STRATEGIC SUCCESS FACTORS FOR DIGITAL TRANSFORMATION TOWARD SMART HOSPITAL IN THAILAND'S PUBLIC HEALTH SECTOR: A MIXED METHOD ANALYSIS

BY

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ABSTRACT

The transition to smart hospitals in Thailand's public sector represents a significant step towards digital transformation in healthcare. Addressing the challenges of knowledge management, leadership capabilities, and technology acceptance is crucial for success. By identifying the key factors that influence this transition, the study can provide valuable insights that contribute to improving healthcare delivery systems. This study not only supports the advancement of smart hospitals but also enriches the ongoing discourse on healthcare digitalization. The research on smart hospitals in Thailand is a comprehensive study that integrates both qualitative and quantitative methods to provide a holistic view of the digital transformation in healthcare. By engaging with healthcare professionals through surveys and in-depth interviews, the study captures a wide range of perspectives on the adoption of technology and management practices. The use of statistical and thematic analysis to interpret the data ensures a robust understanding of the underlying factors influencing the implementation of smart hospitals, which could significantly contribute to the optimization of healthcare services. (2) The findings of this research are a testament to

the pivotal role that knowledge management, leadership, and technology acceptance play in the evolution of smart hospitals. They not only contribute to a more innovative and adaptable healthcare environment but also directly impact operational efficiency and patient care. This underscores the broader implications of digital transformation within the healthcare sector, suggesting that the integration of technology is not just a trend but a fundamental component of modern healthcare delivery. The recent study underscores the synergy between knowledge management, leadership, and technology acceptance in transforming public hospitals into smart hospitals. It reveals that a strong foundation in knowledge management is crucial for the successful integration of new technologies and for fostering a culture of innovation among staff. Leadership is identified as the catalyst for change, essential for navigating the complexities of technology implementation. Moreover, the positive disposition of healthcare professionals towards technology is vital for the adoption of digital advancements, ensuring a smoother transition to smarter healthcare systems. The study underscores the transformative potential of digital technologies in Thailand's healthcare sector. It highlights the importance of leadership and knowledge management in adopting smart hospital technologies, which can lead to enhanced healthcare delivery and patient care. The insights provided by this research could be instrumental in guiding the development of policies and programs that support the digital competencies of healthcare professionals, ensuring that the benefits of technological advancements are fully realized in the public health domain.

Keywords: Knowledge management, Leadership capabilities, Technology acceptance

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Symbols/Abbreviations	Terms
EFA	Exploratory Factor Analysis
EHRs	Electronic Health Records
EMR	Electronic Medical Records
ERP	Enterprise Resource Planning
IOC	Index of Item Objective Congruence
KM	Knowledge Management
loT	Internet of Things
TAM	Technology Acceptance Model
UTAUT	Unified Theory of Acceptance and Use of Technology
KMO	Kaiser-Meyer-Olkin

CHAPTER 1
INTRODUCTION

Technology is presently being integrated into the healthcare sector. It is a subject of global interest. In Thailand, the public healthcare sector faces significant challenges that hinder the delivery of quality services. The healthcare industry faces challenges such as long waiting times and insufficient staffing, which can be attributed to reliance on outdated practices. Nevertheless, the emergence of artificial intelligence will help to improve the accuracy and efficiency of diagnosis process and its application in the healthcare sector.

Additionally, 3D printing is revolutionizing the creation of medical implants and prosthetics. These advancements, along with telehealth services and integrated systems, are pivotal in enhancing healthcare delivery and patient outcomes. Furthermore, additional technologies and services such as electronic health records, telemedicine services, and AI-driven diagnostic technologies could reduce issues and improve service efficiency for patients. By embracing these changes, Thailand's healthcare system can better meet the needs of its population and guarantee a higher standard of care for all (Kumar et al., 2023; Uslu, Okay, & Dursun, 2020).

Healthcare technology has many benefits that help to improve the standard of patient care services. Advanced technology in medical services allows providers to access and analyze patients' data quickly.

