

Determinant Factors of Intellectual Capital for Improving Public Sector Innovation: An Empirical Study from Indonesia

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Received: August 30, 2021 Revised: November 07, 2021 Accepted: November 15, 2021

Abstract

The aim of the study is to explore the impact of intellectual capital and knowledge management on public sector innovation and also role knowledge management as the mediator variable. The study applied a descriptive quantitative method and by using a simple random sampling approach to 200 civil workers in Indonesian government entities. The data was gathered using an online questionnaire technique and analyzed using the AMOS program for structural equation modeling (SEM). According to the findings of the research, intellectual capital has a substantial influence on knowledge management. As a result, intellectual capital and knowledge management have a significant impact on public sector innovation, with knowledge management serving as a mediator between intellectual capital and public sector innovation. Besides that, the findings of this study suggest that organizations can increase innovation by choosing the right intellectual capital and utilizing good knowledge management. This work addresses a vacuum in the literature on applying knowledge management in the public sector, and so adds substantially to the theoretical progress of the area. Moreover, this is the first study to test the mediating role of knowledge management in the relationship between intellectual capital and innovation in the public sector of a developed country.

Keywords: Innovation, Knowledge Management, Intellectual Capital, Public Sector, SEM

JEL Classification Code: M10, M12, O30, O34

1. Introduction

Along with competition in a volatile business environment, innovation is one of the drivers and means of survival. An organization's intellectual capital, which is embedded in its people, is the primary driver of its competitive advantage. Businesses incorporate intellectual capital management into their strategic initiatives. Although businesses recognize the

value of managing their intellectual capital, some of them are unaware of the needs and complexities involved. Managing intellectual capital is challenging because it is generated and utilized by humans and hence heavily impacted by the values and ideas of individuals and organizations. This is also supported by Kamukama et al. (2011), who stated that intellectual capital is a significant driver of corporate success. Intellectual capital is connected to innovation. This is due to the fact that intellectual capital is used to govern and coordinate all human and non-human information accessible in the company to produce value.

Although it has been stated that managing, measuring, and assessing intellectual capital is challenging, one could not deny that it is regarded as the foundation for establishing competitive advantage. Given the current circumstances, it is reasonable to conclude that companies face severe dangers if they fail to manage their intellectual capital. Businesses seeking a competitive advantage in a turbulent business environment must manage their knowledge flexibly. Furthermore, managing knowledge is important because it allows organizations to innovate and respond to changing customer expectations. Thus, through knowledge management, organizations consciously identify their

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knowledge and use it to improve performance and produce various innovations.

According to Lee et al. (2013), knowledge management may be utilized as a vehicle for innovation. This is connected to the fact that knowledge management assists companies in understanding that efficient asset utilization assists them in knowing knowledge. However, as compared to the private sector, the adoption of knowledge management in the public sector is relatively recent. Knowledge management still has numerous issues and is classed as a field in its infancy in the public sector. In fact, only a few studies have evaluated knowledge management in the public sector, and some have fragmented and identified a subset of issues (Massaro et al., 2016), such as knowledge creation and knowledge sharing (Chung et al., 2019), rather than considering all aspects holistically. Akhavan et al. (2012), for example, said that information sharing and knowledge production are essential components of knowledge management that play a role in building organizational value. As a result, managerial information is scarce and dispersed across the literature. This raises the possibility that practitioners and policymakers are focusing on the incorrect issues and overlooking more essential aspects, as well as companies paying particular attention to how intellectual capital is turned into innovation and the role knowledge management plays in this process.

This study is also a replication of the research conducted by Obeidat et al. (2017) while developing research with a different unit of analysis, namely in public sector organizations; in addition, some previous studies used knowledge management as a mediating variable between intellectual capital and innovation (Hsu & Sabherwal, 2012; Mahmoodi et al., 2020).

This study complements and adds to current research in a number of ways. To begin with, this research adds to existing knowledge by being one of the first to look into the important relationship between intellectual capital and innovation via knowledge management. Second, the majority of the previous study has been undertaken in Western industrial companies; however, little has been researched in the public sector, particularly in developed countries.

2. Theoretical Backgrounds and Hypotheses Development

2.1. Innovation

Organizational innovation, according to Jansen et al. (2006), is critical because it helps companies achieve their objectives, especially in the face of competition, market changes, resource scarcity, and society's and other stakeholders' increasing expectations and demands for high-quality products and services. Innovation is defined as a

solution that allows companies to adapt to changing internal and external conditions, particularly those in the public sector. In the public sector, innovation can help provide better public services (Damanpour et al., 2009).

