Knowledge Management: The Value of Inter And Intra-Firm Activities Towards Innovation Performance

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Abstract: Firms mainly depend on innovation to remain competitive in business. New knowledge is a major resource for firms on the path of achieving innovation performance. This paper seeks to examine how intra-firm and inter-firm activities promote knowledge sharing toward innovation performance. We used the variables channels of information to represent inter-firm activities and workplace organization methods to represent intra-firm knowledge-sharing activities. The proxies for innovation performance were product innovation and business process innovation. Cross-sectional country-level data from CIS 2018 for 17 countries within the EU region was used for our study. The OLS regression method was used for the analysis. While existing studies concentrate on inter-firm knowledge transfer and single country-level studies, our study focuses on a blend of intra-firm and intra-firm cross-country studies. We also emphasized the value of knowledge sharing and cognition in the knowledge transfer process toward achieving firm innovation performance. Our model was built on the knowledge-based view (KBV) and social network theory (SNT). We found that cross-functional workgroups, conferences, trade fairs and exhibitions have a positive significant impact on both product and business process innovation. Published patent had a significant impact on product innovation but was not statistically significant for business process innovation. In conclusion, we found that intra-firm knowledge-sharing activities impact more on innovation performance of firms more than inter-firm knowledge-sharing activities of firms in the EU. Our study is limited to using cross-sectional data and the number of countries within the EU involved in the study. We believe longitudinal data and the involvement of more EU countries in future studies will yield robust findings for more reliable inferences.

Keywords: Knowledge sharing, Knowledge-based view, Social network theory, Channels of information, EU

1. Introduction

Knowledge is an undisputable resource for a firm's competitive advantage and profitability. Its creation, acquisition and transfer need to be cautiously planned and executed to achieve the intended purpose. The link between knowledge and innovation is crucial in the current technological and dynamic business environment. The creation of knowledge and its acquisition is as important as its sharing. A firm's proximity to other firms with similar business interests has the potential to share knowledge more than distant firms. Inter-firm activities involve collaborations between and among firms in leading to sharing of knowledge producing improved products and services. Knowledge sharing does not only occur between firms but within firms as well. Acquiring knowledge is not enough but consciously working and putting the right mechanisms in place to aid knowledge transfer among workers within a firm is essential to achieving innovation outcomes. Firms ought to appropriately balance the level of concentration given to both inter-firm knowledge generation activities and intra-firm knowledge generation activities. Acquisition of new knowledge through inter-firm cooperation and collaboration might not necessarily be costly but the process of acquiring new knowledge could be costly. It is, therefore, necessary for firms to get value for the knowledge acquired by ensuring that the new knowledge is not just shared among employees but gain cognition of the new knowledge to implement it successfully towards innovation. Scholarship on knowledge sharing has basically been focused on interfirm knowledge sharing (Cui et al., 2020; Xu et al., 2021; Majuri, 2022) at the expense of intra-firm. Extant literature is a dearth of intra-firm knowledge sharing activities and their impact on innovation. This is an issue because collaboration between and among firms is necessary for knowledge sharing and innovation but knowledge sharing within the firm through intra-firm knowledge activities is a sufficient condition for effective innovation within a firm. Wang et al. (2018) examined the impact of an inter-firm knowledge network on innovation performance among high-tech firms in Taiwan's science parks using snowball sampling techniques and knowledge-based theory. They found that an inter-firm knowledge network improves a firm innovation performance. In Singapore, Cui et at. (2020) found that IT-enabled inter-firm knowledge exploration capabilities help product effectiveness and process efficiency through the case study method. Using a single case of an aviation refuelling company in Canada as the study setting, Usman et al (2019) developed a framework for inter-firm and intra-firm knowledge sharing and learning. Their findings showed that intra-firm knowledge sharing capabilities promote the diffusion of inter-firm learning.