The intersection of healthcare and emerging technologies has been a focal point of recent research, highlighting transformative effects on the industry. (Ghaleb, Dominic, & A, 2020) delved into how cloud computing, IoT, and AI can revolutionize

healthcare in developing nations by enhancing efficiency and performance. Similarly, (Rejeb et al., 2023) underscored the significance of digital transformation in healthcare, emphasizing its role in fostering a patient-centric culture and improving care delivery. The studies show that advanced technologies in healthcare can help to transforming the medical services to be more personalized and efficient solution. As digital transformation continues to evolve, it is expected to address some of the most pressing challenges in healthcare while unlocking new opportunities for innovation and growth in the sector.

Similarly, (Al-Kahtani et al., 2022) conducts a cross-sectional analysis of digital health transformation in Saudi Arabia, offering valuable insights but failing to present a comprehensive framework suited to the distinct context of Thai public hospitals. Nevertheless, these studies typically concentrate on broad technological adoption and explore the specific factors that affect the implementation of smart hospitals within Thailand's public healthcare sector. This research seeks to address these gaps by identifying and analyzing key factors such as leadership, knowledge management, and technology acceptance, which are crucial for achieving successful digital transformation in Thailand's public healthcare system.

Technology will be helped in providing, developing, and improving healthcare outcomes for service users due to accessibility and communication efficiency. The emphasis is on written and verbal matters, including patient counseling, investigations, diagnosis and treatment (Vermeir et al., 2015). Moreover, the efficiency of a hospital and quality improvement of care delivered to patients are things that hospitals pay attention to (Needleman & Hassmiller, 2009). In a word, “smart hospital” (ENISA, 2016) defines it that concerned with optimized and automated processes that help to

improve the efficiency of patient care. Similarly, the Ministry of Public Health of Thailand defines the Smart Hospital as a government hospital under the Ministry of Public Health that uses the application of digital technology to support in-hospital services, simplify procedures, and facilitate quicker delivery of good quality service that is safe, modern, and environmentally friendly. The Ministry of Public Health of Thailand has arranged the smart hospital project, which aims to use technology to develop work and management processes in the hospital. A smart hospital project comprises five maturity levels, including smart place, smart tools, smart service, smart outcome, and smart hospital. The characteristics of a hospital at the smart hospital level are as follows. First Smart Place, the hospital operates on environmental health. Passed the GREEN & CLEAN Hospital operating criteria of the Department of Health and decorated the place to have a beautiful modern look (digital look), which increases the convenience and speed of receiving services. Second, Smart Tools: Hospitals applied to use a new technology to increase service efficiency by applying automated medica technologies and devices, such as Queue Management System. Third, the Smart service, the hospital has efficient process management consistent with development and organization according to the Digital government development plan of Thailand by canceling the request for a copy of the ID card and other documents issued by the government from patients and change to use Electronic Medical Records (EMR: Electronic Medical Records. Fourth, Smart outcome: ERP (Enterprise Resource Planning) has been used in this level as a management system. Lastly, Smart hospital: The hospital is efficient in managing and has the unit cost in the appropriate criteria that can be compared. (Benchmarking) with other agencies. There is good proactive risk management in all dimensions. To provide good quality service in all

dimensions and to conserve the environment and sustainable energy conservation. The objective of this study is to identify and analyze the factors that affect the smart hospital maturity level.

Our research attempts to fill these gaps by study through the detailed analysis of the factors influencing the digital transformation towards smart hospitals within Thailand. We aim to reveal the complex interconnections among leadership skills, knowledge management practices, and technology acceptance through a mixed-methods approach incorporating thematic analysis by using semi-structured interviews and comprehensive surveys. This paper expands the literature by providing a targeted examination of the Thai healthcare context, which has been insufficiently explored in prior research (Darmawan & Laksono, 2021). In doing so, we offer a comprehensive roadmap for stakeholders and policymakers to promote innovation and enhance patient care through strategic digital transformation.

