

Knowledge management process and worker's performance: Role of smart technology and training/ skill development

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Abstract: The objectives of this study are to examine the impact of Knowledge management process on worker performance in Hail health cluster, to inspect the mediating role of smart technologies between Knowledge management process and worker performance. Further, to explain the importance of training/skill development as moderator between use of smart technologies and worker performance in the context of Hail health cluster Saudi Arabia. This study is quantitative in nature and data is collected with the help of well-developed questionnaire randomly from 302 employees working in different hospital in Hail health cluster. Smart PLs is used, for analyzing the PLS-SEM of conceptual framework. After the Analysis, this study found positive and significant relationship of knowledge management process (knowledge sharing, knowledge acquisition and knowledge utilization) with worker performance. Further, smart technologies play important role in enhancing the worker performance directly and also play mediating role between of knowledge management process (knowledge sharing, knowledge acquisition and knowledge utilization) with worker performance. Moreover, training/skill development has positive moderating role between smart technologies and worker performance. This study not only has theoretical and empirical implications but its practical implication, this study provides the open horizon for utilization, sharing and acquisition of knowledge for increasing the performance of worker in healthcare sector. Further, this study explains the smart technology mediating role to link these variables. Moreover, it is considered that training/skill development is important for utilization smart technologies for enhancing the performance of healthcare workers. Overall, this study is very beneficial for the ministry of health, administration and policy makers for development of this health sector by boost up the productivity of employee. This study is very important in the context of health cluster of Hail. With the best of authors' knowledge this study is one of the initial studies related to unveil the impact of knowledge management process with its important dimension such as (knowledge sharing, knowledge acquisition and knowledge utilization) with worker performance. Further smart technologies are mediator and training/ skill development is moderator.

Keywords: Hail health cluster, Knowledge management process, Smart technologies, Training/ Skill development, Worker performance.

1. Introduction

In current time in dynamic work environment, the knowledge management is important factor to optimize the worker performance. Knowledge is consisted on various tools, technologies and strategies which provide collaborative platform for the workers to utilize the skill and give their best performance (Abass et al., 2020; Abdullah et al., 2005). Therefore, Knowledge management process (KMP) evaluate the improvement in any sector with its different components such as knowledge organization, accessibility, creation, sharing, acquisition, dissemination, application and knowledge utilization etc (Migdadi, 2022; Parayitam et al., 2021). The dimension of KMP provide a range of

benefits which include improved decision making process, accessible consumer service and better productive of employee (Abass et al., 2020; Abdullah et al., 2005; Azam et al., 2023; Hussain et al., 2022; Li et al., 2021). In the health care sector KMP majorly emphasize on sharing and collaboration of knowledge among the healthcare professionals (Adeinat & Abdulfatah, 2019). KMP with not only optimize the worker performance by providing productive environment but it integrate smart technology and skill development programmes. Smart technologies such as data analytics, knowledge sharing, and artificial intelligence allow the employees to get access to relevant knowledge for making effective decisions. Incorporation of smart technologies within department enhances the team synergy which further increases the worker performance. However, for fully utilization of these tools, workers are needed to equip with necessary skills. Therefore, the training and skill development play essential role to ensure that workers for understand the used of smart technologies and stay abreast with best practices (Dash et al., 2019; Eberhard et al., 2017; Mohsin et al., 2024; Mohsin et al., 2021; Muhammad et al., 2019).

Regarding to Hail health cluster in the Saudi Arabia, this country has given deep attention to improve its healthcare system for providing better life to nation. The health ministry of Hail entitlements to have best health system in this country (Chowdhury et al., 2021). But recent time, the utilization and application of the technologies is challenge in transformation this sector (Alshahrani, 2023). In the Hail health cluster there is need of use the technologies at high level for the worker's performance and awareness to patients (Ansari et al., 2020), Further Saudi Vision 2030 recognizes the importance of improving employee performance in the health sector as a key factor in achieving its goals in the Hail (Al-Dhlan et al., 2022). The Enhancing the capabilities and performance of healthcare professionals is crucial for providing high-quality healthcare services (Naseem et al., 2020; Naseem et al., 2023; Song et al., 2017).

There are some previous studies that remain the limited to variables and some used very common indicator to enhance the healthcare in their studies such as (Al-Borie & Damanhour, 2013) explain that previous studies are also consider the services provide by health care professional are important issue. This study was based on patients' point of view, while (Hensen et al., 2008) argument on the hospital service assessment from the health professional's point of view,. (Ovretveit, 2014) studied qualitatively and qualitatively about the proficient and resource but did not provide satisfactory consequences about the knowledge acquisition. Alonazi (2020) explained the empolyee performance in Hail healthcare cluster during covid by usign emotional intelligence and used statistical aanalysis but did not explains any thing about the administration regarding the knwoeldge mangement which is very essential for the empolyee performance. Adobor et al. (2019) examine the KM in the context of public agencies and its performance. But this study is not consistency bias and socially acceptable as it depends on merely self-reporting Fadaie (2023) explained the knowledge mangement is healthcare and collected the data of empolyee, But this study could not developed link with technology.

Further (Alboliteeh et al., 2023) conducted a study on stability performance of Hail healthcare by taking KM as independent variable, The results of this study can not be specified as it did not specified the profession of participants. Further study conducted by (Al Reshidi et al., 2023) explained the employee performance in Hail healthcare cluster mainly used nurses and limited to leadership behavior, work environment but did not explained the technological aspects for increasing the performance of workers.

