Jahangirnagar University Journal of Management Research

Journal Homepage: https://journals.juniv.edu/index.php/jujmr

Digital Leadership, Knowledge Sharing, and Innovation in Organizations: Evidence from South Korea as a Developed Economy

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Article Info:

Received: November 13, 2025
Revised: June 11, 2026
Accepted: June 16, 2026
Published: June 2026

Keywords:

Digital Leadership, Knowledge Sharing, Innovation, South Korea

JEL Codes: M15, O31, D83

DOI:
http://doi.org/10.59185/jujmr.v8i1.512

Abstract: In this era, digital leadership (DL) plays a crucial role in incorporating up-to-date knowledge through collecting and sharing valuable information to gain competitive advantages. This study focuses on how DL contributes to organizational innovation (OI) and the mediating role of knowledge sharing (KS) in a developed country. To fulfill the purposes of this study, 243 samples were collected from various organizations in Korea through an online survey. Data analysis and hypotheses were tested using SPSS and the AMOS package, based on the knowledge-based and resource-based views. Findings depicted that DL has a significant effect on innovation, while KS partially mediates the interconnection between DL and OI. Additionally, the second order or subdivision of KS, e.g., knowledge collection and donation, has no significant mediation effect between DL and innovation. This study added value to the research arena by supporting the positive role of DL in KS and innovation in South Korea. Theoretically and practically, the KS behavior of digital leaders affects the enhancement of resources, such as innovation, in the South Korean economy.

1.0 Introduction

1.1 Background of the study

After the COVID-19 pandemic, digital transformation is becoming faster than ever before, and to cope with these dynamic environmental changes, organizations require new leadership with much knowledge sharing (KS) capabilities (Masa'deh et al., 2016; Verhoef et al., 2021). Along with this, traditional management systems and business models are shifting as a result of recent digital technology advancements and the growth of threats in the digital domain (Holzmann et al., 2020; Wesseling et al., 2020). For

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example, it has also observed that customer data and its utilization are at the heart of Facebook, Amazon, Netflix, Uber, Microsoft, Apple, and other companies. Additionally, it is found that Kodak, Tesla, and Nordstrom manage their organizations based on a digital system, Burberry, a world-renowned fashion-based organization, also shifted from a traditional to a digital fashion innovator (Araujo et al., 2021). Although 87% of respondents trust that digital TL is vital, where only 5% have a sound DL (Loubier, 2017). It indicates that digital technology has now not only been used by digital-based organizations but also general organizations for business management. In addition, today's business success not only depends on the organization's core business nature but also depends on the timely transformation of service, products, markets, strategy, and most importantly, management systems (Mollah et al., 2023). Therefore, KS and organizational support are crucial for organizational innovation (OI).

DL refers to fundamental skills in communication, digital content management, and expert in computing as a key role player to a knowledge society in the field of leadership (Willson et al., 2023). According to Amelda et al. (2021) "DL is created by combining leadership and digital abilities to optimize the benefits of digital technology to improve business performance". Drawing from Zhu (2015), DL consists of five profound characteristics: creativity, thinking, global vision, collaboration, inquisitiveness, and deep knowledge. DL is defined as the combination of leadership and digital abilities used to optimize the benefits of technology to improve organizational performance (OP) (Mollah et al., 2024). It includes fundamental skills in communication, digital content management, and computing expertise. This work views DL as an evolution of Transformational Leadership (TL), where digital technologies are integrated into the leadership style to manage rapid organizational changes (Kohli & Johnson, 2011; Liu et al., 2011; Ismail et al., 2017). By clearly stating that DL is the integration of a digital mindset with collaborative leadership, the study distinguishes itself from research that might view DL merely as technical literacy or IT management. The study conceptualizes and defines DL as a strategic synthesis of traditional leadership behaviors and advanced digital competencies designed to navigate the complexities of Industry 4.0.

In particular, previous studies show that digital technology enhances organizational creativity and innovation (Gozman & Willcocks, 2019; Hassani et al., 2017). Along with this, it is also found that DL has a significant effect on OP (Shin et al., 2023) and sustainable performance (Mollah et al., 2023) in Korean settings. Based on Erhan et al. (2022), suggestions DL can be used as the primary independent variable in future studies to assess the competency of DL; while also additional mediating variables can be applied for empirical test. In this digital age, the capability of DL should be dynamic, and to achieve organizational goal knowledge-sharing ability must be adapted to be cope with environmental changes.

