



Research Paper

Analysis of the Effect of Knowledge Hiding on Educational Innovation of Primary School Principals: The Role of Knowledge Flow as a Moderating Variable



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Abstract

The present study aimed to analyze the effect of knowledge hiding on the educational innovation of primary school principals, considering knowledge flow as a moderating variable, using a descriptive-correlational approach within the framework of structural equation modeling. The target population consisted of 152 primary school principals in the city of Ardabil, of whom 109 were selected through simple random sampling using Cochran's formula. Data were collected using the Explicit and Tacit Knowledge Hiding Questionnaire (Connelly et al., 2012), the standard Innovation Quality Questionnaire (Wang & Wang, 2012), and the Knowledge Flow Questionnaire, adapted from Hemmati (2010). Structural equation modeling was employed for data analysis. The results indicated that both explicit and tacit knowledge hiding had a negative and direct effect on the innovation quality of school principals. Moreover, the findings revealed that knowledge flow positively moderated the effect of explicit and tacit knowledge hiding on principals' innovation quality. Specifically, at higher levels of knowledge flow, the impact of knowledge hiding on innovation quality was stronger, and vice versa. Based on these findings, it can be concluded that educational innovation is not merely a product of individual skills of principals but is also dependent on the quality of knowledge flow within the school. Therefore, policymakers and educational administrators should create environments that facilitate effective knowledge circulation, such as establishing learning communities, knowledge networks, and organizational trust culture, in order to reduce the tendency for knowledge hiding and foster the development of schools' innovative capacities.

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Introduction

Educational organizations are vital instruments for building a better society and contribute to the overall welfare of a country (Kaleem & Akhtar, 2022). Due to their impact on organizational growth, innovation, and employee performance, knowledge hiding has attracted significant attention from researchers and practitioners in recent years (Anand, Offergelt, & Anand, 2022). Research on knowledge hiding has increased rapidly over the past decade (Garg, Kumar, & Ganguly, 2022). Despite extensive studies on why and how employees share knowledge, relatively little attention has been given to knowledge-hiding behaviors (Černe, Nerstad, Dysvik, & Škerlavaj, 2014; Singh, 2019). It is common for employees in an organization to face a tension between competition and collaboration. Specifically, they may be willing to share knowledge while simultaneously possessing “unspeakable hidden knowledge.” Numerous academic institutions and enterprises have reported instances of knowledge hiding (Pan & Zhang, 2014). Knowledge hiding refers to an individual’s deliberate effort to withhold or conceal knowledge. Field research indicates that evidence such as “unsuccessful or relatively successful group projects compared to individual work,” “low-level operational staff interaction,” and “organizational non-competitiveness with similar foreign organizations in terms of expertise and multi-skilled human resources” points to the existence of knowledge-hiding processes in Iranian organizations (Kamareiy, Hasanzadeh, & Elahii, 2018). Connelly,

Zweig, Webster, and Trougakos (2012) defined this phenomenon as knowledge hiding, conceptualized as an organizational behavior in which employees intentionally conceal knowledge requested by their colleagues at work. Theoretically, knowledge hiding has been considered the opposite of knowledge sharing until an increasing number of recent studies recognized it as a distinct concept. In-depth investigations have been conducted to examine the antecedents and drivers of knowledge hiding using various theoretical frameworks (Duan et al., 2022). However, research on the outcomes of knowledge hiding has not been sufficiently explored (Singh, 2019). Previous studies have examined the effects of knowledge hiding at individual and team levels, generally indicating that knowledge-hiding behaviors negatively affect individual creativity (Huo, Cai, Luo, Men, & Jia, 2016). Most studies emphasized that knowledge-hiding behaviors negatively impact team creativity, individual creativity, and team performance. However, Connelly et al. (2012) and Černe et al. (2014) identified a potential positive aspect of knowledge hiding, suggesting it can improve short-term organizational performance. These perspectives indicate that whether knowledge-hiding behaviors have both positive and negative effects on an organization warrants further investigation (Y. Wang, Han, Xiang, & Hampson, 2019). Clearly, there is limited research on the effects of knowledge hiding on organizational outcome variables, such as innovation performance. Evidence suggests that