This research enhances the current body of knowledge by providing practical insights into the strategic implementation of technologies in smart hospital within Thailand's public healthcare sector. Our findings underscore the critical importance of competent leadership, effective knowledge management, and strong levels of technology acceptance in facilitating the successful development of smart hospitals. These insights are essential for healthcare providers looking to navigate the complexities of digital transformation and create a more integrated and efficient system. By addressing the unique challenges and opportunities in the Thai context, this study advances academic understanding and offers actionable recommendations for practitioners focused on improving healthcare delivery and patient outcomes.

The study commences with a literature review focusing on the levels of smart hospitals, knowledge management, leadership skills, and technology acceptance. Drawing from this review, we create a conceptual model to explore how each factor influences the advancement of smart hospitals in Thailand. The organization of this study is as follows: Section 2 the literature review part of all relevant factors; Section 3 details the research methodology, including data collection, measurement scales, and analysis methods; Section 4 presents the conceptual model; Section 5 presents the results and discussions based on the research hypotheses, and finally, Section 6 concludes the study.

CHAPTER 2
REVIEW OF LITERATURE

2.1 Definition and Framework of Smart Hospital

A smart hospital is healthcare setting where different information systems are linked and work together. Based on (Rajaei, Khayami, & Rezaei, 2024) mentions about smart hospital that hospital uses technology for example the Internet of Things (IoT), robotics, and mobile tools to automate process and data collection which help to increase accuracy and reduce human errors.

In Thailand, to become a Smart Hospital as the Ministry of Public Health of Thailand defines the healthcare providers must be as a government hospital which under the supervision of the Ministry of Public Health that uses the application of digital technology to support in-hospital services, simplify procedures, and facilitate quicker delivery of good quality service that is safe, modern, and environmentally friendly. The Ministry of Public Health of Thailand has arranged the smart hospital project, which aims to use technology to develop work and management processes in the hospital. A smart hospital project comprises five maturity levels; the outlined framework provides a roadmap for hospitals to evolve. ‘The smart place,’ which focuses on the hospital operating on environmental health, Passed the GREEN & CLEAN Hospital operating criteria of the Department of Health and decorated the place to be beautiful Modern look (Digital Look) increases the convenience and speed of receiving services, to the 'smart hospital, which represents the culmination of fully integrated technological systems, the framework ensures a structured approach to adopting new technologies.

This progression concerns the hardware and software and redefining the healthcare delivery ecosystem.

To become a smart hospital, a variety of strategies are required. It is not adopting new technologies but changing culture to embrace continuous learning and adaptability. Effective leadership is essential for steering organizations through the multifaceted challenges inherent in digital transformation. Leaders play an important role in setting a clear digital vision, fostering organizational readiness, and ensuring that technological initiatives align with strategic objectives. Moreover, the information collected is properly captured and utilized, and effective knowledge management is important. In addition, creating an innovation encourages the exploration of new ideas and solutions to drive the hospital toward operational excellence and improve patient outcomes.

The framework for smart hospitals is structured into five distinct maturity levels, each representing a progressive integration of technology within the healthcare environment. Table 2.1 shows the progression from primary environmental health initiatives to advanced technological integration

Table 2.1 Smart Hospital Maturity Level Definition

Smart Hospital Maturity Level	**Description**	**Reference**
Smart Place (Maturity Level 1)	They are creating a sustainable healthcare environment. Hospitals can ensure they meet rigorous environmental health criteria by adhering to the Department of Health's GREEN&CLEAN standards. These enhancements not only strengthen the aesthetic and functional qualities of the hospital environment but also support well-being of patients and staff by ensuring a cleaner, safer, and more supportive setting for healthcare delivery	The Ministry of Public Health of Thailand
Smart Tools (Maturity Level 2)	Hospitals harnessing digital technologies at this level can streamline patient flow with Queue Management Systems, Automated medical equipment contributes to higher precision in diagnostics and treatments, improving overall healthcare outcomes. This stage is crucial as it lays the foundation for further technological integration in healthcare, aiming for a more efficient, accurate, and patient-centered service model.	The Ministry of Public Health of Thailand