Thus, current study goes along with previous study but innovate the investigation by including three most important dimension of KMP such as (knowledge sharing, knowledge acquisition and knowledge utilization) for worker performance. The research framework also uses smart technologies as mediator between KMP and worker performance, whereas most importantly this study has used training/skill development as moderator which never has been used with the combination of such variables in health care sector.

So, this study has objectives to inspect the impact of Knowledge management process on worker performance in Hail health cluster, to inspect the mediating role of smart technologies between Knowledge management process and worker performance. Further, to explain the importance of training/skill development as moderator between use of smart technologies and worker performance in the context of Hail health cluster Saudi Arabia.

2. Review of Previous Literature

This part of the study structured into three parts; the first part establishes the theoretical foundation by discussing theories related with variables. Further, the second section describes the definition and details of the variables. The third part establishes the link among variables by developing hypothesis constructed on earlier studies.

2.1. Underpinning Theory

This study underpinning two theories in the context of variables used in this current article, the technology acceptance theory was developed from theory of reasoned action (TRA) (Sohn & Kwon, 2020). This theory was established to improve the understanding of user acceptance of information systems. This theory is usually used to describe the behavior of the customer regarding technology adoption (Sohn & Kwon, 2020). It is important to define how people respond to the occurrence of new technologies. The low levels of acceptance for specific information technology can lead to the implementation failures or delays. Moreover, acceptance of technology can negatively affect its important objects just because of the deficiency of acceptance of technology in the healthcare (AlQudah et al., 2021).

The resource based theory has been used for this study. This theory is used by some of firms for consideration the sustainable competitive profits. Moreover, the resource based view theory has described explained for merging the resources of the firm (Miller, 2019). This theory explains that all resources are working for the optimal performance of an organization. This theory is used in the organizations to use their strategic resources to increase sustainability and competitive advantage (Khan et al., 2019). In the recent study, some resources can be divided in the form of relational capital, human capital, and structural capital. These resources are used by entrepreneurial opportunity recognition, providing optimal competitive advantage and grow innovation performance of the firm (Zhai et al., 2018).

2.2. Knowledge Management Process (KMP)

Knowledge management process is important in knowledge evaluation and continuous improvement. Such as, Healthcare centers need to regularly evaluate the effectiveness of knowledge management initiatives and processes. This may involve measuring the impact of knowledge utilization on patient outcomes, conducting audits, and collecting feedback from healthcare professionals to identify areas for improvement and refine knowledge management strategies (Alrahbi et al., 2022). Knowledge management process provides evaluation and continuous Improvement in any sector. Healthcare centers need to regularly evaluate the effectiveness of knowledge management initiatives and processes. This may involve measuring the impact of knowledge utilization on patient outcomes, conducting audits, and collecting feedback from healthcare professionals to identify areas for improvement and refine knowledge management strategies (Alrahbi et al., 2022; Dixon et al., 2009; Louise Hamilton et al., 2014). Knowledge management process in the health care center of Saudi Arabia is very essential to full fill the aim of Vision 2030 of Saudi Arabia. So, the management of this country is giving more focus on the use of technology in the health care centers and increases the performance with good management strategies (Salvador et al., 2022; Sarfraz et al., 2022, 2023).

2.3. Smart Technologies (ST)

Smart technologies is related to apps, smart devices which use for the information and quick response (Hussain et al., 2019). The aim of technology in health care is important for the provision of help and swift response to the patient. The use of technologies allows data analysis for both healthcare staffs and ministry of health. The information and documentation from this source use for application of rules in order to good treatment and avoid the blowout of infections (Hussain et al., 2019). The smart technologies in the healthcare sector improve the value of healthcare distribution, raise patient safety, decreases medical issues, and grow the contact between patients and healthcare employees (Miotto et al., 2016; Zanaboni et al., 2020).

2.4. Worker Performance (WP)

Worker performance discusses the activities and behaviors of workers while doing their assigned work or duties (Darvishmotevali & Ali, 2020; Kalogiannidis, 2020; Meyers et al., 2020). It is the strong relationship created by workers within an organization (Folorunso et al., 2014), and is dignified against the organization's necessities, and prospects. Worker performance is partial by their capabilities, efforts, and insights of their tasks (Hee et al., 2016). Worker performance plays a vital role in the development of the productivity of the organization by successful task productivity and efficiency. High-quality work and increased productivity is possible when workers show excellent performance (Buil et al., 2019), which can also increase the confidence and energy of other workers within the organization. The way an organization connects with its workers can reproduce the performance of its workers. Effective communication between management and workers can grow productivity and efficiency (Hee et al., 2019; Verghese, 2017).

Worker performance in the healthcare sector is very important. Worker performance creates a relationship between workers and patients in the healthcare sector (Tran et al., 2018). Effective worker performance in the field of healthcare sector requires combination of technical expertise. Healthcare workers and professionals must continuously inform their knowledge and skills to keep speed with medical developments and developing best practices (Duffy, 2022).

2.5. Training Skill / Development (TS/D)

Training skill and development is very important for the workers of organizations. Organizations provide a working environment to their employees. Organizations play a vital role in the training of skill and development of employees (Hammond & Churchill, 2018). With good training and skill workers provide a better work. In the training of workers they are trained about how to create a strong relationship with patients and workers but also between workers and organizations (Sarre et al., 2018). Training is the learning procedure that is the essential part of HRD. Training of any skill is important for some workers because some of the workers have lack of knowledge skills and capabilities and failed to accomplish task on timely basis. Some of the main elements including regular training sessions, certifications, and workshops that address both medical skills and soft skills such as statement, compassion, and cooperation (Sinclair et al., 2021).

