

Demystifying the link between knowledge management capability and innovation ambidexterity: organizational structure as a moderator

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Demystifying the link between knowledge management capability and innovation ambidexterity: Organizational structure as a moderator

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3 **Demystifying the link between knowledge management capability and innovation**
4 **ambidexterity: Organizational structure as a moderator**
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10 **ABSTRACT**

11 **Purpose:** This study examines the relationship between knowledge management (KM) capability
12 and innovation ambidexterity, and their subsequent influence on firm performance. It also
13 investigates whether organizational structure – in terms of connectedness and centralization –
14 helps to develop a suitable context that either hinders or catalyzes the effectiveness of KM
15 capability in predicting innovation ambidexterity.
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19 **Design/methodology/approach:** Data were collected from 336 manufacturing organizations in
20 Pakistan using a random sampling technique. Partial least square-based structural equation
21 modelling (PLS–SEM) was employed to analyze the data.
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24 **Findings:** Results reveal that KM capability is positively linked with innovation ambidexterity
25 and firm performance. Innovation ambidexterity positively mediates the link between KM
26 capability and firm performance. Connectedness positively moderates the association between KM
27 capability and innovation ambidexterity. However, centralization negatively moderates the link
28 between KM capability and innovation ambidexterity.
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31 **Research/Theoretical implications:** This research offers theoretical insights into when and how
32 KM capability is effective in prompting performance through innovation ambidexterity by creating
33 a suitable context.
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36 **Practical implications:** The study indicates that innovation may develop in an ambidextrous
37 manner in an organization as long as the organization is proficient in creating a suitable context,
38 i.e. structure to support it. Organizations should strive to develop sustained KM capabilities
39 because these are seminal for enabling the challenging task of exploiting existing resources for
40 innovation while also tapping on new opportunities for explorative breakthroughs.
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43 **Originality:** This research contributes to a novel understanding regarding the importance of KM
44 capability in fostering manufacturing organizations to engage in ambidexterity by creating a
45 suitable context where optimal amount of each form of innovation activities is calibrated using
46 KM capability.
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49 **Keywords:** Knowledge management capability, innovation ambidexterity, organizational
50 structure, connectedness, centralization, firm performance
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Demystifying the link between knowledge management capability and innovation ambidexterity: Organizational structure as a moderator

INTRODUCTION

Rapid changes in the contemporary global business environment are forcing organizations to become more proficient in adjusting to the dynamic competitive environment (Doh, Tashman, & Benischke, 2019; Wen, Qualls, & Zeng, 2021). Innovation by means of offering new products and services, exploring new segments of markets, identifying venture opportunities, and/or seeking new ways of doing business seems to be a potential solution to the survival and subsequent financial growth of organizations (Shafique, Ahmad, & Kalyar, 2020; Xie, Huo, & Zou, 2019). For long-term survival and growth, organizations must be involved in two forms of innovation activities – exploitative and exploratory – which enable them to grasp opportunities and tackle potential threats prevailing in the external business environment (Farzaneh et al., 2022; Jansen, Simsek, & Cao, 2012). Innovation ambidexterity entails adopting both exploratory and exploitative innovation simultaneously (De Silva et al., 2022). Organizations can adopt and manage these two activities to establish competitiveness using their competencies of exploiting current processes, procedures, and products for incremental benefits, and exploring new, novel, and useful ideas for breakthrough improvements (Gibson & Birkinshaw, 2004). However, ambidexterity is difficult to achieve because exploration and exploitation demand unique capabilities, knowledge, skills, and resources (Boamah et al., 2022a; Rabej, Jimenéz–Jiménez, & Martínez-Costa, 2013; Yan, Tsinopoulos, & Xiong, 2021). Given the significance of innovation ambidexterity for firm performance, studies have started to identify how organizations can achieve ambidexterity by managing and combining unique capabilities and calibrating between exploratory and exploitative innovation to attain equilibrium for sustained performance.

Pioneering literature has shown that organizations' unique resources and capabilities provide solutions for ambidexterity by leveraging exploration in one and exploitation in other business area, process, product, and/or service (Chang & Huges, 2012; Cho, Bonn, & Han, 2020; Gibson & Birkinshaw, 2004; Ren & Zhao, 2021). For example, Lavie, Stettner, and Tushman (2010) suggested inter-organization specialization as a key element to promote innovation ambidexterity. Andreeva and Kianto (2011) advocated that effective management of knowledge resources facilitates organizations to devise innovation. Similarly, Puranam, Sing, and Zollo

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3 (2006) proposed structural and temporal separation capabilities as potential solutions for handling
4 ambidexterity. However, these solutions assume that exploitative and explorative activities are
5 absolutely incompatible, hence seeking a trade-off between the two forms of innovation (Chang
6 & Huges, 2012, p. 12). Nevertheless, a recent stream of research (Ali et al., 2022; Božič &
7 Dimovski, 2019; Ceptureanu, Ceptureanu & Cerqueti, 2021; Jiang & Liu, 2022) argues that both
8 forms of innovation activities can be carried out simultaneously in a single organization given that
9 the organization is capable of building a suitable context to perform innovation ambidexterity.
10 Following this approach to ambidexterity and drawing on the knowledge-based view (KBV), we
11 propose that knowledge management (KM) capability is an important strategic resource that helps
12 organizations achieve incremental innovation by exploiting existing knowledge and fosters
13 breakthrough innovation by exploring new knowledge.
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23 KBV suggests that the knowledge of an organization – if it is valuable, inimitable, un-
24 substitutable, and rare – is an important strategic resource which helps the organization to attain
25 sustained competitive advantages (Boamah et al., 2022b; Felin & Hesterly, 2007). Hence, an
26 organization's ability to effectively create, disseminate, and manage knowledge alongside the
27 capability to combine such knowledge with other resources could enable the organization to
28 successfully achieve incremental and breakthrough solutions to respond to competitors' actions
29 and market demands (Ferreira, Coelho & Moutinho, 2020; Buenechea-Elberdin, Sáenz & Kianto,
30 2018). Existing literature on innovation ambidexterity, however, has paid little attention to KM
31 capability while investigating the propensity of organizations to engage in exploratory and
32 exploitative innovation. Further, there is paucity of research examining contingent conditions in
33 understanding the effectiveness of antecedents of organizational ambidexterity. These contingent
34 conditions serve as organizational contexts that nurture or inhibit ambidexterity. Previous studies
35 have suggested that external environmental factors, such as dynamism and competitive intensity,
36 are important contingencies affecting organizations' initiatives toward ambidexterity (Cao et al.,
37 2009; Jansen et al., 2006); however, the role of internal context remains less examined. For
38 example, although accumulating evidence has shown that the effectiveness of KM on
39 organizational outcomes is contingent upon organizational structure, our understanding of how
40 KM capability and organizational structure *jointly* affect an organization's ability to engage in
41 exploratory and exploitative innovation activities still remains limited.
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Hence, this study contributes to a novel understanding regarding the importance of KM capability in fostering organizations to engage in ambidexterity by creating a suitable context where the right amount of each form of innovation is calibrated using KM capability. Innovation ambidexterity in turn contributes toward financial performance of the organizations. This study examines the premise that if organizations are proficient in creating suitable contexts, then they may ambidextrously develop innovation. Organizational structure is suggested as a potential moderator that helps understand *when* KM capability is more/less effective in prompting innovation ambidexterity of focal organization. The examination of the contingent role of organizational structure also answers a call for more research on the boundary conditions regarding the determinants of innovation ambidexterity (Bani-Melhem, Abukhait & Bourini, 2022; Fu, Liu & Liao, 2018).

