

A Meta-Analysis on the Relationship Between Innovation Capability & Knowledge Sharing and Role of Innovation Capability on Financial Performance of Firms

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Abstract:

Discussing the relationship between the many innovation constructs, such as knowledge sharing and innovation capability, and its effect on financial performance, previous investigation has led to inconsistent results, that provide researchers and practitioners potentially inconclusive results in the public domain. The aim of this study is to determine the relation between knowledge sharing and innovation capability and understand the role of innovation capability on the financial performance of organizations. Further, this paper also unfolds the acceptable definition of innovation and its constructs in reference to different perspectives from the recently published literature. In the systematic literature review process, more than 50 investigations were identified, but, finally, 28 were shortlisted with the relevant data to conduct the meta-analysis study. The database of the HSE University library and Google Scholar were used for the collection of studies. The paper used a fixed effect model for the analysis of the relation between the constructs. The comprehensive meta-analysis was used for the analysis. The key findings indicate a positive and significant relation among knowledge sharing and innovation capability. Moreover, in the other finding, the result also concludes the positive role of innovation capability on the financial performance of the firms. The findings of this study can be used by policymakers and management to create policies and allocate finances for innovation projects.

Keywords: Innovation, Innovation Capability, Knowledge Sharing, Financial Performance

1. Introduction

Innovation was recognized as a fundamental idea for growth during the initial phase of the Industrial Revolution, which produced already unprecedented advancements in global wellness. Evidence from history has demonstrated that innovation is the primary driver of increases in employment, productivity, and market competitiveness. Over the course of the last two decades, an enormous number of innovative and determined entrepreneurs have emerged, and they have had an advantageous effect on the market economy and the development of nations, especially in developing nations. Furthermore, governments around the world, particularly those in developing and impoverished nations, encourage innovative ideas that are turned into tangible commodities and put into action through regional initiatives (Donkor et al., 2018; Burns, P. 2022). They are especially focusing on the SMEs as they are a source of innovative ideas and help the economies grow in income distribution, entrepreneurship environment, and employment generation (Pandya, V. M. 2012).

The changing role of innovation and knowledge sharing in providing sustainable competitive advantages to firms has taken the central stage for the researchers and industrial practitioners (Bajwa et al., 2015). This study focuses on the innovation capability effect on the financial performance of the firms and the role of knowledge sharing in the development of the innovation capability. Innovation is a fundamental reform that facilitates organizations in adapting to the shifting demands of the business environment and customers in recognition of forthcoming challenges and transforming economic climate. However, in the new global trend's firms are participating in knowledge sharing, knowledge digitalization, and improving collaborative culture among the firms to embrace the firm's innovation and financial performance. Thus, it is a very critical activity of the supply chain to search for the for the right partners to integrate and execute innovation activities with the available resources to optimize the outcomes (Xie et al., 2023).

With the expanding supply chain and rapid technological advancement in the present information-driven economy era, several domestic and MNCs are involved in the collaboration with the external partners to share the technology and knowledge to accelerate the innovation activities and performance (Xie et al., 2016). The current global climate, environmental changes, geopolitical unrest, trade wars, legislative changes, and technological advancements have disrupted and presented numerous issues for supply chains worldwide (Hille, K. 2020; Bednarski et al., 2024). The maintenance of supply chains and the development of partnerships and collaborations between businesses on a global level to foster innovation activities and culture have been significantly hampered by pandemics, conflicts and wars between major economies in the region, and extreme weather events such as heat waves and floods. Being in this situation also required certain innovative approaches to address the issue, as well as collaboration between the businesses to put together their resources and actually solve the challenge in the most efficient manner possible.

Both private and public sectors around the world, such as Global Innovation Funds, invest in innovation initiatives for the reason every breakthrough to innovative products, services, and processes promotes to achieve the UN Sustainable Development Goals such as Affordable and Clean Energy, Industry, Innovation, Infrastructure & Climate Actions, and so forth. According to a report published by Dutta et al. (2023), Global Innovation Index, R&D spending by the top 2500 R&D spenders crossed the margin of 1.3 trillion euros in 2022, marking more than a 425% increase over the last 20 years and a 13% increase over the last year. Moreover, the lower- and middle-income countries like India, Brazil, and Indonesia are also trying to invest in the innovation projects to boost their economic activities and gain the competitive edge. With the R&D intensity, Pharma, ICT services, and automobiles are major sectors participating in the innovation projects and receiving the major investments (Piotr, S. 2009; Dutta et al., 2023).

When performing research and development to support innovative ventures and executing their outcomes into commercial circulation for testing and customer accessibility, the financial aspect is crucial. In order to make innovation initiatives both financially and technologically feasible, resources are pooled and products and services are developed collaboratively (Avnimelech & Teubal, 2008). This helps to alleviate the financial burden of necessity and provide technological accessibility. At least two individuals—suppliers, manufacturers, distributors, R&D specialists, executives, and so

forth—participate in collaborative development. They exchange knowledge, create innovative projects, and then execute them for the benefit of the community. Najafi-Tavani et al. (2018).

