	-0.091n.s. (-0,910)	No
IC → FP	0.762***(7.019)	Yes	0.679***(7.201)	Yes
IC*I5 → FP			0.387*** (4.532)	Yes

**** p < 0.001, ** p < 0.01, * p < 0.05, ns: not significant.*

Source: *Own study.*

The next Table 6 shows the regression analysis results of the effect of innovativeness aspects on firm performance, divided between cultures with weak and strong support for innovation. The variables were found to significantly affect firm performance in the market innovation, process innovation, and product innovation groups. The demonstrated link was stronger for high-innovation culture (culture with stronger support for innovation). In the behavioral innovation-firm performance model, the behavioral innovation was confirmed to affect the low-innovation culture (culture with weak support for innovation) $t=2.333$; $\beta=0.398$; $p < 0.05$, which noted the case with the high-innovation culture, $t=1.919$; $\beta=0.379$. In the case of the strategic innovation-firm performance model, the strategic innovation was confirmed to have an effect in the high-innovation culture (culture with strong support for innovation) $t=3.890$; $\beta=0.638$; $p < 0.01$, but not in the low-innovation culture $t= -0.329$; $\beta= -0.061$.

Table 6. *Results of the regression analysis conducted for H3 considering low- and high-innovation culture*

Relation	Results of regression	Hypothesis confirmed
	$R^2_{FP}= 0.158$	
	$R^2_{FP}= 0.143$	
I1 → FP (low culture)	0.398* (2.333)	Yes
I1 → FP (high culture)	0.379 (1.919)	No
	$R^2_{FP}= 0.437$	
	$R^2_{FP}= 0.627$	
I2 → FP (low culture)	0.661*** (4.744)	Yes
I2 → FP (high culture)	0.792*** (6.083)	Yes
	$R^2_{FP}= 0.173$	
	$R^2_{FP}= 0.385$	
I3 → FP (low culture)	0.416* (2.461)	Yes
I3 → FP (high culture)	0.621** (3.714)	Yes
	$R^2_{FP}= 0.184$	
	$R^2_{FP}= 0.411$	
I4 → FP (low culture)	0.429* (2.558)	Yes
I4 → FP (high culture)	0.641** (3.914)	Yes
	$R^2_{FP}= 0.004$	
	$R^2_{FP}= 0.407$	
I5 → FP (low culture)	-0.061 (-0.329)	No
I5 → FP (high culture)	0.638** (3.890)	Yes

**** p < 0.001, ** p < 0.01, * p < 0.05, ns: not significant.*

Source: *Own study.*

5. Discussion

Findings related to the performance implications of firm innovativeness vary substantially across studies (Rubera and Kirca, 2012). As such, the positive impact of innovativeness on firm performance was not that obvious. The results of the present survey of industrial enterprises in Poland are in line with other studies (Li and Atuahene-Gima, 2001; Guo, Baruch, and Zhou, 2005; Rhee, Park and Lee, 2010; Leal-Rodríguez, Luis, Roldan, and Leal-Millán, 2015) that have demonstrated a significant effect of innovativeness on firm's performance.

Our findings also indicate that the innovation culture is a strong predictor of enterprise's performance, a conclusion in line with other research showing that the organizational culture is related to a firm's performance (Chan, Shaffer, and Snape 2004; Ngo and Loi, 2008; Uzkurt, Kumar, Kimzan, and Eminoglu, 2013). By way of example, Ngo and Loi (2008) showed that an adaptive culture positively affects market-related performance.

The relationship between innovativeness and firm performance was found to be positively moderated by innovation culture. These findings are hardly surprising, given that the ongoing implementation of innovations is determined by innovation-promoting qualities of corporate culture (values, norms, dominant modes of action). Companies should have a strong interest vested in supporting values and creating an environment favorable for fostering innovation within the organization.

