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Research Article

Determinants of Knowledge Sharing and Innovation Capability: A Mediating Model of Innovation Strategy

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Abstract - *This paper aims to develop a model of the connection between innovation capability (IC), knowledge sharing (KS), and innovation strategy (IS), through a systematic literature review. Researchers explore opportunities to expand model that drives prospective research affecting relationships related to knowledge management, strategy, and innovation. Authors are motivated to analyse the predisposing of innovation strategy towards innovation capability by using a theoretical model, which is developed as fundamental for conducting empirical data. The result shows that the literature on innovation strategy as a moderator role between innovation capability and sharing of knowledge has a considerable impress. This means that process integration between innovation variable and knowledge sharing has a potential leverage on increasing innovation capability, which leads to improve organizational performance.*

Keywords - *Innovation capability, Knowledge sharing, Innovation strategy, Systematic literature review.*

I. INTRODUCTION

A dynamic environment characterized by rapid, competitive, and unpredictable environmental changes, guides organizations to develop a climate of innovation (Sethibe & Steyn, 2016). Organizational development is a form of innovation capability resulting from innovation intentions (Yang, 2012), organizations develop competitive capabilities through appropriate innovation strategies and innovation processes (Husain, Dayan, & Di Benedetto, 2016).

Previous researchers explored innovation capabilities and knowledge management as Podrug, Filipović, and Kovač (2017) have identified that a company's innovation capability is influenced by the willingness of employees to gather and share knowledge. Kocoglu, Imamoglu, Ince, and Keskin (2012) argue that spending in accommodating both tacit and explicit knowledge leads to the development of recent innovations. Furthermore T.-C. Lin, Wu, and Lu (2012) suggest that employee involvement in social interactions affects knowledge exchange and knowledge sharing. This is in line with H. F. Lin and Svetlik (2007) who have identified that sharing of knowledge has an influence toward innovation capability.

Innovation mechanism is influenced by knowledge sharing through innovation strategies that encourage companies to develop innovation capabilities such as efficiency, technology adoption, cost and time efficiency, as well as reducing risk (Deck & Erkal, 2013). Knowledge sharing practices among employees significantly affect proactive strategy and innovation capability (Ryszko, 2016).

Researchers endeavor to develop a framework of interconnection between innovation capability and knowledge sharing at organizational level. How to develop a theoretical model of the correlation between innovation capability, sharing of knowledge, and innovation strategy can drive innovation? The research objectives are formulated as follows: to explore the potential influence of innovative strategies in the interaction between innovation capability and sharing of knowledge.

II. REVIEW OF LITERATURE

A. Innovation Capability

Previous researchers, Romijn and Albaladejo (2002) have defined innovation capability as knowledge and competencies needed to drive new technologies and or develop new product. Rajapathirana and Hui (2018) stated that innovative culture is built through transformation of knowledge, skills, and innovation capability, influenced by knowledge sharing both implicitly and explicit (Ganguly, Kumar, Saxena, & Talukdar, 2020).

Organizational commitment is influenced by comprehensive knowledge of customers, competitors, and technological advances, driving innovation capabilities (Calantone, Cavusgil, & Zhao, 2002), capability to develop sustainable innovation leads to environmental dynamic responses (Rajapathirana & Hui, 2018; Slater, Hult, & Olson, 2010), drive to management, process and product innovation (Bittencourt, Galuk, Daniel, & Zen, 2019).

B. Knowledge Sharing

Bartol and Srivastava (2002) have described sharing of knowledge as information, advice, ideas, and appropriate expertise in organizations, where the process of how to create recent knowledge is encouraged through individual actors in both tacit and explicit knowledge sharing (Van Den Hooff & De Ridder, 2004), transfer of knowledge, sharing of knowledge, and knowledge distribution (Hou, Sung, & Chang, 2009).

Both implicit and tacit knowledge sharing is obtained through involvement, interaction, and action based on individual capability and willingness, while explicit sharing of knowledge is through formal communication, teaching materials, standards, systematics, and information technology (Z. Wang & Wang, 2012). The application of sharing of knowledge, both implicit and explicit, has an impact on organization through the capability and quality of innovation (Ganguly et al., 2020; Z. Wang & Wang, 2012).

Du, Ai, and Ren (2007) have identified that sharing of knowledge is a particularly important element in the management of knowledge mechanisms. Internalization of knowledge dissemination in the knowledge transfer process is not automatic, but a knowledge sharing mechanism is needed (Dieter Ernst, 2002).

Knowledge sharing influenced innovation capability, where the knowledge sharing process opens a niche, benefits, and explores innovation capabilities (H. F. Lin & Svetlik, 2007; Liu, Lv, Ying, Arndt, & Wei, 2018). Sharing of knowledge mechanisms through informatic systems, and social networking, assist to cope with dynamical market and technological disturbance engage to a greater sharing of knowledge role (Hartono & Sheng, 2015; Podrug et al., 2017), enable organizations to enhance innovation capabilities.