The findings of prior literature have been based on single firm or country-level data. In situations where inter-firm knowledge activities have been investigated, less emphasis has been placed on a very important variable

such as channels of information in the knowledge transfer process. Thus, even though prior literature has stressed the importance of both inter-firm and intra-firm knowledge activities toward innovation, we were unable to find a study that blends both concepts and assesses the impact on innovation. Practically, knowledge is transferred into firms through inter-firm collaboration and is shared within the firm-through intra-firm activities. The effect of knowledge transferred on innovation is complete if there is a simultaneous assessment of both inter-firm and intra-firm knowledge-based activities among firms. This study seeks to fill the gap in extant literature by exploring how intra-firm and inter-firm activities promote knowledge sharing towards innovation performance. We used the variables channels of information to represent inter-firm activities and workplace organization to represent intra-firm knowledge sharing activities. The proxies for innovation performance were product innovation and business process innovation. Cross-sectional country-level data from CIS 2018 for 17 countries within the EU region was used for our study. The OLS regression method was used for the analysis. We based our model on knowledge-based view (KBV) and social network theory (SNT) which have been tried and tested (Wang et al., 2018) to foster knowledge sharing from outside and within the firm.

This paper extends extant scholarship on inter-firm and intra-firm knowledge activities as well as innovation in three ways. First, it synthesizes ideas from inter-firm (Cui et at., 2020; Majuri, 2022; He et al., 2021) and intra-firm knowledge activities (Usman et al., 2019; Muhammed & Zaim,2020; Song et al., 2020) and innovation literature (Arthur & Stejskal, 2022; Di Vaio et al., 2020) examining the effect of inter-firm knowledge activities in the form of channels of information and intra-firm knowledge activities in the form of workplace methods on product and business process innovations. Second, this study fills the literature gap on how inter-firm and intra-firm knowledge activities simultaneously impact product and business process innovation. Thirdly, it contributes to the body of knowledge on knowledge-based view and social network theory. Our findings have key implications for managers and owners of firms on the value of both external and internal activities that aid knowledge flow leading to innovation. It also helps them to understand key activities and mechanisms to be implemented to support the free flow of new knowledge to the firm and within the firm structures.

The next chapter is the theoretical framework of the study. It reviews related current literature of the study and formulates the hypothesis of the study. Chapter 3 deals with the data and methodology of the study. The data analysis and results are in Chapter 4 while Chapter 5 captures the discussion and conclusion.

2. Theoretical Framework

2.1 Firm Innovation the Nexus Between Intra and Interfirm Knowledge Activities

Intra-firm knowledge activities involve all mechanisms used by a firm to transfer or share knowledge within the firm. Knowledge especially in tacit form is best shared through social interactions. The bedrock of innovation is knowledge. Managers ought to exhibit great skills in ensuring that, all forms of knowledge that enter the firm are adequately shared for employees to be cognizant of its implementations to achieve the expected innovation outcome. Usman, Ahmad & Burgoyne (2019) suggest that to improve organizational learning intra-firm knowledge sharing mechanisms such as teams, meetings, training and mentoring should be in place. Without intra-firm knowledge sharing activities, acquired knowledge if tacit, remains in the minds of people, while expressed knowledge is restricted to the confines of books, magazines, computers and other storage devices. The process of unleashing acquired knowledge is key to reaping the full benefit of the cost of knowledge acquisition. All workers across all departments of the firm are expected to full be abreast of the new process of producing the new product. Information asymmetry among workers creates imbalances in knowledge sharing and its implementation. Regardless of the vitality and quality of information, if workers of firms do not have the know-how of its implementation, it remains valueless and does not produce the expected innovative outcome. Existing literature (Arthur& Stejskal, 2022) supports the importance of a firm's internal knowledge sharing in the promotion of innovation. In order for acquired knowledge to be shared effectively, it must be released randomly in both time and space. This is what Fan, Lian & Wang (2020) referred to as the cafeteria effect. The creation of a new product or adoption of a new process in the production process needs to be learned and understood by all workers within the firm to effectively impact positively on the expected innovation. This study adopts work method organizations as an intra-firm activity that influences innovation. Based on these intra-firm activities expressed above, the following hypothesis is formulated.

H_{1A}: Work method organization has a positive significant impact on firm product innovation.