knowledge-hiding behaviors seriously hinder the transfer and generation of new knowledge and creative ideas among employees, consequently negatively affecting organizational innovation (Ardito, Petruzzelli, Dezi, & Castellano, 2020; Xiong, Chang, Scuotto, Shi, & Paoloni, 2021). Given the need for further understanding of why and how individuals hide knowledge, Singh (2019) and Shrivastava, Pazzaglia, and Sonpar (2021) recommend that future research examine how different dimensions of knowledge hiding, such as explicit and tacit knowledge hiding, influence organizational performance. Overall, the effects of explicit and tacit knowledge hiding on organizational innovation remain largely unexplored.

In today's dynamic and competitive environment, knowledge management has become a critical economic resource (Disterer, 2001). Knowledge management practices are particularly important for universities and academic institutions aiming to enhance performance as their success depends on effective knowledge management (Stamou, 2017). A primary function of academic institutions is the transfer and sharing of knowledge (Veer Ramjeawon & Rowley, 2018). The absence of these processes impedes successful knowledge management (Asrar-ul-Haq & Anwar, 2016). Organizations strive to promote both knowledge sharing and knowledge transfer; however, the outcomes of these efforts remain uncertain (Hislop, 2002). Researchers with a clear understanding of knowledge-based innovation strongly argue that improving innovation quality requires new knowledge

resources, particularly in contemporary organizational contexts. Insufficient knowledge bases significantly limit an organization's scope and capacity to assimilate and utilize new knowledge in innovation processes (Hill & Rothaermel, 2003). Therefore, knowledge management is crucial for enhancing an organization's innovation level and capabilities. Innovation quality directly reflects how well an organization performs in terms of products, services, and processes. It encompasses both organizational innovation capability and the quality of all innovation outcomes (Haner, 2002). Similarly, knowledge, as an intangible asset, is a key resource for organizations to sustain a strong innovation momentum (Chierici, Tortora, Del Giudice, & Quacquarelli, 2021). Consequently, high-quality innovation output and sustainable development heavily depend on the interaction between static knowledge resources and dynamic knowledge management approaches (Duan et al., 2022; Ferreira, Mueller, & Papa, 2020). In this context, Ardito et al. (2020) suggested that knowledge hiding obstructs smooth knowledge flow and prevents the generation of new ideas. The integration of knowledge-hiding behaviors with organizational innovation is vital, ensuring a conducive knowledge-sharing environment to enhance innovation quality. Internal expertise and knowledge are transferred from the "knowledge provider" to the "knowledge seeker." However, when knowledge flow is disrupted due to knowledge hiding, organizational innovation performance is negatively affected. Only when knowledge

continuously flows within an organization can employees effectively exchange ideas and develop critical core competencies (Ferreira et al., 2020). Azan, Bootz, and Rolland (2017) demonstrated that the scale and efficiency of knowledge flow directly impact organizational innovation. Accordingly, knowledge flow plays a deeply rooted role in organizational knowledge management and innovation. Nevertheless, existing studies rarely consider knowledge flow as a moderating factor in the relationship between knowledge hiding and organizational innovation quality. Overall, this study aims to address research gaps by disaggregating the dimensions of knowledge hiding and developing a theoretical model linking explicit and tacit knowledge hiding with organizational innovation quality. In this model, knowledge flow within the organization is included as a moderating variable. Subsequently, a survey of employees is conducted to examine the following two questions: (1) What are the relationships between employees' explicit and tacit knowledge-hiding behaviors and organizational innovation quality? and (2) Does knowledge flow play a moderating role in these relationships? Therefore, the research question of this study is whether knowledge hiding affects the educational innovation of primary school principals, with knowledge flow serving as a moderating variable.