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

KM capability

KM capability refers to the abilities of an organization to create, acquire, transfer, apply, and store knowledge with a supportive and pro-knowledge structure so that knowledge resources can be managed, mobilized, and combined with other organizational resources to leverage opportunities and respond to external changes (Chuang, 2004). Hence, KM capability enables organizations to identify and channel essential knowledge toward smooth functionality of organizational activities and facilitate them to achieve competitive goals (Tseng, 2016). Organizations possessing high level of KM capability are likelier to develop their competencies, which helps them decrease redundancy, respond quickly to market changes, and promote creative ideas and innovation more proficiently compared with organizations expressing low KM capability (Mao et al., 2016; Sun, Liu, & Ding, 2020). Moreover, empirical studies provide accumulated evidence that KM capability positively influences firm performance through the development of sustained intellectual resources and competitive advantages (Ge, 2022; Mokhtarzadedeh, Jafarpanah, & Babgohari, 2022; Inkinen, 2016). In addition, KM capability enhances the dexterity of organizations and empowers them to respond proactively in highly competitive and dynamic markets through (re)designing up-to-date products and services (Eklund, 2020; Mardani et al., 2018).

Innovation ambidexterity

Innovation ambidexterity refers to an organization's ability to engage in exploitative and exploratory innovation simultaneously (Jansen et al., 2012). While exploratory innovation encompasses breakthrough advancement by exploring new opportunities to meet emergent customer/market requirements, build novel products, and target new market segments, exploitative innovation entails innovation geared toward serving the present customers or desires of the market and refining current designs or products (Jansen et al., 2006), and exploits existing resources to respond to market demands. Hence, exercising both forms of innovation activities simultaneously allow organizations to avoid dropping into a "failure setup" and reap benefits from "success setup" (Gibson & Birkinshaw, 2004). Both forms of innovation strive for scarce resources of the organizations and to manage conflicting needs for organizational mindset and processes (March 1991), because resource competition has always been the central argument behind the 'incompatibility' of organizations to achieve strategic fit in market competitions (Prajogo, 2016). Organizations that foster exploitative actions can enjoy short-term revenues while competing with the risk of inability to (re)configure themselves in different competitive positions (March, 1991). However, organizations relying on exploration cannot gain full benefits linked to the commercialization of prevailing capabilities (Gupta, Smith & Shalley, 2006). Hence, organizations that chase ambidexterity effectively may rationally presuppose satisfactory improvement (Lavie et al., 2010). For empirical investigation, past studies determined innovation ambidexterity either as product (multiplication) or aggregation (summation) of exploitative and exploratory innovation (De Silva et al., 2022; Lubatkin et al., 2006). However, we adopt a robust approach by exploring the recent stream of research – advancing psychometric properties of innovation ambidexterity in management research – and recommend innovation ambidexterity as a second-order construct (see Soto-Acosta, Popa & Martinez-Conesa, 2018).

2.3 Linking KM capability and innovation ambidexterity

Innovation ambidexterity entails a range of company practices and resources (Gupta et al., 2006) to leverage both explorative and exploitative innovation (Jansen et al., 2012; Raisch & Birkinshaw, 2008). Since KBV suggests organizational knowledge as a critical resource for strategy formulation and execution, goal setting, innovation, and ensuring high performance (Andreeva &

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3 Kianto, 2011; Wu et al., 2020), it has an important role in determining when and which form of
4 innovation an organization needs to exercise. However, Gold, Malhotra, and Segars (2001) argued
5 that the existence of knowledge alone is insufficient unless organizations develop both process and
6 structural abilities to identify, generate, store, protect, and use such knowledge in combination
7 with other resources. Hence, KM capability gives organizations advantages for optimizing
8 innovation ambidexterity because these capabilities assist an organization to access its employees'
9 resources and mixed knowledge (Chuang, 2004), which enable the organization to leverage new
10 opportunities to extend its existing knowledge base and resource centers (Holsapple & Wu, 2011).
11 KM capability enables organizations to gain and utilize ideas and feedback through sustained
12 interactions with employees about the knowledge and information on new product ideas, upcoming
13 trends, and fluctuations in the market, which are highly beneficial for both exploitative and
14 exploratory innovation (Zhao, 2021). By getting a variety of knowledge and resources through
15 diverse networks, organizations can enrich their catalogues of solutions, thus diminishing resource
16 limits (Ryu, Baek, & Yoon, 2022; Gupta et al., 2006), which in turn influence organizations' ability
17 to execute explorative and exploitative activities in a productive manner (Jansen et al., 2012). As
18 mentioned before, KM capability allows organizations to gain rich and varied information and
19 knowledge about market variations and competitions by rigorous collaboration between
20 organizations and their network partners, both internal and external (Wang & Hu, 2020).
21 Ambidextrous organizations rely on exploiting existing knowledge, methods, and practices to
22 foster incremental innovation while exploring new knowledge, methods, and practices to promote
23 radical innovation (Anser et al., 2021; Soto-Acosta et al., 2018). While knowledge along with great
24 strategic prospective is an important resource, KM capability is likely to gear organizations in
25 scanning the business environment proactively and responding quickly to competitors' actions
26 (Choi, Ha, & Kim, 2022; Farzaneh et al., 2022). Hence, organizations possessing KM capability
27 are anticipated to become more proficient in harmonizing exploitative and exploratory innovations
28 ambidextrously. Following these argumentations, we hypothesize that:

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47 **H1:** KM capability is positively associated with innovation ambidexterity.