H_{1B}: Work method organization has a positive significant impact on business process innovation.

Knowledge travels between and among firms through cooperation and collaboration. Inter-firm knowledge activities aid knowledge exchange, sharing and evolution. Firms are likely to interact and share knowledge when concentrated or agglomerated at a geographical area. Agglomeration according to Marshall's theory of innovation stemmed from interaction of technology, labour pool and networking of firms (Shoufu, 2022). Two main factors that influence inter-firm knowledge activities are geographical and cultural proximity. The spread of knowledge, especially tacit knowledge is effective when firms are not just closer but interact through a number of knowledges sharing activities. Geographical proximity is the physical concentration of firms in a specific space. Firms that are geographically concentrated benefit from economies of scale in the form of lower costs. They are also able to pool resources together to undertake a research or infrastructure project which normally could not have been done by any single firm due to the high cost involved. Emphasis must be made that, geographical concentration of firms alone is not enough to create inter-firm collaboration, but mutual share of trust, values, norms and interests are catalysts for inter-firm knowledge activities. It implies that firms that are culturally related are more likely to interact and share knowledge toward innovation. Complexities associated with the innovation process are reduced and resolved in an environment where there are active inter-firm knowledge sharing activities (Cui et al., 2020). In the current volatile, complex and dynamic business environment, no firm could claim to be independent and remain innovatively competitive. It is an era of high interdependence, cooperation and collaboration and the surest way is inter-firm knowledge related activities that promote innovation. However, inter-firm cooperation is not at smooth as might seem. The process of collaboration and cooperation through inter-firm knowledge activities is hampered by trust issues between firms, varied cooperate cultural interest, great disparities in resource endowment, public rules and regulations. The main aim of inter-firm cooperation is to share knowledge. In a circumstance where one firm withholds part of information or knowledge to be shared, it does not promote successful inter-firm cooperation. Inter-firm knowledge activities must ensure a win - win situation. When a firm perceives to be more endowed in resources than the other, it, might stand not to gain as much as the other firm, this could hinder the smooth process of inter-firm knowledge activities. The forgoing arguments points to the fact that, an effective interfirm cooperation is based on diverse and distinctive channels of information accessible to firms. The more variations channels of information available, the quality of options available for firms to access and gain knowledge to promote innovation. We therefore hypothesised that:

H_{2A}: The more distinct firms' channels of information, the stronger its impact firm product innovation.

H_{2B}: The more distinct firms' channels of information, the stronger its impact on business process innovation.

2.2 Theoretical Background: Knowledge-Based View (KBV) and Social Network Theory (SNT)

This paper draws on the axioms of KBV and SNT to buttress on the impact of inter-firm and intra-firm knowledge-based activities on innovation performance of firms. KBV is an extended version of the Resource Based View (RBV). The KBV argues that, knowledge is the most significant and strategic resource of the firm. Its proponents assert that, knowledge especially if tacit is difficult to imitate and involves a complex means of transferring it from one entity to the other. Without the right quality and quantity of resources, all firms would struggle in achieving the needed innovation. Thus, all departments and employees should have the know how to effectively utilise the knowledge resources acquired for production of goods and services. If KBV considers knowledge as an important resource, then every bit of the resource should be equally and adequately accessible to employees within the firm among enhance productivity and innovation. The means of knowledge transfer and sharing is through interactions of firms. This is where the Social Network Theory (SNT) aids in the process. The focus of SNT transfer of knowledge and information through interpersonal ties and social interactions (Do, Nguyen & Shipton, 2023). Social networks involve social interactions which have an impact on business relationships and innovations through the exchange and sharing of valuable information across departments and among employees of firms. In this direction, we argue that social networks within firms are essential for transmitting knowledge from one employee to the other in the process of firm innovation. Scholarship therefore supports the assertion that developing and maintaining social network in firms enhance knowledge sharing and innovation (Xing & Cao, 2019; Do et al., 2023). At the firm level, firms regard relationship ties and social networks as key contributor to innovation outcomes and internal change. Social network theorists acknowledge the fact that social networks offer support for firm innovation and firm internationalization (Perry-Smith & Mannucci, 2017)