From the peer reviews, we observed researchers has conducted several research to identify the relation among the collaborative innovation, innovation activities, innovative capacity, innovation capacity, and knowledge sharing within the firms and among the firms (internally and externally) and obtained diverged results (Bogers, M. 2012; Akhavan et al., 2016; Yang et al., 2018; Hong et al., 2019b; Wang & Hu, 2020; Le et al., 2020; Scaliza et al., 2022; Shi et al., 2022; Xie et al., 2023); nevertheless, no consistent outcome has been documented with the information available to the public domain. In the current situation of the market, the life cycle of the products became shorter, and the companies needed more innovative products to be competitive in the current volatile and turbulent market. With the increasing necessity of innovative products and services, the innovation process has become more risky, complex, and capital intensive, making it vulnerable to failure in the market at the implementation stage (Dziallas and Blind, 2019; Ponta et al., 2021).

For innovation initiatives to succeed and incorporate new technologies and methods at the appropriate time and location, "collaboration" is another essential word to define and correctly understand. It has been explained in previous studies differently by the different researchers according to the nature of the application and field of studies. According to my understanding, collaboration can be defined as "the sharing of resources, including data and technology, among the partners (inter-organizational and intra-organizational), on the agreed terms and conditions for the mutual benefits for the agreed time period." It is very important for the firms to understand the basic questions for the correct partnership, like with whom, why, and how to be partners. Moreover, another factor in the collaboration that has been ignored by several researchers is "time period" for the collaboration. The needs of the market shift with time, and businesses must work with new partners who have recently developed collections of resources or newly formed reserves. The purpose of this study was to investigate the correlation, outcomes, and degree to which the innovation capability, knowledge sharing, and financial performance of firms have been studied in the previous literature and identify any gaps in the study carried out so that further research can be done. We take a meta-analysis approach to quantitatively review the literature in the past two decades across the globe, which can contribute to finding solutions to the theoretical confusion among the professionals and academic society.

2. Research Objective

The main purpose of this study is to examine the relationship between the collaborative and organizational innovation capability and financial performance of the firms, and relation between innovation capability and knowledge sharing in the supply chain, with the help of investigation conducted by several researchers across the different countries.

1. What are the differences in the relation among the collaborative innovation capability and financial performance of the firms?
2. What is the impact of the Knowledge sharing on the innovation capability of the firms in the supply chain?

3. Theoretical Background and Hypotheses Development

Literature has provided several theoretical models that explain the nature, consequences, and types of relationship between innovation capability, knowledge sharing, and financial performance. Previous studies investigated an assortment of criteria and components that affect an organization's ability of innovation both directly and indirectly, as well as the impact that knowledge sharing contributes and how firms collaborate with one another. Investigation conducted to establish the relation between factors such as knowledge sharing and innovation capability and its impact on the innovation and financial performance of firms, as well as the mediating effect of variables like size of the firms, age, and so forth. Some of the outcomes from different studies conducted have been listed in Table 1.

Table 1: Results of studies published in the field of innovation

Authors	Topic	Results / Outcomes
Darroch, 2005	Knowledge management and impact on innovation management	Knowledge management capability has a positive relation with innovation performance. Innovation has a positive impact on the financial performance.
Lin, 2007	Knowledge sharing and innovation Capability	Knowledge sharing can be influenced by several factors. Knowledge sharing culture has a direct positive impact on the firm's innovation capability.
Saenz et al., 2012	Impact of Different Knowledge Sharing Methods on Innovation Capability	Knowledge sharing has a positive and significant impact on the innovation capability of firms.
Lee et al., 2012	Relationship between knowledge process capabilities and firms' performance	Collaboration among the firms positively affects the knowledge process capabilities.
Yesil et al., 2013	Study the knowledge sharing process and its impact on innovation capability and innovation performance.	Knowledge donating and collecting positively influence the innovation capability of firms. The knowledge sharing process has no positive relation with innovation performance.
Ritala et al., 2015	Positive and negative effect of knowledge sharing and leakage on firms' innovation performance	External knowledge sharing is positively associated with the relative firm's level of innovation performance.

Qammach, 2016	Evaluating the mediating role of knowledge sharing in relation to innovation performance and IT capability	The result supported Knowledge sharing is positively related to innovation performance.
Chang et al., 2017	Analysis of the effect of organizational culture and knowledge sharing on innovation capability	Knowledge sharing has a positive influence on innovation capability. Organizational culture has a positive impact on innovation capability.
Sun et al., 2019	Evaluating relation between cooperative culture, knowledge flow, and innovation network governance Performance	Collaborative culture has a positive and significant effect on knowledge flow. Collaborative culture has a positive and significant effect on knowledge creation.
Siddiqui et al., 2019	Analyzing factors affecting knowledge sharing and innovation capabilities	Knowledge sharing significantly affects innovation capabilities. ICT infrastructure and availability significantly influence innovation capabilities.
Ferraris et al., 2019	Relation between Global R&D Partnership and Innovation Performance	Global R&D partnership has no significant impact on innovation performance. Global R&D partnerships positively affect integrative capacities; however, they directly influence innovation performance.
Kurniawan et al., 2020	Relationship between knowledge sharing, absorptive capacity, and innovation capability	Innovation capability has a positive and significant effect on innovation quality performance.
Liu et al., 2021	Factors that influence collaborative innovation project performance	Project knowledge sharing has a positive and significant correlation with the performance of collaborative innovation projects.
Azeem et al., 2021	Analyzed competitive advantage with related to organizational culture, knowledge sharing, and organizational innovation	Organizational culture positively affects knowledge sharing in organizations. Organizational culture positively affects innovation in organizations.
Shi et al., 2022	Analyzing the Direction of Knowledge Sharing to Improve Innovation Performance	Knowledge outbound sharing has a positive and significant impact on organizational innovation performance. Knowledge-bound sharing has no negative impact on organizational innovation performance.