A series of moderation analyses were performed to examine the impact of the different innovation dimensions on firm performance, considering the moderating effect of innovation culture. They showed that culture did indeed play a moderating role in this relationship for all the dimensions of innovation. The moderation itself was the strongest in strategic innovativeness, whereas the most significant variance attributable to the moderator was produced for the market innovativeness model. Therefore, as corroborated by our findings, industrial enterprises can perform better if they market novel products and extend support for values, attitudes, and norms that promote market orientation.

The regression analysis results for the impact of innovativeness aspects on firm performance – divided between cultures with weak and strong support for innovation – showed that these variables had a significant and positive effect on firm performance in the market innovativeness, process innovativeness, and product innovativeness groups. However, a high-innovation culture does not affect the strength or direction of the correlation between behavioral innovativeness and firm performance. This association may stem from the high overlap between behavioral innovativeness and innovation culture, which relates to the support and acceptance provided by the management to the employees wishing to explore new ways of handling tasks. Both innovation culture and behavioral innovativeness emphasize the need and willingness to test new models of action, strive for novel solutions, and encourage employees to engage in original and novel behavior (Wang and Ahmed, 2004; Dobni, 2008).

It was shown that low-innovation culture does not affect the strength or direction of the correlation between behavioral innovativeness and firm performance. Low levels of innovation culture in enterprises do not function as a moderator of this relationship. It is reasonable to conclude that the assorted elements of strategic innovativeness are strong determinants of firm performance. Assignment of assets to R&D, risk-taking by managers, constant pursuit, and implementation of new solutions by the top management are all strong drivers of firm performance. A culture with strong support for strategic innovativeness further bolsters this correlation.

6. Conclusions

Our study found positive results for all the relationships hypothesized in our model. Organization innovativeness was found to impact positively – which can be described as vital - on firm performance. Innovation culture was shown to have a similarly strong impact on firm performance and played a moderating role in the relationship between innovativeness and firm performance in both high- and low-innovation cultures.

The study speaks to the need to take business innovativeness and drivers of innovation culture into account when pursuing good firm performance – a notion important for management practice. Innovation culture seems to function as a moderator of the relationship between innovativeness and firm performance. It also serves as an integral driver of innovativeness, as well as a variable affecting firm performance. This correlation suggests that several measures should be taken to create an innovation-friendly culture, including fostering employee creativity, sharing knowledge within the organization, and maintaining high integrity and trust. Equally important is also the availability of superiors and their openness towards their subordinates. At the same time, employees should be involved in the decision-making process and assured that they would not be punished if a novel solution under development proves unsuccessful. The declared organizational values and principles should be reflected in the organization's actual practices. Equally important is the ongoing monitoring of customer satisfaction, knowledge of customer needs, and swift responsiveness to market changes related to customer behavior and competitor activity. Appetite for innovation-related risk is also a relevant factor.

Furthermore, innovation should be treated as a priority and strategic issue, meaning that tangible or intangible assets must be devoted to developing innovations, whereas know-how should be viewed as an asset for building a competitive market advantage. Attributes of innovation culture that promote innovativeness in firms include readiness for changes and employee promotion through such changes. These factors are significant predictors of innovativeness, and thus – of firm performance.

This study provides a better understanding of the link between organizational innovativeness, firm performance, and innovation culture. It can serve as a foundation for further, more detailed research on the subject. The findings of this empirical study may be examined in terms of the limitations of the research method, sample size,

sample choice, and operationalization of variables. Limitations of this study stem from its scope are limited to medium and large manufacturing enterprises. Future studies may include a different cross-section of company sizes and other industrial sectors or service providers.

References:

Akgün, A., Keskin, H., Byrne, J. 2012. The Role of Organizational Emotional Memory on Declarative and Procedural Memory and Firm Innovativeness. Journal of Product Innovation Management, 29(3), 432-451.

Baer, M., Frese M. 2003. Innovation is not enough: Climates for initiative and psychological safety, process innovations and firm performance. Journal of Organizational Behaviour, 24, 45-68.

Besanko, D., Dranove, D., Shanley, M. 2007. Economics of Strategy. 4th Ed. John Wiley and Sons, New York, 606.