48 49 50 51 52 **Innovation ambidexterity and firm performance**

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54 Past studies (Cao et al., 2009; Cho et al., 2020) suggest ambidexterity as a strategic driver that
55 optimizes organizations' long-term operational alongside financial performance. Exploitative
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3 innovation enables the (re)configuration and use of current organizational resources, thereby
4 facilitating organizations to fully leverage their existing resources to achieve extraordinary
5 performance. Exploratory innovation tends to support organizations to discover and develop new
6 marketplaces and novel ideas regarding product design and development alongside new ways and
7 methods of doing business activities, which equip organizations to leverage opportunities and
8 respond to threats to minimize potential risks (Jansen et al., 2012). Both of these activities are
9 perceived as critical for sustained competitive advantage and assist organizations to improve their
10 competitiveness and performance (Liao, Liu & Zhang, 2018; Onufrey & Bergeek 2021; Raisch &
11 Birkinshaw, 2008). Also, the ability of organizations to strive for exploratory innovation might be
12 embedded in an aptitude to mutually chase exploitative innovation efficiency (Smith & Tushman,
13 2005), and competence in exploitative actions may improve exploratory determinations in a
14 balancing manner, which can contribute to improving organizations' overall performance.
15 Moreover, Chang and Huges (2012) argued that organizations equilibrating the two activities –
16 exploitation and exploratory innovation simultaneously – have more chances to attain higher
17 performance than those focusing one on the cost of another (Tushman & O'Reilly, 1996).
18 Furthermore, there is universal agreement in the literature suggesting that both incremental and
19 radical innovation are important determinants of competitiveness and performance (Cho et al.,
20 2020; Jansen et al., 2012); therefore, organizations that can equilibrate by calibrating the scope
21 and extent of innovation(s) are expected to have better performance. Hence, we hypothesize that:

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36 **H2:** Innovation ambidexterity is positively associated with firm performance.
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41 **KM capability and firm performance**

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43 KBV suggests that knowledge is one of the important resources of an organization and if managed
44 and utilized effectively, may provide a basis for competitive advantage and improved performance.
45 Kim, Mukhopadhyay, and Kraut (2016) argued that deployment of KM capability facilitates
46 organizations to positively influence performance outcomes through the development and
47 implementation of a broad and deep knowledge base, particularly in contexts that need a large
48 amount of knowledge resources (Mokhtarzadedeh; 2022; Oliveira et al., 2020). Unique knowledge
49 regarding novel methods and processes facilitates organizations to leverage innovative techniques
50 to work proficiently and manage and increase customer satisfaction (Brito et al., 2020; Papazoglou
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3 & Spanos, 2021). KM capability helps organizations to identify, acquire, and disseminate
4 knowledge regarding customer preferences and market fluctuations, thereby enabling
5 organizations to (re)configure resources and (re)develop products that are best fit in meeting
6 marketing demands and satisfying customer needs. Several studies (e.g. Ferraris, Santoro, & Dezi,
7 2017; Mao et al., 2016) have provided evidence on successful achievement of positive
8 organizational outcomes through effective acquisition, sharing, application, and management of
9 knowledge. Specifically, Inkinen (2016), in his systematic review of empirical research, found
10 accumulated evidence that organizations utilizing KM practices – enabled through the arrangement
11 of a knowledge-supportive organizational structure – to manage sustained knowledge resources in
12 responding to market changes, customer needs, and internal and external business challenges
13 outperform those organizations that are either inefficient in utilizing KM practices or deficient in
14 unique knowledge resources. Given that KM capability is characterized by organizational
15 processes and structure for effective management and utilization of knowledge resources (also in
16 combination with other resources to optimize the effect by calibrating the right amount of each
17 resource), then the KM capability of an organization is also expected to increase firm performance.
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31 **H3:** KM capability is positively associated with firm performance.
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36 **Mediating role of ambidexterity**

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38 Besides direct effects, we also propose that innovation ambidexterity mediates the association
39 between KM capability and firm performance. KM capability enables organizations to respond
40 promptly to external demands by offering products matching market needs, thereby minimizing
41 the propensity of product design and development, if not failure, incompatibility. Ritala et al.
42 (2015) found explicit knowledge to be an important determinant of innovation. Similarly, Podrug,
43 Filipović, and Kovač (2017) advocated implicit knowledge as a source of firm innovation. Thus,
44 organizations that can utilize both forms of knowledge can increase their propensity for radical
45 and incremental innovation and enhance overall performance. Therefore, KM capability can
46 encourage exploitative and exploratory innovation to provide novel solutions and apply advanced
47 technology to resolve technical difficulties in product design and development (Luo, Lui, & Kim,
48 2017), thereby strengthening the firm's ability for new products and market growth, which, in turn,
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3 enhance firm performance. Hence this research proposes that KM capability enables organizations
4 to perform exploratory and exploitative activities synergistically, and thereby produce radical and
5 incremental innovations that are determinants of firm performance (Jansen et al., 2006; Cho et al.,
6 2020). Various studies have suggested (see e.g., Inkinen, 2016) the presence of an underlying
7 mediating mechanism for the effect of KM on organizational outcomes and argued that this
8 capability–performance relationship can be understood better in the presence of mediators because
9 such mechanism(s) provide(s) insight into *how* certain capabilities foster performance outcomes.
10 Therefore, innovation ambidexterity is expected to mediate the effect of KM capability on firm
11 performance so that KM capability fosters innovation ambidexterity, which, in turn, enhances firm
12 performance. Hence, we hypothesize that:
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21 **H4:** Innovation ambidexterity mediates the relationship between KM capability and firm
22 performance.
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27 **Organizational structure as a moderator**