Training/skill development is necessary factor and it has an important effect on the achievement of an organization by improving workers performance in the health sector (Akdere & Egan, 2020). Healthcare organizations can create a strong, flexible, and skilled work team skilled of meeting the developing tasks of the healthcare industry by spending in inclusive training programs (Sinclair et al., 2021).

2.6. Knowledge Management Process and Worker Performance

Knowledge management is important element in the organizational development of organizations, driving endless innovation and improving efficacy (Fayyaz et al., 2020). It works as a keystone for designing competitive advantages, improving executive capability, and raising organizational

achievement. Organizations can safeguard that individuals are prepared to increase their performance, increase work quality, and advanced problem-solving by enhancing knowledge management abilities (Atapattu, 2018). Effective knowledge management also indorses teamwork and knowledge sharing, which enhances teamwork, increases workers confidence, and encourages a positive work behavior. When workers feel their charities are valued, they become more involved and motivated. Moreover, knowledge management processes offer development opportunities that advance enhance workers skills and performance (Hislop et al., 2018).

Some dimensions of the KMP can be defined as Knowledge sharing is a vital feature of organizational success, expediting the discussion of info, experiences, and visions among workers. This process improves attentiveness, task performance, and job fulfillment, adopting a cooperative and innovative work environment (Dwivedi et al., 2020). In the healthcare sector, knowledge sharing is mostly important as it encourages effective teamwork, continuous learning, and improved patient consequences. Organizations can confirm better joint decision-making and the execution of advanced working policies by permitting healthcare professionals to share their capability and visions. This not only primes to improved workers performance but also encourages innovation and process developments (Olivia, 2018). The development of a knowledge-sharing culture supports continuous professional development, keeps workers informed with the recent advancements, and finally pays to the organization's success. Ranking knowledge sharing within organizations, mainly in healthcare, is important for raising a culture of teamwork, invention, and continuous development, thus increasing overall performance and achieving better conclusions (Tassabehji et al., 2019)

Knowledge acquisition is vital for enhancing workers performance through industries, including healthcare. This process includes acquiring new knowledge and skills by training, research, and association with specialists (Ayatollahi & Zeraatkar, 2020). In healthcare, knowledge acquisition is important for healthcare professionals to stay informed with the latest medical practices, rules, and regulatory standards. It prepares them with the proficiency required to deliver accurate analyzes, effective treatments, and informed decisions (Gruber & Harteis, 2018). Furthermore, acquiring new knowledge improves communication skills, allowing healthcare specialists to teach patients, and observe to moral standards efficiently. Healthcare specialists not only develop their own abilities but also contribute to the efficacy or merit of healthcare distribution by continually obtaining and relating new knowledge (Al-Jaroodi et al., 2020).

Knowledge utilization plays a vital role in developing organizational success, mostly within healthcare settings (Popa & Ștefan, 2019). Healthcare experts can drive decision-making, modernism, and performance improvement by excellently applying knowledge resources and visions. The capability to utilize knowledge professionally not only updates workflows and increases time management but also improves patient care consequences by confirming that healthcare provider's workers have access to up-to-date info and evidence-based practices. Furthermore, knowledge utilization promotes a culture of constant learning and teamwork within healthcare teams, encouraging interdisciplinary communication and collaboration (Hall, 2005). This collaborative approach not only increases the quality of precaution but also develop patient satisfaction and supports patient-provider relationships. Healthcare organizations can obtain significant success in quality improvement advantages and general organizational quality by improving knowledge successfully (Organization, 2019). Therefore, ranking knowledge utilization is important for enhancing healthcare delivery and obtaining positive outcomes for both healthcare experts and patients equally (Karamat et al., 2019).

The following hypothesis has developed on the base of the literature.

H_{1a}: Knowledge sharing has positive and significant relationship with Worker Performance.

H_{1b}: Knowledge acquisition has positive and significant relationship with Worker Performance.

H_{1c}: Knowledge utilization has positive and significant relationship with Worker Performance.

2.7. Knowledge Management Process and Smart Technologies

Knowledge management needs different technologies and instruments to obtain, store, distribute, and apply knowledge within an organization (Polyakov et al., 2020). Smart Technology can update and mechanize many knowledge management processes, leading to a more effective and current process (Zenkert et al., 2021). Smart technology rises internal and external teamwork in the organization and is important for innovation in the production process. Smart technology is the best instrument of the digital revolt in the productive, which increases the organizational production development (Rymarczyk, 2020). The technological revolution increases organizational performance widely by providing advanced policies and techniques in production measures (Tortorella et al., 2019).

Some dimensions of the KMP can be defined as

Knowledge sharing depends upon smart technologies (Castaneda & Cuellar, 2020). Technologically ready workers are more likely to use technology successfully to access and knowledge sharing in the health sector (Ghaleb et al., 2021). On the other hand, workers who are not technologically ready may struggle to use technology tools and may not fully use from knowledge sharing. Consequently, smart technology readiness can strengthen or weaken knowledge management in the health sector (Pandey et al., 2021). Organizations that invest in smart technology can increase the likelihood of successful knowledge management practices. The technology influences communication raised area, and knowledge management systems to share knowledge, cooperate with coworkers, and give to group learning (Choi et al., 2020).