Smart Hospital Maturity Level	Description	Reference
Smart Services (Maturity Level 3)	The hospitals mark a significant advancement in healthcare delivery. Hospitals can streamline patient interactions and administrative processes by integrating digital services, leading to a more efficient healthcare system. Adopting electronic medical records is a crucial component of this level, aligning with Thailand's digital government development plan and contributing to enhanced patient satisfaction through reduced wait times and improved access to healthcare services.	The Ministry of Public Health of Thailand
Smart Outcome (Maturity Level 4)	The level represents a significant milestone for hospitals, reflecting a commitment to excellence in healthcare delivery. By integrating data-driven strategies, these institutions can benchmark performance, manage risks proactively, and allocate resources efficiently.	The Ministry of Public Health of Thailand
Smart Hospital (Maturity Level 5)	This level represents the pinnacle of healthcare technology integration. These hospitals are at the forefront of medical innovation, providing top-tier services and prioritizing environmental sustainability. Utilizing renewable energy and cutting-edge technologies	The Ministry of Public Health of Thailand

Smart Hospital Maturity Level	Description	Reference
	ensures operational efficiency and adaptability to the ever-changing landscape of healthcare demands. Their dedication to continuous improvement sets a benchmark for excellence in healthcare service delivery, representing a vision in which technological advancement and sustainability are integrally aligned.	
Advance Smart Hospital (Maturity Level 6)	The concept of an Advanced Smart Hospital represents the pinnacle of integrating technology in healthcare. At Maturity Level 6, the hospital is a standalone facility and a node in a more extensive healthcare network. This advanced stage enables a comprehensive approach to patient care by utilizing innovative technologies tools such as artificial intelligence (AI) and the Internet of Things (IoT) to optimize operational efficiency and improve service quality. Such a system exemplifies the future of healthcare, where connectivity and real-time data are key to delivering personalized, efficient, and collaborative care.	(Higazee & Gab Allah, 2022)

2.2 Knowledge Management

One of the factors that bring success to business leaders is Knowledge Management (KM) (Davenport & Völpel, 2001). There are many ways knowledge management has been defined in the literature. Such as (Gloet & Terziovski, 2004) Knowledge management is a systematic process of capturing, sharing experience to support innovation and enhance value for the organization and their customer. In additional, (Darroch & McNaughton, 2002) is the duty of the management to enhance or obtain knowledge, maintain the flow of knowledge management, and ensure that it is used effectively and efficiently for the long-term benefit of the Organization. Moreover, the suggested form (Parlby & Taylor, 2000) that knowledge management can create a new idea and helps organizations make better of their existing knowledge. Knowledge management also makes it easy to enter the knowledge process. Moreover, knowledge management also promotes collaboration: knowledge sharing, continuous learning, and improvement. Therefore, knowledge management includes critical corporate activities. It can increase company productivity and other key performance measures (Martinsons, Davison, & Huang, 2017). The knowledge management have a complexity of theories and practice from the organizational behavior, Artificial Intelligence (AI), and information technology (Liebowitz, 2001). Core activities such as problem-solving, dynamic learning, strategic planning, and decision-making allow organizations to obtain store knowledge from knowledge management (Sveiby, 2001). Effective knowledge management processes should enable organizations to generate, acquire, apply, share, and preserve knowledge, which collectively constitute a key source of competitive advantage. (Pillania, 2008) proposes that knowledge management activities are critical to a company's success. Additionally, (Parlby &

Taylor, 2000) emphasize that knowledge management should enable companies to develop innovation. Therefore, knowledge management can also help both organizational and management processes (Mugellesi Dow, Merri, Sebastiao, Roveda, & Pallaschke, 2010).