Birley, S., Westhead, P. 1990. Private Business Sales Environments in the United Kingdom. Journal of Business Venturing, 5, 349-373.

Brettel, M., Cleven, N.J. 2011. Innovation culture, collaboration with external partners and NPD performance. Creativity and Innovation Management, 20(4), 253-272.

Büschgens, T., Bausch, A., Balkin, D.B. 2013. Organizational culture and innovation: A meta-analytic review. Journal of Product Innovation Management, 30(4), 763-781.

Chan, L.L.M., Shaffer, M.A., Snape, E. 2004. In search of sustained competitive advantage: the impact of organizational culture, competitive strategy, and human resource management practices on firm performance. International Journal of Human Resource Management, 15(1), 17-35.

Covin, J.G., Slevin, D.P. 1988. The influence of organization structure on the utility of an entrepreneurial top management style. Journal of Management Studies, 25(3), 217-234.

Danks, S., Rao, J., Jeff, M.A. 2017. Measuring Culture of Innovation: A Validation Study of the Innovation Quotient Instrument (Part One). Performance Improvement Quarterly, 29(4), 427-454.

Danneels, E., Kleinschmidt, E.J. 2001. Product innovativeness from the firm's perspective: Its dimensions and their relationship with project selection and performance. Journal of Product Innovation Management, 18, 357-373.

Das, R.R., Joshi, M. 2012. Process Innovativeness and Firm Performance in Technology Service Firms: The Effect of External and Internal Contingencies. IEEE Transactions on Engineering Management, 59(3), 401-414.

Deshpande, R., Jarley, U., Webster, F. 1993. Corporate culture, customer orientation, and innovativeness in Japanese firms: A quadrat analysis. Journal of Marketing, 57(1), 23-37.

Dobni, B.C. 2008. Measuring innovation culture in organizations: The development of a generalized innovation culture construct using exploratory factor analysis. European Journal of Innovation Management, 11(4), 539-559.

Drew, S. 1997. From knowledge to action: The impact of benchmarking on organizational performance. Long Range Planning, 30(3), 427-441.

El-Kot, G., Gamal, D. 2011. How Does Knowledge Management Drive Competitiveness in Egyptian Software Companies? Review of Management, 1(4), 56-76.

Ellonen, R., Blomqvist, K., Puumalainen, K. 2008. The Role of Trust in Organisational Innovativeness. European Journal of Innovation Management, 11(2), 160-181.

Engelen, A., Brettel, M. 2012. A Coalitional Perspective on the Role of the R&D Department within the Organization. Journal of Product Innovation Management, 29(3), 489-505.

Goswami, S., Mathew, M. 2005. Definition of innovation revisited: an empirical study on Indian information technology industry. International Journal of Innovation Management, 9(3), 371-383.

Govindarajan, V., Trimble, C. 2005. Organizational DNA for strategic innovation. California Management Review, 47(3), 47-76.

Guo, R.J., Baruch, L., Zhou, N. 2005. The valuation of biotech IPOs. Journal of Accounting, Auditing & Finance, 20(4), 423-459.

Hammer, M. 2004. Deep change: how operational innovation can transform your company. Harvard Business Review, 82(4), 84-96.

Hartmann, A. 2006. The role of organizational culture in motivating innovative behaviour in construction firms. Construction Innovation, 6(3), 159-172.

Heunks, F.J. 1998. Innovation, Creativity and Success. Small Business Economics, 10, 263-272.

Hilmi, M.F., Ramayah, T. 2008. Market innovativeness of Malaysian SMEs: Preliminary results from a first wave data collection. Asian Social Science, 4, 42-49.

Hsu, S.H. 2007. Human Capital, Organizational Learning, Network Resources and Organizational Innovativeness. Total Quality Management 18(9), 983-998.

Hult, G.T., Hurley, R.F., Knight, G.A. 2004. Innovativeness: its antecedents and impast on firm performance. Industrial Marketing Management, 33(5), 429-438.