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29 To this point, this study argued that KM capability enhances firm performance by fostering
30 innovation ambidexterity. However, literature suggests that contextual qualities of an organization
31 (such as organizational structure) could serve as contingent factors that might influence the
32 effectiveness of capabilities on performance outcomes. Given that both KM capability and
33 innovation ambidexterity are seen as dynamic capabilities (cf. Vohlne & Jonsson, 2017), it is
34 expected that their effectiveness in predicting outcomes could be contingent upon organizational
35 structure. Moreover, Miller (1987) argued that organizational structures and strategy-making
36 processes are highly interdependent and must be complementary to ensure high performance.
37 Therefore, examining the moderating effects of organizational structure in this study is reasonable.
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45 Research has suggested several elements whose characteristics describe different forms of
46 structure in an organization (Pugh et al., 1968). In this study, we consider two elements –
47 connectedness and centralization – that represent organizational structure. These two elements are
48 imperative to our study because connectedness and centralization are critical in determining
49 interaction patterns and flow of information in an organization (Mihalache et al., 2014).
50 Connectedness refers to the “sum of ties among the members of a network” (Mihalache et al.,
51 2014), which provides organizational members’ opportunity to interact in a trust-centric context
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3 and enables open sharing of information. Centralization represents a parsimonious organizational
4 structure with a clearly defined hierarchy and flow of information (Tsai, 2002). We argue that both
5 elements of organizational structure moderate the effect of KM capability on innovation
6 ambidexterity (first-stage moderation) and the effect of innovation ambidexterity on firm
7 performance (second-stage moderation). We argue that organizational structure is an important
8 boundary condition that influences the effects of firm capabilities in predicting outcomes. We
9 develop an integrated conceptual framework and suggest that one capability (KM capability)
10 determines another (design) capability (innovation ambidexterity), which, in turn, influences firm
11 performance; hence, moderation at both stages tends to broaden our understandings in the
12 capability–capability–performance context.
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23 ***Moderating role of connectedness***

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25 Connectedness enables organizations' members to construct a better communication framework
26 characterized by trust through which they can establish a productive and supporting environment
27 for interaction and open sharing of information with each other (Mihalache et al., 2014), which is
28 an essential context fostering KM activities. Connectedness can catalyze the effect of KM
29 capability in innovation ambidexterity in several ways. First, it permits the assimilation of ideas in
30 the process of solving the problem because of confirming the accessibility toward the others'
31 resources and proficiency through extended interactions and resource sharing. Second,
32 connectedness reinforces the connections that provide affirmative bonds among organizational
33 members and warrant numerous opportunities to them for receiving feedback. Third,
34 connectedness ensures a basic supporting environment that is mutually beneficial for
35 accomplishing the functions and activities of the organization and its members. In the perspective
36 of a closely joined network, the degree and eminence of information accessible is increased among
37 the members in an organization (Mihalache et al., 2014), thereby facilitating organizational
38 members to find solutions by exploiting existing resources and enabling them to seek new ideas
39 and radical solutions. Hence, innovation ambidexterity stemming from KM capability seems to be
40 higher in organizations characterized by connectedness than those that are more formal, and
41 organizational members have a low propensity toward informal interaction and open
42 communication. Therefore, it is reasonable to suggest that when connectedness is high in
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3 organizations, KM capability fosters a high degree of engagement of organizations in both
4 exploitation and exploratory innovation activities. Hence, we hypothesize that:

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7 **H5:** Connectedness moderates the relationship between KM capability and innovation
8 ambidexterity such that the relationship is stronger for higher levels of connectedness.
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10 11 12 13 *Moderating role of centralization* 14

15 Centralization refers to embodiment of formal authority-hierarchy organization design and
16 represents concentration of decision-making authority. A study has shown that centralization
17 reduces commitment, supporting behavior, and sponsorship (Pierce & Delbecq, 1977); thus, in
18 centralized organizations, employees' readiness toward acquisition, dissemination, and application
19 of knowledge seems to remain minimal. In centralized organizations, first, information travels
20 through top-bottom channels, which usually take a longer time to reach at destination. Second,
21 managers in centralized organizations are less likely to seek information from lower-level
22 organizational members; instead, they rely more upon their own knowledge resources. Third,
23 decision-making powers reside with top-ranked members (i.e., top management); hence, other
24 organizational members situated at the bottom of the hierarchy possess only minimal decision-
25 making power (Vagstad, 2000). The constraints restrain these organizational members from
26 exploiting existing knowledge resources and discourage them from exploring new resources
27 during innovation activities. Moreover, a centralized context provides less discretion to lower-
28 level members to furnish suggestions and quickly respond to unique opportunities, environmental
29 threats, and market changes; hence, when organizational members see little or no application of
30 their knowledge toward innovation, they remain passive in acquiring and utilizing unique
31 knowledge (Argyres & Silverman, 2004). Therefore, KM capability would be less effective in
32 predicting innovation ambidexterity in contexts where information flow takes longer, and
33 subordinate members have less discretion in decision-making and responding to market changes.
34 Hence, we hypothesize that:
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51 **H6:** Centralization moderates the relationship between KM capability and innovation
52 ambidexterity such that the relationship is weaker for higher levels of centralization.
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Figure 1 below presents conceptual framework of the study and displays the graphical representation of hypothesized relationships among study variables.

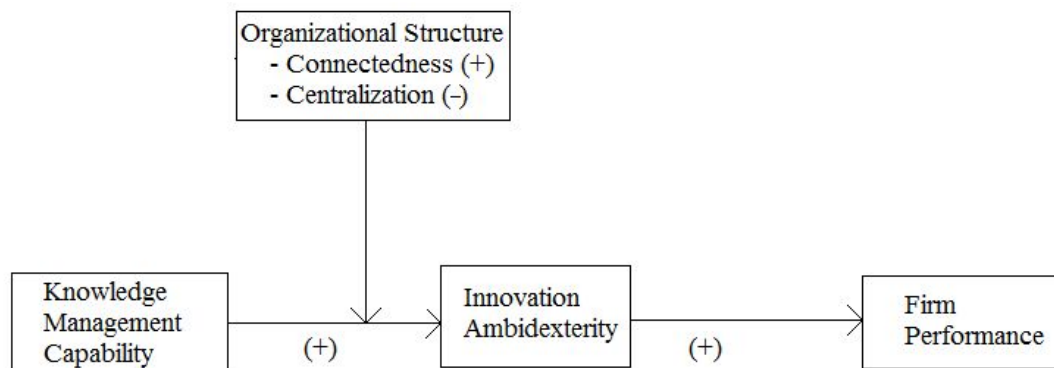


Figure 1: Conceptual Framework

METHODOLOGY

This section explains the population, sample, and procedure used to collect the data. Moreover, it also pertains the information regarding measurement instruments used for the purpose of data collection.