Knowledge acquisition is the process of organizing and understanding the information. Knowledge acquisition involves the collection of information and designing a framework. It includes learning which consists on traditional learning, self-study and on job training (Bolisani et al., 2018). Knowledge acquisition also includes research, data collection and knowledge management system. Smart technologies and knowledge acquisition has positive and significant relationship. Moreover, Smart technology plays a crucial role in improving knowledge acquisition (Al-Emran & Teo, 2020). It enables the creation of digital platforms, databases, and knowledge management systems that facilitate easy and quick access to information. Smart technologies improve the accessibility and collection of information process (Cáceres et al., 2023). Health sectors can obtain advancement in the care of patients, medical research and healthcare delivery by improving smart technology and knowledge acquisition (Al-Jaroodi et al., 2020).

Knowledge utilization and smart technologies relate with each other in different ways (Lytras & Visvizi, 2018). As some smart technologies such as AI, machine learning and IOT play a vital role in the effective application of knowledge utilization. Smart technologies support the real-time data analysis, or analytical modeling that help the individuals and organizations to make accurate and quick decisions (Vassakis et al., 2018). Smart technologies enable the utilization of the data of patients improve the treatment plans and expect health trends. An AI algorithm which is the form of smart technology can analyze the large amount of medical data for optimal treatments and leading to good patients outcomes (Shiwlani et al., 2023).

Based on the above discussion, the following hypotheses are developed

H_{2a}: Knowledge sharing has positive and significant relationship with ST

H_{2b}: Knowledge acquisition has positive and significant relationship with ST

H_{2c}: Knowledge utilization has positive and significant relationship with ST

2.7. Smart Technologies and Worker Performance

Smart technologies contain important processes that match the innovative structures of digital transformation. The integration of smart technologies leads the innovation into management practice (Sjödín et al., 2018). Some characteristics such as programmability or sustainability in somatic policies allow the organizations to keep bound with marketplace vibrant and the satisfaction of the customer

(Barcan, 2020). Smart technologies control the digital innovation to increase the capability of the users through the different industries (Urbinati et al., 2020).

Smart technologies play an important role in renovating healthcare processes or interactions of the patients in the healthcare sector (Anagnostopoulos, 2018). Smart technologies allow health sectors to update procedure (Trivedi, 2019). Moreover, worker performance plays an important role in the development of organizations. Worker performance can perform better in the healthcare sector by using smart technologies. Workers promote their capabilities with some of smart technologies. Workers performance can provide good care for patients and help them to achieve fairness because of the use of smart technologies (Gajdzik & Wolniak, 2022).

With the help of smart technologies worker performance has become important in the progress of the productivity of the organization by successful task productivity and efficiency (de Assis Dornelles et al., 2022). High-quality work and increased productivity is possible when workers use the smart technologies and show excellent performance, which can also increase the confidence and energy of other workers within the organization (Buil et al., 2019).

H_s: Smart Technologies have positive and significant relationship with worker performance

2.8. Smart Technologies as a Mediator

Smart technology plays an important role in improving the relationship between knowledge sharing and worker performance (Nisar et al., 2019). Smart technology assures that overall information can be delivered among all team workers easily by simplifying teamwork. This openness can ensure a culture of continues learning and development, allowing employees to influence shared knowledge successfully (Lam et al., 2021). Workers can accomplish different responsibilities more efficiently and adapt changing conditions, leading to improved overall performance and productivity (Diamantidis & Chatzoglou, 2019). Smart technology allows the healthcare experts to share the information accurately. Smart technological tool such as EHRs facilitate the exchange of knowledge sharing among the doctors, patients, nurses and all staff members (Dinh-Le et al., 2019). Moreover, healthcare workers can perform their duties and increased the efficiency within the health sector. Smart technology can boost up the knowledge sharing and worker performance in the health sector (Shujahat et al., 2019).

Smart technology has a positive mediating influence on the relationship between Knowledge acquisition and worker performance (Butt et al., 2019). Smart technology improves the process of knowledge acquisition by providing smart technology tools and platforms for the collection of information, data analysis and real-time team collaboration (Chamoso et al., 2018). All these smart technologies help the workers to access the information quickly. Workers acquires this knowledge, improve the ability to perform different task, It also increases the productivity and the better performance. So, the incorporation of smart technologies plays a role as vital enabler and strengthening the relationship between knowledge acquisition and worker performance (Olan et al., 2022). Smart technologies enable the healthcare workers to be informed and apply this knowledge to their practice work. Smart technology improves the ability of decision making, different skills and overall performance of the health care sector (Tian et al., 2019).