Ingram, T. 2013. Linking Organizational Support to Innovativeness - Conceptual Implications for Talent Management. International Journal of Contemporary Management, 12(4), 20-31.

Jamrog, J., Vickers, M., Bear, D. 2006. Building and Sustaining a Culture that Supports Innovation. Human Resource Planning, 26(3), 9-19.

Jong, J.P.J., Hartog, D.N.D. 2007. How leaders influence employees' innovative behaviour. European Journal of Innovation Management, 10, 41-64.

Jucevičius, G. 2009. The innovation culture in modern lithuanian organizations: values, attitudes and practices. Social Sciences, 63(1), 38-45.

Kelly, L., Kumar, R. 2009. Impact of knowledge management on the self-efficacy entrepreneurs: Mexican SME context. International Journal of Management and Decision Making, 10(1/2), 111-24.

Khazanchi, S., Lewis, M.W., Boyer, K. 2007. Innovation-supportive culture: The impact of organizational values on process innovation, Journal Operational Management, 25(4), 871-884.

Leal-Rodríguez, A., Luis, E.S., Roldan, J.L., Leal-Millán, A.G., Ortega-Gutiérrez, J. 2015. Organizational unlearning, innovation outcomes, and performance: The moderating effect of firm size. Journal of Business Research, 68(4), 803-809.

Lee, H., Choi, B. 2003. Knowledge management enablers, processes, and organizational performance: An integrative view and empirical examination. Journal of Management Information Systems, 20, 179-288.

Lemon, M., Sahota, P.S. 2004. Organizational culture as a knowledge repository for increased innovative capacity. Technovation, 24(6), 483-498.

Lennerts, S., Eisend, M., Lieven, T., Brexendorf, S., Tomczak, O., Torsten, T. 2016. The Power of Innovativeness in Manufacturer - Retailer Relationships. Journal of Business-to-Business Marketing, 23(3), 235-251.

Li, H., Atuahene-Gima, K. 2001. Product innovation strategy and the performance of new technology ventures in China. The Academy of Management Journal, 44(6), 1123-1134.

Lovelace, K., Shapiro, D.L., Weingart, L.R. 2001. Maximizing Cross-functional New Product Teams' Innovativeness and Constraint Adherence: A Conflict Communications Perspective. Academy of Management Journal, 44(4), 779-793.

Martins, E.C., Terblanche, F. 2003. Building organizational culture that stimulates creativity and innovation, European Journal of Innovation Management, 6(1), 64-74.

McGee, J., Dowling, M., Megginson, W. 1995. Cooperative Strategy and New Venture Performance: The Role of Business Strategy and Management Experience. Strategic Management Journal, 16(7), 565-580.

Moos, B., Beimborn, D., Wagner, H-T., Weitzel, T. 2010. Suggestions for Measuring Organizational Innovativeness: A Review. Proceedings of the 43rd Hawaii International Conference on System Sciences, 1-10.

Nasierowski, W., Arcelus, F.J. 2012. What is Innovativeness: Literature Review. Foundations of Management, 4(1), 63-74.

Nawrocki, T. 2015. Problematyka pomiaru i oceny innowacyjności przedsiębiorstw. Zeszyty Naukowe Politechniki Śląskiej. Organizacja i Zarządzanie, 79, 217-226.

Ngo, H.Y., Loi, R. 2008. Human resource flexibility, organizational culture, and firm performance: An investigation of multinational firms in Hong Kong. The International Journal of Human Resource Management, 19(9), 1654-1666.

O'Cass, A., Ngo, L.V. 2007. Market orientation versus innovation culture: two routes to superior brand performance. European Journal of Marketing, 41(7/8), 868-887.

Quandt, C.O., Bezerra, C.A., Ferraresi, A.A. 2015. Dimensões da inovatividade organizacional e seu impacto no desempenho inovador: proposição e avaliação de um modelo. Gestão e Produção, 22(4), 873-886.

Rainey, H.G. 1999. Using Comparison of Public and Private Organizations to Assess Innovative Attitudes among Members of Organizations. Public Productivity & Management Review, 23(2), 130-149.

