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Identifying the Innovative Tension: A Meta-Analysis on Innovative Firm Behavior, Organizational Ambidexterity and Innovative Performance

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ABSTRACT

Purpose – In terms of business activities determining which financial and human resources will use existing knowledge (exploitation) and which will make efforts to discover new knowledge (exploration) creates an innovative tension. Since the choice of innovative action leads to different expectations and different outputs, the cause and consequences of tension will also differ for each firm. Ultimately, the purpose of the study is to reveal the relation amongst innovative firm behavior, organizational ambidexterity, and innovative firm performance in the axis of innovative tension.

Design/methodology/approach – In this study, meta-analysis was used to determine the effect size of innovative firm behavior on organizational ambidexterity and the effect size of organizational ambidexterity on innovative performance. To test the hypotheses determined in the research, the studies published since 2000 were reviewed and the appropriate ones were selected within the framework of certain criteria. The determined database is divided into two separate data sets (Dataset 1 consists of 19 studies, 30 effect values, 11246 samples - dataset 2 consists of 22 studies, 49 effect values, 98630 samples). The first data set was used to investigate the relation between innovative firm behavior and organizational ambidexterity and the second data set was used to test the relation amongst organizational ambidexterity and innovative firm performance.

Findings – According to the effect size level obtained from the meta-analysis, it was found that innovative firm behavior has a positive and significant effect on organizational ambidexterity and organizational ambidexterity has a positive and significant effect on innovative performance.

Discussion – Considering the requirements of the technology era we live in, it is necessary to take into account that innovative attitude and behavior, organizational ambidexterity, and innovative performance network have the power to determine not only the production of new products and services but also the rules of the competition game on the global basis. While the wrong choice to be made at this point will directly affect the life span of the firm, the right one will contribute to the effectiveness of a new actor at the level of macro competition.

1. INTRODUCTION

Businesses operating in a global economy are faced with turbulent environmental conditions, unstoppable change, technological transformation, diversified customer demands and expectations, and unstoppable competition. So much so that in environments where environmental uncertainty and constant change are experienced, it is becoming more and more difficult for businesses to continue their activities effectively (Ünlü&Aydoğan, 2015:31). Surviving in a challenging business environment with these environmental conditions is possible by providing a sustainable competitive advantage. It is imaginable for businesses to survive, achieve success and be one step ahead of their competitors, with the development of their ability to innovate. Innovation is the realization of new, creative, and potentially useful ideas that positively contribute to the performance, growth, survival, and competitive advantage of businesses (Zacher&Rosing, 2015:57). In other words, innovation is the production of new knowledge and its integration with business activities, which includes planning the basic orientations of business functions in line with strategic goals, depending on the priorities and values of the business (Alayoğlu, 2010:31). Successful completion of the integration process plays a key role in providing a competitive advantage (Corbo et al, 2022:2).

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It is no longer sufficient to develop the ability to innovate in the global economic system. What is acceptable and reasonable is to balance both exploitative (incremental) and exploratory (radical) innovation because the two branches of this balance represent two different forms of organizational learning (March, 1991:73). Exploitative innovation focuses on existing knowledge, processes, products and technologies, and is productivity oriented. Exploratory innovation, on the other hand, tends to seek new knowledge, build the future, take risks, and cope with it by creating conscious uncertainty (O'Reilly & Tushman, 2008:187; Cho, Bonn & Han, 2020:343). To provide organizational learning and create strategic moves from this learning process, both exploration and exploitation are essential; however, these activities compete for scarce resources with insufficient time and limited human resources (Bercovitz&Feldman, 2007:932). Thus, the main challenge facing an organization is to allocate sufficient resources for exploration in the name of its vision for the future while exploiting to the extent necessary to ensure its sustainability (Hughes, 2018:182: Altın, 2020:75).

In the literature, there are many studies on explanations related to organizational ambidexterity and its conceptual relationship with innovation (see Appendix 1 and Appendix 2). In addition, no study has yet been conducted to examine the relationship between organizational ambidexterity, which is defined as the use of different innovation skills together, and which innovative behaviors provide a relationship and the relationship between organizational ambidexterity and innovative firm performance from a broad perspective. This study aims to examine the relationship between innovative firm behaviors, organizational ambidexterity and innovative firm performance using the meta-analysis method. Based on the mentioned conceptual agreement within the literature, it is possible to ask the following research question: Which innovative behaviors are associated with organizational ambidexterity? In addition, it has been observed that many studies have been conducted on organizational ambidexterity and firm performance in the literature. The second research question that the research seeks to answer is: What is the relationship between organizational ambidexterity and innovative firm performance? At this point, it should be noted that firm attitudes and behaviors, which are accepted as innovative behavior in the meta-analysis, have been defined and/or described as "innovative firm behavior and/or firm behavior leading to innovation " by the researchers who carried out the studies. In the study, the related concepts were categorized under the title of innovative firm behavior.

2. THEORETICAL FRAMEWORK

2.1. Innovative Firm Behavior

Within organizational studies, factors that make a firm innovative and the transformation experienced by innovative companies in parallel with social dynamics are issues of general importance and curiosity. The innovation process needs to be supported by the social conditions of the companies (Galende&De La Fuente, 2003:719). This process, which should evolve into organizational learning through the accumulation of experience, should be carried out with a collective effort within the organization because it involves the collective harmony and integration of different individual and organizational abilities (Battisti, 2012:233). Therefore, these collective efforts are innovative firm behaviors that can be considered as a set of innovative activities that distinguish the firm from its competitors, are supported by internal and external factors, reflect the organizational culture, and are also a part of the strategic management process.