2.2.1 Key Theme of Knowledge Management in Smart Hospital

2.2.1.1 Organization Competency

In the healthcare sector, knowledge management is a fundamental component of organizational effectiveness and service quality, where the efficient handling of knowledge can significantly improve patient care and organizational performance. By implementing robust knowledge management strategies, healthcare institutions can ensure that critical information is accurately captured, systematically shared and effectively utilized. This process not only enhances the organization's core competencies but also supports a culture which focusing in continuous learning and improvement. As a result, healthcare professionals become more capable of making decision which contributes to improved service delivery and operational efficiency, essential for meeting healthcare services' evolving demands (Darroch & McNaughton, 2002).

2.2.1.2 Knowledge Capture and Sharing

Effective knowledge management in health sector is crucial for continuously improving patient care and organizational efficiency. By capturing healthcare professionals' valuable insights and experiences, institutions can foster an environment of learning and innovation.

Moreover, knowledge sharing in healthcare can occur through various methods and practices, for example: team meetings and case discussions. Based on this, healthcare providers can effectively share knowledge to help improve patient care and healthcare delivery (Zamir, 2019). This involves establishing robust systems and processes that enable seamless knowledge-sharing across various departments. Such a framework ensures that best practices, cutting-edge research, and innovative solutions are effectively communicated and adopted throughout the Organization, enhancing care quality, patient safety, and overall healthcare delivery. (Sveiby, 2001) highlights the significance of these practices, which remain relevant as healthcare continues to evolve with technological advancements.

2.2.1.3 Continuous Learning and Training

Integrating continuous learning into the healthcare environment, particularly in smart hospital initiatives, is crucial. It fosters an atmosphere where staff are encouraged to expand their knowledge and adapt to evolving technologies and procedures. This commitment to ongoing education ensures that medical professionals are well-versed in the latest advancements and instills a sense of competence and proficiency. As a result, patients receive care informed by the most current medical insights and technological innovations, leading to improved outcomes and the overall advancement of healthcare services. (Martinsons et al., 2017) underscore the significance of this approach, highlighting the positive correlation between continuous learning and the successful deployment of smart healthcare solutions.

2.2.1.4 Leadership and Communication

Strong leadership is a key to the development of organizational culture on knowledge sharing. Leaders who communicate effectively foster trust and empower their teams, creating a collaborative atmosphere which help ensure that the free flow of information across the organization. This, in turn, ensures that the Organization's vision and knowledge management objectives are in harmony, leading to a more informed, efficient, and innovative workplace. As (Bessick & Naicker, 2013) highlighted, the impact of leadership on knowledge sharing can be profound, influencing the overall success of knowledge management initiatives within an organization.

2.2.1.5 Integration of Technology

Digital tools and platforms integration is a key component of smart hospitals. These technologies streamline the management of vast amounts of medical data, enhancing the skill to make well-informed decisions. EHRs provide a background of patient’s for helping accurate diagnosis and treatment. Collaborative software facilitates seamless communication among healthcare professionals, ensuring critical information is shared promptly and securely. Moreover, data analytics systems are instrumental in identifying patterns and trends within the health data, leading to improved patient outcomes and optimizing hospital resources. Together, these technologies form the backbone of a modern healthcare infrastructure, fostering a more efficient and effective environment for patient care (I. Wu & Hu, 2012).

2.2.1.6 Patient-Centric Knowledge Management

Integrating patient feedback into knowledge management practices is a critical aspect of healthcare which can lead to enhanced patient engagement and satisfaction. By actively listening to and incorporating patient insights, healthcare providers can create a more patient-centric approach to care. This not only helps in personalizing treatment plans but also improving the overall quality of healthcare services. Such practices can contribute to a positive healthcare environment where patient experiences are valued, leading to better health outcomes and increased trust in healthcare systems. It is a continuous improvement cycle that benefits all stakeholders involved in the healthcare process (Pillania, 2008).

The hypothesis proposes that in hospitals, knowledge management practices are crucial for enhancing organizational effectiveness and patient care. These practices often include using information technologies to facilitate the storage, retrieval of knowledge, reinforcing organizational culture to support knowledge sharing, and strengthening trust among staff for better organizational learning. Leadership is pivotal in successfully implementing these practices, ensuring active employee involvement and alignment with organizational goals. Additionally, investments in training and collaboration technologies are essential for maximizing knowledge creation, retention, and sharing. Such practices enable hospitals to manage complex systems and integrate knowledge from various stakeholders, leading to improved decision-making, service quality, and risk management.