Babaei Meybodi and Alirezai (2020), in their study titled "Structural Modeling of the Impact of Rational Knowledge Hiding on Performance with Emphasis on the Mediating Role of Employee Job Satisfaction (Case

Study: Yazd IRIB)," found that rational knowledge hiding positively influenced job performance both directly (path coefficient = 0.69) and indirectly through job satisfaction as a mediator (path coefficient = 0.66). Additionally, rational knowledge hiding had a positive effect on job satisfaction (path coefficient = 0.91), and job satisfaction also positively affected job performance (path coefficient = 0.73). Kamareiy et al. (2018), in their study titled "What Knowledge Do Project Team Members Hide? (Case Study: ECO Oil Industry Startup and Operation Organization)," concluded that the uniqueness of knowledge is a key factor influencing knowledge hiding in project teams. Unique knowledge can provide individuals with a competitive advantage, especially among temporary project team members, offering them more security for participation in future organizational projects. Gholipour and labbafi (2015), in their study "Providing a Contextual Model of Knowledge Hiding in Software Production Organizations," concluded that individuals' ethical characteristics are a causal condition for knowledge hiding, serving as a driving force for its emergence. Duan et al. (2022), in their study "Examining Explicit versus Tacit Knowledge Hiding on Innovation Quality with the Moderating Role of Knowledge Flow," found that both explicit and tacit knowledge-hiding behaviors exhibited inverted U-shaped relationships with innovation quality, and organizational knowledge flow positively moderated these curved relationships. Donate, González-Mohino, Appio, and Bernhard (2022), in their study "Combating Knowledge Hiding to

Enhance Innovation Capabilities in the Hospitality Industry: The Role of Unconventional Knowledge-Oriented Leadership,” found that deceptive knowledge hiding, arising from task management conflicts, undermines innovation capabilities in the industry. They also found that knowledge-oriented leadership had strong direct and indirect positive effects on task management conflicts, knowledge hiding, and innovation capabilities. Deceptive knowledge hiding suppresses creativity and impedes the development of innovative skills and organizational performance. Singh (2019), in their study “The Relationship between Knowledge Hiding and Knowledge Sharing: Through Determinants of Knowledge Hiding and Sharing,” concluded that the effects of knowledge hiding only influenced knowledge hiding itself and did not impact knowledge sharing. This implies that knowledge hiding and knowledge sharing are not on the same continuum but exist independently, akin to Herzberg’s two-factor theory. The study indicates that knowledge hiding is a distinct area of interest, separate from knowledge sharing. In practice, promoting knowledge sharing does not necessarily reduce knowledge hiding; thus, these concepts should be managed independently.

Research Methodology

Since the present study examines the effect of knowledge hiding on the educational innovation of primary school principals, with knowledge flow as a moderating variable (Case Study: Principals and Vice-Principals of Primary Schools in Ardabil City), it is classified as an applied research based on its objective. Methodologically, it is a correlational study employing structural equation modeling. The statistical population of this study consisted of all principals and vice-principals of primary schools in Ardabil, totaling 152 individuals. From this population, 109 participants were selected as the sample using simple random sampling, guided by Morgan’s table. Data were collected using the Explicit and Tacit Knowledge Hiding Questionnaire (Connelly et al., 2012), the standard Innovation Quality Questionnaire (Z. Wang & Wang, 2012), and the standard Knowledge Flow Questionnaire adapted from Hemmati (2017). Structural equation modeling was employed to analyze the data.

To assess the reliability of the instruments, Cronbach’s alpha coefficient was calculated. Table 1 presents the Cronbach’s alpha values for the study variables. A Cronbach’s alpha value greater than 0.70 indicates that the questionnaire items are reliable.