Encouragement, enthusiasm, and enjoyment of support colleagues to contribute knowledge, is an organizational climate that has an important meaning in supporting knowledge sharing behavior (H. F. Lin & Svetlik, 2007; Podrug et al., 2017). The willingness to contribute, gather, and share knowledge, strengthened enthusiasm and support from management enhances innovation capability (Podrug et al., 2017).

C. Innovation Strategy

Davenport, Campbell-Hunt, and Solomon (2003) have found that innovation strategy through right innovation process and innovators encourage organizations to be competitive. The innovation strategy is developed through a suitable scheme of environmental practices, over all relevant dimensions (Buysse & Verbeke, 2003). Furthermore, Rothaermel and Deeds (2004) have argued that innovation strategies or innovation formation are developed through new products.

Standing and Kiniti (2011) have identified that Cisco adopted an innovation strategy through open idea search and use of wikis, as a collaborative medium. Pfizer also implements continuous product improvement, and adopts a culture of innovation to achieve company goals. Hernández-Espallardo, Sánchez-Pérez, and Segovia-López (2011) have argued that both exploitation and exploration-based innovation has leverage on achievement.

Particularly, exploitation-based innovation has satisfied outcome on open system performance. Furthermore Husain et al. (2016) have argued that competitiveness is built through the efforts of the innovative role of employees which leads to the effectiveness of sustainable innovation strategies.

III. METHODOLOGY

Literature review analysis mechanism adopted in the study, using content analysis related to categorizing, organizing and coding (Kitchenham, 2007; Petersen, Vakkalanka, & Kuzniarz, 2015), as shown on Figure 1.

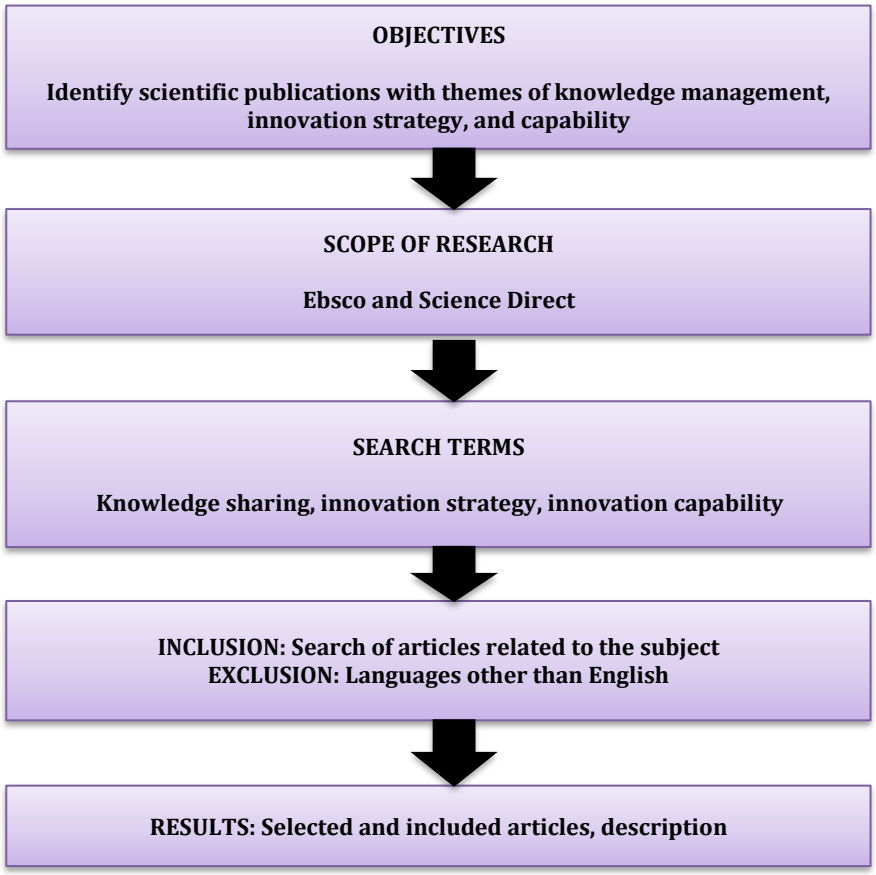

Figure 1. Methodology

Figure 2. shows a graph of the growth of publications per year linked to the research object. Papers that are recognized in more detail reveal the dominant (37.89%) in business management, then decision science (21.74%), economics and finance (8.07%), as shown on Figure 3.