2.2. Organizational Ambidexterity

It is generally accepted that organizational ambidexterity is generally accepted as performing exploitative and exploratory innovation activities on a certain level, simultaneously, and in a balanced way. (Tushman & O'Reilly, 1996; O'Reilly & Tushman, 2004; Cao, Gedajlovic&Zhang, 2009; Piao&Zajac, 2016; Çekmecelioğlu, Günsel&İlhan, 2018; Cho, Bonn & Han, 2020). Organizational ambidexterity skills of businesses that want to successfully maintain their existence in turbulent environmental conditions are explained with the metaphor of "people's ability to use both hands at the same time". Organizational ambidexterity is the capability of businesses to use their knowledge, skills and resources to the last point, and to become a master at discovering new development areas and ideas (Kanten & Kanten, 2019). The basic premise of organizational ambidexterity is that it considers multifaceted skill use as a vital paradigm that guarantees the future.

2.3. Innovative Performance

Considering globalized business activities, innovation refers to the use of any new application in an industry for the first time. In this process, it is seen that there is no room for the known, repetition, or customary, as well as rules and limits (Akyüz and Örücü, 2018:23). For this reason, each firm's innovative performance criteria and expectations also differ. Since innovations are of great importance for the medium and long-term success of enterprises, all activities of enterprises aim to survive and provide a competitive advantage (Yücel & Özgül, 2020:406). So much so that, from the industrial revolution to the present, innovative activities have been the most important determinant of the competition system, despite all the difficulties (Prajogo&Ahmed, 2006:507). As a result, all organizational actions of enterprises are evaluated with innovative performance outputs at the end such as achieving success in introducing new products to the market before their competitors, increasing the number of projects and ideas for new products and services developed, and achieving new product development success with the quality and number of processes and methods developed (Eren, Alpkan ve Erol, 2005; Reulink, 2012).

2.4. Understanding Innovative Tension: Relations Between Variables

Developing new knowledge and turning it into leverage that will provide a competitive advantage by making it a part of routine business activities is not easy for many companies. This process requires the dedication of both financial and human resources. The expectation of companies from innovation is that it provides a distinctive gain in their favor within the sectoral conditions (Mir&Casadesus, 2022:3). This level of organizational motivation, which is being tried to be achieved, may be weakened by either insufficient financial resources or human resources that have difficulty in reading the innovation. In other words, determining which financial and human resources will use existing knowledge (exploitation) and which will make efforts to discover new knowledge (exploration) creates an innovative tension. Because not every firm has the organizational capacity to balance these two types of innovation. Deciding which will result in competitive advantage is the main source of innovative tension.

There are enough studies in the literature that innovative tension promotes organizational ambidexterity (Raisch&Birkinshaw, 2008; Junni et.al.,2013; Chen&Liu, 2018; Solís-Molina, Hernández-Espallardo, & Rodríguez-Orejuela, 2018; Corbo et al, 2022:). The complexity of the tension causes the difficulty of knowledge management and the narrowing of the organizational operational space. Since the choice of innovative action causes different expectations and different outputs, the cause and consequences of tension will also differ for each firm. This is the tension between the old and the new, freedom and responsibility, centralization and decentralization (Andriopoulos & Lewis, 2009:699). While the risk of strategic blindness emerges for companies that focus more on one point (Catino, 2013), businesses that can manage to integrate their perceptions and capabilities with environmental factors will be able to evolve towards organizational ambidexterity by successfully managing the innovation process. In this sense, organizational ambidexterity improves innovation capacity by reducing the tension between short- and long-term orientation of the enterprise, the method of allocation of resources, and competing goals (Constant, Calvi & Johnsen, 2020:5). Ultimately, the organizational goal (reducing innovative tension to the benefit of the firm) is to acquire organizational ambidexterity skills by exhibiting an innovative firm behavior; to exhibit an innovative performance by using organizational ambidexterity skills.

According to March (1991), the source of innovative tension is the balance paradox between exploitation and exploration. This paradox is directly related to the short-term and long-term innovation capacity along with the firm's ability on obtaining and processing information. These two forms of innovation require the functional use of knowledge. Chen and Liu (2018), who examined the relationship between open innovation as an innovative firm behavior and organizational ambidexterity, determined as a result of their research on high-tech firms in China that it would not be reliable to provide only internal sources of information that will guide the strategic decisions of the firm. They also found that external sources of information should be directed inward for collective learning. In the literature, it is possible to come across different studies confirming the relation amongst open innovation and organizational ambidexterity (Greco et. al., 2014; Hwang, Lai & Wang, 2021). The two-way operation of the information flow is a prerequisite for the

organization to be able to balance two-way innovation in light of the basic propositions of organizational ambidexterity. In other words, the organization must have a mechanism to operate both the incoming and outgoing information flow system. Úbeda-Garcia et. al., (2008) found in their research in the hotel industry that high-performance work systems (HPWS) as an innovative human resource mechanism strengthen the integration between exploitative and exploratory activities and contribute to the sharing of organizational culture. Similarly, Mokhtarzadedeh, Jafarpanah & Babgohari (2022) found that knowledge management capability in the food industry positively affects ambidexterity. As can be observed from the studies used in the research (Appendix 1), the main factor is the competitiveness attitudes and innovative behaviors of the firms. Due to the natural structure of business activities, firms that wish to maintain their living in a hypercompetitive environment and take steps forward must act innovatively. Firms that can transform the tension created by this obligation into an operational advantage are those that have achieved organizational ambidexterity. From this point of view, it can be said that innovative firm behavior has a significant effect on organizational ambidexterity.