Borghini (2005) defines innovation as the process of discovering, testing, and developing new technologies, goods and services, manufacturing processes, and organizational structures. The application of new ideas is related to innovation. Innovation is the process of developing or implementing new ideas or behaviors. Novelty in products and services, markets, structures, processes, and systems are all part of these new concepts.

Damanpour et al. (2009) defined innovation as a new condition in the company's structure, administrative system, program or plan, policy, and product or service. Organizations produce innovations to adapt to changes in management and technical ideas, changing competitive constellations, rising community requirements, or organizational leaders' instructions to increase organizational performance. Furthermore, according to Drucker (2014), innovation is the process of creating new commodities, services, labor processes, or management procedures to obtain a competitive advantage or achieve organizational goals.

Further, the literature provides various measures of knowledge management such as Mavondo et al. (2005), who used three aspects to define innovation, namely service/product innovation, process innovation, and administrative innovation. Damanpour et al. (2009) measured the innovation variable using the innovation dimensions of service and process. The process innovation dimension used by Damanpour et al. (2009) is an amalgamation of the dimensions of process innovation and administrative innovation used by Mavondo et al. (2005). Furthermore, Hilman and Kaliappen (2015) described the innovation variable with two dimensions, namely process innovation and service innovation.

2.2. Intellectual Capital

According to Soemaryani (2006), intellectual capital is a more appropriate capital for an organization than other types of capital, such as physical or financial capital. Because intellectual capital can be absorbed in organizational members' knowledge, skills, and talents, work processes and operational procedures are heavily influenced. Finally, it will have a significant impact on the organization's goals and performance.

Intellectual capital, according to Firer and Williams (2003), is the sum of each employee's knowledge, information, and experience that is leveraged to gain a competitive advantage and become a valuable asset to the organization. Intellectual capital is knowledge included in relevant experience, skills, job instructions, and customer

relationships that helps firms become more competitive and inventive.

Intellectual capital is all assets and all organizational resources that contain knowledge including work processes, innovation capacity, knowledge of organizational members, and knowledge available through relationships with external parties of the organization. Meanwhile, Wang et al. (2014) defined intellectual capital in their research as “the complete knowledge that exists in the organization that may impact activities in the organization and the attainment of competitive advantage.”

Furthermore, the literature gives a variety of measurements of intellectual capital in terms of the components that make it up. According to some researchers, intellectual capital consists of three major components: human capital, structural capital, and relational capital (Subramaniam & Youndt, 2005). The intellectual capital variable was measured using three dimensions by Kamukama et al. (2010). Human capital, structural capital, and relational capital are the dimensions utilized. Youndt and Snell (2004) divide intellectual capital into three dimensions: human capital, social capital, and organizational capital.

2.3. Knowledge Management

Knowledge management will benefit both organizations and individuals. Individuals will gain from knowledge management because it will help them do their job effectively and improve their skills while also saving time through decision-making and problem-solving, as well as giving challenges and opportunities for them to participate. Knowledge management will benefit businesses because it will improve their agility. Organizations will be able to quickly adapt to changes in the environment as well as issues and challenges that develop as a result of continuous knowledge renewal. Knowledge management may also assist firms to improve their productivity, their ability to innovate, their ability to collaborate with other organizations, their cost and time efficiency, and their ability to move plans and solve problems rapidly (Dalkir, 2011).

Knowledge management in the public sector, according to McNabb (2007), is a government institution’s effort to

manage information and knowledge so that information and knowledge can be used to solve obstacles and problems faced by organizations, as well as to increase government organizations’ innovation and performance. To increase organizational performance and generate value, Dalkir (2011) defined knowledge management as a series of methodical cycles encompassing the acquisition, development, organization, sharing, distributing, storing, applying, and updating of all sorts of information.

Furthermore, Dahiya et al. (2012) defined knowledge management as a process that starts with knowledge acquisition and continues with knowledge creation, knowledge storage, knowledge sharing, and knowledge utilization to improve productivity, improve financial and human resources performance, and achieve long-term competitive advantage. Sprinkle and Urick (2017) defined knowledge management as the process of transferring specific skills relevant to task implementation, as well as information related to organizational behavior that is critical to the achievement of organizational goals.

2.4. Theoretical Framework

Figure 1 illustrates the conceptual framework of the study as well as the hypothesized connections between the accepted components.