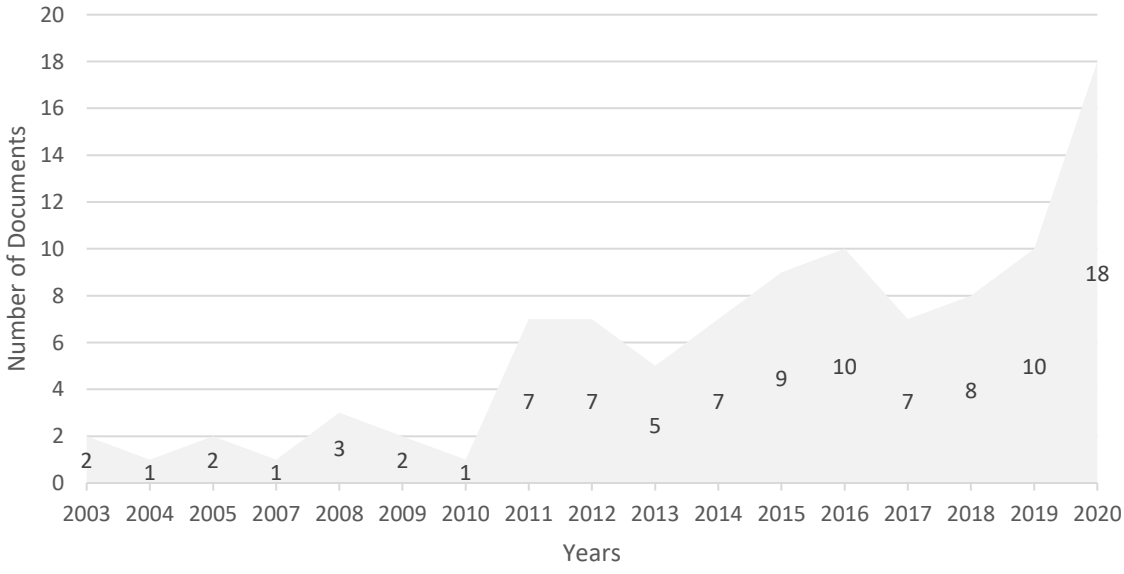

Figure 2. Number of Documents Issued Per Year (2003-2020)

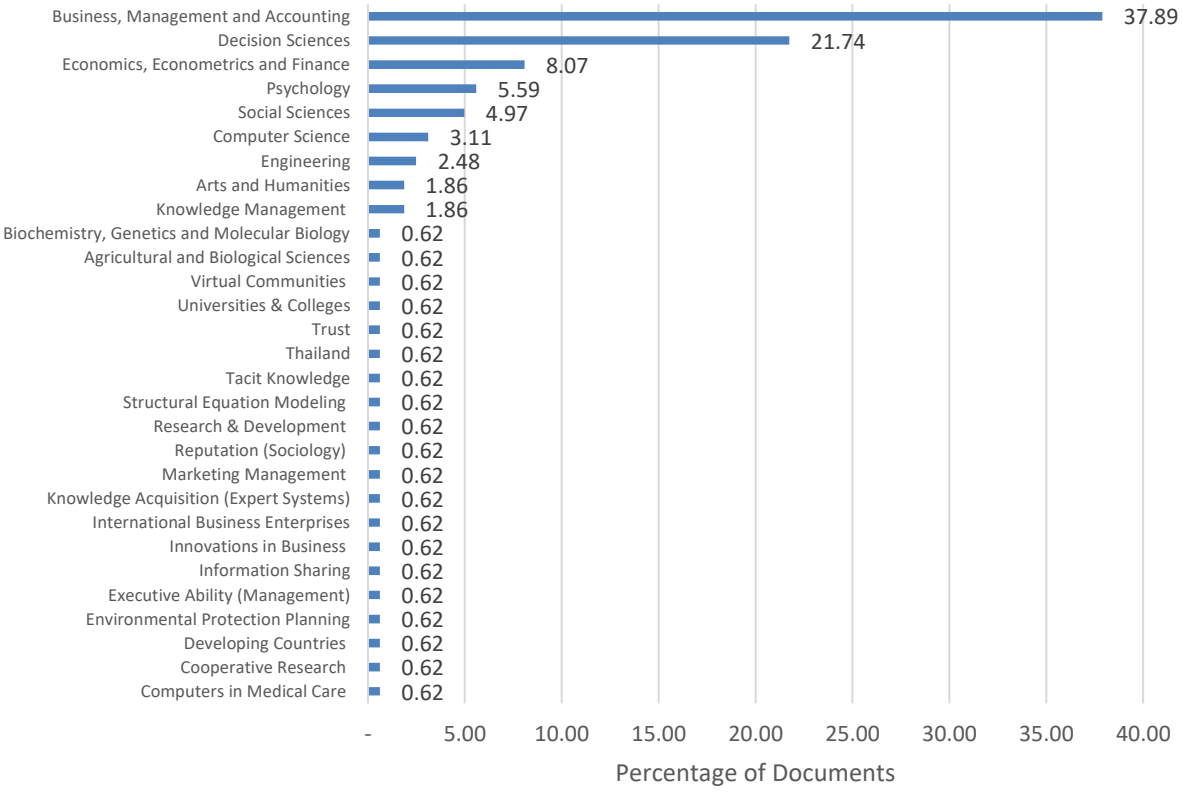

Figure 3. Documents Issued by Subject Per Year (2003-2020)