H¹: *Innovative firm behavior positively affects organizational ambidexterity.*

One of the most important managerial skills in the innovation management process is to choose innovative behavior patterns that will increase the innovation performance with the organizational ambidexterity actions of the firm. This process can be explained as the right time, right step, and right decision from start to finish. Hwang, Lai & Wang (2021) found that organizational ambidexterity plays an important mediating role in the relationship between open innovation and firm performance in a study they conducted in high-tech firms. In practice, this is an important example of the positive effect of innovative firm behavior preference on firm performance. This preference is directly proportional to the support provided by the organizational culture at one point. Because one of the important tools for organizations to maintain their organizational ambidexterity in their structures is organizational culture. It is known that the stringent or slack organizational culture shapes the organizational structure (Afacan Fındıklı & Pınar, 2014:158). As can be understood from Schein's (2004) definition of "the fundamental assumptions that a group learns while solving external cohesion and internal integration problems and taught to new members as a correct way of perceiving, thinking and feeling organizational programs", innovative attitudes and behaviors, like all organizational actions, should be supported by the organizational culture. In support of this proposition, Pelagio Rodriguez, Hechanova & Regina (2014) surveyed the information technology teams of companies that produce product and service innovations. The survey results reveal that there is a positive relationship between cultural factors, organizational ambidexterity, and innovative firm performance.

Opportunity identification is the beginning of innovation. Innovation should take place as a process that starts with the perception of opportunity, develops within the framework of the opportunity, and ends with the commercialization of the emerging opportunity. Individual factors have an important place in the essence of opportunity detection (Naktiyok & Gürsoy, 2014). In this sense, all organizational elements, including culture, should make room for this action area that will reduce innovative tension. Because, in addition to organizational culture, many concepts such as leadership styles (Zacher&Rosing, 2015), shared vision (Chen, Chang & Lin, 2014), organizational structure (De Visser et. al.,2010), corporate entrepreneurial intention (Burgers & Jansen, 2008), supply chain and knowledge management (Shen & Saide, 2021) are the determinants of organizational ambidexterity that affects innovative performance. As shown in Appendix 2, there are many studies in the literature that have identified the positive relationship between organizational ambidexterity and innovative firm performance. According to the aforementioned studies and explanations, it is predicted that organizational ambidexterity is related to innovative firm performance.

H²: *Organizational ambidexterity positively affects a firm's innovative performance.*

3. METHOD

The meta-analysis method was used to determine the effect size of innovative firm behavior on organizational ambidexterity and the effect size of organizational ambidexterity and innovative performance. Meta-analysis can be characterized as one of the systematic synthesis methods. It can be defined as the quantitative method used to combine the results of multiple studies into a single conclusion (Göktaş, 2017:36). To test the two hypotheses in the study, two separate meta-analyses were made with two separate data sets, and the findings were combined in the tables. The first data set consists of studies selected to test the relation amongst

innovative firm behavior and organizational ambidexterity, and the second data set to test the relation between organizational ambidexterity and innovative firm performance.

3.1. Selection Procedure

The studies published since 2000 within the databases of "Web of Science, Science Direct, Springer Link, EBSCO Host, and JSTOR" are systematically scanned to reveal the researches to be included in the study. By using advanced search features of databases; "innovation", "innovative firm behavior", "organizational ambidexterity" "organizational versatility", "organizational mastery", "firm performance", "organizational performance" and "innovative performance" were used in combination with the conjunctions "and/or" as the keywords. As a result of the scanning processes, it is determined that there are 31 studies suitable for data set 1 and 32 studies suitable for data set 2.

3.2. Inclusion Procedure

Several criteria are used to determine which of the studies found in the search would be included in the meta-analysis: (1) presence of correlation coefficient amongst independent and dependent variables (or having a t value in the regression table), (2) the existence of more than one correlation coefficient in the same study because the sub-dimensions of the scales were used instead of the total scores, (3) The reliability and validity of the scales should have been proven. Considering the condition that these three criteria are met together, studies that do not contain the mentioned criteria are excluded from the analysis, 19 studies (and 30 effect values), for data set 1 (DS1), 22 studies (and 49 effect values) for data set 2 (DS 2) are identified and included in the meta-analysis.

3.3. Analysis of Data

After the determination of the studies used in the research, "the imprint consisting of the author and the date of the study", "the number of participants", "the correlation coefficient between innovative firm behavior and organizational ambidexterity ", "t-value in the regression table of innovative firm behavior on organizational ambidexterity", "correlation coefficient between organizational ambidexterity and innovative performance" are coded. Analyzes of the study were performed with Comprehensive Meta-Analysis (CMA) software. Hedges' g coefficient (Hedges' g) was used to calculate the effect size of the sample (Borenstein et. al., 2014). The ranges shown in Table 1 were used for the level of effect size (g).