Table 1. Cronbach’s Alpha Values for Research Variables

Variable	Cronbach’s Alpha
Explicit Knowledge Hiding	0.784
Tacit Knowledge Hiding	0.753

Cronbach’s Alpha for All Knowledge Hiding Items	0.861
Cronbach’s Alpha for Innovation Quality Items	0.782
Knowledge Creation	0.766
Knowledge Sharing	0.754
Knowledge Application	0.778
Knowledge Storage	0.793
Cronbach’s Alpha for All Knowledge Flow Items	0.871

As shown in the table above, all calculated Cronbach’s alpha coefficients are greater than 0.70, indicating a high level of reliability for the questionnaires used in this study.

Research Finding

Structural Model of the Study

After examining the measurement model, the next step is to assess and test the structural model of the research. The graphical output of the study’s structural model is presented as follows.

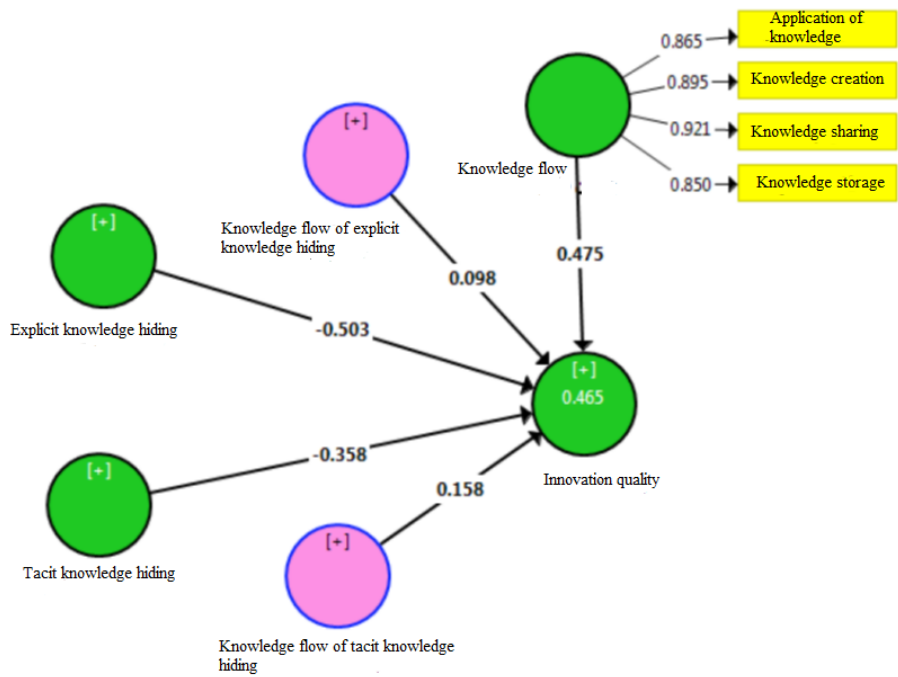


Figure 1. Standardized Path Coefficients of the Conceptual Model of the Study

The numbers displayed on the paths represent the path coefficients. To test the significance of the path coefficients, the Student’s t-test was calculated using the

bootstrap method. If the t-test values exceed 1.96, the corresponding path coefficient is considered significant at the 0.05 level.