Figure 4. Describes the percentage of published documents by primary source of publication, with a distribution on Technovation (20%), Business Research, Technological Forecasting and Change (each 19%), Research-Policy (15%), Industrial Marketing Management, and Engineering and TM (each 10%), and Social-Behavioral Science (7%).

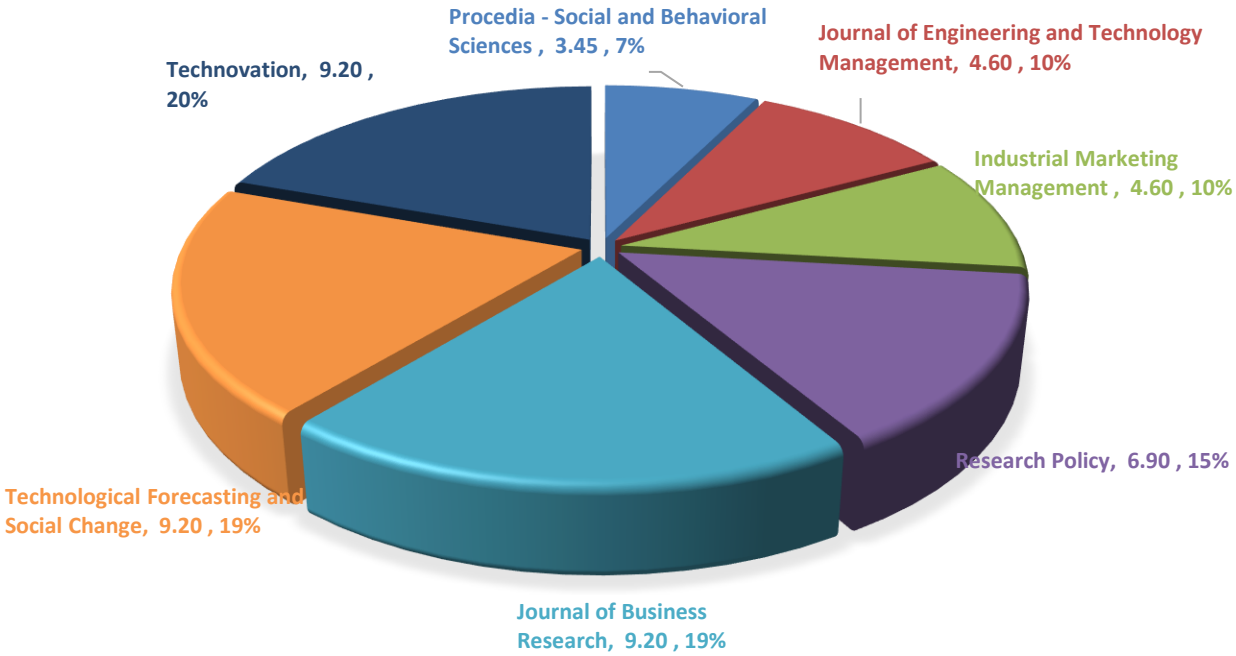

Figure 4. Documents Published by Primary Sources (2003-2020)