Smart technology has a positive mediating influence on the relationship between knowledge utilization and worker performance. Smart technology improves the capability of workers to successfully relate the knowledge which they have attained (Shujahat et al., 2019). Smart technologies involve the practical implementation of knowledge utilization by proposing effective resource management (Butt et al., 2019). Moreover workers can increase the capability of decision making, increased development and overall performance. With smart tool such as EHRs the health care experts can apply their knowledge in real time patient care (Moreira et al., 2019). Healthcare workers can make informed decisions, decrease mistakes, and improves patient outcomes just because of smart technologies. Also, the actual knowledge utilization by smart technology primes to important

developments in worker performance, finally increasing the quality and productivity of healthcare services (Alam et al., 2023). There are following relevant hypothesis:-

H_{2a}: ST has a positive mediating influence on the relationship between Knowledge sharing and Worker Performance

H_{2b}: ST has a positive mediating influence on the relationship between Knowledge acquisition and Worker Performance

H_{2c}: ST has a positive mediating influence on the relationship between Knowledge utilization and Worker Performance

2.9. Training/ Skill Development as a Moderator

Training / Skill development play a vital role in moderating the relationship between smart technologies and worker performance (Ahmed et al., 2020). Smart technologies provide different smart tools that help the workers to increase the capability of their work in the sector. When the workers are adequately trained to use the tools or perfectly able to use the smart tools they increase the productivity (Kaasinen et al., 2020). Inclusive training programs confirm that workers understand the functionalities or applications of smart technology, permitting them to influence these tools to their completest level (de Assis Dornelles et al., 2022).

This skill not only increases the paybacks of ST but also allows workers to make informed decisions, and enhance overall productivity (Hannola et al., 2018). In the healthcare sector, proper training in using EHRs and analytic tools can expressively improve patient care and productivity (Si et al., 2021). Therefore, the incorporation of smart technology, fixed with training and skill development, makes a synergistic effect that improved worker performance. Organizations that invest in ongoing training advantages guarantee that their workforce is capable and viable, finally driving better outcomes and higher productivity (Greer, 2021). Thus, training and skill development are important factors that increase the positive impact of smart technology on worker performance (de Assis Dornelles et al., 2022; Molino et al., 2020).

H₅: Training/ Skill development moderate the link between ST and WP

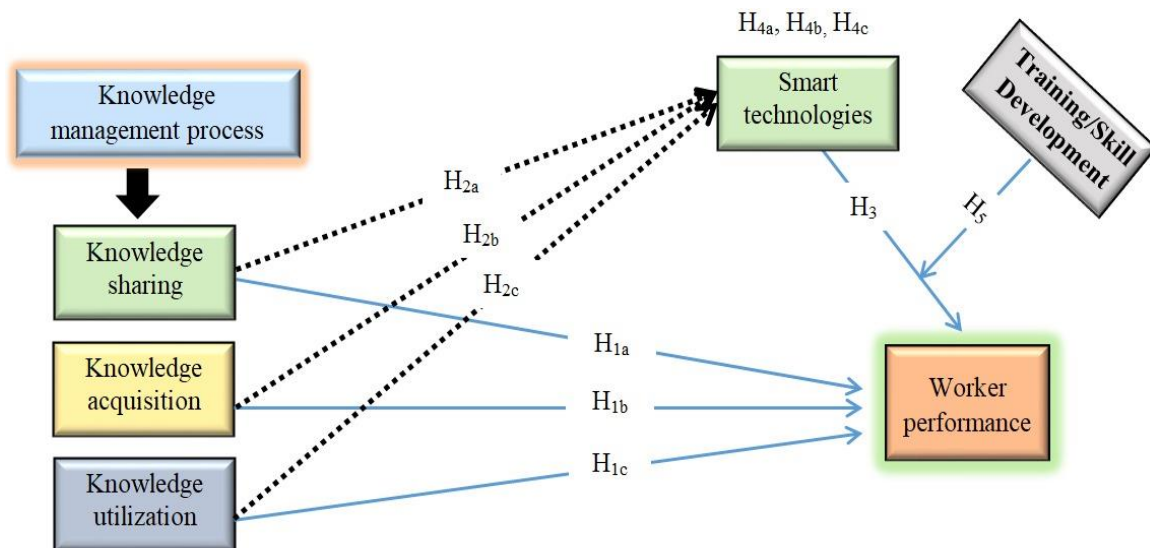


Figure 1.
Research framework.

This conceptual framework is developed on the bases of previous studies. This framework elaborated that knowledge management process is measured with its three dimensions such as knowledge sharing, knowledge acquisition and knowledge utilization. This variable is independent in this model. The worker performance is used as dependent variable, for the mediating variable smart technology is chosen as this is hot topic in current era. So, smart technology is mediator between knowledge management process and workers performance. This model is innovative as there is one more variable named training and skill development. This variable act as moderator between smart technology and worker performance in case of healthcare sector in Saudi Arabia.

3. Methodology and Data Collection

3.1. Sample and Data Collection

This study is cross-sectional in its nature and data is collected with well-designed questionnaire. The questionnaire was based previous studies. Data is collected from three hospitals of Hail health cluster, these hospitals as well as the participants are also are randomly selected. The participants are health professionals. Hail is north-western city and capital of Ha'il region Saudi Arabia with population of 605,930 (est-2018). Data is collected form Hail General Hospital, King Salman Specialist Hospital, King Khalid Hospital. Before the distribution of questionnaires and formal data collection, questionnaire was presented before 3 academic scholars with deep knowledge in the field of research issues. Permission was taken from administration department of hospital and aware them about the aim of current study. During this visit, e-mail address and what's-app connects were taken from administration department. Questionnaire was distributed by electronic source from December 2023 to January 2024. There were 500 questionnaires distributed and 302 valid questionnaires were used for analysis. So, the response rate was 60. 4%. Table 1 depicts characteristics of respondents.

Table 1.
Profile of respondents.