There is ample research related to DL and OP or sustainable performance (Erhan et al., 2022; Mollah et al., 2023; Mihardjo et al., 2019; Zeike et al., 2019), but none of the studies have tried to find the mediating role of KS (knowledge collecting and donating) between DL and OI in South Korea.

In order to promote creativity, cooperation, learning, and agility and help individuals and organizations succeed in a dynamic and competitive environment, information sharing is crucial in the digital age. The position of leader is critical to fostering rapid decision-making and accelerating change in digital transformation (Kohli & Johnson, 2011; Liu et al., 2011; Ismail et al., 2017). Actually, a digital leader can share and donate knowledge for the organization and successfully deal with this digital dynamism through organizational support.

1.2 Objectives of the study

There are numerous businesses that are adopting new digital business strategies, but they may not fully comprehend the significance of the DL process (Abbu & Gopalakrishna, 2021; de Villiers et al., 2020). In this situation, as an innovative country, South Korea is also trying to adopt higher DL to adapt to changing digital environments (Shin et al., 2023). Specific objectives of the research are:

RO1: *To investigate the direct impact of DL on OI in South Korean organizations.*
RO2: *To examine the impact of DL on KS and KS on OI.*
RO3. *To evaluate whether the sub-dimensions of KS (knowledge collecting and knowledge donating) independently mediate the relationship between DL and OI.*

2.0 Literature Review and Hypotheses

2.1 Theoretical position

Since the leaders are vital in overseeing organizational operations, successfully managing the overall system requires the organization to be more supportive and to emphasize KS as a driver for innovation. Grounded in the works of scholars like Grant (1996) and Conner & Prahalad (1996), the KBV posits that knowledge is a primary organizational asset. The Knowledge-Based View (KBV) provides a critical theoretical foundation for understanding how organizations leverage internal information to drive performance and innovation. Based on these theoretical grounds, Knowledge-Based View (KBV) offers significant contributions to understanding the interplay among DL, KS (comprising knowledge collection and donating), and OI. By comprehending these interconnections, organizations can formulate strategies and implement practices that foster an environment favorable for innovation and harness the capabilities of digital technologies to attain enduring success in the era of digitalization. This research focuses on two primary theoretical lenses: it examines DL from a behavioral perspective of leadership in South Korean organizations, while analyzing KS and OI through the framework of the Resource-Based View (RBV).

2.2 Relationship of DL and OI

Digital leadership (DL) is not merely a technical skill set; it combines advanced digital technologies with the core behavioral style of transformational leadership (TL) to manage organizational change effectively (Mihardjo & Rukmana, 2018). This integration suggests that digital leaders leverage the visionary and inspirational qualities of TL to optimize the benefits of technology for business performance. In the age of Industry 4.0, organizations are transforming very fast and facing unforeseen challenges; simultaneously, digital technology plays a pivotal role in navigating this volatile environment (Kohli & Johnson, 2011; Ismail et al., 2017). Oberer and Erkollar (2018) highlighted that this fourth industrial revolution influences value-creation processes and demands new business models. DL combines digital technologies with the leadership style of TL (Mihardjo & Rukmana, 2018). At the same time, digital technology is playing a pivotal role in this changing environment (Verhoef et al., 2021). Also, digital technology has emerged as a critical driver of organizational transformation, enabling firms to enhance innovation, operational efficiency, and sustainable competitiveness in rapidly changing business environments (Luo & Liu, 2024; Feroz et al., 2021). In this perspective, Oberer and Erkollar (2018) highlighted the era of the fourth industrial revolution, which provides new business models and influences value creation processes in organizations.

Previous empirical studies have established that certain qualities help digital leaders capture opportunities from different environments (Sandell, 2013; Ahmed et al., 2024; Shin et al., 2023). When organizations recruit leaders with a digital mindset, they can accelerate innovation. They also help to increase OP (Shin et al., 2023; Erhan et al., 2022). In fact, creativity, deep knowledge, global vision, and collaboration are key character of DL. In the conceptualization of DL by Zhu (2015); characterized it as a fast-paced, cross-hierarchical, team-oriented, and collaborative leadership style. It is also found that digital leaders are creative, imaginative, and collaborative in order to capture opportunities from digital changes (Ahmed et al., 2024; Sandell, 2013). Study found that change is obvious, and to face these challenges, organizations are recruiting digitally skilled leaders with a digital mindset (Shin et al., 2023). Finally, digital leaders are

creative, imaginative, and collaborative to capture emerging opportunities (Sandell, 2013). It also significantly emphasizes innovation (Oberer & Erkollar, 2018). While the literature identifies the technical competencies of DL, our interpretation suggests that DL acts as the human logic behind the digital revolution. Thereafter, the following hypothesis posits that:

H1. The interconnection between DL and OI is positively related.