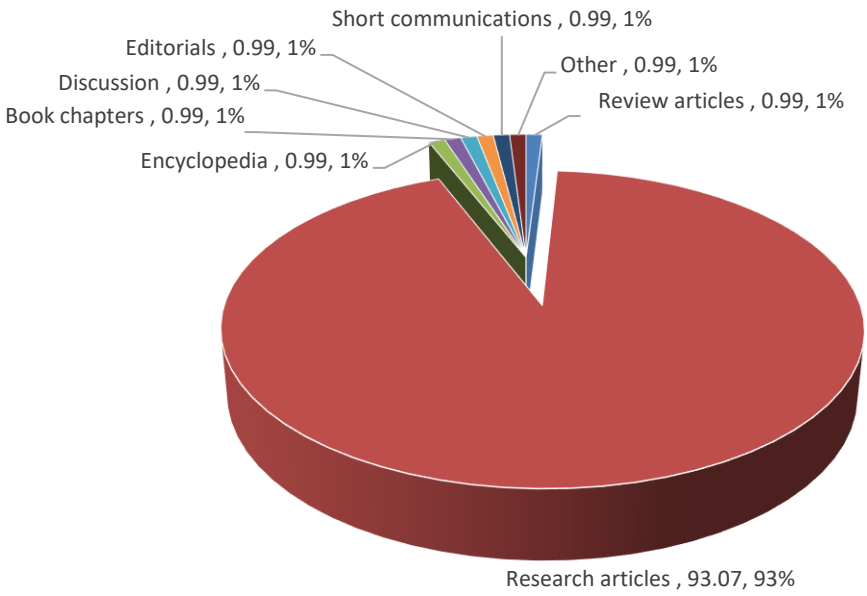

Figure 5. Documents Issued by Type (2003-2020)

Furthermore, regarding the classification of documents, and papers published, Figure 5. demonstrates Research Articles are most widely published types of documents, amounting to 93%. The documents selected in this study are shown in Table 1 which presents a classification based on variables related to the study, including the author's name, title, method and variables. Based on the research article, the three variables IC, IS, KS have not been found to be used together.

Table 1. Variable Used: Innovation Capability (IC), Innovation Strategy (IS), and Knowledge Sharing (KS)

			Relevance variable		
Author	Keywords	Methods	IC	IS	KS
Collinson, Kato, and Yoshihara (2005)	Japanese firms, strategy, intellectual assets.	Mix-methods. 65 questionnaires and 24 interview-based. electronic. Japan.		✓	
H. F. Lin and Svetlik (2007)	Knowledge sharing, Organizational innovation.	Quantitative, SEM. 172 respondents. Taiwan.	✓		✓
C.-h. Wang, Lu, and Chen (2008)	Technological innovation capability.	Mixed methods. Taiwan.	✓		
Hernández-Espallardo et al. (2011)	Innovation, exploitation, exploration, performance.	Quantitative. 201 Companies. Spain.		✓	
Standing and Kiniti (2011)	Innovation, knowledge management.	Review of literature.		✓	
Yam, Lo, Tang, and Lau (2011)	Firm innovation, knowledge, technological innovation capability.	Quantitative. 200 Companies. Hong Kong.	✓		
Sun, Wong, Zhao, and Yam (2012)	Innovation competence, strategic enablers, innovation performance.	Quantitative 7 Companies. Hong Kong.	✓	✓	
Yang (2012)	Innovation capability, knowledge-based view,	Qualitative. 500 Companies. China.	✓		

	dynamic capability.				
Kocoglu et al. (2012)	Learning capability, technological innovation, innovation capability, firm performance.	Conceptual model.	✓	✓	
Deck and Erkal (2013)	Knowledge sharing, cooperative, experiments.	Case study. 96 subjects. Australia.		✓	✓
Jiang, Waller, and Cai (2013)	Knowledge strategy, innovation performance.	Quantitative. 303 Companies. China.		✓	
Hartono and Sheng (2015)	Knowledge sharing, innovation capability, environment-strategy performance.	Qualitative. Systematic literature of review.	✓		✓
Schneckenberg, Truong, and Mazloomi (2015)	Dynamic capability, collaborative technologies, organizational learning, knowledge management.	Mixed method. 28 managers.	✓		✓
Ryszko (2016)	Interorganizational cooperation, knowledge sharing, technological eco-innovation.	Quantitative. 292 companies. Poland.		✓	✓
Chiu and Chen (2016)	Knowledge management capability, organizational effectiveness, organizational commitment.	Quantitative. 302 Companies. Taiwan	✓		
Husain et al. (2016)	Competitiveness, organizational learning, employee innovativeness, innovation process and IT.	Quantitative. 110 Companies. India.	✓	✓	
van Kerkhoff and Szlezak (2016)	Governance, knowledge transfer, science-policy.	Case Study. 28 repondents. China.		✓	✓
Podrug et al. (2017)	KS, firm IC, ICT companies.	Quantitative. 196 respondents, SEM. Croatia.	✓		✓
X. Wang and Dass (2017)	Innovation capability, financial performance.	Quantitative. 335 companies.	✓		
Protogerou, Caloghirou, and Vonortas (2017)	Innovative performance, knowledge sources	Quantitative. 10 countries.	✓		
Mardani, Nikoosokhan, Moradi, and Doustar (2018)	Knowledge management, knowledge integration, innovation performance.	Quantitative. 120 Companies. Iran.	✓		
Rajapathirana and Hui (2018)	Innovation capability, innovation performance,	Quantitative. 379 Managers. Sri Lanka.	✓		