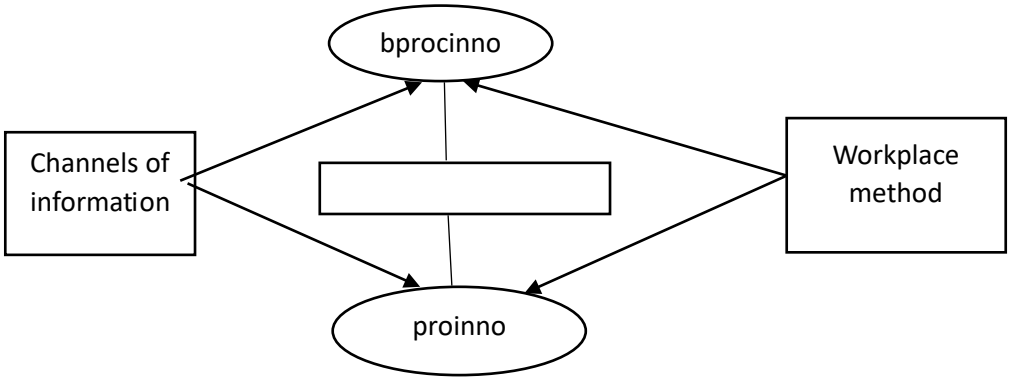

Figure 1: Conceptual Model

3. Data and Methodology

3.1 Data

Cross-sectional country level data from CIS 2018 Eurostat database for 17 countries within the EU region was used for our study. Prior studies have used data from the Eurostat database for several years due to its credibility, reliability, ethical and accurate methods used in the data collection process (Arthur et al., 2023). This makes the data credible for high level of validity for research analysis. The entire population of the firms in Europe engaged in innovation are classified as NACE2 and is usually the population of the survey. The survey comprises harmonized questionnaire based on the Oslo manual (EU, 2020). This nature of the data is consistent with the study aim. The EU was chosen as the context of the study due to high level of incentives and collaboration among firms within the EU. In 2019, the EU had 5 out of 10 most innovative Countries in the World. Germany (2nd), Finland (3rd), Switzerland (4th) Sweden (7th) and France (10th) (Scuotto et al., 2020). The intensity of innovative activities within the European region supports the view that, European firms are and ideal setting to examine inter-firm and intra-firm knowledge transfers towards innovation. CIS allows voluntary participation and answering of questions. There is therefore a high possibility of missing data. To forestall this problem, we limited our data selection to countries and variables whose data are entirely available. Data were controlled for normality of distribution and residuals. The OLS regression method was used for the analysis. This was after a test for normality indicated that the data is normally distributed (Motta, 2019). OLS regression results are highly actionable and predictive for managerial actions.

3.2 Description of Variables

The dependent variable is innovation. Innovation was proxied by two main indicators. Production innovation (proinno) and business process innovation (bprocinn). Product innovation is where a firm has introduced to the market a new or improved good or service that differs significantly from the firm's previous goods or services while business process innovation is a new or improved business proccess introduced on the market by firms that differ significantly from the previous business processes by the firm (Rydvalova & Skala, 2021). Our study had two models. Model 1 examined the impact of inter-firm and intra-firm knowledge related activities on product innovation. Model 2 on the other hand, examined the impact of inter-firm and intra-firm knowledge related activities on business process innovation. The unit of measure is the number or quantity of innovative products or processes.

The two main variables used for the analysis worked organization methods denoting intra-firm knowledge activities and channels of information representing inter-firm knowledge activities. Work organization method is proxied my planned job rotation of staff and cross-functional work groups or teams. Also, channels of information are measured by conferences/ trade fairs/ exhibitions, trade publications, published patents and crowd-sourcing. All are measured in numbers or quantities of activities held (Muhammed & Zaim,2020; Montecchi et al., 2022). Crowdsourcing is a new method for acquiring knowledge and ideas through collaborative events where experts meet to develop specialized software to solve specific problems confronting the industry (Manual, 2018)

Firm age is used as a control variable. This is because firms that have existed for a long period of time are more likely to be innovative than relatively new firms. This was obtained based on the year of registration of the firm starting from 2009 and after (Pellegrino & Piva, 2020).