Sample and procedure

A cross-sectional survey method was employed to test the hypothesized framework through the ratings of main informants from top management, as it is a commonly used methodology to assess the perceptions of organizational variables. The sample comprised Pakistani manufacturing sector because of three reasons. First, Pakistan is an emerging economy, where organizations are facing market competition and regulatory pressures while pursuing corporate goals to ensure sustained growth (Kalyar, Aftab & Shafique, 2020). Second, Pakistani industry and economy are trying hard to revive after around fifteen years of socio-political crisis that arose due to war on terrorism and energy shortfall. Third, manufacturing industries provide significant employment and have major contribution to the economy of Pakistan. In this way, the perspective of an emerging economy serves as a good context to empirically examine the proposed framework. We targeted seven main manufacturing sectors (textile, leather, electrical and electronics, chemical, sports, pharmaceuticals, and surgical) because of their significant contribution toward the economic development of the country. Since the variables of this study are organizational level, therefore,

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3 the unit of analysis was an 'organization' and informants were the people of having key positions
4 in the organizations. Initially, 1000 organizations were drawn randomly from associations of these
5 manufacturing sectors fulfilling two criteria. First, the organization's age must be at minimum of
6 four years because for an infant organization, according to Wil Schroter¹, it takes at least four years
7 for a startup to get toward real business as well as attaining persistency in running of business.
8 Second, the organization has a minimum of 100 numbers of employees because small-sized
9 organizations with fewer employees lack a formal structure; however, organizations with a greater
10 number of employees are structured and formal (Meijaard, Brand, & Mosselman, 2002). We
11 contacted the top managers of these 1000 organizations via emails and invited them to participate
12 in this study, and 483 managers replied and showed their consent to participate in the study.
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21 To avoid common method bias (CMB), the data were collected in two different spans of
22 times. At time one (T1), 483 questionnaires were distributed via emails, and respondents were
23 asked to rate their perceptions on KM capability, innovation ambidexterity, and organizational
24 structure (connectedness & centralization). Each respondent was assigned a unique identity so that
25 responses could be matched with their later response at time two (T2), and 377 questionnaires
26 were received with 78.05% of response rate. After four weeks of T1, the second phase of data
27 collection was conducted where 377 questionnaires were sent to the respondents. Out of 377, 351
28 questionnaires were received back, out of which 15 questionnaires were incomplete. Finally, 336
29 questionnaires were used for the final analysis. The questionnaires were distributed electronically
30 via emails and were followed up telephonically. The final sample comprised 83 companies from
31 textile, 62 from leather, 56 from electrical and electronics, 48 from chemical, 41 from sports, 37
32 from pharmaceutical, and nine from surgical. Of 336 organizations, seven organizations aged
33 between four and five years, 61 organizations aged between 6 and 10 years, 172 organizations
34 aged between 11 and 15 years, 85 organizations between 16 and 20 years, and 11 organizations
35 exceeded 20 years of age. For organization size, which was measured based on the number of
36 employees, 81 organizations had employees between 100 and 500, 174 organizations had
37 employees between 501 and 1000, 73 organizations had employees between 1001 and 1500, and
38 eight organizations had employees exceeding 1500.
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55 ¹ Wil Schroter is the Founder + CEO @ [Startups.com](https://www.startups.com), a startup platform that includes Bizplan, Clarity, Fundable,
56 Launchrock, and Zirtual.
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Measures

All the constructs were measured by adapting pre-developed measurement scales on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). KM capability was measured using a 10-item scale adapted from Liao, Chuang, and To (2011). Innovation ambidexterity was measured as a second-order construct of exploitative and exploratory innovation (6 items each) adapted from Jansen et al. (2006) and Chang and Hughes (2012). Firm performance was measured using five items that were drawn from Martín-Rojas, García-Morales, and García-Sánchez (2011) and Murray and Kotabe (1999). Centralization was measured using a 6-item scale originally developed by Breugh (1985). Connectedness was measured using a 4-item scale adapted from Jaworski and Kohli (1993). Validity and reliability of all measurement constructs were ensured before hypothesis testing. Firm age and firm size were taken as control variables because prior studies have suggested that organizations' demographics have a significant association with firm performance (Jansen et al., 2012).

ANALYSIS AND RESULTS

PLS-SEM was employed to analyze the hypothesized relationships because of the complex nature of the proposed framework (Hair, Ringle, & Sarstedt, 2011). In PLS-SEM, sample size must be more than ten times the maximum number of paths affecting an endogenous variable (Hair et al., 2011). The maximum number of arrows was 9 pointing at firm performance comprising one independent variable (KM capability), one mediating variable (innovation ambidexterity), four arrows of two moderators (connectedness and centralization), and two control variables (firm age and firm size). Therefore, the final sample size of 336 exceeded 90, which is essential for analysis. There was no substantial variance found in early and late key informants regarding response patterns.

Measurement model

PLS models are normally tested in two stages. First, an assessment of the measurement model is performed to analyze the construct validity and reliability. Convergent validity was examined using factor loadings and average variance extracted (AVE). As Table 1 indicates, the values of

factor loadings and AVEs exceeded 0.50; hence, convergent validity exists (Bagozzi & Yi, 1988). Divergent validity was assessed by comparing the square root of AVE with the relevant correlational construct such that the values of the square root of AVE exceeded the values of correlations (Fornell & Larcker, 1981). Table 2 shows that the square roots of AVEs exceeded its pertinent correlational construct; therefore, divergent validity exists. To achieve reliability, the values of composite reliability (CR) and Cronbach's alpha must exceed 0.70 (Nunnally, 1978; Hair et al., 2010). Table 1 illustrates that the values of CR and Cronbach's alpha exceeded 0.70.