Irawan & Mudrifah, 2022	Analysis of the impact of knowledge sharing and innovation capability on the public sector	Tactic knowledge sharing has no effect on the innovation capability. Explicit knowledge sharing has a positive effect on innovation capability.
Yuen & Lam, 2024	Knowledge sharing as the catalyst for bolstering innovation capability and performance	Organizational culture is positively related to knowledge sharing. Organizational culture is positively related to innovation capacity and performance. Knowledge sharing is positively related to innovation capability and performance.

In addition, empirical studies tried to define these constructs and capture the diverse learning process. If we glance all the way at the topic's development over the course of history, we can observe that around 1975, researchers began becoming increasingly interested in it and conducted a number of investigations by researchers in various countries. However, the publication of research articles and studies attempting to investigate the relationship between an organization's capability to innovate, its knowledge sharing, and its impact on the financial performance observed an immense increase during the 1990s. A number of significant economies had trouble getting into the global market in the 1990s, which sparked vigorous efforts to produce innovative products, services, and processes. We may examine the studies carried out from 2010 to 2023 in figures 1 and 2.

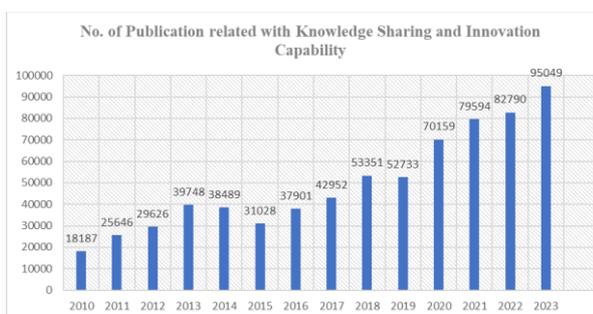


Figure 1: Frequency of publications with the keywords Knowledge sharing and innovation capability from 2010-2023
 Source: [Publications - Dimensions](#)

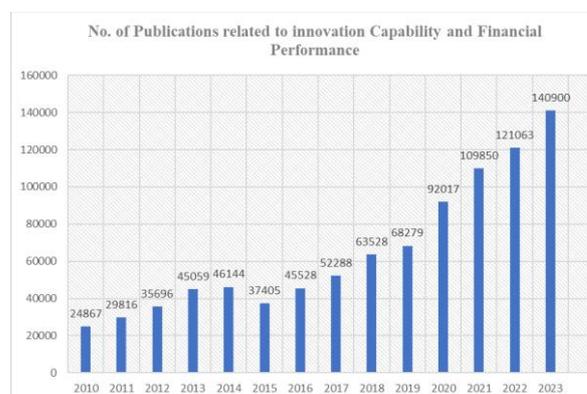


Figure 2: Frequency of publications with the keywords Innovation capability and Financial Performance from 2010-2023
 Source: [Publications - Dimensions](#)

The graphs show that, following the pandemic, geopolitical crisis, and several other climatic events, researchers are encouraged to become more inclined to investigate related fields of study. This makes sense given that, during the pandemic, supply chains are likely to be seriously disrupted and businesses are likely to be facing severe financial difficulties, which created many opportunities for innovative products and services. The array of publications has significantly increased since 2016, which further

implies that professionals and academics have focused on innovation and information sharing as critical issues for an organization's capacity to effectively operate in today's business situation and get a competitive edge over the competitors. The conducted research bases its findings on many different types of theories, including resource and capability, innovation theory, organizational learning, diffusion of innovation, and so on; still, it is vital to offer an explanation for the proposed relationships (Khosravi et al., 2019).