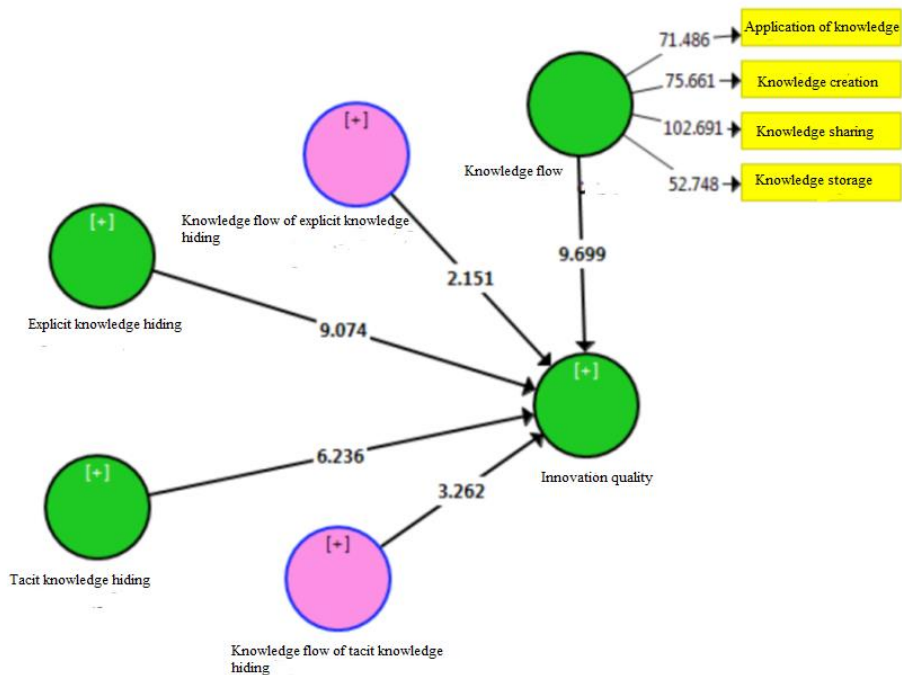


Figure 2. Results of the Student’s t-Test for Assessing the Significance of Path Coefficients

Model Adequacy Assessment

The criterion relates to the endogenous (dependent) variables in the model. It indicates the impact of an exogenous variable on an endogenous variable, with benchmark

values of 0.19, 0.33, and 0.67 considered as thresholds for weak, moderate, and strong effects, respectively. The value presented in the table below confirms the approximate adequacy of the structural model fit.

Table 2. R² Values of the Study Variables

No.	Variable	R ²
1	Organizational Innovation Quality	0.465

Predictive Relevance (Q² Criterion)

This criterion indicates the predictive power of the model. For an endogenous construct, Q² values of 0.02, 0.15, and 0.35 represent weak, moderate, and strong predictive power of the construct or its related

exogenous constructs, respectively. The value presented in the table below demonstrates adequate predictive power of the model for the endogenous constructs of the study, confirming the satisfactory fit of the structural model.

Table 3. Q² Values of the Study Variables

No.	Variable	Q ²
1	Organizational Innovation Quality	0.338

Goodness-of-Fit (GOF) Criterion

Another index for assessing model fit, introduced by Tenenhaus, Vinzi, Chatelin, and Lauro (2005), is the Goodness-of-Fit (GOF). It is calculated as the geometric mean of the average communality and the average R² values, using the following formula:

$$GOF = \sqrt{communality \times \overline{R^2}}$$

This index functions similarly to LISREL fit indices and ranges between 0 and 1, with values closer to 1 indicating better model quality. However, it should be noted that, like chi-square-based LISREL indices, this measure does not evaluate the fit of the theoretical model to the collected data directly. Instead, it assesses the overall predictive capability of the model and whether the tested model has been successful in predicting the endogenous latent variables.

Table 4. Overall Model Fit Results Using the GOF Criterion

$\overline{R^2}$	<i>Communalities</i>	$GOF = \sqrt{Communalities \times \overline{R^2}}$
0.465	0.614	0.540

As shown in Table 4, the average communality value *Communalities* was 0.614, and the average R² value was 0.465. Based on the GOF formula, the GOF value was calculated as 0.540, which exceeds the

benchmark value of 0.3, indicating that the model has adequate capability in predicting the endogenous latent variables.

To examine the hypotheses and test the significance of the path coefficients between variables, the software output was used. The

path coefficients and their corresponding significance results are presented in the table below.