	financial performance.				
Salazar and Lant (2018)	Interdisciplinary teams, team innovation.	Quantitative. 52 team. USA			✓
Or, Tong, Tan, and Chan (2018)	Electronic medical Records, adoption factors.	Qualitative. 23 health providers. Hong Kong.			✓
Gaviria-Marin, Merigó, and Baier-Fuentes (2019)	Knowledge management.	Literature review. Bibliometric, WoS.			✓
Altınay, Altınay, Dagli, and Altınay (2019)	Knowledge management, open data source, higher education.	Qualitative. 35 participants. Turkey.	✓		✓
C. Wang and Hu (2020)	Collaborative innovation, knowledge sharing, innovation performance.	Quantitative. 236 companies. China	✓		✓
Ganguly et al. (2020)	Reputation for Innovation, innovation capability, knowledge sharing.	quantitative. 75 Executives. SEM. India.	✓		✓
Mostofa, Othman, Mukherjee, Hasan, and Society (2020)	KM, design knowledge, knowledge sharing.	Review of literature.			✓
Total			18	10	14

Correlation analysis and theoretical model discussed in the paper refer to the construction of review of literature and presentation of research propositions. A comprehensive review is presented in Table 2. Knowledge sharing management both tacitly and explicitly correlates closely with innovation ability (Ganguly et al., 2020; H. F. Lin & Svetlik, 2007). Also, innovation capability influences innovation performance, and competitive advantage (Ganguly et al., 2020; Hartono & Sheng, 2015; Mardani et al., 2018; Rajapathirana & Hui, 2018; Schneckenberg et al., 2015; C. Wang & Hu, 2020). In addition, Table 2. shows that proactive environment is correlated with knowledge sharing (Ryszko, 2016), and innovation strategies increase competitiveness (Husain et al., 2016).

IV. DISCUSSION

A. Innovation Capability and Knowledge Sharing

Ryszko (2016) has argues that innovation capabilities and sharing of knowledge have a strong correlation with strategic proactive environment, and knowledge sharing with innovation technology, this is in line with Or et al. (2018) have argued that improvements in social and organizational efficiency and quality are affected by the use of technology and electronic knowledge sharing. Moreover, Hartono and Sheng (2015) have argued that innovation capability moderated by social networks (technology) through innovation sharing, tends to have better innovation performance.

Innovation ability has a relationship with knowledge sharing, where innovation ability is moderately correlated with knowledge sharing both explicitly and implicitly (Ganguly et al., 2020), in which innovation performance improvement is influenced by HRD practices in knowledge sharing (Soto-Acosta, Del Giudice, & Scuotto, 2018).

Ganguly et al. (2020) have argued that an increase in innovation capability is obtained through organizations working in both of explicit and implicit knowledge sharing, this is in line with H. F. Lin and Svetlik (2007) have stated that employee attitudes and behaviors can be changed through a culture of willingness to share knowledge, and ensure sustainable, cross-functional, cross-departmental, and cross-structure innovative capabilities through the use of technological innovation (Schneckenberg et al., 2015).

The growth of innovation capability is driven through knowledge sharing, learning, and system integration for the innovation process, both on implicit and explicit knowledge (Schneckenberg et al., 2015). An exploration of the elements of innovation capability that affects sharing of knowledge has been recommended to gain a broader perspective (Hartono & Sheng, 2015), comprehensive analysis influencing knowledge sharing towards proactive strategy (Ryszko, 2016). Ganguly et al. (2020) have recommended strategies to create an environment for innovation capability through explicit and implicit knowledge sharing. This shows mediating role of innovation strategy on innovation capability and sharing of knowledge. Furthermore, the proposition is as follows. Proposition 1. if the intensity of sharing of knowledge is high, then the capacity to generate innovation is higher.

Table 2. Recapitulation of the Analyzed Literature Construct

Relevance Variable	Main Result	Key Article
Innovation Capability (IC)	Innovation ability influences competitive advantage, organizational performance, and innovation performance.	Hartono and Sheng (2015); Schneckenberg et al. (2015); C. Wang and Hu (2020); Mardani et al. (2018); Rajapathirana and Hui (2018); Ganguly et al. (2020).
	Knowledge capabilities strengthen knowledge strategies.	Chiu and Chen (2016).
	Innovation capability is influenced by human resource innovation and top management innovation.	X. Wang and Dass (2017); Protogerou et al. (2017); Mardani et al. (2018).
Innovation Strategy (IS)	Innovation strategy affects competitiveness.	Husain et al. (2016).
	Proactive environmental strategy correlates with knowledge sharing.	Ryszko (2016).
Knowledge Sharing (KS)	Explicit and tacid knowledge sharing enhances innovative capabilities.	H. F. Lin and Svetlik (2007); Schneckenberg et al. (2015); Ganguly et al. (2020).
	Knowledge sharing requires top management support.	H. F. Lin and Svetlik (2007); Podrug et al. (2017); Salazar and Lant (2018).
	Knowledge sharing is correlated with social networking and a proactive environment.	Hartono and Sheng (2015); Ryszko (2016); Or et al. (2018).
	The role of the individual, mastery of technology and innovation influence knowledge sharing.	Altınay et al. (2019).