Variable	Category	Percentage
Gender	Male	60.5
	Female	30.5
	Total	100
Age	Less than or 30 years	30
	30 to 35	30.5
	35 to 40	19.5
	Above 40 years old	20
Experience	Total	100
	Less than 1	18
	1 to 4	35
	4 to 7	39
	More than 7	8
	Total	100

3.2. Measurements

Knowledge management process is in dependent variable, which is measure with its dimension such as KS (knowledge sharing), KU (knowledge utilization), KA (knowledge acquisition). The items to measure these dimensions are measured at five Likert scale and adopted from study by (Kun, 2022) and (Popa & Ştefan, 2019). Smart technologies are mediator between KMP and worker performance. This variable is measure with seven items adopted from the study of (Yoo et al., 2010; Nasiri et al., 2020) and used according to study requirements. Further, In current model training/skill development is moderator between use of smart technologies and worker performance. There are five items of this

variable which are measured at five Likert scale. Moreover, In this study employee performance as task performance is measured by five items, these item are adopted from the study by (Liu & Ren, 2022).

All the items for each variable is measure at five Likert-scale from 1=strongly agree to 5= strongly disagree. Tables 2, 3, 4, gives the details about the measurement scale.

Table 2.
Measurement items of knowledge sharing.

Variable	Items	Source
Knowledge sharing	<ol style="list-style-type: none"> 1. We share information and knowledge necessary for the tasks. 2. We exchange knowledge between employees in order to achieve our goals with little time and effort. 3. We promote sharing of information and knowledge between team members 	(Kun, 2022)
Knowledge utilization	<ol style="list-style-type: none"> 1. The hospital manages various sources and types of knowledge. 2. The firm utilizes available knowledge in improving services provided to its customers. 3. The firm applies available knowledge in order to improve its performance. 	
Knowledge acquisition	<ol style="list-style-type: none"> 1. New sources of information and knowledge are continually being discovered 2. New information and knowledge are gained through participation in medical conferences and congresses. 3. New information and knowledge are obtained through the study of relevant literature. 4. New information and knowledge are gained by attending training or specialization courses. 5. New information and knowledge are obtained from reputable medical centers. 	(Popa & Ștefan, 2019)

Table 3.
Measurement items of smart technologies.

Variable	Items	Source
Smart technologies	<ol style="list-style-type: none"> 1. In hospital, all the devices are programmable 2. In hospital, all the devices can send and receive messages 3. In hospital, all the devices can record and store all information 4. In hospital, all the devices are able to be uniquely identified 5. In hospital, all the devices are able to respond to changes in their environment 6. In hospital, all the devices can record and store all information 7. In hospital, all the devices can identify with other entities etc. 	(Yoo et al., 2010; Nasiri et al., 2020)

Table 4.
Measurement items of training/ Skill development.

Variable	Items	Source
	1. Training and Skills development programs are useful in helping me 2. The frequency of skills development programs is adequate. 3. Training and skill development programs are useful in improving my social status. 4. Training and skill development programs are useful in improving my family life. 5. Training and skill development programs are useful in helping me to develop my personal attributes/Qualities.	(Hameed et al., 2018)

Table 4.
Measurement items of worker performance (Continue....)

Variable	Items	Source
Worker performance	1. Rarely make mistake 2. My work is always up to stander 3. Often plan and advance woke 4. My work is productive and on time 5. My work performance is understandable in organization”	(Liu & Ren, 2022)

4. Data Analysis

This study used Smart PLS for data analysis. Further, PLS-SEM (partial least squares structural equation modeling) approach was adopted to measure the quantitative data (Sahibzada et al., 2023). This approach is used in social science studies to handle non normal facts and sample size effectively as well as it is known as growing information analysis tool (Hair Jr et al., 2017). PLS-SEM is consisted on dual examination such as measurement model as well as structural model; the measure model explains the acceptable factor loading, convergent validity and discriminant validity. The model assesses the model to evaluate path coefficients. Current study is related to knowledge management ground; therefore PLS-SEM tool is effective for data analysis (Sahibzada et al., 2023).

5. Results

5.1. Measurement Model

The measurement model is important for the data analysis. This approach first time used by Hair (2006). It checks the reliability, validity, factor loading and average variance extracted of items and dimension. The value of measurement in the Table 5 explains that values of each variable for CA, CR and AVE is accurately meeting the threshold level set by (Hair et al., 2017).

Table 5.
Measurement model.

Variable	Codes	Factor loading	CA	CR	AVE
Knowledge sharing	KS 1	0.733	0.793	0.770	0.875
	KS 2	0.841			
	KS 3	0.743			
Knowledge utilization	KS 1	0.733	0.762	0.793	0.874
	KS 2	0.841			
	KS 3	0.743			
Knowledge acquisition	KS 1	0.976	0.814	0.715	0.801
	KS 2	0.990			

	KS 3	0.817			
	KS 4	0.972			
	KS 5	0.826			
Smart technologies	ST 1	0.935	0.814	0.715	0.801
	ST 2	0.814			
	ST 3	0.804			
	ST 4	0.780			
	ST 5	0.857			
	ST 6	0.731			
	ST 7	0.809			
Training/Skill development	TD 1	0.795	0.774	0.831	0.871
	TD 2	0.843			
	TD 3	0.857			
	TD 4	0.773			
	TD 5	0.740			
Worker performance	WP 1	0.811	0.864	0.810	0.841
	WP 2	0.818			
	WP 3	0.863			
	WP 4	0.766			
	WP 5	0.743			

Note: CA (Cronbach's Alpha), CR (Composite reliability), AVE (Average variance).