Table 1: Validity and reliability

Item	KMC	IA	FP	Con	Cen	SE	P value
KM capability							
KMC1	(0.790)	-0.117	0.163	-0.079	-0.16	0.049	<0.001
KMC2	(0.777)	0.049	-0.118	0.055	-0.068	0.049	<0.001
KMC3	(0.795)	-0.055	0.1	0.057	-0.107	0.048	<0.001
KMC4	(0.719)	0.068	-0.062	0.049	0.291	0.049	<0.001
KMC5	(0.799)	-0.091	0.07	0.01	-0.154	0.048	<0.001
KMC6	(0.770)	0.132	-0.094	-0.025	0.278	0.049	<0.001
KMC7	(0.778)	0.007	0.06	-0.025	-0.045	0.049	<0.001
KMC8	(0.794)	0.018	-0.139	0.003	0.043	0.048	<0.001
KMC9	(0.762)	-0.048	0.037	-0.017	0.049	0.049	<0.001
KMC10	(0.806)	0.046	-0.024	-0.024	-0.09	0.048	<0.001
Innovation ambidexterity							
<i>Exploitative</i>							
IA1	0.01	(0.707)	-0.073	0.007	0.141	0.049	<0.001
IA2	-0.19	(0.686)	0.054	0.07	-0.123	0.049	<0.001

IA3	0.061	(0.773)	0.02	-0.037	0.012	0.049	<0.001
IA4	0.002	(0.745)	0.057	0.027	-0.114	0.049	<0.001
IA5	0.029	(0.778)	-0.047	0.017	0.11	0.049	<0.001
IA6	0.005	(0.788)	0.026	0.01	-0.033	0.049	<0.001
<i>Exploratory</i>							
IA7	0.049	(0.795)	-0.048	-0.058	0.013	0.048	<0.001
IA8	-0.063	(0.785)	0.046	0.044	-0.02	0.049	<0.001
IA9	-0.01	(0.794)	-0.057	-0.016	0.011	0.048	<0.001
IA10	0.038	(0.770)	0.04	0.038	0.032	0.049	<0.001
IA11	0.034	(0.760)	-0.057	-0.117	0.118	0.049	<0.001
IA12	0.013	(0.776)	0.042	0.024	-0.151	0.049	<0.001
Firm performance							
FP1	-0.073	0.011	(0.791)	0.066	0.073	0.049	<0.001
FP2	0.082	-0.01	(0.774)	-0.075	-0.031	0.049	<0.001
FP3	-0.074	-0.07	(0.781)	-0.009	-0.171	0.049	<0.001
FP4	0.141	-0.016	(0.785)	-0.102	0.107	0.049	<0.001
FP5	-0.081	0.091	(0.727)	0.129	0.022	0.049	<0.001
Organizational structure							
<i>Connectedness</i>							
Con1	-0.043	0.064	-0.062	(0.792)	-0.07	0.049	<0.001
Con2	0.09	-0.012	-0.008	(0.753)	-0.158	0.049	<0.001
Con3	-0.034	-0.085	0.065	(0.826)	0.023	0.048	<0.001
Con4	-0.007	0.036	0.002	(0.810)	0.191	0.048	<0.001
<i>Centralization</i>							

Cen1	-0.058	0.004	-0.011	0.03	(0.846)	0.048	<0.001
Cen2	0.075	-0.004	-0.028	-0.026	(0.804)	0.048	<0.001
Cen3	-0.006	-0.026	-0.007	-0.012	(0.807)	0.048	<0.001
Cen4	0.024	-0.023	0.056	-0.035	(0.832)	0.048	<0.001
Cen5	-0.032	0.047	-0.011	0.041	(0.841)	0.048	<0.001
R ²		0.064	0.202				
Adj. R ²		0.055	0.190				
AVE	0.607	0.583	0.596	0.633	0.682		
Full Col. VIF	1.393	1.321	1.278	1.272	3.131		
CR	0.939	0.944	0.881	0.873	0.915		
Cronbach's α	0.928	0.935	0.830	0.807	0.883		

Although the issue of CMB was tackled by collecting data on T1 and T2, it was still vital to check CMB and multicollinearity statistically. Full collinearity variance inflation factor (VIF) was employed to test CMB and multicollinearity. Table 1 shows that the values of full collinearity VIF are in the acceptable range (< 3.3), confirming the data lacked CMB and multicollinearity (Kock & Lynn, 2012). According to Kock and Lynn (2012), full collinearity VIF is a more traditional and possibly a better method to test CMB and multicollinearity (Lindell & Whitney, 2001). Further, Heterotrait–Monotrait (HTMT) ratios are presented in Table 2 to ensure discriminant validity.

Table 2: Results on Heterotrait–Monotrait ratio (HTMT)

	KMC	IA	FP	Con	Cen
KMC	---				
IA	0.363				
	CI _{.90} [0.281, 0.445]				

FP	0.368	0.469		
	CI. ₉₀ [0.287, 0.450]	CI. ₉₀ [0.386, 0.552]		
Con	0.408	0.314	0.196	
	CI. ₉₀ [0.326, 0.490]	CI. ₉₀ [0.233, 0.395]	CI. ₉₀ [0.117, 0.276]	
Cen	0.075	0.043	0.096	0.064
	CI. ₉₀ [-0.003, 0.153]	CI. ₉₀ [-0.035, 0.121]	CI. ₉₀ [0.018, 0.174]	CI. ₉₀ [-0.014, 0.142]

(Good if < 0.90, best if < 0.85); **KMC**=knowledge management capability, **IA**=innovation ambidexterity, **FP**=firm performance, **Con**=connectedness, **Cen**=centralization

Table 3 includes means, standard deviations, and correlations of the factors. The low and medium levels of correlations reveal that a relationship exists among the variables allowing for further analysis.

Table 3: Mean, standard deviation, and correlations

Construct	Mean	SD	KMC	IA	FP	Con	Cen	FA
KMC	4.1720	0.57856	(0.779)					
IA	3.9745	0.55459	0.339***	(0.764)				
FP	4.0060	0.56944	0.324***	0.412***	(0.772)			
Con	4.1592	0.60312	0.352***	0.271***	0.16**	(0.796)		
Cen	2.9815	0.64997	-0.044	-0.004	0.035	0.053	(0.826)	
FA	3.0952	0.80103	-0.044	-0.002	0.026	-0.005	0.713	1
FS	3.0238	0.74475	-0.03	0.029	-0.005	0.052	0.64	0.376

***p<0.001, **p<0.01, **KMC**=knowledge management capability, **IA**=innovation ambidexterity, **FP**=firm performance, **Con**=connectedness, **Cen**=centralization, **FA**=firm age, **FS**=firm size

Structural model

Prior to testing the hypotheses, structural model fitness with the data was ensured through several model fit, and quality indices provided by WarpPLS. The fit indices are average path coefficient (APC), average R-squared (ARS), average adjusted R-squared (AARS), average block variance inflation factor (AVIF), average full collinearity variance inflation factor (AFVIF), and the

Tenenhous' GoF (Tenenhaus et al., 2005). The values of APC ($\beta=0.148, p=0.001$), ARS ($\beta=0.128, p=0.004$), AARS ($\beta=0.117, p=0.008$), AVIF (1.152-ideal), AFVIF (1.574-ideal), and Tenenhaus GoF (0.283-acceptable). The results of structural model fit, and quality indices reveal the structural model fits with the data and allow us to test the hypotheses.