Hypothesis 1: Knowledge Management positively impacts upgrading the smart hospital level.

2.3 Leadership Skills

Many authors have mentioned the leader's role in quality success (Collins, McKinnies, & Collins, 2015). Contemporary research on leadership styles that promote quality implementation remains limited; however, existing evidence highlights transformational leadership as a key factor in ensuring implementation success(Bass & Avolio, 1993). (Guzmán, Muschard, Gerolamo, Kohl, & Rozenfeld, 2020) has classified leadership skills into four main groups: Cognitive skills, business skills, interpersonal skills, and strategic skills. Each skill has details as follows: 1) Cognitive skills which executive leaders need to analyze and understand the complex behavior of desired patterns. Which include creativity, decision-making, and strategic problem-solving (Zaccaro, 2001); 2) Interpersonal skills, which are defined as "goal-directed behaviors used in face-to-face interactions in order to bring about a desired state of affairs " (Hayes, 2002); 3) Business skills include Organization, negotiation and management of personal, financial, and material resources (Kearns, Livingston, Scherer, & McShane, 2015); and 4) Strategic skills are related to the mission concept and vision of the Organization (kalargyrou & T.Pescosolido, 2012). Leadership skills, knowledge, and attitudes are essential to a hospital's effectiveness and efficiency (Ayeleke, Dunham, North, & Wallis, 2018).

Thus, Leadership skills are indeed crucial in the context of smart hospitals. They catalyze fostering an environment where innovation thrives, and collaboration is routine. Influential leaders can inspire their teams to embrace patient-centered care, ensuring that the technology serves the patient's needs first and foremost. Moreover, leaders with a well-defined vision and strong problem-solving abilities can navigate the complexities of integrating smart technologies into existing healthcare systems. By

doing so, they upgrade the hospital's capabilities and enhance the healthcare delivery process, making it more efficient, accurate, and accessible. Ultimately, leadership in smart hospitals is about steering the institution toward a future where technology and human expertise combine to provide the best possible care.

Hypothesis 2: Leadership skills positively impact upgrading the smart hospital level.

Table 2.2 show the critical measures of leadership skills essential for effective management in a healthcare setting, particularly in the context of transforming hospitals into smart healthcare facilities.

Table 2.2 Measure of Leadership Skills

Leadership Skills	Description	References
Cognitive Skills	Understanding complex situations and making informed decisions is a cornerstone of critical thinking. The process of critical thinking involves examining information, assessing evidence, and reflecting on diverse viewpoints before reaching a conclusion. Skilled critical thinkers demonstrate the ability to identify biases and uncover logical inconsistencies in reasoning which allows them to make decisions that are not only informed but also fair and balanced. This skill is invaluable in various fields, from business and law to science and education, as it enables individuals to navigate the intricacies of challenging scenarios and contribute to more effective problem-solving strategies.	(Rider & Keefer, 2006), (Wittenberg-Lyles, Goldsmith, & Ferrell, 2013), (Guzmán et al., 2020)
Business Skills	In hospital operations, a operation and financial management is a key to sustaining efficiency and delivering quality health services Effective operational management involves overseeing the day-to-day activities that impact patient experience and align with organizational goals, which include administrative, financial, and legal components. On the other hand, financial management is pivotal in optimizing budgets, securing funding, and establishing financial goals to ensure the hospital's sustainability and growth.	(Fitzgerald, 2009), (Jahromi, Tabatabaee, Abdar, & Rajabi, 2016), (Bregenzer, Milfelner, Šarotar Žižek, & Jiménez, 2020), (Guzmán et al., 2020)