Table 1. Effect Size Levels and Ranges

Impact Value	Impact Level
-0,15 < g (or d) < 0,15	insignificant level of impact
0,15 < g (or d) < 0,40	small level of impact
0,40 < g (or d) < 0,75	moderate effect
0,75 < g (or d) < 1,10	wide-level impact
1,10 < g (or d) < 1,45	very wide-level impact
1,45 < g (or d)	Excellent level of impact

If studies are homogeneous in meta-analysis studies, study weights are similar and a fixed effect model is used. If the studies are heterogeneous, the study weights need to be made similar, in which case the random effect model is used. Q and I2 statistics are used to test for homogeneity and decide whether to use fixed effect or random models. If the Q statistic is significant ($p<0.05$), heterogeneity is accepted and the random effect model is recommended. The I2 statistic explains the variance rates for the effect size and enables the homogeneity to be decided. It takes a value between 0-100 and if it is >75, it is evaluated together with the Q statistics and it is accepted that there is a high level of variance (heterogeneity) (Lipsey ve Wilson, 2001). The Egger test was used to test publication bias in the study. Also, Kendall's tau b test was used to determine the relationship between the number (size) and the effect size of studies used within the study.

4. RESULTS

In the study, 30 effect values were obtained from 19 studies included in the meta-analysis data set 1 and a total of 11246 samples were used. Within the scope of data set 2, 49 effect values were obtained from 22 studies and a total of 98630 samples were used.

4.1. Publication Bias Findings

The meta-analysis results regarding publication bias, the effect of possible missing studies on the meta-analysis, the relationship between variance and effect size, and the number of studies needed to refute the effect size results are shown in Table 2.

Table 2. Results on Publication Bias

	Test	Symbol/ Coefficient	The Obtained Value	Result
DS1	*Egger*	*Egger*	2,422	p>0,05: There is no publication bias.
		sh	1,347	
		t	1,797	
		p	0,084	
DS2	*Egger*	*Egger*	0,264	p>0,05: There is no publication bias.
		sh	1,354	
		t	0,195	
		p	0,846	

t: Group comparison statistics, p: Significance level

According to the results of the Egger test, which was carried out to test the publication bias in the study, it was determined that there was an effect on publication bias in the studies included in the research in data set 1 (Egger=3,75; t=2,69; p<0,05). For this reason, 2 studies (M3, M51_1, M51_2) that caused publication bias were eliminated and the analyzes were repeated with 17 studies and 27 effect values, and it was seen that the publication bias effect disappeared. According to the data set 2 Egger test results, it was determined that there was no effect on publication bias in the studies included in the study (Egger=0.26; t=0.19; p>0.05).

4.2. Findings Regarding the Determination of the Appropriate Model

Since it was determined that there was a high level of variance (heterogeneity) according to the Q (Q18=259,42; p<0,01) and I2 (I2=89,98; I2>75) tests for the heterogeneity/homogeneity conditions of the studies for the data set 1, it was appropriate to use the random effect model. Similarly, for data set 2, it was determined that there was a high level of variance (heterogeneity) compared to the Q (Q18=3036,27; p<0,01) and I2 (I2=98,42; I2>75) tests for the heterogeneity/homogeneity of the studies, it was appropriate to use the random effect model. Results are shown in Table 3.

Table 3: Findings Regarding the Determination of the Appropriate Model

	Test	Symbol/ Coefficient	The Obtained Value	Result
DS1	*Heterogeneity*	*Q*	259,425	Heterogeneous: A random effect model should be used
		sd	26	
		p	0,000	
		I^2	89,978	
DS2	*Heterogeneity*	*Q*	3036,273	Heterogeneous: A random effect model should be used
		sd	48	
		p	0,000	
		I^2	98,419	

*DS: Data set, **DS1: Values obtained after repeated publication bias test

4.3. Meta-Analysis Findings

The meta-analysis results obtained as a result of the analyzes made for two separate data sets in the study are shown in Table 4, Figure 1, and Figure 2.

Table 4. Meta-Analysis Results

	Test	Symbol/ Coefficient	The Obtained Value	Results
DS1	*Effect Size*	*N*	27	0,75 < g < 1,10 Wide-level impact
		g (d)	**0,783**	
		%95 (lower limit)	0,622	
		%95 (upper limit)	0,943	
		Z	9,561	
		p	0,000	
DS2	*Effect Size*	*N*	49	0,75 < g < 1,10 Wide-level impact
		g (d)	0,771	
		%95 (lower limit)	0,639	
		%95 (upper limit)	0,903	
		Z	11,468	
		p	0,000	

According to the effect size level obtained as a result of the meta-analysis for data set 1, it was determined that innovative firm behavior has a wide-level impact and significant effect on organizational ambidexterity (g=0.78; p<0.05). In the 95% confidence interval, this effect size was the lowest 0.622 (moderate effect); the highest was calculated as 0.94 (Wide-level impact). When the direction of the effect size obtained is evaluated together with the graph in Figure 1, it has been determined that this effect is positive, in other words, innovative firm behavior has a positive and wide-level impact on organizational ambidexterity. On the other hand, according to the effect size level obtained as a result of the meta-analysis for data set 2, it was determined that organizational ambidexterity has a wide-level impact and significant effect on innovative performance (g=0,77; p<0,05). In the 95% confidence interval, this effect size was the lowest 0.64 (moderate effect); the highest was calculated as 0.90 (wide-level impact).