2.3 Relationship of DL and KS

DL and knowledge management (KM) hold considerable importance within contemporary businesses that aim to efficiently utilize digital technology for the purpose of managing and capitalizing on knowledge assets. Apart from this, the fast growth of new technologies and digital communications highlights the relevance of knowledge management as a source of competitive advantage (Obeidat & Abdallah, 2014). Based on the study of Liao et al. (2007), KS is divided into two categories: collecting and donating. Actually, knowledge collection is related to actively consulting with others for gathering, while knowledge donation is related to communication with others for intellectual capital (de Vries et al., 2006). According to the opinion of Wang and Noe (2010), positive association or combination is vital for cost reduction, new project development, team performance, innovation, and firm performance. This implies that the synergistic interplay between the 'pull' of collecting information and the 'push' of donating it creates a continuous flow of knowledge. A "positive association or combination" means that for an organization to innovate, employees must engage in both behaviors simultaneously. The combination of looking for information (collecting) and providing information (donating) creates a reciprocal cycle that is critical driver for team performance and firm innovation Wang and Noe (2010) identify as the critical driver for team performance and firm innovation.

However, knowledge management depends on the organizational culture and also on leader types and character. Information sharing mediates the interrelationship between transformational or transactional leadership and OI success to some extent (Han et al., 2016; Zheng et al., 2017). In addition to being open to new ideas, research shows that digital leaders should be intellectually curious, have a thirst for information, and be willing to teach and learn. (Mihardjo & Rukmana, 2018). Based on Meier et al.'s (2017) drawings, an ontological frame of leadership appropriate for considering digitalization's social aspects is developed (e.g., enhanced team cooperation). There are some studies that have found that a leadership positive approach is linked with KS (Bradshaw et al., 2015) while TL (Kim & Park, 2020), transactional leadership (Masa'deh et al., 2016), and authentic leadership (Zeb et al., 2020) are positively associated with KS. Beyond the definitions of collecting and donating, we interpret the 'positive association' of these behaviors as a synergistic 'push and pull' mechanism. Therefore, DL will also support KS. Therefore, it is suggested that:

H2. The interconnection between DL and KS is positively related.

2.4 Relationship of knowledge sharing and OI

Leaders impart their wisdom and skills refers to the proactive role digital leaders play as knowledge conduits within their teams. The connection between KS and innovation or innovation behavior has already been proven by many researches (Kamaşak & Bulutlar, 2010; Yeşil et al., 2013; Castaneda & Cuellar, 2020). When leaders and employees share their experiences and skills with each other, the rest of the people can generate new ideas and come up with better solutions (Al-Husseini et al., 2021). Since the advent of digital technology, knowledge is being shared more and faster within organizations. Results show that TL had a direct positive relationship with KS, and innovation (Al-Husseini et al., 2021). The fast growth of new technologies and digital communications, results the significance of knowledge management which is a source of competitive advantage (Obeidat & Abdallah, 2014). To achieve KS benefit and organizational goals, the leaders

must have a willingness to share knowledge among the employees. As we know, knowledge considered as an asset to the organizations (Grant, 1996), enabling them to achieve various organizational outcomes, such as innovation (Smith et al., 2010; Kogut & Zander, 1996). Knowledge collection had a considerable influence on all forms of innovation and ambidexterity, but knowledge donation both within and outside the group, found no effect on exploratory innovation (Kamaşak & Bulutlar, 2009). Besides, this previous study shows that there is a supportive relationship between KS and innovation (Castaneda & Cuellar, 2020; Sáenz et al., 2009; Leonardi, 2014; Kim & Shim, 2018), while Kamaşak & Bulutlar (2010) found that in-group KS supports innovation. Therefore, it is posited that:

H3. KS is positively interrelated to OI.