Further, this study has checked the Heterotrait-Monotrait ratio (HTMT) to verify the multi-collinearity. According to Henseler et al., (2014) the threshold level for the variable's value is 0.9. Consequently, the result of discriminant validity expose that all the value in the Table 5 are below the 0.9 and there is no any factor of Multi-collinearity.

Table 5.
Heterotrait-Monotrait ratio (HTMT) (Continue....)

	KS	KU	KA	ST	WP	TD
KS						
KU	0.332					
KA	0.451	0.325				
ST	0.637	0.435	0.453			
WP	0.302	0.214	0.160	0.451		
TD	0.431	0.291	0.599	0.254	0.171	

Note: KS (Knowledge sharing), KU (Knowledge Utilization), KA (Knowledge acquisition), ST (Smart technologies), TD (Training/Skill development).

6. Structural Model

The structural model explains the hypotheses which are developed on the base of framework. Decision of acceptance or rejection of hypothesis is depends on the standard error and p-values. The Q^2 value are used to explain the predictive value of model in the table it explains the value of variables are more the zero, so the model has power of prediction. Further, in the table the F^2 explains the effect of exogenous variables on the dependent variable. The 0.21 shows the small effect while 0.1 shows the medium effect.

Furthermore, the Table 6 shows the direct hypothesis and Table 7 explain the summary of indirect hypothesis testing, on the base of p value this study has accepted as the p-value of H1a, H1b and H1c ($\beta = 0.170, p = 0.000$), ($\beta = 0.121, p = 0.003$), ($\beta = 0.159, p = 0.000$) are below the threshold level. Further,

H2a and H2b are also accepted as the values are ($\beta= 0.182, p= 0.000$), ($\beta= 0.341, p= 0.001$), while H2c is rejected which explains that Knowledge acquisition has positive impact on smart technologies. This decision is based on p-values which are ($\beta= 0.105, p= 0.104$).

Table 6.
Summary of hypothesis testing.

Hypothesis	Relationship	Std. beta	Std. error	p-value	Decision	Q ²	R ²	F ²
H1a	KS ->WP	0.170	0.047	0.000	Accepted	0.316	0.482	0.021
H1b	KA ->WP	0.121	0.043	0.003	Accepted			0.031
H1c	KU ->WP	0.159	0.041	0.000	Accepted			0.048
H2a	KS ->ST	0.182	0.032	0.000	Accepted	0.314	0.341	0.116
H2b	KA ->ST	0.105	0.312	0.104	Rejected			0.431
H2c	KU ->ST	0.341	0.044	0.001	Accepted			0.032
H3	ST ->WP	0.118	0.047	0.012	Accepted			0.026
H5	TD*ST->WP	0.435	0.051	0.000	Accepted			0.314

Note: * $p<0.05$ ** $p<0.01$ *** $p<0.001$.

The Table 7 below explains the results of indirect hypothesis which elaborate that the smart technologies mediate the relationship between KMP and worker performance. All the hypothesis are accepted as the value of H4a is ($\beta= 0.165, p= 0.000$), H4b ($\beta= 0.043, p= 0.001$) and H4c ($\beta= 0.161, p= 0.009$).

Table 7.
Summary of indirect hypothesis testing.

Hypothesis	Relationship	Std. beta	Std. error	T-value	p-value	Decision
H4a	KS ->ST->WP	0.165	0.034	3.110***	0.000	Accepted
H4b	KA ->ST->WP	0.043	0.022	2.278*	0.001	Accepted
H4c	KU ->ST->WP	0.161	0.025	4.304*	0.009	Accepted

7. Discussion

This study is developed link of KMP with worker performance in the context of Hail health cluster. Smart technologies are mediating variable, which mediate the relationship between KMP (knowledge sharing, knowledge utilization and knowledge acquisition) and worker performance. On the base of previous literature hypothesis are developed and further analyzed on smart Pls.

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After the data analysis, this study has accepted the hypothesis H1a, which explains that knowledge sharing has positive and significant impact on the worker performance. In the healthcare sector when workers share their expertise and capabilities it creates a unified environment where information spreads easily and allowing everyone to grow and learn. This shared knowledge leads to better policy making and innovation. Furthermore, knowledge sharing helps in ensuring that all workers have access to the information which they need to complete their task successfully. It also builds trust and well-being among all the workers, which improves the optimism and performance. This result is aligning with (Olivia, 2018; Tassabehji et al., 2019; Dwivedi et al., 2020).

Secondly, hypothesis H1b is also accepted, this hypothesis explains that knowledge acquisition has positive relationship with worker performance. Knowledge acquisition provides workers with important and useful skills and information to perform excellently. All the workers keep informed with the latest industry trends, technologies and best practice through ongoing acquiring new technologies; it also improves their ability to perform their task excellently. This continues learning process enhances the problem solving capabilities of workers. Furthermore knowledge acquisition also increases the confidence of the workers in tackling challenges.

Further, H1c Hypothesis related to knowledge utilization and worker performance is accepted. Knowledge utilization has positive link with the worker performance because it involves employing learned skills to tasks and challenges, leading to improved outcomes. When all the workers use their knowledge excellently they are able to make informed policies and innovate in their roles. The practical implementation of the knowledge utilization can improve the capability of the employees to perform their task with effectiveness. Moreover, knowledge utilization helps optimize workflows and improve efficiency. Workers build confidence by using their expertise which boosts their job satisfaction and work performance. This result is supported by (Popa & Ștefan, 2019; Organization, 2019; Karamat et al., 2019).