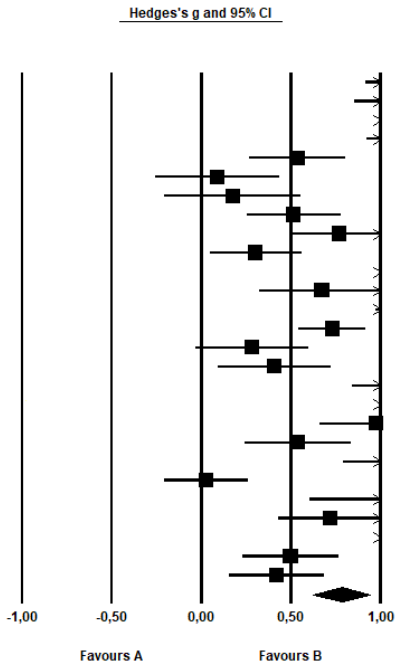

Figure 1. DS1 Effect Size Graph

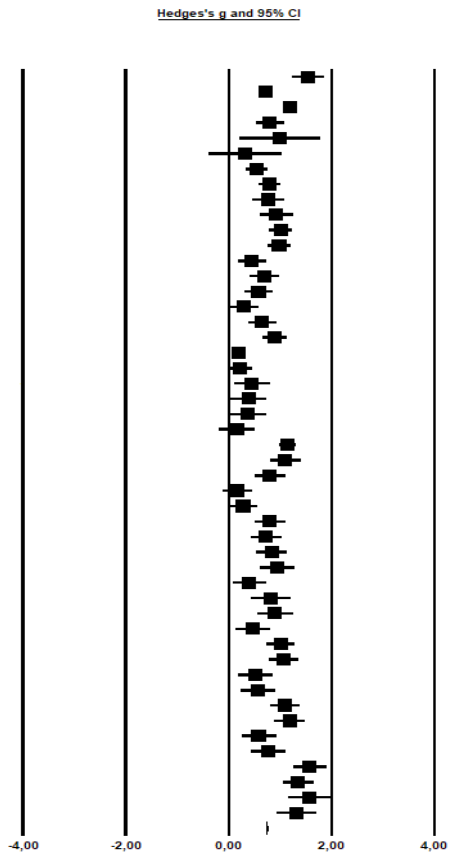

Figure 2. DS2 Effect Size Graph

5. CONCLUSION and DISCUSSION

In today's highly turbulent and hyper-competitive knowledge economy, organizations' capacity to innovate is an important strategic asset and an essential tool for sustainable competitive advantage. Generating a "new idea", which is the most basic point that will reveal this advantage, is based on talented human resources, an organizational structure that will organize this resource correctly, and an organizational culture that will support it (Akyüz and Örücü, 2018:21). Organizational culture is the common understanding of an organization's employees about the problem of "how we do things here". Individuals who are suitable to work in an organization with an innovative culture are challenging, encouraging, creative, result-oriented, and risk-taking entrepreneurs (Öner and İşcan, 2022: 54-55). In terms of organizations, innovation means both creating opportunities by having a new and different value-creating product, service, process and marketing approach, and explaining opportunities by producing better and different products (Naktiyok, 2007:214). Innovation should go beyond a certain idea and create opportunities in line with customer needs or create competition according to the resources of the enterprise, or it should be transformed into a commercial result that creates economic and social added value (Timuroğlu, 2015:41). To meet the conflicting demands of the competitive and turbulent business environment, organizations both improve their existing capabilities and differentiate by acquiring new ones (De Brentani, 2001:170). The ability to compete with organizations to carry out two different jobs at the same time is referred to as organizational ambidexterity and is equated with the competency to use both hands with the same ability (Chams-Anturi, Moreno-Luzon & Romano, 2022:243). Accordingly, organizations should be adept at discovering new areas of development, on the one hand, and effectively use their knowledge, skills, and all the resources they have on the other hand (Erşahan et.al., 2019:194). The study primarily seeks the relationship between organizational ambidexterity, which we can define as an important managerial skill of the new age, and innovative firm behaviors. As stated earlier, firm attitudes and behaviors that are considered innovative behavior in the study selected for meta-analysis have been described as "innovative behaviors or behaviors causing innovation" by the researchers who conducted the studies. This study has identified these definitions by conducting a systematic review and collecting the

relevant concepts under the top heading innovative firm behavior. In addition, the relationship between organizational ambidexterity and innovative firm performance has been investigated as an answer to the second research question of the study.

According to the meta-analysis results of data set 1 data measuring the effect of innovative firm behavior on organizational ambidexterity, it has been determined that innovative firm behavior has a wide-level impact and significant effect on organizational ambidexterity. Accordingly, the increase in the innovative firm behavior level also increases the level of organizational ambidexterity. At this point, the decision on resource allocation will be used by the firm for a specific purpose and will determine the innovative attitude and behavior that will be displayed. The ability to carry out exploitation and exploration activities in a certain balance will allow businesses to adapt to changing environmental conditions. The ability to adapt to environmental conditions affects product and service quality, market conditions, and adaptation to technological developments in the long run (Yıldız and Karataş, 2018:106). When the studies examining the relationship between innovative firm behavior and organizational ambidexterity are examined, it can be said that while the preference of exploitation and exploration as a common feature has a mission to reduce innovative tension, it can be said that the realization of this preference as a balanced parameter creates a competitive vision for the firm.