H1: Intellectual capital has a beneficial impact on knowledge management.

H2: Intellectual capital has a substantial beneficial impact on innovation.

H3: Knowledge management has a substantial beneficial impact on innovation.

H4: Knowledge management as a mediated variable between intellectual capital and innovation.

3. Research Methodologies

3.1. Research Design

To answer the problem formulation that has been described previously, this study uses a survey method.

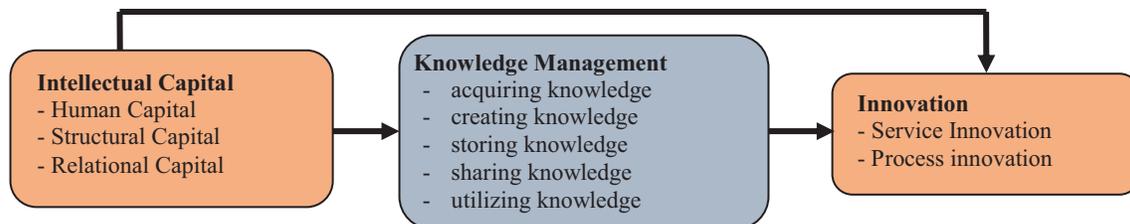


Figure 1: The Proposed Research Model

This approach is seen to be ideal for obtaining an overview of the population, which is the unit of analysis in this study, by sampling that represents the population's characteristics. Furthermore, the method utilized in this study is quantitative. The quantitative technique was chosen because it is consistent with the study aim, which is to test the theory by defining specific hypotheses and gathering data to support or disprove the hypothesis.

The analysis technique for the data used is descriptive analysis and verification. Descriptive analysis is used in this study because it is in line with the objectives that have been described since the beginning, namely to explain the condition of the variables of knowledge management, intellectual capital, and innovation on the research object raised on this occasion, while the consideration of verification analysis is the right instrument to analyze, test, and explain the influence between the variables raised in this study through hypothesis testing.

3.2. Population and Sample

The population is the whole or collection of individuals, activities, organizations, or items that are worth studying (Sekaran & Bougie, 2013). In this study, the population consisted of all regional government organizations of the Regency/City Government in South Sulawesi Province. While the number of samples used in this study was as many as 200 samples referring to the minimum number of samples as a minimum requirement in the use of SEM (Hair et al., 2014).

3.3. Variables and Measures

Three variables are utilized, involving Knowledge Management, Intellectual Capital, and Innovation. The indicators used to assess such factors were developed from prior research. According to Damanpour et al. (2009) and Hilman and Kaliappen (2010), innovation is measured using two dimensions. Subramaniam and Youndt (2005) developed the Intellectual Capital scale, which is split into three dimensions: human capital, structural capital, and relational capital. The Information Management scale, developed by Dahiya et al. (2012), is divided into five dimensions: obtaining knowledge, generating knowledge, storing knowledge, sharing knowledge, and applying knowledge. Each item was scored on a 5-point Likert scale, with 1 being strongly disagreed and 5 being strongly agree.

3.4. Data Analysis

As previously said, descriptive analysis was used to assess the condition of the variables in this study, and verification or causality analysis was used to verify the

findings. The data to be analyzed was gathered from responses to questionnaires distributed to a select group of people. The information to be analyzed comes from the answers to the questionnaire distributed to a certain group of people. In this study, descriptive analysis is used to identify and describe the conditions of Knowledge Management, Intellectual Capital, and Innovation based on respondents' responses, whereas verification analysis, also known as causality analysis, is used to answer the research objectives and test the compiled hypotheses and test models that construct correlation and causal relationships from the data. Structural Equation Modeling is used to perform verification and causality analysis in this study (SEM) and the AMOS software.

4. Results

4.1. Descriptive Statistics

The mean, standard deviation, skewness, and kurtosis of all 52 items were calculated. The descriptive statistics suggest a favorable attitude toward the goods. Despite the fact that the standard deviation (SD) values ranged from 0.809 to 2.238, they show a tight spread around the mean. The data, however, was determined to be regularly distributed following rigorous examination utilizing skewness and kurtosis. According to the data revealed normal distribution, skewness is 0 and kurtosis is 3.

This study was evaluated utilizing Confirmatory Factor Analysis (CFA) variables, which analyzed the complete research model using the SEM structural equation model and AMOS 22 to determine and analyze the Goodness of Fit (GOF). Figure 2 depicts the analysis of the structural equation model used in this study. Table 1 presents the feasibility test findings to further understand them.