Table 5. Structural Model Evaluation Results for Testing Research Hypotheses

No.	Path	Path Coefficient (β)	t-value	Test Result
1	Explicit Knowledge Hiding → Organizational Innovation Quality	-0.503	9.074	Supported
2	Tacit Knowledge Hiding → Organizational Innovation Quality	-0.358	6.236	Supported
3	Knowledge Flow × Explicit Knowledge Hiding → Organizational Innovation Quality	0.098	2.151	Supported
4	Knowledge Flow × Tacit Knowledge Hiding → Organizational Innovation Quality	0.158	3.262	Supported

In accordance with the output of the conceptual model of the study, the research hypotheses are presented and analyzed as follows:

Hypothesis 1: Explicit knowledge hiding affects the quality of innovation among principals and assistant principals of elementary schools in Ardabil city. According to Table (5), the t-statistic between the variables of explicit knowledge hiding and innovation quality of school principals is 9.074, which is greater than 1.96. This indicates that the relationship between explicit knowledge hiding and the innovation quality of school principals is significant at the 95% confidence level. Furthermore, the path coefficient between these two variables is -0.503, showing the negative impact of

explicit knowledge hiding on the innovation quality of school principals. In other words, a one-unit change in explicit knowledge hiding results in a 0.503-unit decrease in the innovation quality of school principals. This means that explicit knowledge hiding has a direct and negative effect on the innovation quality of school principals. Therefore, this hypothesis is confirmed.

Hypothesis 2: Tacit knowledge hiding affects the quality of innovation among principals and assistant principals of elementary schools in Ardabil city. According to Table (5), the t-statistic between the variables of tacit knowledge hiding and innovation quality of school principals is 6.236, which is greater than 1.96, indicating that the relationship between tacit knowledge

hiding and the innovation quality of school principals is significant at the 95% confidence level. The path coefficient between these two variables is -0.358, showing the negative effect of tacit knowledge hiding on the innovation quality of school principals. In other words, a one-unit change in tacit knowledge hiding leads to a 0.358-unit decrease in the innovation quality of school principals. This means that tacit knowledge hiding has a direct and negative effect on the innovation quality of school principals. Therefore, this hypothesis is confirmed.

Hypothesis 3: Knowledge flow moderates the relationship between explicit knowledge hiding and the quality of innovation among principals and assistant principals of elementary schools in Ardabil city. According to Table (5), the t-statistic between the variable “Knowledge Flow $\times$ Explicit Knowledge Hiding” and “Innovation Quality of School Principals” is 2.151, which is greater than 1.96. Therefore, the moderating effect of knowledge flow on the relationship between explicit knowledge hiding and the innovation quality of school principals is accepted. Moreover, based on the path coefficient value (0.098), it is evident that knowledge flow plays a positive moderating role in the effect of explicit knowledge hiding on innovation quality. This means that at higher levels of knowledge flow, the impact of explicit knowledge hiding on innovation quality becomes stronger, and vice versa.

Hypothesis 4: Knowledge flow moderates the relationship between tacit knowledge hiding and the quality of innovation among principals and assistant principals of

elementary schools in Ardabil city. According to Table (5), the t-statistic between the variable “Knowledge Flow $\times$ Tacit Knowledge Hiding” and “Innovation Quality of School Principals” is 3.262, which is greater than 1.96. Therefore, the moderating effect of knowledge flow on the relationship between tacit knowledge hiding and innovation quality of school principals is accepted. Furthermore, based on the path coefficient value (0.158), it is evident that knowledge flow plays a positive moderating role in the relationship between tacit knowledge hiding and innovation quality. This means that at higher levels of knowledge flow, the impact of tacit knowledge hiding on the innovation quality of school principals is stronger, and vice versa.

Discussion & Conclusions

The present study aimed to analyze the effect of knowledge hiding on instructional innovation among elementary school principals: the role of knowledge flow as a moderating variable. The results indicated that both explicit and tacit knowledge hiding exert a direct and negative effect on the innovation quality of school principals and staff. These findings are consistent with those of Kamareiy et al. (2018), Gholipour and labbafi (2015), Babaei Meybodi and Alirezai (2020), Pan and Zhang (2014), and Singh (2019).