According to another result obtained from the research, it is seen that organizational ambidexterity has a wide-level impact and significant effect on innovative performance. Organizational ambidexterity is the sum of organizational skills that are essential to investigative and beneficiary abilities. In other words, it is defined as the equal and simultaneous use of different strategies (Li, Lin and Chu, 2008:1003). This set of organizational capabilities will allow the business to take steps that will provide a sustainable competitive advantage, and also will provide the opportunity to plan the future in a planned way. In other words, companies that can overcome the tension of exploitation and exploration with organizational ambidexterity are the ones that can achieve competitive advantage by achieving innovative outputs (Marín-Idárraga et. al, 2022:313). Considering the requirements of the technology age we live in, it is necessary to understand that innovative attitude and behavior, organizational ambidexterity, and innovative performance relationship network have the power to determine the rules of the competitive game on a global basis. The wrong preference to be made at this point will directly affect the life span of the firm, and the right one will contribute to the effectiveness of a new actor at the macro level.

Implications For Researchers And Practitioners

As a result, the literature suggests that innovative firm behavior and organizational ambidexterity are important drivers of innovative firm performance, and that the ability of firms to balance exploration and exploitation activities is a critical mechanism that links innovative behavior to performance outcomes. Some suggestions can be developed in light of the results obtained for the researchers: (1) In this study, innovative firm behaviors in research with certain criteria are evaluated. In another study, innovative firm behaviors that do not meet the selection criteria can be examined, (2) Sectoral comparisons can be made for organizational ambidexterity activities and suggestions can be developed to reduce innovative tensions based on the outputs obtained, (3) The antecedents and successors of innovative performance can be handled on their own and their relations with other sectoral factors affecting can be examined, (4) The relationships between managerial decision-making at the organizational level and innovative outputs can be examined within the scope of competitive strategies, (5) The results obtained from the research can be used as a guiding tool for managerial studies in different sectors in the decision making process.

On the other side some recommendations could be made for practitioners: (1) Foster a culture of innovation so that firms should create a work environment that encourages creativity, experimentation, and risk-taking. This can be achieved by promoting open communication, providing resources for innovation projects, and recognizing and rewarding innovative ideas and behaviors. (2) Develop an innovation strategy so that firms should have a clear and well-defined innovation strategy that aligns with their overall business strategy. This strategy should focus on both exploratory and exploitative innovation activities and should be regularly reviewed and updated based on changing market conditions and customer needs. (3) Invest in innovation capabilities thus firms should invest in building their innovation capabilities by hiring and training employees with the necessary skills and knowledge to generate new ideas and products. They should also establish

partnerships with external stakeholders, such as universities, research institutes, and start-ups, to access new technologies and knowledge. (4) Pursue ambidextrous strategies in order that firms should balance their exploratory and exploitative activities to achieve both short-term and long-term goals. This can be done by creating separate units for each type of innovation activity or by integrating both activities within the same unit. (5) Measure and evaluate innovation performance so that firms should develop metrics to measure their innovation performance, such as the number of new products launched, the percentage of revenue generated from new products, and the number of patents filed. They should also evaluate their innovation performance regularly and use the results to improve their innovation strategy and activities.

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Appendix 1. Overview of Data Set 1 Studies Examining the Relationship between Innovative Firm Behavior and Organizational Ambidexterity

Journal	Author &Year	Title	Innovative Firm Behavior Definition	N	r / t
IEEE Transactions on Engineering Management	Qian Chen & Zhiying Liu, 2019	How Does Openness to Innovation Drive Organizational Ambidexterity? The Mediating Role of Organizational Learning Goal Orientation	Open innovation is a paradigm that expands the extroverted knowledge network and accelerates innovative behavior (p. 158)	195	r 0,53, r 0,51
International Journal of Contemporary Hospitality Management	Mercedes Úbeda-García, Enrique Claver-Cortés, Bartolomé Marco-Lajara, Francisco García-Lillo and Patrocinio Carmen Zaragoza-Sáez, 2018	Continuous innovation in the hotel industry. The development of organizational ambidexterity through human capital and organizational culture in Spanish hotels	high-performance work systems as a human resource management tool to balance exploratory and exploitative (innovative) learning (p.3610-3612)	5000	t 2,659
European Journal of Innovation Management	Bang-Ning Hwang and Yi-Ping Lai & Chunhsien Wang, 2021	Open innovation and organizational ambidexterity	Open innovation is an innovative integration system that allows internal and external opportunities to deploy systematically within the firm (p. 4)	215	r 0,5
Journal of Business Research	Mandana Farzaneh, Ralf Wilden, Leila Afshari, Gholamhossein Mehralian, 2022	Dynamic capabilities and innovation ambidexterity: The roles of intellectual capital and innovation orientation	Dynamic capabilities are considered as providing innovative behaviors such as adapting to the changing environment and developing new products and services (p.50)	170	r 0,57, r 0,54
Organization Science	Justin J. P. Jansen, Michiel P. Tempelaar, Frans A. J. van den Bosch, Henk W. Volberda, 2009	Structural Differentiation and Ambidexterity: The Mediating Role of Integration Mechanisms	Structural differentiation is a way of pursuing explorative and exploitative innovation (p. 797)	230	r 0,26
Human Resource Management	Ciaran Heavey, Zeki Simsek, And Brian Curtis Fox, 2015	Managerial Social Networks and Ambidexterity of SMEs: The Moderating Role of A Proactive Commitment To Innovation	The extensiveness of top managers' networks encourages the firm to develop an innovative behavior pattern by diverging from its existing products, technologies, and practices (p.202).	140	r 0,32