4. Data Analysis and Results

We used the OLS regression model for the analysis. Stata 17 was the statistical software adopted to investigate the impact of inter-firm and intra-firm activities on the innovation of firms. Tables 1 and 2 below show the detailed results of the analysis.

Table 1: Regression Analysis of the Work Organization Methods and Channels of Information Toward Innovation

Variables	Model 1 prodinno	Model 2 bprocinno
Conferences, trade fairs or exhibitions	0.881*** (0.037)	1.570*** (0.156)
Scientific/technical journals or trade publications	-0.353*** (0.047)	-0.882*** (0.170)
Published patents	-0.577*** (0.228)	-0.577 (0.654)
Social web-based networks or crowed-sourcing	-0.211*** (0.496)	-0.557* (3.71)
Planned job rotation of staff	-7.076*** (1.283)	-10.597*** (2.087)
Cross-functional work groups or teams	8.878*** (1.428)	13.121*** (1.892)
Firm age	3.16** (0.433)	2.74* (0.399)
_cons	-7.692*** (1.956)	4.582** (2.58)
	R-sqr **0.618**	**0.504**
	N **153**	**153**

Note: Co-efficient in parenthesis * p< 0.1; ** p < 0.05; *** p < 0.01

Model 1 in Table 1 shows the results of the relationship between indicators of inter-firm and intra-firm knowledge activities and product innovation. The results indicate that there is a significant positive (β=0.037, p<0.01) impact of conferences, trade fairs and exhibitions on product innovation. Also, scientific/technical or trade journals showed a significant positive (β=0.047, p<0.01) impact on product innovation. The other inter-firm knowledge activity indicators such as published patents and social web-based networks or crowd-sourcing have a significant positive impact on product innovation. Similarly, all indicators of intra-firm knowledge activities showed a positive and significant impact on product innovation with cross-functional work groups or teams having the higher impact (β=1.428, p<0.01) on product innovation. The Pseudo R^2 is 0.618, which means, all other things being equal, our model explains 61.8% of the variations in the independent variables used. In model 2, there is a positive and significant impact of intra-firm knowledge activities and business process innovation with planned job rotation of staff having the higher impact (β=2.087, p<0.01). With the exception of published patents, which did not have a significant impact on business process innovation and crowed-sourcing having a positive significant impact on business process innovation at p<0.1 significant level, all other inter-firm knowledge activities had a positive significant impact at p<0.01 significant level. Model 2 has a Pseudo R^2 of 0.504. This means our model explains 50.4% of the variations in the independent variables.

4.1 Test for Robustness

Table 2: Results of Average Marginal Effects Estimations

Variables	Delta-method	
Variables	dy/dx	z score
Conferences, trade fairs or exhibitions	1.570*** (0.156)	10.05
Scientific/technical journals or trade publications	-0.882*** (-0.170)	-5.18
Published patents	-0.577 (0.655)	-0.88
Social web-based networks or crowed-sourcing	-0.557* (0.197)	-2.83
Planned job rotation of staff	-0.596*** (0.887)	-5.08
Cross-functional work groups or teams	0.121*** (0.792)	6.94

Note: Robust Co-efficient in parenthesis estimated P- values: * p<0.1; ** p<0.05; ***p<0.01

Average marginal effect estimation was conducted to examine the robustness of the model. The results in Table 2 showed that all inter-firm and intra-firm knowledge activity variables have a significant effect on innovation except published patents. All things being equal, inter-firm activities such as Conferences, trade fairs or exhibitions, firm innovation improves by 15.6%. Surprisingly, the average marginal effect of scientific/technical journals or trade publications on firm innovation showed negative (-0.170) results. But the rest of the inter-firm and intra-firm indicators have positive effects on innovation with a unit increase. The intra-firm variables showed a higher marginal effect of 79.2% and 88.7% on firm innovation for cross-functional work groups or teams and planned job rotation of staff respectively.