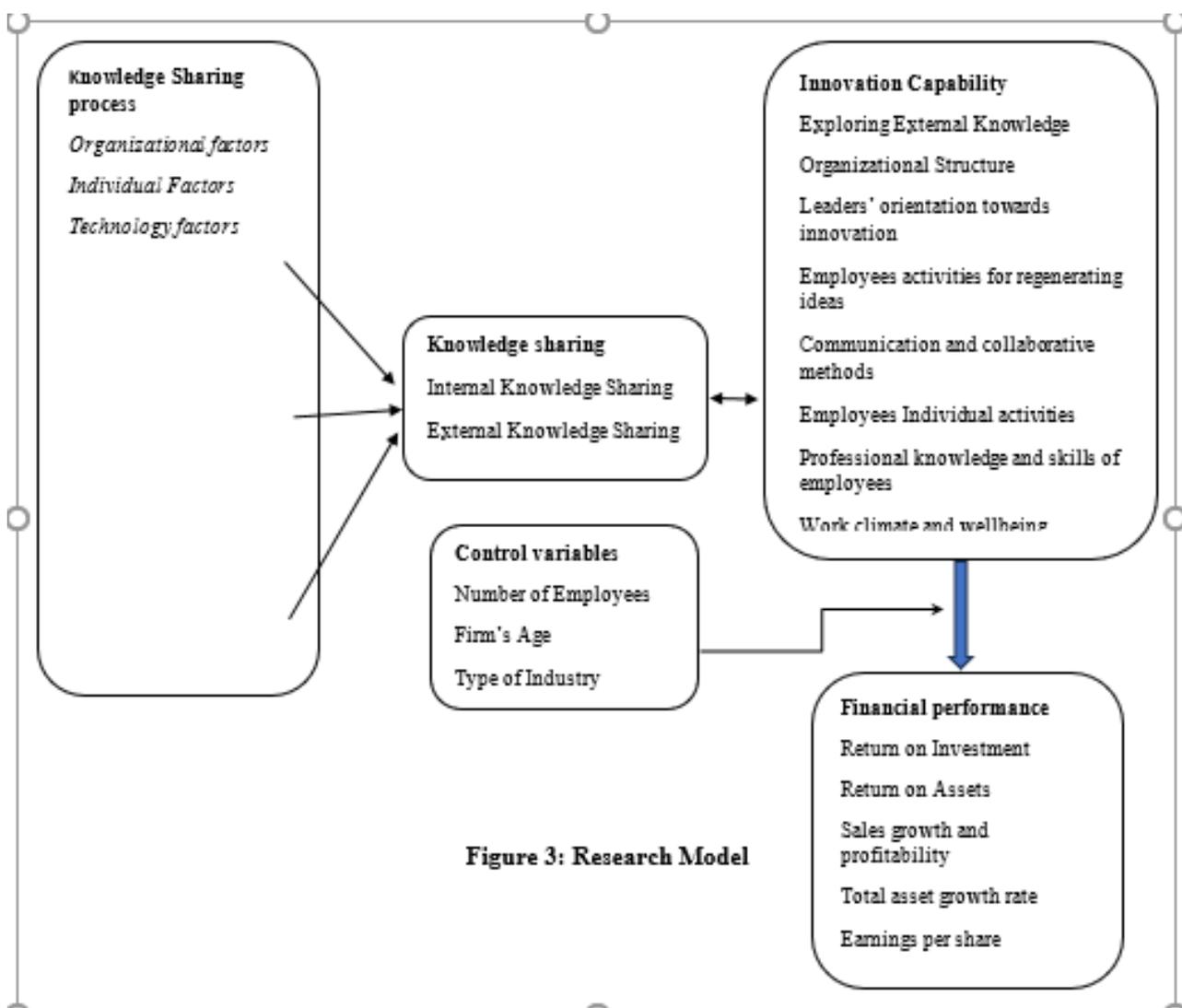


Figure 3: Research Model

3.1 Conceptualization of Knowledge Sharing:

In the current data-driven business environment, it is critical to define knowledge sharing as it is essential for the process of organization innovation and knowledge management. Multiple studies have shown knowledge sharing has a positive impact on team performance, R&D outcomes, accelerates new project development, and optimally utilizes available resources (Mesmer-Magnus and DeChurch, 2009; Akhavan and Hosseini, 2016). Knowledge sharing can be divided on the basis of sphere of flow as international knowledge sharing and external knowledge sharing. Knowledge sharing has been defined by several researchers in the previous studies; according to Hogel et al. (2003), knowledge sharing is defined as a social interaction culture, experiences, involving the exchange of employee

knowledge and skills through the department or organization. It includes processes related to providing employees access to all relevant information and using the network within or between the organization for the flow of information. Knowledge flow between individuals and organizations serves as one of the numerous traits of knowledge sharing. According to **Oyemomi et al. (2016)**, knowledge sharing is the process of transferring organizational knowledge and experience to business processes through the communication channel between the individuals. We can summarize the definition of knowledge sharing from the previous studies as "knowledge sharing is the exchange of pertinent information between and among the organization in the correct structure, right point in time, and proper location within the supply chain network." As a critical factor in knowledge sharing, information should reach the correct person in the supply chain in readable format.

Employers attitude towards the sharing of information among the individuals defined the knowledge-sharing culture of the organization. It is possible to cultivate a culture of knowledge sharing in organizations not just by implementing novel business strategies but also by influencing the attitudes of the workforce and management (Lin and Lee, 2004; Lin, 2007; Ahmed et al., 2016). Continuous knowledge exchange and transfer of information and experience helps the organization as well as individuals to be more creative, innovative, sustainable, transformative, and boost higher performance (Barratt-Pugh et al., 2013). In the process of promoting knowledge sharing culture implementation of the proper channel for the knowledge flow, information leakage and reliability of the information are critical factors and concerned with the intellectual abilities and intellectual capital.

3.2 Conceptualization of Innovation Capability

Innovative products and processes always boost the economy by increasing sales, profit, and power, forcing the firms to approach in different directions to gain competitive advantages and be sustainable. Based on the previous research, the innovation capability has multiple aspects and can be determined by top management (Kim et al., 2018), collaborative and external networking (Liu et al., 2013; Kim et al., 2018), individual activities and culture (Tang, 1998; Paalanen et al., 2009; Saunila et al., 2014), and processes and tools for the idea management (Tidd et al., 2005; Smith et al., 2008; Saunila and Ukko, 2012). The R&D team can be characterized as the knowledge-intensive department and considered as the critical firms' innovation capability; thus, a firm that is able to manage its R&D team more successfully will ultimately be able to transform into an innovative firm and align their strengths according to the market opportunities. Measurement of innovation capability of any company has needed metrics and been defined in multiple studies, which include measures like customer satisfaction, brand platform, return on investment, number of patents, number of patent applications, and so forth (Wallin et al., 2011). A company's capability for innovation is an indispensable asset for an extended period of company sustainability. It gives it a competitive edge in the market when it comes to introducing innovative products and processes, reducing costs associated with technology, and meeting shifting consumer needs. Several studies defined the innovation capability. Romijn and Albaladejo (2002) define innovation capability as the skills and knowledge to absorb and transform the existing technologies or resources into the new technologies with the available resources. According to Chen (2009), companies with the innovation capability lead to superior competences and are defined as firms' capabilities, which can be applicable to the innovation activities for the development of products and processes; furthermore, in the current study, we can define the innovation

capability (IC) as the “assets of the firms, including tangible and intangible, which fuel the process of involving the creation of the new ideas and development of the new products and processes according to the needs of the market. It includes the process of creation and implementation of new ideas, which also involves the decision-making process.”