B. Innovation Capability and Innovation Strategy

Sun et al. (2012) have stated that innovation capability is a strategic element that has an influence on innovation metabolism, measured through measures (innovation matrix) such as innovation performance, innovation management, involvement of universities or expert companies. Kocoglu et al. (2012) have argued that the development of new ideas, new technologies and new systems is obtained through investment in learning skills that encourage organizational capability, share both explicit and implicit knowledge, absorb and integrate new technologies.

Ryszko (2016) have promoted analysis of the influence between knowledge management, utility, knowledge sharing with proactive strategy. Meanwhile, Husain et al. (2016) have promoted innovation strategy as an innovation capability and a driver of organizational competitiveness through human resource capabilities, and relevant innovation processes. Strong innovation processes involve competitiveness, but innovation strategies cannot mediate innovation and competition processes. This leads to a research niche on the significance role of innovation strategy and innovation capability. Furthermore, the following proposition is proposed. Proposition 2: If the intension of the innovation strategy is higher, it will have an influence on the higher innovation capability.

C. Theoretical Model

Based on the evaluation of theoretical and empirical developments related to innovative capabilities, opportunities were diagnosed to study the influence of knowledge sharing, either implicitly or explicitly in relation to the interaction efforts carried out by the innovation strategy on innovative capabilities. This study opportunity allows a conceptual exploration of the model of the correlation between innovation capability, sharing of knowledge, and innovation strategy, as shown in Figure 5.

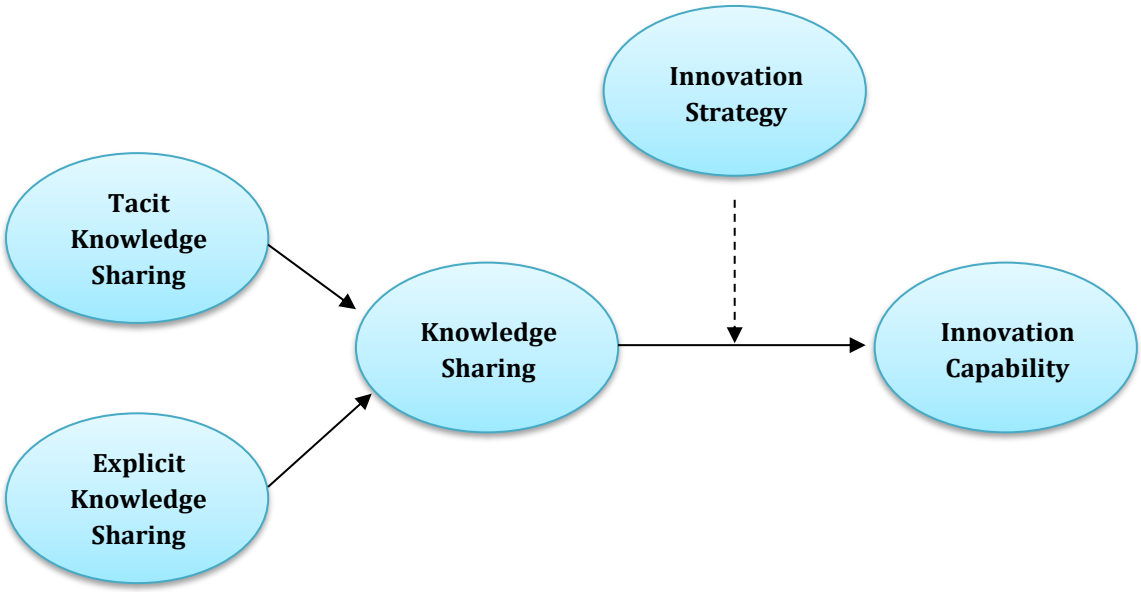

Figure 6. The Model Considers the Influence of Innovation Strategies on the Relationship between Innovative Capabilities and Sharing of Knowledge

The study of the relationship between innovation capability, strategic innovation, and sharing of knowledge is an opportunity to understand their direct and indirect effects. The proposed and measured variables represent aspects that have relevance. The scale of knowledge sharing and innovative capabilities is adopted from the scale determined by Ganguly et al. (2020). Knowledge sharing can be defined as the behavior of imparting knowledge within organization, which involves knowledge sharing, skills, and experiences of employees in the organization, which is facilitated through the media of socio-cultural interaction (H. F. Lin & Svetlik, 2007). While innovation capabilities are capacity, competence, and knowledge needed to create or perform new products, services, and technology. Variable scale of innovation strategy was adapted by Husain et al. (2016). The innovation strategy is based on the competitive advantage that can be provided to improve the position of the company or organization. Vision, mission and appropriate use of short-term and long-term strategies are needed to develop innovation capacity. The implementation of the innovation strategy takes into account the overall environmental aspects, customer needs, as well as the commitment of top management.