5. Discussion and Recommendations

Our study reveals that intra-firm knowledge activities such as planned job rotation of staff and cross-functional work groups or teams improve product and business process innovation. But the impact of intra-firm knowledge activities on product innovation is greater than business process innovation. This supports our hypotheses H_{1A} and H_{1B} that work method organization has a positive significant effect on firm product innovation and business process innovation. Work method organization involves teams and planned job rotation of staff. Working in teams promotes knowledge sharing and learning due to information synergy. Teamwork among firms produce results that could not have been obtained independently. It is therefore effective for firms to adopt teamwork in an effort to introduce a new idea or process towards the creation of new product, service or process. Planned job rotation enriches work experience of the worker, offer new challenges to the worker in question and new avenues for knowledge sharing and learning among workers in the department. This is consistent with Usman et al., (2019) and Arthur & Stejskal (2022) that intra-firm or internal knowledge sharing promotes firm innovation. Working in teams complements knowledge sharing. New business processes introduced into the firm with the aim of producing a new product or service must be well understood and applied by all workers. Information asymmetry among workers could be resolved through teamwork. Planned job rotation should consciously be executed by managers or HR practitioners to promote firm innovation. By implication, HR managers should encourage teamwork and rotation of staff across departments for the furtherance of firm innovation. On the other hand, our hypotheses H_{2A} and H_{2B} are supported by our findings that the more distinct firms' channels of information, the stronger their impact on firm product and business process innovations. These findings further support Cui et al., (2020) that inter-firm interactions lead to the inflow of knowledge into firms and further enhance innovation. This is consistent with

open innovation theory. The open innovation theory states that, firm innovation is driven by new knowledge from outside the firm. It is necessary for firms to collaborate with other firms of common interest for knowledge sharing towards innovation. It is also sufficiently important for firms involved in the collaboration to ensure that intra-firm activities are put in place to promote internal knowledge sharing. Although inter-firm knowledge activities have been the most focused area in knowledge sharing, our results show that intra-firm knowledge-sharing activities promote innovation among firms in the EU better than inter-firm knowledge activities. By implication, policymakers and managers of firms should place equal importance on both intra-firm and inter-firm knowledge activities for improved innovation performance among firms in the EU region.

5.1 Limitations and Future Research

Notwithstanding the fact that our findings supported the stated hypothesis, the findings of our study is not without limitations. The data used is cross-sectional and does not allow for periodic analysis of the variables employed. Also, the European Union region comprises countries with varied levels of economic development which leads to differences in innovation outcomes. It could therefore be misleading to lump 17 EU countries together for a single analysis. This opens an opportunity for further research. We recommend further research into intra-firm and inter-firm knowledge activities using panel data and categorizing the EU region on basis of the economic development of the countries involved. Our study contributes to KBV and SNT by emphasizing that knowledge sharing is a priceless resource towards innovation. This could be achieved through a conscious and simultaneous interplay of inter-firm and intra-firm knowledge activities.

References

Arthur, E. E. & Stejskal, J., 2022. Managing Knowledge Towards Firm Performance: The Moderation role of the Business Environment. In *European Conference on Knowledge Management* 23(1), pp. 44-51.

Arthur, E. E., Gyamfi, S., Gerstlberger, W., Stejskal, J., & Prokop, V.,2023. Towards Circular Economy: Unveiling Heterogeneous Effects of Government Policy Stringency, Environmentally Related Innovation, and Human Capital within OECD Countries. *Sustainability*, *15*(6), 4959.

Caputo, F., Garcia-Perez, A., Cillo, V., & Giacosa, E.,2019. A knowledge-based view of people and technology: directions for a value co-creation-based learning organisation. *Journal of Knowledge Management*, *23*(7), pp.1314-1334.

Cui, T., Tong, Y., Teo, H. H., & Li, J.,2020. Managing knowledge distance: IT-enabled inter-firm knowledge capabilities in collaborative innovation. *Journal of Management Information Systems*, *37*(1), pp.217-250.