Technology Analysis & Strategic Management	Jinjuan Zang & Yuan Li, 2017	Technology capabilities, marketing capabilities, and innovation ambidexterity	technology capabilities and marketing capabilities are innovative behaviors that have an inverse U-shape relationship with innovation ambidexterity (p. 23)	190	r 0,6, r 0,44, r 0,26, r 0,49
European Journal of Innovation Management	Younes El Manzani, Mostapha El Idrissi, Zakaria Lissaneddine, 2022	Soft quality management practices and product innovation ambidexterity: the mediating role of market orientation ambidexterity	Soft quality management practices are the innovative implications to understanding the tie between quality management and innovation such as visionary leadership and shared vision, employee relations, and open organizations (p. 3).	130	t 0,51
International Journal of Innovation Management	Sébastien Brion, Caroline Mothey & Maréva Sabatier, 2010	The Impact of Organisational Context and Competences on Innovation Ambidexterity	Firms exhibiting innovative behaviors such as explorative and exploitative innovation behaviors adopt long-term practices that favor risk-taking and creativity, and thereby build an organizational context suited to organizational ambidexterity (p. 151).	108	r 0,0877
European Management Journal	Yi-Ying Chang & Mathew Hughes, 2012	Drivers of innovation ambidexterity in small- to medium-sized firms	Main effect variables such as leadership characteristics, structural characteristics, and contextual characteristics are the innovative drivers of a firm (p. 1).	243	r 0,25, r 0,36, r 0,15
Journal of Business Research	Miguel Solís-Molinaa, Miguel Hernández-Espallardob, Augusto Rodríguez-Orejuelac, 2018	Performance implications of organizational ambidexterity versus specialization in exploitation or exploration: The role of absorptive capacity	The absorptive capacity is the contextual paradigm that has the power to determine the effects of a firm's innovation strategy (to identify which type of innovation will be more effective) (p.182).	281	r 0,014
Journal of Strategic Information Systems	Katerina Božič & Vlado Dimovski, 2019	Business intelligence and analytics use, innovation ambidexterity, and firm performance: A dynamic capabilities perspective	The use of business intelligence and analytics (BI&A) contributes positively to business performance as a balancer of innovation activities. It does this by interacting with the firm's absorptive capacity (p. 1).	97	t 7,379
The International Journal of Human Resource Management	Marjolein C. J. Caniëlsa & Monique Velda, 2019	Employee ambidexterity, high-performance work systems and innovative work behavior: How much balance do we need?	*** Innovative working behavior at the employee level is considered as the independent variable that affects ambidexterity.	160	r 0,14, r 0,2

European Management Journal	Kyootai Lee a, Han-Gyun Woo b, Kailash Joshi, 2017	Pro-innovation culture, ambidexterity, and new product development performance: Polynomial regression and response surface analysis	*** Pro-innovation culture is considered the independent variable that affects ambidexterity.	110	r 0,46
Technological Forecasting & Social Change	Amir Ashrafi & Ahad Zareravasan, 2022	An ambidextrous approach to the business analytics-competitive advantage relationship: Exploring the moderating role of business analytics strategy	The term Business Analytics (BA) leads to innovative outputs as analysis techniques that enable the business to make timely decisions to better understand the sectoral conditions. (2)	181	r 0,41, r 0,695
British Food Journal	Nima Garousi Mokhtarzadedeh, Ismail Jafarpanah and Ali Zamani Babgohari, 2022	Knowledge management capability, entrepreneurial creativity, entrepreneurial intensity, and firm performance: the mediating role of ambidexterity	Knowledge Management Capability and Entrepreneurial Creativity are the essential innovative behavior patterns that enable survival in turbulent environmental conditions and adapting to competitive conditions (p. 2179)	227	t 3,748, t 3,164
The Journal of Technology Transfer	Wenhong Zhang, Yapu Zhao, Donghan Wang, Haifeng Wang, & Jian Li, 2019	Ambidextrous search and product innovation: moderating effects of resource and structural attributes	***Product innovation is considered as a variable that has a relation with ambidexterity.	500	r 0,507, r 0,343
Journal of Product Innovation Management	Floortje Blindenbach-Driessen & Jan van den Ende, 2014	The Locus of Innovation: The Effect of a Separate Innovation Unit on Exploration, Exploitation, and Ambidexterity in Manufacturing and Service Firms	*** Separate innovation unit is considered as the independent variable that affects ambidexterity.	2865	r 0,499
Journal of Product Innovation Management	Hsing-Er Lin, Edward F. McDonough III, Shu-Jou Lin, & Carol Yeh-Yun Lin, 2012	Managing the Exploitation/Exploration Paradox: The Role of a Learning Capability and Innovation Ambidexterity	Learning Capability foster to create an innovative culture that encourages knowledge sharing with the external environment as well as in-house learning supported by employees.	204	r 0,34

Appendix 2. Overview of Data Set 2 Studies Examining the Relationship between Organizational Ambidexterity and Innovative Performance