Table 1 shows the Goodness of Fit study findings result that the model meets the eligibility test conditions. As a result, the research and proposed model have a high Goodness of Fit. For example, GFI = 0.901, AGFI = 0.921, TLI = 0.917, RMSEA 0.051 and CFI = 0.927 suggested a superior fit to the data when all loading elements were included. Using the fit model requirements outlined above, as seen in Figure 2, the measurement indicators of each latent variable have a factor coefficient value greater than 0.50. This means the measurement indicator is appropriate.

4.2. SEM Analysis

Figure 2 shows a structural model that was used for verification in this study using SEM by AMOS, while Table 2 summarizes what is seen in Figure 2.

Based on Table 2 above, the influence between variables is explained below.

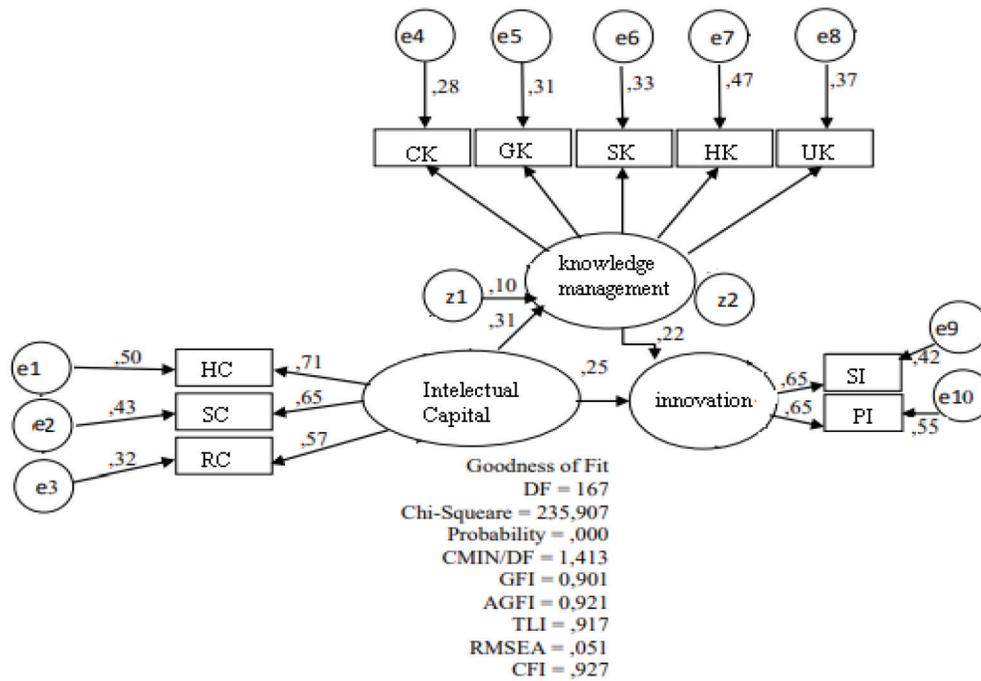


Figure 2: Full Structural Models

Table 1: Model Feasibility Test Results

The Goodness of Fit Index	Cut of Value	Result	Evaluation
Chi-Square	<198.15	235.907	Marginal Fit
Significant Probability	≥0.05	0.000	Marginal Fit
CMIN/DF	<2.00	1.413	Good Fit
GFI	≥0.90	0.901	Good Fit
AGFI	≥0.90	0.921	Good Fit
TLI	≥0.90	0.917	Good Fit
RMSEA	≤0.08	0.051	Good Fit
CFI	≥0.90	0.927	Good Fit

Table 2: Coefficient of Influence Between Variables

Relationship	Estimate	Error	CR	P
Knowledge management ← intellectual capital	0.31	0.086	2.915	0.004
Innovation ← intellectual capital	0.26	0.134	2.254	0.024
Innovation ← Knowledge management	0.22	0.167	2.034	0.042

The effect of the estimated parameter on the influence of intellectual capital on knowledge management reveals a coefficient of 0.31 CR value above 1.96 at 2.915 with a probability of less than 0.05, namely 0.004. Thus, intellectual capital has a significant and positive impact on knowledge management. The estimated parameter for the effect of knowledge management on innovation, therefore, shows a coefficient of 0.22, a CR value greater than 1.96 at 2.034, and a probability of less than 0.05, precisely 0.042. As a result, knowledge management has a significant and positive impact on innovation. Finally, the estimated parameter for the effect of intellectual capital on innovation shows a coefficient of 0.26 with a CR value greater than 1.96 at 2.254 and a probability smaller than 0.05, precisely 0.024. As a result, intellectual capital has a significant and positive impact on innovation.