Leadership Skills	Description	References
	Institutions like The Johns Hopkins Hospital have demonstrated the importance of integrating financial, operational, and clinical collaboration, which is especially critical in financial challenges. Embracing digital transformation can further enhance decision-making processes and streamline patient flow, staffing, scheduling, and supply chain management, improving care quality and efficiency.	
Interpersonal Skills	Effective communication and relationship-building are a cornerstone of successful leadership and management. It involves the ability to clearly articulate ideas, actively listen, and engage with staff and stakeholders in a manner that fosters trust and collaboration. Effective communication strategies include regular updates through different channels for examples emails, meetings, and reports, ensuring transparency and consistency in messaging. Relationship-building, on the other hand, requires a more personalized approach, taking the time to understand each stakeholder's unique perspectives and needs. This may cause stronger alliances and a more collaborative team environment. By prioritizing these skills, leaders can enhance their influence, make informed decisions, and manage risks more effectively.	(Rider & Keefer, 2006; Wittenberg-Lyles et al., 2013)

Leadership Skills	Description	References
Strategic Skills	Developing long-term plans for a hospital requires a strategic approach that aligns the institution's vision with the ever-evolving healthcare policies. A successful strategy should begin with a comprehensive assessment of the current healthcare landscape, including regulatory changes, technological advancements, and shifts in patient care models. This assessment will inform a robust strategic plan that looks at least a decade ahead, setting clear objectives and measurable goals. It is essential to incorporate scenario planning to anticipate future healthcare delivery and policy changes. Moreover, aligning the hospital's mission and vision with its strategy ensures that all efforts are directed towards a common goal, fostering a cohesive organizational culture. This alignment also facilitates the engagement of stakeholders, who are crucial for successfully implementing the strategic plan. Regular reporting and accountability mechanisms should be put in place to monitor progress and make necessary adjustments, ensuring the hospital remains on course to achieve its long-term objectives.	(Guzmán et al., 2020)

2.4 Technology Acceptance

The Technology Acceptance Model (TAM) is an important framework for explaining how individuals accept and use new technologies. In healthcare, where the accuracy is vital and tolerance for error is minimal, the design and functionality of new technologies must not only meet clinical needs but also align with the users' capabilities and expectations (Davis, Bagozzi, & Warshaw, 1989). The intuitive design ensures that healthcare professionals can adopt these technologies without feeling overwhelmed. This subsequently can contribute to better patient outcome and more efficient healthcare delivery systems. As technology continues to evolve, ongoing research and user feedback are essential in refining TAM to predict better and enhance the acceptance of new healthcare technologies (Venkatesh, Morris, Davis, & Davis, 2003).

The research highlighting the correlation between user-friendly technology and healthcare professionals' satisfaction and engagement is pivotal. It emphasizes the critical role of intuitive design in healthcare technology, which can significantly impact the efficiency and effectiveness of medical care. By prioritizing the user experience, developers can ensure that healthcare professionals can leverage technology to its fullest potential, enhancing patient care and operational workflows. This user-centric approach in technology design fosters a positive attitude towards new systems and encourages the adoption of innovative solutions that can transform healthcare delivery (I. Wu & Hu, 2012). The significance of organizational support and training in the context of technology acceptance is indeed profound. As posited by Venkatesh and colleagues, these factors are instrumental in fostering a conducive environment for adopting new technologies. They facilitate a smoother transition by equipping staff with

the necessary skills and bolstering their confidence in engaging with novel systems. This, in turn, can lead to improved efficiency and productivity.