Journal	Author &Year	Title	N	r
Journal of Technology Management & Innovation	Raul Pelagio Rodriguez & Ma. Regina M. Hechanova, 2014	A Study of Culture Dimensions, Organizational Ambidexterity, and Perceived Innovation in Teams	245	0,61
Organizacija	Mladenka Popadić, Matej Černe & Ines Milohnić, 2015	Organizational Ambidexterity, Exploration, Exploitation and Firms Innovation Performance	33590	0,34, 0,51
Sustainability	Yu-Shan Chen, Ching-Hsun Chang &Yu-Hsien Lin, 2014	The Determinants of Green Radical and Incremental Innovation Performance: Green Shared Vision, Green Absorptive Capacity, and Green Organizational Ambidexterity	202	0,369, 0,084 0,139, 0,372
Frontiers of Entrepreneurship Research	Henri Burgers &Justin J.P. Jansen, 2008	Organizational Ambidexterity and Corporate Entrepreneurship: The Differential Effects on Venturing, Innovation and Renewal Processes	240	0,37
Leadership & Organization Development Journal	Hannes Zacher & Kathrin Rosing, 2015	Ambidextrous leadership and team innovation	33	0,45, 0,16
Technovation	Matthias deVisser, PetradeWeerd-Nederhof, Dries Faems , MichaelSong, Bartvan Looy, Klaasjan Visscher, 2010	Structural ambidexterity in NPD processes: A firm-level assessment of the impact of differentiated structures on innovation performance	387	0,26, 0,37
Asian Journal of Technology Innovation	Suqin Liao, Zhiying Liu & Shanshan Zhang, 2018	Technology innovation ambidexterity, business model ambidexterity, and firm performance in Chinese high-tech firms	201	0,34, 0,385
Kybernetes	Sebastian Ion Ceptureanu & Eduard Gabriel Ceptureanu, 2021	Innovation ambidexterity effects on product innovation performance: the mediating role of decentralization	174	0,36, 0,42
European Journal of Innovation Management	Hongyun Tian, Courage Simon Kofi Dogbe, Wisdom Wise Kwabla Pomegbe, Sampson Ato Sarsah and Charles Oduro Acheampong Otoo, 2019	Organizational learning ambidexterity and openness, as determinants of SMEs' innovation performance	388	0,451, 0,44
International Business Review	Jie Wua, Geoffrey Woodb, Xiaoyun Chena, Martin Meyerd, Zhiyang Liu, 2020	Strategic ambidexterity and innovation in Chinese multinational vs. indigenous firms: The role of managerial capability	220	0,22, 0,33
Journal of Business Research	Margaret L. Sheng, Saide Saide, 2021	Supply chain survivability in crisis times through a viable system perspective: Big data, knowledge ambidexterity, and the mediating role of virtual enterprise	207	0,279, 0,146

Technological Forecasting & Social Change	Jingjing Guoa, Bin Guoc, Jianghua Zhoud, Xiaobo Wue, 2020	How does the ambidexterity of technological learning routine affect firm innovation performance within industrial clusters? The moderating effects of knowledge attributes	217	0,309
Journal of Cleaner Production	Junaid Aftab, Monica Veneziani, Huma Sarwar, Muhammad Ishtiaq Ishaq, 2022	Organizational ambidexterity, firm performance, and sustainable development: Mediating role of entrepreneurial orientation in Pakistani SMEs	339	0,41
International Business Review	Ji Yan, Christos Tsinopoulos, & Yu Xiong, 2021	Unpacking the impact of innovation ambidexterity on export performance: Microfoundations and infrastructure investment	21484	0,1
Journal of Business Research	Bernardo Balbonia, Guido Bortoluzzib, Roberto Pugliesec, Andrea Tracognab, 2019	Business model evolution, contextual ambidexterity, and the growth performance of high-tech start-ups	267	0,11
BRQ Business Research Quarterly	Eva M. Pertusa-Ortega, José F. Molina-Azorín, 2018	A joint analysis of determinants and performance consequences of ambidexterity	164	0,427 0,198
Industrial Marketing Management	Mahdi Vesal, Vida Siahtiri, Aron O'Cass, 2022	Do senior managers hold the keys to unlock innovation and environmental sustainability?	130	0,22, 0,19 0,18, 0,08
Industry and Innovation	Jojo Jacob, Maggie-Qiuzhu Mei, Theresia Gunawan & Geert Duysters, 2022	Ambidexterity and innovation in cluster SMEs: evidence from Indonesian manufacturing	120	0,38
European Journal of Innovation Management	Fuqiang Zhao, Wei Hu, Fawad Ahmed, Haoyu Huang, 2021	Impact of ambidextrous human resource practices on employee innovation performance: the roles of inclusive leadership and psychological safety	788	0,496
British Journal of Management	Catherine L. Wang and Mohammed Rafiq, 2012	Ambidextrous Organizational Culture, Contextual Ambidexterity and New Product Innovation: A Comparative Study of UK and Chinese High-tech Firms	150* 242**	*0,41, 0,23, 0,25 0,27, 0,28, 0,36 **0,45, 0,47, 0,48 0,51, 0,62, 0,56
Sustainability	Michael Yao-Ping Peng, Ku-Ho Lin, Dennis Liute Peng, and Peihua Chen, 2019	Linking Organizational Ambidexterity and Performance: The Drivers of Sustainability in High-Tech Firms	228	0,482
Journal of Innovation and Entrepreneurship	Faris Alghamdi, 2018	Ambidextrous leadership, ambidextrous employee, and the interaction between ambidextrous leadership and employee innovative performance	147	0,62, 0,55