Raj, R., Srivastava, K. 2014. The mediating role of organizational learning on the relationship among organizational culture, HRM practices and innovativeness. Management and Labour Studies, 38(3), 201-223.

Rhee, J., Park, T., Lee, D.H. 2010. Drivers of innovativeness and performance for innovative SMEs in South Korea: Mediation of learning orientation. Technovation, 30(1), 65-75.

Rubera, G., Kirca, A.H. 2012. Firm Innovativeness and Its Performance Outcomes: A meta-Analytic Review and Theoretical Integration, Journal of Marketing, 76, 130-147.

Rudzewicz, A., Strychalska–Rudzewicz, A. 2014. Trust as a Factor Supporting Innovative Culture. Baltic Horizons, 22(119), 41-48.

Santos-Vijande, M.L., Alvarez-Gonzales, L.I. 2007. Innovativeness and organizational innovation in total quality-oriented firms: The moderating role of market turbulence. Technovation, 27(9), 514-532.

Schweisfurth, T.G., Raasch, C. 2018. Absorptive capacity for need knowledge: Antecedents and effects for employee innovativeness. Research Policy, 47(4), 687-699.

Sommer, L.P., Heidenreich, S., Handrich, M. 2017. War for talents - How perceived organizational innovativeness affects employer attractiveness. R&D Management, 47(2), 299-311.

Sorescu, A., Spanjol, J. 2008. Innovation's Effect on Firm Value and Risk: Insights from Consumer-Packaged Goods. Journal of Marketing 72(2), 114-132.

Strychalska-Rudzewicz, A. 2016. The Impact of National Culture on the Level of Innovation. Journal of Intercultural Management, 8(1), 121-145.

Strychalska-Rudzewicz, A. 2019. Kulturowe uwarunkowania innowacyjności technicznej przedsiębiorstw przemysłowych, UWM Publisher, Olsztyn.

Szymanski, D.M., Kroff, M.W., Troy, L.C. 2007. Innovativeness and new product success: insights from the cumulative evidence. Journal of the Academy of Marketing Science, 35, 35-52.

Tajeddini, K., Trueman, M., Larsen, G. 2006. Examining the Effect of Market Orientation on Innovativeness. Journal of Marketing Management, 22, 529-551.

Theoharakis, V., Hooley, G. 2008. Customer orientation and innovativeness: Differing roles in New and Old Europe. International Journal of Research in Marketing, 25(1), 69-79.

Uzkurt, C., Kumar, R., Kimzan, H.S., Eminoglu, G. 2013. Role of innovation in the relationship between organizational culture and firm performance: A study of the banking sector in Turkey. European Journal of Innovation Management,16(1), 92-117.

Van de Ven, A.H. 1986. Central Problems in the Management of Innovation. Management Science, 32, 509-607.

Vermeulen, P. 2005. Uncovering barriers to complex incremental product innovation in small and medium-sized financial firms. Journal of Small Business Management, 43(4), 432-452.

Wang, C.L., Ahmed, P.K. 2004. The development and validation of the organisational innovate-veness construct using confirmatory factor analysis. European Journal of Innovation Management, 7, 303-313.

Werlang, N.B., Rossetto, C.R. 2019. The effects of organizational learning and innovativeness on organizational performance in the service provision sector. Gestão and Produção, 26(3), 1-18.

Wilcox, J.B. 1994. Assessing Sample Representativeness in Industrial Surveys. Journal of Business & Industrial Marketing, 9(2), 51-61.

Yusof, N., Abidin, N.Z. 2011. Does Organizational Culture Influence the Innovativeness of Public-Listed Housing Developers? American Journal of Applied Sciences, 8(7), 724-735.

Yusof, N.A.B., Shafiei, M.W.M., Said, I., Abidin, N.Z. 2010. Factors influencing firms' readiness towards innovation in house building industry: A multi-dimensional construct. International Journal of Organizational Innovation, 2, 74-88.