2.5 Role of KS as mediator

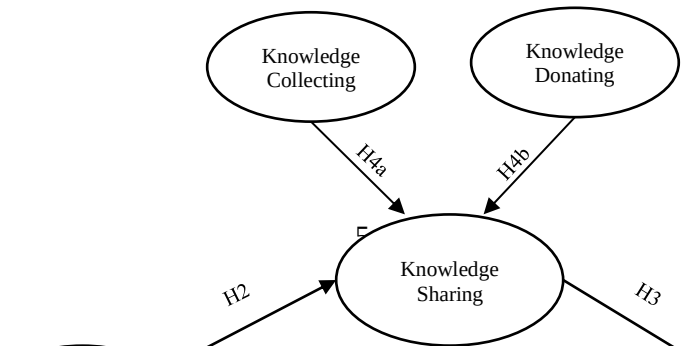
Previous research has consistently demonstrated that KS serves as a vital mediating mechanism across diverse organizational contexts and theoretical perspectives. According to Barron and Kenny (1986) mediation is established when the independent variable significantly affects the dependent variable, the independent variable significantly affects the mediator, the mediator significantly affects the dependent variable. Supporting with this, previous research clearly show that TL have positive impact on KS (Yin et al., 2019; Han et al., 2016) and KS have positive impact on innovation (Kamaşak & Bulutlar, 2010; Yeşil et al., 2013; Castaneda & Cuellar, 2020). As DL is also one kind of TL (Mollah et al., 2023) this logic can also be used here to show that DL has an effect on KS, and KS would also mediate between DL and innovation. For the support of mediation, Yang et al. (2018) mentioned that KS plays an intermediating role among collaborative culture and product innovation and process innovation. Also, KS act as mediator between job satisfaction and workplace innovation (Tarigh & Nezhad, 2016). Similarly, Elrehail (2018) study proved as a substantial or significant relationship exist between innovative leadership and the outcome indicates that KS somewhat or partially mediates the relationship. Additionally, research in the IT-based industry, also found that TL styles increase employee creativity while knowledge management playing as a mediating role (Mittal & Dhar, 2015). Similarly, the findings lead by Vandavasi et al. (2020), conclude that encouraging a culture of KS can boost team creativity. Additionally, the study has also showed that once KS culture is implemented, it completely mediated the relationship between TL and employee efficiency (Dwivedi et al., 2020). Based on the literature, DL support KS, and KS sharing have positive effect on OI. Therefore, based on mediation (Barron & Kenny, 1986) and the above discussion subsequent proposition has proposed:

H4. KS mediates the interconnection between DL and OI.
H4a. Knowledge collecting mediates the connection between DL and OI.
H4b. Knowledge donating mediates the connection between DL and OI.

3.0 Research Model and Methodology

To be innovative and sustainable in today's digital world, an organization needs digitally savvy employees, leaders, and KS. Based on the literature conceptual model has proposed.

Figure 1: *Proposed conceptual model*



3.1 Sampling and data collection

The data was obtained from employees working in various sectors of South Korean businesses, including manufacturing, sales and services, and information technology. This has been done through the administration of an online questionnaire using Google Forms, and this study involved the random selection of employees who expressed their willingness to participate. A total of 243 employees provided their opinion in the research survey, which is valid for analysis. The findings indicate that the sampled respondents were adequately represented in terms of the distribution of employee characteristics. The manufacturing sector accounted for the highest proportion of industries at 65.40%, with the services sector at 27.60% and both types of organizations at 2.90%. The findings suggest that a significant proportion of organizations exhibited a workforce size ranging from 51 to 100 employees, accounting for 39.90% of the sample. Organizations with 21 to 50 employees were the ones that came after this. In addition, the participants have work experiences range from 5 to 10 years, with the highest experience at 54.70%, followed by 1 to 4 years' experience at 37.4%.

3.2 Measurement of Variables

To measure the DL scale developed by Ulutas and Arslan (2017) and used by Erhan et al. (2022) to find the effect of worker innovative behavior later used by Mollah et al. (2023) for measuring OP. The measurement of KS was measured using the scale devised by Liao et al. (2007). The instrument was specifically developed to assess the knowledge contribution and knowledge acquisition aspects of KS. Lastly, to measure OI, this study has used instruments measured by Gunday et al. (2011).