3.3 Relationship between Knowledge Sharing and Innovation Capability

Previous research has published and provided theoretical and empirical support for the hypothesis that there is an associated positive relationship between innovative capabilities and knowledge sharing. Moreover, through the integration of shared knowledge with the firm’s capability to innovate, the firms were able to perform better in terms of technical and administrative innovations. Lin (2007) and Yesil et al. (2013) reported willingness to collect and share the knowledge enables the organizations to improve their innovation capability; a similar result was also published by Iqbal et al. (2011); published knowledge sharing helps in avoiding mistakes and encourages the development of the innovation capability. Similarly, Chang et al. (2017) and Aulawi (2018) reported that knowledge sharing is positively related to innovation capability, as knowledge sharing behaviors of organizations higher reflect greater innovation capability. Researchers argued in the previous studies that sharing knowledge can help individuals and teams think critically, acquire knowledge and novel ideas, and ultimately strengthen a company's capacity for innovation (Aulawi et al., 2009). According to Storey & Kelly (2002) and Belso & Diez (2018), considering discrepancies in knowledge are the main obstacle to an organization's ability to innovate, those with greater involvement in networking and knowledge sharing are significantly more likely to experience increases in their innovation capability. Collaborative culture with all levels of hierarchy in the organization and attitude of employees to share the knowledge is seen as a basic condition to promote the knowledge sharing (Sveiby and Simons, 2002). Moreover, Wang and Wang (2012) indicated a level of innovation capability not solely influenced by knowledge sharing but also experience—the firm’s capability to transform and adopt according to change and apply the gained knowledge. However, the innovation capability is complex in firms and influenced by several factors other than knowledge sharing. In general, these arguments lead us to suggest the result: knowledge sharing is likely to have a positive impact on the innovation capability. Therefore, we propose the mentioned hypothesis in this study for re-evolution:

H1a: Knowledge sharing positively influence the innovation capability of firms

H1b: Knowledge sharing negatively influence the innovation capability of firms

3.4 Relationship between Innovative Capability and Financial Performance

Innovation capability and its impact on financial performance are broad and controversial concepts. In the previous majority of investigations, overwhelming support for the positive relation has been found between the innovation capability and financial performance of the firms (Neely, 1998; Le et al., 2020; Fu et al., 2021; Purwati et al., 2021), but some research also showed that innovation capability has no positive and significant effect on the firm’s performance. A number of variables, including market conditions, industry characteristics, organizations' overseas operations, collaboration resources, and so on, might have an influence on the relation between innovation capability and financial performance (Alam et al., 2013). However, the influence of several different innovations on a firm's performance varies, necessitating the use of a multifaceted method to examine and establish the relationship

between the constructs (Gunday et al., 2011). Businesses must analyze market trends and make strategic investments in the growth of their innovation skills in order to manage their resources effectively and leverage innovation for the benefit of the company's financial performance. Moreover, according to Walker (2004), innovation is vital for enhancing the standing of an organization in competition by delivering an advantage over rivals and enhanced financial performance. Financial performance measurement indexes suggested by several researchers like sales growth rate, customer retention, rate of return on investment, market share rate, comparison success with other companies, growth rate, profitability, and ability to innovate (Haner, 2002; Lee and Choi, 2003; Wang et al., 2008). Previous research on the relation between the innovation capability and performance of the firms considered both the operational and financial dimensions of the performance; however, in the current study we will address the financial performance of the firms (Love & Roper, 2015; Ali et al., 2020). In normal circumstances, in customer-oriented businesses, capturing innovative ideas and innovative opportunities keeps customers engaged and helps them influence new ones with their capacity for innovation, all of which ultimately improve their financial performance (Mukerjee, 2013; Jalilvand, 2017). Therefore, it is hypothesized that firms with higher innovation capability will lead to higher financial performance.

H2a: Innovation capability has a positive influence on the financial performance of firms

H2b: Innovation capability has negative influence on the financial performance of firms.

4. Methodology

The method employed in this study was a systematic review, covering knowledge sharing, innovation capability, and financial performance from 2006 till 2024 (inclusive). The application of meta-analytical methodology to examine the outcomes published from reviewing the studies into the role of knowledge sharing in the innovation capability and innovation capability in the financial performance of the firms can enable us to get an approximate magnitude of the effect of studies on this relation. We may establish an explanation of the significance of the study and the necessity for further investigation to clarify our understanding based on the average correlation degree.

This study uses the meta-analysis approach to test the hypotheses and proposed theoretical models to draw a valid conclusion by using the coefficients reported by the previous studies (Sabherwal et al., 2006; Liang et al., 2010). In this meta-analysis research work, we followed the general norms in each of the following phases carried out in the research as mentioned: selection of the literature for the primary studies, selection of the variables, analysis of the obtained data from the previous research papers, analysis of the results, and sketching the conclusion.

4.1 Selection of the Primary Studies

In order to select the primary studies relating to the relation between innovation capability, knowledge sharing, and the firm's financial performance, the below mentioned processes have been adopted:

- The database has been searched to find the relevant bibliography in reference to the problem we defined in the research question section. The databases that have been used for searches were HSE Library (International Periodical Database) and Google Scholar. In the searching process, different

keywords have been used to find the targeted published research, such as innovation capability, knowledge sharing, financial performance, relation between the construct, and so on.