Moreover, the hypothesis H2a has also accepted. It shows knowledge sharing has positive impact on use of smart technologies. When employees and teams exchange their expertise and experience, it enhances the adoption and utilization of smart technologies. This collective environment assures that workers are aware of the latest technologies, can resolve issues effectively and execute new approaches. Healthcare sector can utilize collective wisdom to optimize technology use and leading to improve performance. Knowledge sharing helps in overcoming limitations to technology adoption, as workers have confidence with knowledge sharing. Current results related to (Polyakov et al., 2020; Zenkert et al., 2021; Pandey et al., 2021)

H2b hypothesis Knowledge acquisition does not show positive impact on use of smart technologies. Knowledge acquisition may not always a positive impact on the use of smart technologies (Gama et al., 2022). While acquiring knowledge is vital, it typically lacks the practical setting or applied experience is needed for successful application. Without adequate training, support and practice workers may struggle to translate theoretical knowledge into practical implementation. Moreover, the rapid pace of technological advancement can lead to knowledge acquisition diminishing its relevance (Yli-Renko, 2001). Furthermore knowledge acquisition alone may not address healthcare sector resistance to change or lack of resources, which can delay the effective use of smart technology. Therefore, the simple collecting information may not convert into improved technology operation or consequences.

H2c of the study is accepted, which explains that Knowledge utilization has positive impact on use of smart technologies because it includes effectively applying obtained data to optimize smart tools and systems. When all the workers effectively use their knowledge and the capability to understand the implement of smart tools they can utilize the full capacity of these tools to enhance performance, efficiency and functionality. Practical implementation of knowledge utilization helps in customizing these smart technologies to meet healthcare sector needs, and leading to more effective innovation. Knowledge utilization allows the better identification of some issues that may arise in the development and implementation of smart technologies (Vassakis et al., 2018). Healthcare sectors can gain better outcomes and maintain an economical edge in a rapidly developing technological background (Shiwlani et al., 2023).

The third H3, hypothesis of this study has also accepted. Smart technologies have positive impact on worker performance by improving the efficiency, productivity and the exactitude of different task. The use of the smart technologies improves the decision making by providing real-time insights and recommendations, allowing workers to be informed. Furthermore, smart technologies provide the better communication and collaboration among the workers and promoting a better working environment (Urbinati et al., 2020; Sjödin et al., 2018). Smart technologies encourage employees to work quickly and

effectively, leading to higher jobs satisfaction and more opportunities by providing powerful smart tools and automating different tasks.

H4 Training/ skill development moderate the relationship between smart technologies and worker performance by closing the gap between technological advancement and practical implementation. As smart technologies continue to grow, employees need to obtain skill to utilize these smart technologies. Training programs assure that some workers are proficient in the advanced technologies, allowing them to utilize the full capabilities of smart technologies. Training/ skill development improves employees' capability to integrate smart technologies to their working environment and it also increases the productivity and the capability. Moreover continuous training helps workers with the knowledge and skill required using smart technologies effectively, training and skill development amplify the positive impact of smart technologies on employee's performance and the development of healthcare sector. The results also related to (Ahmed et al., 2020; Kaasinen et al., 2020; Greer, 2021)

7.1. Theoretical Implications

The theoretical contribution of this research depends upon its combinative analysis of the knowledge management process, worker performance, the impact of skill development training, and the mediating role of smart technology within the healthcare sector. This study elaborates on the understanding of how the use of smart technology and the knowledge management process can improve the healthcare sector outcomes by linking all of these theories. It introduces a novel framework for examining the link between the organizational knowledge management process, the adoption of smart technologies, and workforce outcomes. Moreover, this study contributes to the literature review on the healthcare knowledge management by emphasizing the vital role of ongoing training in helping the workers effectively use smart technology in the healthcare sector. This hypothetical model not only provides a base for more future studies to discover more new policies for improving the performance in the different organizational contexts but also expands the scope of current research.

7.2. Practical Implication

The practical contribution of this research is offering policymakers, practitioners, and valuable insights for healthcare administrators. This research provides a novel framework for healthcare sector to improve their information system by representing how the knowledge management process can improve the worker performance. This study explains the mediating role of the smart technologies in the healthcare sector and describes how the use of some digital tools can improve knowledge allocation, working productivity and better decision making. Furthermore, the research highlights the significance of skill development training, guiding the healthcare organizations on how to prepare their workers with the different essential skills to leverage smart technologies effectively. These practical references have the potential to substantially improve patient care quality, boost the organizational efficiency, and improve healthcare consequences, making the research valuable assets for advancing the healthcare sector in Hail, Saudi Arabia.

8. Limitations and Recommendation of Future Studies

This study has great importance not only in the field of health sector but it has practical, empirical and theoretical importance in the other management filed. It opens novel arena for future study in field of management. This study has some limitation as well. First, this study is limited to Hail city and data is collected from three hospitals, future study has selected another city, area or region to check the validation of results. Secondly, this study has used only the three dimension of KMP but future studies can use same research framework and experience other dimension such as knowledge store, creation and accessibility. Final, this study has small sample size which is based on the population; therefore future study can select large sample size for the data analysis.

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