4.0 Empirical Results

4.1 Model Evaluation

This study used SPSS 23 to calculate variable mean, standard error, and reliability correlation values. AMOS 24 was used to evaluate the study's scale's reliability and validity. The scales' validity in this particular context has been assessed through the utilization of confirmatory factor analysis. The internal consistency coefficient has been selected as the measure to assess the reliability of the scales. The technique of path analysis has been employed to examine the impact of the variables under investigation. The structural equation modeling technique was employed in this study, along with the maximum likelihood estimation method. Additionally, the bootstrap resampling technique was utilized with a sample size of 5,000 and a confidence interval of 95% that was corrected for bias.

According to Anderson and Gerbing (1988), it is recommended to follow a sequential approach when conducting studies using structural equation modeling, wherein the measurement model is tested prior to the structural model. As a result, the initial step involved conducting a thorough examination of the measurement model. Once the measurement model demonstrates satisfactory fit values, it is imperative to proceed with testing the structural model. The outcomes derived from the measurement model are presented in Table 1. The researchers found that the goodness of fit value for the three-factor structure demonstrated a higher level of fit than two-factor structure, as indicated

by previous studies (Hu & Bentler, 1999; Kline, 1998). At this stage of the study, a structural equation modeling approach has been employed to establish a research model. The adequacy of the model fit has been assessed using the AMOS software package. The results of the model indicate that the fit indices fall within acceptable ranges, with the following values: (x^2/df = 1.73; CFI = 0.95; NFI = 0.90; AGFI =0.84; RMSEA = 0.055).

Table 1: *Comparison of Measurement Structural Model*

Model	x^2	df	x^2/df	Δx^2	CFI	NFI	AGFI	RMSEA	RMR
3 factors (DL, KS, OI)	70.91	27	2.62	-	.97	.96	.91	.082	0.16
2 factors (DL, KS+OI)	317.81	151	2.10	246.90***	.94	.90	.85	.068	.024
1 factor (DL+KS+OI)	470.52	272	1.73	152.70***	.95	.90	.84	.055	.023

Notes: *** p < .001, DL: Digital leadership, KS: Knowledge Sharing, OI: Organizational Innovation

According to the recommendations made by Fornell and Larcker (1981) and Hair et al. (2012), the researchers tested the study model's convergent and discriminant validity. These tests included evaluating the composite reliability and Cronbach's alpha coefficient, which needed to be above 0.70, as well as the AVE, which needed to exceed 0.50. Furthermore, the analysis of discriminant validity was conducted to ascertain whether a particular measurement is distinct from other measurements and does not reflect the same underlying construct. Also, the researchers employed Harman's single factor test to assess the presence of a common method variance error in the study which indicates there is no common method bias issues (Podsakoff et al., 2003).

Table 2: *Convergent validity assessment*

Constructs	Loading Value	CR	AVE	α
Digital Leadership				
DL1.	0.81			
DL2.	0.82			
DL3.	0.79	.907	.618	.906
DL4.	0.77			
DL5.	0.76			
DL6.	0.78			
Knowledge Sharing: Knowledge Collecting				
KSC1.	0.72			
KSC2.	0.72			
KSC3.	0.70			
KSC4.	0.73			
KSC5.	0.78	.917	.525	.916
Knowledge Sharing: Knowledge Donating				
KSD1.	0.70			
KSD2.	0.67			
KSD3.	0.73			
KSD4.	0.67			
KSD5.	0.81			
Organizational Innovation				
OI1.	0.83			
OI2.	0.81			
OI3.	0.80	.949	.676	.949
OI4.	0.85			
OI5.	0.83			
OI6.	0.77			
OI7.	0.80			

OI8.	0.80
OI9.	0.88

The interconnection among the variables of the work was identified by presenting the results of Pearson correlation analysis in Table 4. Table 3 presents, there is a clear and statistically significant connection between DL, KS and OI. According to Fornell and Larcker (1981), the model's discriminant validity is indicated by each square root of AVE exceeding the other correlation coefficients in this study.