This study also examines the effect of mediation, namely intellectual capital influence on innovation mediated by knowledge management. The direct influence of intellectual capital on innovation is 0.26 with a significance of 0.024, while the indirect influence of intellectual capital on innovation is 0.96 with a significance of 0.008. These are the results of the AMOS calculation to assess the effect of mediation. The significance result for the visual influence of intellectual capital on innovation, either directly or indirectly, is less than 0.05. These results indicate that knowledge management mediates the effect of intellectual capital on innovation. Based on these results, the fourth hypothesis in this study which states that knowledge management mediates intellectual capital effect on innovation is proven and accepted.

5. Discussion

H1: *Intellectual capital has a beneficial impact on knowledge management.*

According to the findings of the study, the regression coefficient value of intellectual capital on knowledge management was 0.31, with a C.R. of 2.915 > 2.0. This demonstrates that intellectual capital has a significant and positive impact on innovation. The positive impact suggests that the more intellectual capital, the greater the knowledge management. This finding contradicts prior research by Obeidat et al. (2017), who showed no link between intellectual capital and knowledge management, but it supports many other studies that have shown a positive significant relationship between intellectual capital and knowledge management. However, this finding is consistent with previous studies indicating that intellectual capital is favorably connected to knowledge management (Hsu & Sabherwal, 2012).

Each dimension of intellectual capital, namely human capital, relational capital, and structural capital, contributes to knowledge management in a different way, as evidenced by previous literature that identifies ways in which each dimension of intellectual capital, namely human capital, relational capital, and structural capital, can influence knowledge management. This is supported by Bontis et al. (2000), who argued that human capital is the abundance of personal expertise owned by organizations that facilitate knowledge implementation. Relational capital is regarded as one of the most essential factors in knowledge management because it allows interpersonal interactions that lead to information integration, knowledge exchange, and knowledge production (Hsu & Sabherwal, 2012). This is reinforced by Monavvarian et al. (2013), who claimed that relational capital has the capacity to increase an organization's ability to manage knowledge since it can do so many things. Finally, structural capital enables knowledge management because structural capital is defined as a valuable and internalized knowledge asset in work routines, work procedures, organizational culture, documents, and databases in the organization as measured by indicators of the adequacy of work procedures, the level of accessibility of information, and organizational culture support (Wang et al., 2014).

H2: *Intellectual capital has a substantial beneficial impact on innovation.*

According to the findings of the study, the regression coefficient value of intellectual capital on creativity was 0.26 with C.R. 2.254 being greater than 2.0. This demonstrates that intellectual capital has a significant and positive impact on innovation. The positive impact suggests that the more intellectual capital, the greater the likelihood of innovation. This finding contradicts earlier research by Obeidat et al. (2017), who stated that there is no relationship between intellectual capital and innovation but supported many studies that found a positive significant relationship between intellectual capital and innovation (Han & Li, 2015; Subramaniam & Youndt, 2005). Several academics have proposed that intellectual capital might be an essential component of organizational innovation.

This link may be demonstrated by looking at the many components of intellectual capital, such as human capital, structural capital, and relational capital. Human capital is seen as critical for achieving new ideas. Human capital, according to the literature, is connected to employees' abilities, motivation, and competence. Structural capital is also seen as a significant contribution to innovation. Similarly, structural capital is linked to information system support, facility support, availability of documents and databases,

and level of document accessibility. Finally, relationships with stakeholders and the quality of collaboration with stakeholders are used to calculate relational capital. According to the findings of the analysis, this study coincides with earlier studies that have demonstrated that innovation is dependent on the intellectual capital that exists in the company and that other variables might enhance the occurrence of inventive processes in companies. This is despite the fact that previous academics utilized or altered one dimension, such as structural capital, by utilizing organizational capital.

H3: *Knowledge management has a substantial beneficial impact on innovation.*

According to the findings of the study, the regression coefficient value of knowledge management on innovation was 0.22, with a C.R. of $2.034 > 2.0$. This demonstrates that knowledge management has a substantial and beneficial impact on innovation. The positive impact suggests that the greater the level of knowledge management, the higher the level of innovation. These findings are corroborated by previous studies done by other researchers (Lee et al., 2013), who found a favorable relationship between knowledge management and creativity. This link can be attributed to the critical role that knowledge management plays in the promotion of innovation.