Table 4: Direct and indirect effects

Path	Direct effect	Indirect effect	Total effect	Result
KMC→IA	0.321***	-	0.321***	Accepted
IA→FP	0.297***	-	0.297***	Accepted
KMC→FP	0.197***	0.095**	0.293***	Accepted
Con*KMC	0.163***	-	0.163***	Accepted
Cen*KMC	-0.088*	-	-0.088*	Accepted
FA→FP	0.031	-	0.031	-
FS→FP	-0.028	-	-0.028	-

*** $p<0.001$, ** $p<0.01$, * $p<0.05$, **KMC**=knowledge management capability,

IA=innovation ambidexterity, **FP**=firm performance, **Con**=connectedness,

Cen=centralization, **FA**=firm age, **FS**=firm size

Table 4 presents the results of the hypotheses. KM capability had a positive relationship with innovation ambidexterity ($\beta=0.321, p<0.001$), H1 accepted. Innovation ambidexterity had a positive relationship with firm performance ($\beta=0.297, p<0.001$), H2 supported. KM capability had a positive relationship with firm performance ($\beta=0.197, p<0.001$), H3 accepted. Innovation ambidexterity positively mediated between KM capability and firm performance ($\beta=0.321, p<0.01$), H4 supported. Connectedness positively moderated the link between KM capability and innovation ambidexterity ($\beta=0.163, p<0.001$), H5 accepted. Centralization negatively moderated the relationship between KM capability and innovation ambidexterity ($\beta=-0.088, p<0.05$), H6 accepted.

DISCUSSIONS

This study aims to determine the antecedent and outcome of innovation ambidexterity and boundary conditions under which the determination and effect of innovation ambidexterity are catalyzed. To do so, this study develops an integrated framework that draws upon KBV to propose KM capability as a potential predictor of innovation ambidexterity; firm financial performance has been suggested as a potential outcome of innovation ambidexterity, along with organizational structure as a boundary condition (context). A considerable number of research has suggested innovation ambidexterity as valued dynamic capability of an organization, which is difficult to achieve because of resource constraints, organization dynamics, and contextual factors (Cao et al., 2009). This study suggests that innovation ambidexterity can be achieved by investigating how organizations access and interchange knowledge, along with other resources, using several internal and external categories of network systems. The findings indicate that KM capability has an optimistic effect on innovation ambidexterity (H1). These findings agree with the existing body of knowledge that suggests knowledge resources and management of these resources as antecedents of organizational innovation (Mardani et al., 2018; Podrug et al., 2017), arguing that knowledge is a dynamic resource of organizations that can elicit innovation (Yusr et al., 2017). These findings demonstrate that organizations with robust KM capability can engage in exploratory and exploitative innovation activities ambidextrously. These results deliver empirical provision for research proposing that challenging environments can drive firms to be involved in these two exploitative and exploratory innovations (Chang & Huges, 2012).

For outcome of innovation ambidexterity, the findings recommend that innovation ambidexterity positively contributes toward optimization of firm performance (H2). This implies that attainment of ambidexterity facilitates an organization to increase its competitiveness, optimizing financial performance (Cao et al., 2009). Findings also provide empirical evidence on the direct and indirect positive influence of KM capability on firm performance; thus, H3 and H4 are supported. The contribution of KM capability to firm performance is also well recognized in prior studies. In this study, however, the indirect effect provides new insights into how the KM capability of an organization may prompt performance. Results show that innovation ambidexterity is an important mediating mechanism in elucidating the KM capability-firm performance relationship. Finally,

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3 findings of the study suggest that the effectiveness of KM capability in predicting innovation
4 ambidexterity, alongside the effectiveness of innovation ambidexterity in predicting firm
5 performance, is contingent upon the context of the organization. Organizational structure, as a
6 context, plays an important moderating role that affects the effectiveness of outcomes. More
7 specifically, findings suggest that connectedness catalyzes the effects of both KM capability and
8 innovation ambidexterity. Developing on the argument that connectedness enriches access to
9 information from bottom to top in the organization (Jaworski & Cohli, 1993; Mihalache et al.,
10 2014), empirical evidence confirms that the KM capability–innovation ambidexterity nexus is
11 stronger (vs. weaker) in organizations where the density of social interactions and information
12 sharing is high (vs. low). However, findings show that centralization cannot be a fundamental
13 structure in enhancing the usefulness of organizational management, as it has adverse effects on
14 organizational competence to use KM capability for initiating both exploratory and exploitative
15 innovations and application of these innovations to capture opportunities and/or responding to
16 market changes.
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30 **Theoretical implications**

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32 Developing an integrated research framework of KM capability, innovation ambidexterity and
33 firm performance, this study increases our current understanding in the research areas of KM and
34 strategic management as it advances the comprehension of the role of KM capability in prompting
35 innovation ambidexterity, which, in turn, fosters firm performance. In this way, this study has
36 important theoretical contributions. First, relating to ambidexterity theory – which submits that
37 innovation in organizations is divided into two types, exploitative and exploratory, both of which
38 are needed – this study draws upon KBV and examines the influence of KM capability in
39 developing ambidextrous innovation capabilities to sustained competitiveness and performance.
40 KM capability encourages constructive learning (Rikkerink et al., 2016), comprising
41 identification, acquisition, dissemination, application, protection, and storing of knowledge (tacit
42 and explicit), and facilitating these activities through supportive structures stimulates exploration
43 and exploitation (Kamaşak & Bulutlar, 2010). This ambidexterity prepares an applicable
44 technology and artistic environment to enrich the rational capital and performance of the firm
45 (Bevan et al., 2012). This study's findings elucidate the manifold nature of the relationship
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3 between KM capability and innovation ambidexterity and provide comprehension regarding the
4 application of one dynamic capability to develop another dynamic capability in strategic
5 competitions. Second, this study contributes to the literature by arguing the innovation
6 ambidexterity mechanism to understand how organizations' certain dynamic capabilities (such as
7 KM capability) enhance firm performance through the development of other dynamic and/or
8 operational capabilities. The findings provide empirical evidence that innovation ambidexterity is
9 an outcome of KM capability, which serves as a mediating mechanism through which
10 organizations can achieve higher levels of financial performance. Third, this research reveals the
11 significance of organizational structure in the effective use of resources (e.g., knowledge) to
12 develop capabilities (e.g., ambidexterity) in determining performance outcomes. The contingent
13 role of two dimensions of organizational structure – connectedness and centralization – provides
14 an important context to logically understand organizational dynamics and characteristics, which
15 catalyze/restrict effectiveness of organizational actions.
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28 **Practical implications**