Table 3: *Discriminant validity assessment*

Variables	Mean	SD	1	2	3	4	5	6
1. Industry Types	1.46	0.74	1					
2. Firm Size	3.94	1.23	-.240**	1				
3. Work experience	1.70	0.61	.045	.159*	1			
4. DL	4.12	0.68	.163*	.187**	.120**	**(.786)**		
5. KS	4.20	0.54	.132*	.178**	.172**	.489**	**(.725)**	
6. OI	4.13	0.69	.133*	.247**	.220**	.776**	.653**	**(.822)**

Notes: * $p < .05$; ** $p < .01$, *** $p < .001$

4.2 Hypotheses testing using structural equation modeling (SEM)

To investigate the results, we adopted the SEM approach sketched by Mackinnon et al. (2002). The structural equation modeling (SEM) approach is often regarded as the preferred method for causal modeling (James et al., 2006). This is due to its ability to effectively account for measurement error, assess the goodness of fit of the tested model, and examine various mediators (Brown, 1997). The baseline model chosen for our study was the completely mediated, wherein direct paths from the predictor variable DL to OI were also separately included (Table 4).

Table 4: *Hypothesized results of the variables*

Paths	Estimates		95% CI		Results
	Direct impact	Mediating impact	LLC	ULC	
H1. DL → OI	0.606***		0.411	0.766	Supported
H2. DL → KS	0.480**		0.302	0.639	Supported
H3. KS → OI	0.354**		0.191	.530	Supported
H4. DL → KS → OI		0.178***	0.083	0.345	Partially Mediated
H4a. DL → Knowledge Collecting → OI		-0.105	-.806	0.082	Not Supported
H4b. DL → Knowledge Donating → OI		-0.034	-.121	0.009	Not Supported

Notes: ** $p < .01$, *** $p < .001$

Based on hypothesis 1 the findings of the model (Figure 1) indicate that DL has a direct, significant positive effect on OI. Therefore, the hypothesized path from DL to OI is found to be significant ($\beta = 0.606$, $p < 0.001$). Thus, the result of hypothesis 1 is supported. This is similar to the findings that TL positively affects OI (Gumusluoglu & Ilsev, 2009; Hsiao & Chang, 2011). It proves that, like transformational, transactional, or benevolent leadership, DL has also contributed to OI.

Hypothesis 2 states that DL positively affects KS (knowledge collection and knowledge donation). The empirical findings proved that the hypothesized path from DL to KS is significant ($\beta = 0.480$, $p < 0.05$). Therefore, hypothesis 2 is supported. It infers that the knowledge-sharing behaviors of digital leaders are vital for OI. Along with this hypothesis 3, it demonstrates that KS has a positive effect on OI. As per the hypothesized

model, path analysis showed that KS has a significant effect on OI ($\beta = 0.354$, $p < 0.05$). So, hypothesis 3 is also supported, which is similar with previous studies (Castaneda & Cuellar, 2020; Sáenz et al., 2009; Leonardi, 2014; Kim & Shim, 2018). Therefore, it can be said that in general, KS plays a vital role in OI in Korea. Lastly, in the case of the mediation effect, it is stated that KS plays a mediating role between DL and OI. As per the hypothesized path, KS significantly mediates the relationship between DL and OI ($\beta = 0.178$, $p < 0.001$). Therefore, it can be concluded that KS in general organizations in the presence of DL is undeniable. Therefore, KS is partially mediated between DL and OI. However, in the second-order test, knowledge collection and knowledge donation have insignificant mediating effects ($\beta = -0.105$, $p > 0.01$ and $\beta = -0.034$, $p > 0.01$). It infers that employees in Korean organizations focus on overall KS rather than differentiating them. Therefore, KS culture and environment exist in South Korea to enhance innovation and performance. Finally, our study suggests that DL has a significant effect on KS, indicating that KS plays a crucial role in OI. Thus, higher KS may increase OI. The empirical results are consistent. Erhan et al. (2022) found that DL influences the innovative behavior of organizations.

5.0 Discussion and conclusion

Previous studies examined that DL has influence on innovative work behavior (Erhan et al., 2022), organizational performance (Shin et al., 2023) and organizational sustainable performance (Mollah et al., 2023). Along with these, Erhan et al. (2022) conducted research on the effect of DL on conventional organizations and mentioned that DL is important for organizational management in this digital age, and in the future, DL can be used as a key independent variable based on perspective and necessity. Undoubtedly, if we carefully and deeply see the character given by Zhu (2015), digital leaders have creative minds; deep thinking means thinking logically and strategically; global vision means wide sense and collaboration with others; and being inquisitive means searching for new knowledge. Digital leaders have the ability to inspire and guide others while also having a thorough understanding of contemporary approaches based on digitalization (Zeike et al., 2019). Though previous study shows the relationship of TL and KS (Yin et al., 2019; Han et al., 2016) and KS and innovation (Kamaşak & Bulutlar, 2010; Yeşil et al., 2013; Castaneda & Cuellar, 2020). However, previous research has not clearly described or explored the specific mediating mechanism of KS including its dimensions or called second-order as knowledge collecting and donating between DL and OI, particularly within the developed economy like South Korean context. This study fills this gap by demonstrating that the social exchange of information is the intervening bridge that translates a leader's digital mindset into tangible innovation. Therefore, this study explored the impact of DL on OI. and results show that KS as a single variable partially mediate between DL and OI, however the second order of KS (collecting and donating) don't have any significant mediating role. Overall KS is a significant mediator, individual dimensions (collecting vs. donating) do not exert separate significant effects in this specific environment, suggesting a highly integrated knowledge culture in South Korean organizations.