Di Vaio, A., Palladino, R., Pezzi, A., & Kalisz, D. E.,2021. The role of digital innovation in knowledge management systems: A systematic literature review. *Journal of business research*, *123*,pp. 220-231.

Do, H., Nguyen, B., & Shipton, H.,2023. Innovation and internationalization in an emerging market context: Moderating effects of interpersonal and organizational social networks. *Journal of International Management*, *29*(2), 101014.

EU, I.,2020. European innovation scoreboard 2020. *Human resources*, *53*(47.3), pp.61-5.

Fan, F., Lian, H., & Wang, S.,2020. Can regional collaborative innovation improve innovation efficiency? An empirical study of Chinese cities. *Growth and Change*, *51*(1), pp.440-463.

Foroudi, P., Gupta, S., Patel, P., Batsakis, G., Vaatanen, J., & Czinkota, M.,2021. The effect of home country characteristics on the internationalization of EMNEs: The moderating role of knowledge stock. *International Business Review*, 101893.

He, Q., Ghobadian, A., & Gallear, D.,2021. Inter-firm knowledge transfer between strategic alliance partners: A way forward. *European Management Review*, *18*(3), pp.229-248.

Majuri, M.,2020. Inter-firm knowledge transfer in R&D project networks: A multiple case study. *Technovation*, *115*, 102475.

Montecchi, M., Bonetti, F., Plangger, K., & Schau, H. J.,2022. Creating discursive channels: generating and disseminating impactful research insights into the strategic sales enablement of retail technology. *European Journal of Marketing*, (ahead-of-print).

Motta, V.,2019. Estimating Poisson pseudo-maximum-likelihood rather than log-linear model of a log-transformed dependent variable. *RAUSP Management Journal*, *54*, pp.508-518.

Muhammed, S., & Zaim, H.,2020. Peer knowledge sharing and organizational performance: the role of leadership support and knowledge management success. *Journal of Knowledge Management*, *24*(10), pp.2455-2489.

Pellegrino, G., & Piva, M.,2020. Innovation, industry and firm age: are there new knowledge production functions?. *Eurasian Business Review*, *10*, pp.65-95.

Perry-Smith, J. E., & Mannucci, P. V.,2017. From creativity to innovation: The social network drivers of the four phases of the idea journey. *Academy of management review*, *42*(1), pp.53-79.

Rydvalova, P., & Skala, M.,2021. Innovation and innovation partnership. In *Innovation and Performance Drivers of Business Clusters: An Empirical Study* pp. 47-57. Cham: Springer International Publishing.

Scuotto, V., Beatrice, O., Valentina, C., Nicotra, M., Di Gioia, L., & Briamonte, M. F.,2020. Uncovering the micro-foundations of knowledge sharing in open innovation partnerships: An intention-based perspective of technology transfer. *Technological forecasting and social change*, *152*, 119906.

Shoufu, Y., Dan, M., Zuiyi, S., Lin, W., & Li, D.,2022. The impact of artificial intelligence industry agglomeration on economic complexity. *Economic Research-Ekonomska Istraživanja*, pp.1-29.

Song, M., Yang, M. X., Zeng, K. J., & Feng, W.,2020. Green knowledge sharing, stakeholder pressure, absorptive capacity, and green innovation: Evidence from Chinese manufacturing firms. *Business Strategy and the Environment*, *29*(3), pp.1517-1531.

Usman, M., Ahmad, M. I., & Burgoyne, J.,2019. Individual and organizational learning from inter-firm knowledge sharing: A framework integrating inter-firm and intra-firm knowledge sharing and learning. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration*, *36*(4), pp.484-497.

Xing, Z., & Cao, X.,2019. Promoting strategy of Chinese green building industry: An evolutionary analysis based on the social network theory. *Ieee Access*, *7*, pp.67213-67221.

Xu, T., Yang, J., Zhang, F., & Guo, W.,2021. Interfirm coopetition, interfirm knowledge creation, and collaborative innovation performance: The moderating roles of environmental competitiveness and dysfunctional competition. *Industrial Marketing Management*, *99*, pp.123-135.