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30 This study also offers important implications for managers. First, the study's findings support the
31 idea that innovation may be advanced ambidextrously in organizations once these organizations
32 can cultivate KM capability, because these competencies are important when searching for
33 exploration and exploitation. Given the empirical evidence, managers can optimize firm
34 performance by calibrating exploratory and exploitative innovation activities, which are likely to
35 be developed easily using KM capability. Since KM capability substantially impacts exploitative
36 and exploratory innovations, managers must take action to enable organizations for development
37 and effective management of knowledge capabilities. Similarly, knowledge-sharing culture may
38 be encouraged because it can assist assimilation and sharing of knowledge among employees,
39 which is a precondition to develop KM capabilities (Bevan et al., 2012). As such, organizations
40 ought to set effective incentive measures, encourage knowledge workers, and embodiment of
41 knowledge-centered policies in human resource management systems, and invest more in
42 resources that assist in managing knowledge capabilities.
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54 Second, our findings reveal that exploitative and exploratory innovations are associated
55 with firm performance. Thus, a quick way to expand organizations and boost performance is
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3 advancing employees' innovative behavior. Managers must provide a portfolio of training, policies
4 for talent-hunt, innovative climate, and proactive leadership behaviors to encourage employees to
5 engage in processes that ultimately promote creativity and innovation at individual, team, and
6 organizational levels. Managers may also take fewer actions, such as altering old-fashioned
7 approaches regarding work processes and replacing them with innovative ideas, technology,
8 methodologies, and cultures to enhance employee efficacy for innovation (Eklund, 2020; Fu et al.,
9 2018). Third, to optimize innovation ambidexterity and catalyze its effectiveness, managers are
10 suggested to determine organizational structure wisely. The findings demonstrate that informal
11 organizational structure characterized by connectedness catalyzes the effects of organizational
12 actions to prompt innovation ambidexterity and positively moderates the effectiveness of
13 ambidextrous organizations in fostering performance. A more formal and concentrated structure,
14 however, restricts the promotion of both innovation ambidexterity and firm performance.
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27 **Limitations and future directions**

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29 Besides important contributions, this study is not free from limitations. First, this study was
30 conducted in a cross-sectional design in a South Asian emerging economy, thereby making it
31 difficult to explore the concern of how the specific antecedents and their prominence can vary with
32 time. Importantly, relationship among variables remains constant or changes when investigated in
33 longitudinal design with repeated measures. Thus, future studies are recommended to replicate this
34 study in developed and/or emerging economies. Second, although this study draws a broad sample
35 of organizations from different industries, it did not examine organization type by competition
36 (prospector, analyzer, defender, reactor). However, it may be that prospectors' strategic
37 orientation/decision to be dexterous could be different from those of defenders and/or analyzers.
38 Hence classifying organizations in terms of prospectors, defenders, analyzers, and reactors could
39 provide further understanding concerning the role of organizations' competitive circumstances and
40 strategic orientations in innovation ambidexterity. Third, since innovation ambidexterity is
41 achieved through organizational proactive actions, future studies may replace KM capabilities with
42 other proactive elements, such as transformational leadership (Montes et al., 2005) and top
43 management team's (TMT) innovativeness (Bosch and Volberda, 2014). Fourth, the
44 conceptualization of the organizational structure in terms of connectedness and centralization is
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3 frugal (Mihalache et al., 2014). A more inclusive investigation could integrate other elements of
4 organizational structure, such as network, cellular, and matrix. Also, future studies are encouraged
5 to examine the moderating effects of environmental factors (e.g., competitive intensity, and
6 dynamism), institutional pressures (e.g., mimetic pressure), and/or leadership behaviors (e.g.,
7 strategic, ethical, and authentic).
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12 **Conclusion**

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14 This study proposes and expands a comparatively fresh framework on antecedent and outcome of
15 innovation ambidexterity while taking organizational structure as an important context to
16 understand the nature and intensity of relationships. Hence, this study proposes KM capability as
17 an antecedent of innovation ambidexterity, where effectiveness is catalyzed by high connectedness
18 and low centralization. However, firm performance is suggested as an important outcome of
19 innovation ambidexterity moderated by two elements of organizational structure. In this way, this
20 study contributes to the management literature, specifically in knowledge and strategic
21 management, emphasizing innovation and firm performance.
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Business Process Management Journal

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3 **Demystifying the link between knowledge management capability and**
4 **innovation ambidexterity: Organizational structure as a moderator**
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42

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50 An informed consent was obtained from all participants prior to data collection. Confidentiality
51 of all respondents and their individual responses was ensured.
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55 **HIGHLIGHTS**
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- 3 - Knowledge management capability is crucial for simultaneous exploitation and
- 4 exploration of innovation
- 5
- 6 - Innovation ambidexterity (i.e. simultaneous exploitation and exploration of innovation)
- 7 fosters firm performance
- 8
- 9 - Innovation ambidexterity mediates the positive effect of knowledge management
- 10 capability on firm performance
- 11
- 12 - Connectedness strengthens the relationship between knowledge management capability
- 13 and innovation ambidexterity
- 14
- 15 - Centralization weakens the effect of knowledge management capability on innovation
- 16 ambidexterity
- 17
- 18 - Innovation can be developed in an ambidextrous way in organizations as long as
- 19 organizations have knowledge-based competencies and proficient in creating suitable
- 20 context
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