To explain this result, it can be argued that because knowledge hiding occurs among colleagues, the quality of interpersonal communication is crucial in determining how an individual responds to requests for

knowledge from others. Dyadic relationships in organizations generally rest on an unstated social exchange between individuals. In interpersonal organizational exchanges, expectations of trust exist such that people are more likely to share their knowledge in those contexts. Fundamentally, a person who voluntarily and spontaneously develops a positive relational stance toward another implicitly tends to transfer their knowledge to that person. Distrust, interpersonal relations, social exchanges, and organizational context may influence employees' knowledge-hiding behaviors. When an individual or group regards knowledge sharing as a core cultural value, organizational distrust is less likely to arise.

Despite some conceptual similarities, distrust is in fact distinct from trust. Research shows that trust is a strong predictor of task performance and organizational citizenship behaviors. Therefore, distrust should be examined when studying knowledge sharing in organizations. Beyond distrust, other predictors of knowledge hiding have been investigated, such as knowledge complexity, related knowledge domains, and the context for knowledge sharing. Scholars with a clear understanding of knowledge-based innovation firmly maintain that improving the quality of innovation requires new knowledge resources a claim especially relevant under current conditions. An inadequate knowledge base significantly limits organizations' scope and ability to comprehend and use new knowledge within innovation processes. Hence, knowledge management is of great importance for enhancing an organization's

level and capacity for innovation. Innovation quality directly indicates how well an organization performs in innovating products, services, and processes. It also encompasses organizational innovation capability and the quality of all innovation outcomes. Likewise, knowledge as an intangible asset is a key resource for organizations seeking to sustain strong vitality for innovation (Chierici et al., 2021). Therefore, organizations should endeavor to facilitate the sharing of existing knowledge among employees.

The results also showed that knowledge flow positively moderates the effects of both explicit and tacit knowledge hiding on the innovation quality of principals and organizational staff. In other words, at higher levels of knowledge flow, the influence of explicit and tacit knowledge hiding on innovation quality is stronger, and vice versa. This finding can be interpreted to mean that high-quality innovation outputs and sustainable development heavily depend on the interaction between static knowledge resources and a dynamic knowledge-management approach. In this regard, Ardito et al. (2020) suggested that knowledge concealment impedes the smooth flow of knowledge and prevents the generation of new ideas. The interplay between knowledge-hiding behaviors and organizational innovation is critical, as it undermines the favorable knowledge-sharing climate required to enhance innovation quality. Domain expertise and internal knowledge are transferred from the "knowledge supplier" to the "knowledge seeker." However, when the flow of knowledge is halted due to knowledge

hiding, organizational innovation performance will be negatively affected. Only when knowledge continuously circulates within the organization can employees effectively exchange ideas and develop vital core competencies. Azan et al. (2017) demonstrated that the scale and efficiency of knowledge flow have a direct impact on organizational innovation. In this respect, the role of knowledge flow is deeply rooted in knowledge management and organizational innovation. Nevertheless, few existing studies have considered knowledge flow as a moderator of the relationship between knowledge hiding and organizational innovation quality. Overall, this study attempts to fill that research gap by distinguishing dimensions of knowledge hiding and developing a theoretical model that links explicit and tacit knowledge hiding to organizational innovation quality. Therefore, it can be concluded that, to improve innovation quality, knowledge must be set in motion within the organization.

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- According to studies, 76% of employees hide their knowledge from colleagues because they believe “knowledge belongs to privacy and should not be shared.” Peng (2013) confirmed the presence of conscious knowledge-hiding behavior, reporting that approximately 46% of participants exhibited such behavior. The results of that research showed that individuals had engaged in knowledge hiding at least once in the workplace. In a competitive business environment where advances are more often normative than exceptional, organizations are obliged to continually develop their products and services to remain in the market. Consequently, most organizations invest in knowledge creation; however, knowledge creation requires teamwork, and team members must be able to share knowledge among themselves. Thus, it can be argued that knowledge flow within an organization plays a significant role in improving the quality of organizational innovation.

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