- The literature search revealed 28 empirical research published during the period 2006 till 2024.
- Primary search provided with the great amount of literature directly and indirectly related to our research problem; however, in order to conduct the meta-analysis, we conducted extensive screening of studies published and identified a certain number of studies that meet a series of our requirements, as studies have to be empirical and have enough data, which can be used for the statistical analysis to evaluate the relationship between the selected parameters.

4.2 Selection of Variables and Definitions

In the second phase, we defined the inter-study variability and specified the parameter characteristics based on the studies that had been conducted previously. After the screening process and availability of the related data from the selected studies, we conducted the meta-analysis by using the comprehensive meta-analysis program. The selected 28 studies are listed in the table 2.

Table 2: Studies included in the Meta-Analysis

Panayides, P. 2006	Kumar & Rose, 2011
Yang, C. C. 2012	Awan & Akram, 2012
Wu & Sivalogathan, 2013	Selakjani & Kelidbari, 2016
Hamidi & Gharneh, 2017	Tufail et al., 2016
Thahjadi et al., 2018	Ullah, M. I. 2017
Donkor et al., 2018	Ganguly et al., 2019
Singh et al., 2019	Yeh & Ku, 2019
Mugambi & Kinyua, 2020	Nham et al., 2020
Santos et al., 2020	Wang & Hu, 2020
Bahta et al., 2021	Wang et al., 2020
Otache & Usang, 2022	Ganguly et al., 2020
Yang and Zheng, 2022	Afsar & Khan, 2021
Sungthong et al., 2023	Dongling et al., 2022
Kaukab, M. E. 2024	Phong & Thanh, 2023

5. Results and Findings

5.1 Knowledge Sharing and Innovation Capability

The analysis is based on the fourteen previous pieces of literature published. The effect size index is the standardized difference in the means (d). In the current study, the fixed and random effect model was employed for the analysis of the studies and data collected.

Table 3: Statistical result of Meta-Analysis of Knowledge Sharing and Innovation Capability

Model	Study Number	Std. diff in means	Standard Error	Variance	Lower Limit	Upper Limit	Z-Value	p-Value
	1	0.160	0.148	0.022	-0.131	0.451	1.077	0.281
	2	0.059	0.140	0.020	-0.215	0.334	0.423	0.672
	3	0.171	0.109	0.012	-0.042	0.384	1.569	0.117
	4	0.173	0.103	0.011	-0.028	0.375	1.684	0.092
	5	-0.076	0.144	0.021	-0.357	0.206	-0.526	0.599
	6	0.685	0.067	0.004	0.554	0.816	10.227	0.000
	7	0.126	0.071	0.005	-0.015	0.266	1.757	0.079
	8	-0.585	0.083	0.007	-0.748	-0.422	-7.029	0.000
	9	-0.123	0.092	0.009	-0.304	0.058	-1.333	0.182
	10	0.169	0.061	0.004	0.049	0.290	2.762	0.006
	11	-0.277	0.089	0.008	-0.451	-0.102	-3.103	0.002
	12	-0.239	0.092	0.009	-0.420	-0.058	-2.588	0.010
	13	0.191	0.096	0.009	0.003	0.379	1.992	0.046
	14	0.118	0.073	0.005	-0.025	0.262	1.616	0.106
Fixed Effect		0.078	0.024	0.001	0.032	0.124	3.313	0.001
Random Effect		0.040	0.091	0.008	-0.137	0.218	0.447	0.655

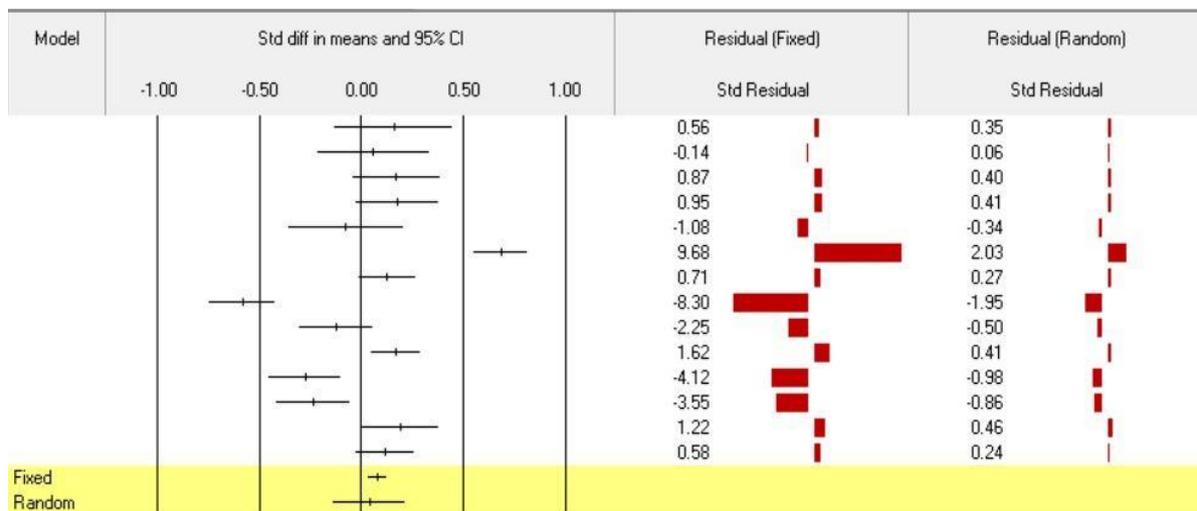


Figure: Impact of Knowledge sharing on Innovation capability: Analysis of Means difference, 95% CI, and Residual

Table 3 showed the result: the common effect size for these studies in the fixed effect model is 0.78 with a 95% confidence interval of 0.032 to 0.124. The effect size in this population could lie within this interval. With the result, we can find that the z-value test the null hypothesis that the common size is 0, and the Z-value in the fixed effect model is 3.313 with the p-value 0.001, which is less than 0.05.