A summary of the variable measurements is presented in Table 4. Specific variable scales were adopted to present observed aspects in the documents according to their various conceptual approaches. Ganguly et al. (2020) have developed knowledge sharing studies, emphasizing the fact that organizational culture and philosophy act an important role. Explicit measurement of sharing of knowledge through items sharing reports

and documents within the organization, collecting reports and documents within the organization, and facilitating information technology to share knowledge. While the measurement of tacit knowledge through items of people collect knowledge of others based on experience, expertise, and past failures to share learning. Ganguly et al. (2020) have found a correlation of the importance of strengthening structured knowledge systems and organizational culture in tacit and explicit knowledge sharing, and determining that organizations need creativity in their interactions, trying out new ideas, and introducing new products or services on their innovations to build innovative capabilities. Study of Husain et al. (2016) have been measured through clarity of ideas in competing, clear understanding of innovation strategy, structured method of dealing with challenges, shared vision, alignment with business strategy, and supported by top management.

Researchers studied the direct correlation between innovative capabilities and sharing of knowledge, in addition to considering innovation strategies consequences. Recognize to the literature studied, there has been no research on the correlation between sharing of knowledge, innovation strategy and innovation capability, therefore this research is proposed. Both in the form of the effect to innovation strategies and knowledge sharing on innovation capabilities, as well as knowledge sharing on innovation strategies, but to achieve competitive performance based on innovation capabilities, an innovation strategy is needed. This is the background of this research.

Table 3. Variables Measured in the Literature

Author	Construction	CR	AVE	Measurement Items	Reliability (Cronbach's Alpha (α))
Ganguly et al. (2020)	Innovation Capability	0.922	0.651	- Organizations often try out new ideas. - Organizations are looking for new ways of doing things. - Creative organization in running operations. - Organizations are the first to market new services and products. - The introduction of new products and services increased.	0.781
Husain et al. (2016)	Innovation Strategy	0.72	0.62	- Clarity of ideas about Information Technology (IT) innovations can help competitiveness. - Clear understanding of innovation strategy - Knowledge of specific competencies. - Competitive advantage through IT System. - Structured methods for facing future challenges in technology and in particular IT. - Shared vision to develop IT innovation. - Top management commitment to using and supporting IT innovation. - Impact of new technology on business. - Relationship between the new project and the overall	0.72

				business strategy.	
Ganguly et al. (2020)	Explicit Knowledge Sharing	0.918	0.663	- People share reports and documents. - People are encouraged to share knowledge mechanisms. - People are offered training and capacity development programs. - People are facilitated by IT system to share knowledge.	0.847
Ganguly et al. (2020)	Tacit Knowledge Sharing	0.930	0.726	- People in the organization share knowledge. - People gather knowledge from others based on experience. - People share knowledge based on expertise. - People gather knowledge from others regarding their expertise. - People share best-practice from past failures	0.891

V. CONCLUSION

The model promoted in this study is intended to elaborate on the interaction of the influence of innovation strategy on innovative ability. The relationship between variables in the model, was examined to consider the impact of imparted knowledge sharing on innovative ability, and to verify the magnitude of the impact of innovation strategy, which acts as a moderating variable in the correlation between sharing of knowledge and innovative capability. elated literature has not been found when discussing direct or indirect relationships, in terms of the moderation approach used in this study. The proposed theoretical model can be used to examine the factors that might affect the ability to innovate. Given the dynamics and complexity of the business and organizational environment, it becomes essential to leverage innovative capabilities that enable organizations to respond to and cope with competition, manage needs and meet customer expectations.

This study offers to the literature related to innovation and knowledge management, particularly towards actions between knowledge sharing and innovation strategies can increase innovative capabilities. For managers, providing practical implications, providing analytical input on the organizational environment, new correlations with relevant types of variables, relating to knowledge sharing and innovation strategies. Through this new approach, it can help executives to make decisions with greater insight and better chances of success.

This conceptual has not been verified on empirical, and scope of research is limited. For forthcoming research, first, we recommend to validate the proposed model framework with a quantitative and qualitative approach to analyze correlation between knowledge sharing and innovation capability, which is moderating by innovation strategy. More, expanding scope of research to obtain more comprehensive point of view. Then, further research can explore other factors by including variables such as competitive advantage, employee motivation, and sustainable development.

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