5.1 Theoretical and practical implications

This study provides significant contributions to the existing body of literature. In the South Korean context, this study empirically validates the nexus of DL-KS-OI. More specifically, this research provides a clear answer to the fundamental question of how DL drives innovation in the era of Industry 4.0. It does so through a dual-mechanism where the digital leader's mindset is amplified by a collaborative knowledge-sharing culture in the organizations. Our findings suggest that in South Korea, DL behavior is not merely advantageous but essential for generating the organizational support necessary for resource development and innovation performance. Also, DL acts as a behavioral capability that allows organizations to effectively manage and capitalize on these knowledge assets to enhance performance. From the empirical results, several managerial implications emerge.

First, given the high direct impact of DL on OI (H1), top management should take necessary steps to increase technology management training and promote organizational KS culture without bureaucratic complexity to gain market advantages. Additionally, organization need to emphasize management training to cultivate the 'digital mindset' including creativity and global vision identified in our model. Second, because KS was found to be a vital intervening bridge (H4), management must implement strategies to increase organizational support for KS, specifically by removing bureaucratic complexities that hinder the 'push and pull' of information. Finally, since our second-order tests (H4a, H4b) suggest that Korean employees value a unified sharing environment over individual behaviors, managers should focus on building an integrated culture of trust and information exchange rather than monitoring isolated transactions. Last but not least, as DL is an emerging concept, therefore organizational decision makers should focus on attracting digital leaders for addressing digital transformation to cope with digital environmental dynamism (Mollah et al., 2024). Finally, it posits that knowledge is a primary organizational asset that enables firms to achieve superior outcomes and competitive advantage in a digital environment.

5.2 Limitations and future research directions

Finally, like other empirical research, this study has some limitations. We use the convenience sampling method in conventional organizations in South Korea for this research; therefore, the results may not show the retention behavior of the DL. Additionally, due to cultural, environmental, and other feature differences, the findings may not be generalizable outside of South Korean conventional companies as the study's subjects. Furthermore, this research does not consider a number of additional aspects linked to DL, knowledge management, organizational backing, and process or product innovation. For future studies, this opens the door to adding variables and elements that were not included in this one to the updated research model.

This research demonstrates the role of DL in KS for innovation in different organizations in South Korea. Future research should investigate the level of DL knowledge and how it supports OI and sustainable performance. If the depth of KS capacity of DL is high, then innovation and sustainable performance increase. Further studies should explore what factors affect digital leaders' knowledge enhancement and what factors motivate organizational support for innovation. Liao (2003) mentioned that the success of KS in an organization depends on behavior and technological knowhow. Still, there is a research limitation in measuring the capacity of DL. Future research can measure the capacity of DL based on the organization's position and its effect on OP.

5.3 Conclusion

In conclusion, this study demonstrates that DL knowledge is a vital behavioral driver of OI within the context of South Korea's developed economy. The empirical evidence confirms that while DL exerts a strong direct influence on innovation, its impact is significantly amplified through the partial mediating role of KS. A key insight from the research is that in the South Korean setting, employees prioritize a holistic culture of information exchange over isolated behaviors of collecting or donating knowledge. Because the mediation is only partial it highlights that while a collaborative culture is vital, it cannot replace the need for a visionary DL who possesses the technical and creative skills to navigate a disruptive environment. Ultimately, for organizations to remain competitive amidst rapid digital transformation, top management must move beyond mere technical adoption to foster a digital mindset in leadership and dismantle bureaucratic hurdles that impede the collaborative flow of intellectual assets. In South Korea's innovative ecosystem, the leader's personal vision and 'digital mindset' remain the primary engines of success.

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