Thus, by using the alpha value less than 0.05, we can reject the null hypothesis and can conclude that in this population the effect size is not precisely zero.

The null hypothesis that every study in the investigation has the same effect size is tested using the Q-statistic. The predicted value of Q would be equal to the degrees of freedom (the total number of studies minus 1) if every study had precisely the same true effect size. With 13 degrees of freedom and $p < 0.001$, the Q-value is 185.341. We can reject the null hypothesis that the true effect size is the same in each of these studies by using the criteria $\alpha < 0.100$. Based on the result, we can conclude that there is a significant impact of knowledge sharing on innovation capability.

5.2 Innovation Capability and Financial Performance

The analysis bases its conclusions on the fourteen published works of previous literature. The standardized difference in the means (d) is the impact size index. The fixed and random effect model was adopted in the current study to analyze the data gathered from the various studies.

Table 4: Statistical result of Meta-Analysis of Innovation Capability and Financial Performance

Model	Study Number	Std. diff in means	Standard Error	Variance	Lower Limit	Upper Limit	Z-Value	p-Value
	1	-0.110	0.077	0.006	-0.261	0.040	-1.435	0.151
	2	0.301	0.071	0.005	0.162	0.440	4.244	0.000
	3	0.418	0.116	0.013	0.191	0.644	3.613	0.000
	4	0.876	0.119	0.014	0.644	1.109	7.394	0.000
	5	0.140	0.163	0.027	-0.181	0.460	0.854	0.393
	6	-0.214	0.134	0.018	-0.477	0.048	-1.598	0.110
	7	0.228	0.159	0.025	-0.083	0.539	1.438	0.151
	8	1.495	0.105	0.011	1.290	1.700	14.298	0.000
	9	0.385	0.090	0.008	0.209	0.562	4.277	0.000
	10	0.125	0.169	0.029	-0.207	0.456	0.736	0.461
	11	3.706	0.426	0.181	2.872	4.540	8.708	0.000
	12	-2.617	0.149	0.022	-2.909	-2.326	-	0.000
							17.607	
	13	-0.134	0.116	0.013	-0.361	0.093	-1.157	0.247
	14	-0.077	0.077	0.006	-0.228	0.074	-0.997	0.319
Fixed Effect		0.172	0.029	0.001	0.115	0.229	5.938	0.000
Random Effect		0.275	0.214	0.046	-0.144	0.693	1.285	0.199

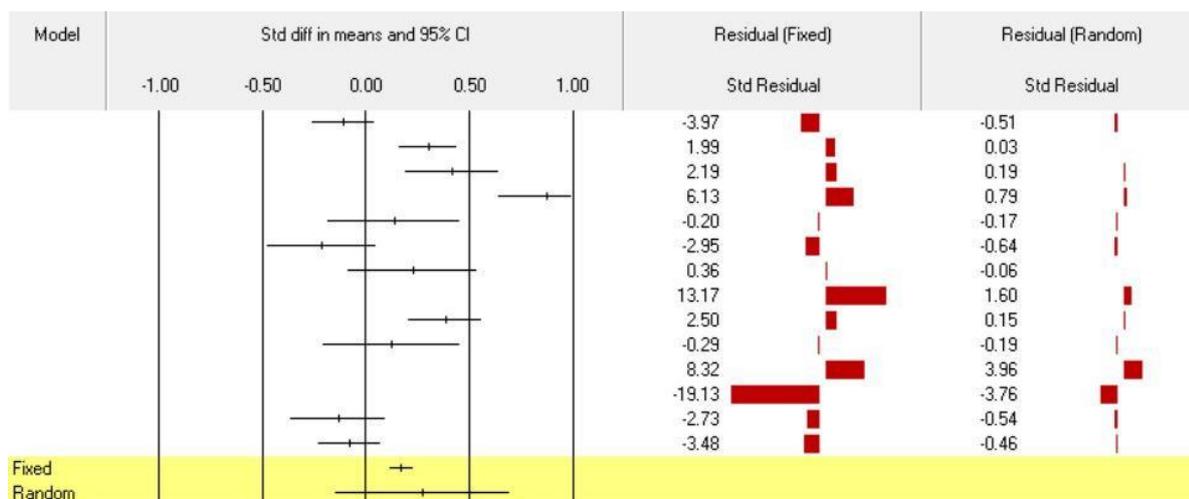


Figure: Impact of Innovation capability on Financial Performance: Analysis of Means difference, 95% CI, and Residual

Table 4, showed the result, the common effect size for these studies in the fixed effect model is 0.172 with the 95 % confidence interval of 0.115 to 0.229. The effect size in this population could lies within this interval. With the result, we can find that the z-value test the null hypothesis that the common size is 0, and the Z-value in the fixed effect model is 5.938 with the p-value which is less than 0.05. Thus, by using the criteria alpha value less than 0.05, we can reject the null hypothesis and can conclude that in this population the effect size is not preciously zero.