Even though there are differences in the dimensions of knowledge management used in this research and previous research because this research used Creating knowledge, Gaining knowledge, Sharing knowledge, Saving knowledge, and Utilization of knowledge, while some scholars (Lee et al., 2013; Hsu & Sabherwal, 2012; Obeidat et al., 2017) used other dimensions such as acquiring knowledge, conversion knowledge. Even Kittikunchotiwut and Siriyota (2021) only used the dimensions of creation knowledge, sharing knowledge and utilization knowledge. While some other research just used knowledge sharing that related with innovation (Muafi, 2020; Hoa, et.al., 2020; Tran, 2021. But Lee et al. (2013) stated that knowledge sharing was not an essential element in promoting innovation.

H4: *Knowledge management as a mediated variable between intellectual capital and innovation.*

According to the findings of the study, knowledge management mediates the influence of intellectual capital on innovation. The results show that knowledge management can mediate intellectual capital on innovation. As the title of this research suggests, it will process and analyze the role of knowledge management as a mediating variable, as well as provide confirmation of a relationship that exists but is not discovered in the results of the study by Obeidat et al (2017). These findings are supported by previous research

that demonstrated that knowledge management mediates the impact of intellectual capital on innovation (Hsu & Sabherwal, 2012; Mahmoodi et al., 2020).

Knowledge management, according to the conclusions of this study, mediates the effect of intellectual capital on innovation. This indicates that the variable knowledge management appears as a function of the variable intellectual capital in any circumstance, and it facilitates the conceptualization and explanation of the variable intellectual capital's influence on the variable innovation.

To summarize, knowledge management is a multi-functional approach that brings together all aspects of acquiring knowledge, creating knowledge, storing knowledge, sharing knowledge, and utilizing employee knowledge to collaborate on innovation breakthrough ideas and driving better intellectual capital. Intellectual capital and knowledge management are frequently identified as two major factors to long-term innovation excellence. Organizations that know how to use current intellectual capital and knowledge management to generate the proper innovations lead the public and commercial sectors. This organizational innovation is influenced by intellectual capital through improving the acquiring knowledge, generating knowledge, storing knowledge, sharing knowledge, and applying knowledge. As a result, the presence of good intellectual capital and knowledge management should boost innovation.

6. Conclusions

According to the findings of this study, intellectual capital and knowledge management have a significant impact on innovation. Knowledge management acts as a buffer between intellectual capital and innovation. It is said that knowledge management is critical for companies to develop intellectual capital and produce innovation. This form of knowledge management is required for businesses to react to changes in the environment as well as the issues and challenges that arise as a result of continual knowledge renewal.

The study's findings attempt to give numerous implications that not only add to the idea of intellectual capital, knowledge management, and innovation but may also provide valuable suggestions for organizational leaders. The theoretical contribution of this study is twofold: first, the findings contribute to the literature on innovation by demonstrating that knowledge management plays an important role in the development of innovation when compared to intellectual capital because, while intellectual capital has an influence on innovation, knowledge management provides more value. Second, this study contributes to knowledge-based organizational theory by demonstrating how human capital, relational capital, and structural capital may be aligned to compliment and complement each other to facilitate knowledge management.

While the next implication is the managerial consequence, which likewise has two components: first, the findings help to understand how the value of intellectual capital is connected to knowledge management in government organizations in the public sector. This explains why organizations must consider intellectual capital in the form of human, relational, and structural capital by respecting their employees' skills and knowledge, developing and maintaining the organization's knowledge, and promoting the formation of relationships between the organization and various stakeholders. As a result, the impact of knowledge management on the organization is heavily influenced by the degree of intellectual capital. As a result, managers must make good use of these assets and technologies to improve knowledge management. Second, the findings demonstrate the significance of knowledge management in the context of innovation. For managers who wish to enhance the degree of innovation in their organizations, this implies that knowledge management is a crucial task to understand and prioritize.

Then, this research recommends that further research be conducted in other sectors. The findings of the current research may not be generalizable to organizations in other sectors. Obviously, the social and cultural environment, forms of organizational structure, and behavior are different among these respondents. Therefore, additional research is needed on this topic in other geographic locations to better understand the generalizability of the findings from the current research.

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