The null hypothesis that every study in the data analysis has the same effect size is tested using the Q-statistic. The predicted value of Q would be equivalent to the degrees of freedom (the total number of studies minus 1) if every study had the same true effect size. With 13 degrees of freedom and $p < 0.001$, the Q-value is 669.333. We can reject the null hypothesis, which states that the true effect size is the same in all of these investigations, using an acceptable alpha of 0.100. From the shown result of fixed model effect, we can conclude that there is significant relation between the innovation capability and financial performance.

In the current study, we will not consider the random effect model because the collected data is from different geographical areas, types of industries, levels of management, and so forth, thus having the influence of several external and internal factors. Which will influence the final conclusion and findings.

6. Discussion and Conclusion

This study was conducted with the literature published in the last two decades to analyze the impact of knowledge sharing on the innovation capability, and the study also investigated the role of innovation capability on the financial performance of the organization.

Previous research has demonstrated that there are three potential associations between the innovation capability and the knowledge sharing component, that is, positive, negative, and non-significant. However, in the current findings, we can conclude that there is a direct and significant relation between knowledge sharing and innovation capability. H1a, reflecting the relation among knowledge sharing

and innovation capability, is supported by the shown result. However, H1b gets rejected as the p-value is less than the criteria alpha 0.05.

The other most significant finding from the research is that there is a positive and significant relationship between the innovation capability and financial performance of the organization. Therefore, the finding supports H2a. The relation between the financial performance of the firms and innovation capability is most controversial, as the financial performance has a multilateral relation with innovation capability. Innovation capability has no direct impact on the financial performance, while it impacts the innovation performance and provides support for the economic growth of the organization. However, the financial allocation and viability are major factors for the innovation projects and in their implementation process. Several empirical and theoretical studies support this multilateral relation. However, these current findings show a strong link between innovation capability and financial performance.

Moreover, in the theory of innovation, the main focus of the researchers is to identify and measure the factors determining the innovation outcomes and capability of the firms. A consistent conclusion from the preceding studies is obstructed, nevertheless, by the standard assessment of the relationship between the innovation-related constructs and the outcomes based on the theoretical and empirical research, which revealed variation in the result.

7. **Theoretical and managerial contributions**

This meta-analysis research makes several critical contributions for the professional and research society in the fields of innovation and knowledge sharing. Firstly, this study contributes to the literature on knowledge management, firms' innovativeness, and financial distribution in the business. The main contribution of this study is to provide a holistic view on the relation among knowledge sharing, innovation capability, and financial performance across the selected countries. Secondly, this study attempted to reconcile the contradictory findings from earlier research and extensively publish the findings as an overall result. By reevaluating the definition, types, and method of knowledge sharing and innovation capabilities by incorporating sub-dimensions, this study also contributes to a broader understanding of these theories.

For the promotion of innovation activities, managers need to create an ideal environment to encourage the creative minds in their organization and provide the financial and moral support to get the outcomes from such creative talents. This study has two major implications for practitioners and management of the firms. Firstly, this study informs the management of firms of the value of innovation capability in the outcome of financial performance and knowledge sharing as the major influential factor in the development of innovation capability. To encourage knowledge sharing, businesses must create a robust conduit for intra- and interorganizational transfer of knowledge for innovation of products and processes. Firms with an efficient and continuously improvement-capable innovation system have a tactical advantage against their competitors and help in the development of sustainable businesses. Secondly, this study supports companies in making evidence-based decisions about when and how much financial and resource allocation they need to devote to develop their innovation capabilities. Managers need to decide the resource allocation to different stages of innovation from the R&D till the implementation of the innovation outcomes. Occasionally, certain firms allocate a major portion

of the innovation development but shortfall with the resources for the implementation of the innovation outcomes. Thus, management needs to understand allocation to avoid the risk and mistakes. Based on this study and findings, it can be argued that management should encourage employees and managers to promote knowledge sharing through effective channels and striving towards competitive advantages by developing the innovation capability.

8. Limitations and directions for future research

This study investigates the expanding phenomenon of innovative activities, which hasn't been thoroughly investigated and documented with appropriate or broadly applicable outcomes. Initially, this research conducted a thorough assessment of the literature, analyzing relevant research according to the relationship between the constructs. Future research must therefore assess these characteristics' mediating effects as well as their causal relationship. Furthermore, secondly, we combined quantitative performance from several investigations using various theoretical models and research designs in the meta-analysis, which gave us a possibility to report conflicting results. Further research using a single research design and theoretical model is therefore necessary. Thirdly, there are several forms of knowledge sharing and innovation capabilities, and various factors have both direct and indirect effects on them. A future study must take into consideration every aspect that affects the constructs, both directly and indirectly, and incorporate all dimensions of knowledge sharing and innovation capability. Fourth, since the meta-analysis was carried out by selection of studies from a specific region rather than worldwide as well, most of the studies have been conducted within a country, we are unable to generalize the findings. As a result, a worldwide study utilizing cross-border respondents from various nations and significant economies is essential. For the researchers to obtain more universally applicable results, this study necessitated large-scale research around the globe utilizing quantitative tools and more optimized questions. It will give management of the firms' useful guidelines to further implement innovation activities in their firms. Nonetheless, current meta-analyses add to an existing wealth of research on innovation and knowledge sharing literature.

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