Furthermore, such support and training initiatives can also mitigate resistance to change, often a considerable barrier to implementing new technological solutions. Ultimately, these efforts create a resilient and adaptable workforce capable of navigating the evolving technological landscape (Venkatesh, Thong, & Xu, 2012). Integrating technology in healthcare is a multifaceted process beyond merely adopting tools. It requires a holistic approach that encompasses the development of an organizational culture attuned to continuous improvement and innovation. When healthcare providers embrace this mindset, they can harness technology to streamline processes, enhance patient care, and deliver services more effectively. This cultural shift towards technology acceptance is crucial for healthcare organizations to keep up with the rapid advancements occurring in medical technology and to meet the evolving needs of patients and healthcare professionals alike. As (Boonstra & Broekhuis, 2010) have noted, such a transformation can significantly enhance the quality and efficiency of healthcare delivery, ultimately benefiting all stakeholders involved in the healthcare system. The transition into smart hospitals is a complex process that requires a deep understanding of the various factors influencing technology acceptance. Research has identified several key elements that play a crucial role in this regard. Theories including the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) are key framework for explaining how healthcare technologies are accepted and use across different user groups and settings. Factors such as anxiety, computer self-efficacy, innovativeness, and trust have been highlighted as significant factors affecting the adoption of new technologies.

Additionally, the perceived benefits, along with the skills, education, and digital affinity of healthcare professionals, are critical in shaping the acceptance and effective adoption of digitalization in hospitals. These insights are vital for healthcare organizations to foster an environment that embraces technological advancements and ensures a smooth transition to smart healthcare systems.

Hypothesis 3: Technology acceptance positively impacts upgrading the smart hospital level.

Table 2.3 Measure of Technology Acceptance

Measure of Technology Acceptance	Description	References
Technology Ease of Usage	Technology's perceived ease of use significantly influences user acceptance and can reduce the effort and anxiety associated with its use. Research has shown that control, intrinsic motivation, and emotion are crucial in shaping these perceptions. Moreover, Based on Technology Acceptance Model, users' intentions to adopt new technologies are directly shaped by their perceptions of how ease of technology is to use and how useful it is. Addressing technology anxiety is essential, as it can negatively impact the perceived ease of use and the overall user experience.	(Lederer, Maupin, Sena, & Zhuang, 2000), (Legris, Ingham, & Collerette, 2003), (Ma & Liu, 2004), (Holden & Karsh, 2010), (Zuiderwijk, Janssen, & Dwivedi, 2015)
Strategic Technology Integration	Incorporating technology into existing systems requires a strategic approach to ensure seamless integration and performance enhancement. This involves harnessing the potential of emerging technologies, such as artificial intelligence (AI), and ensuring their alignment with core business processes. Effective integration can streamline workflows, automate tasks, and improve decision-making. However, it is crucial to plan meticulously, manage change effectively, and address compatibility	(Venkatesh et al., 2003), (J.-H. Wu, Shen, Lin, Greenes, & Bates, 2008), (Pai & Huang, 2011), (Strudwick, 2015).

Measure of Technology Acceptance	Description	References
	and security concerns to maximize the benefits of technology adoption. Technology integration in healthcare is revolutionizing operational processes, enhancing. The implementation of digital transformation initiatives contribute to improved patient care quality and operational efficiency through optimized patient flow management. staffing, scheduling, and supply chain operations. Advanced technologies, including AI-driven diagnostic tools and virtual reality improve early disease detection, treatment, and personalized patient care. As healthcare embraces these innovations, it moves towards a more resilient, efficient, and patient-centric future.	(Aggelidis & Chatzoglou, 2009) ,(Dünnebeil, Sunyaev, Blohm, Leimeister, & Krcmar, 2012), (Esmaeilzadeh, Sambasivan, Kumar, & Nezakati, 2013), (AlQudah, Salloum, & Shaalan, 2021).
Data-Driven Decision Making	In healthcare management, the utilization of technology for data analysis is a pivotal factor in informed decision-making. Advanced analytics, including predictive modeling and machine learning, are increasingly employed to interpret large volumes of healthcare data, which contribute to more accurate diagnoses, efficient operational management, and personalized patient care. These technologies enable healthcare providers to transition from reactive to proactive care, optimizing the delivery of healthcare services and improving patient outcomes.	(Holden & Karsh, 2010), (Prasanna & Huggins, 2016) (Setiawati, Trisnawati, & Diana, 2019).

Measure of Technology Acceptance	Description	References
Automation-Driven Workplace Efficiency	Technology plays a pivotal role in healthcare by automating tasks, significantly enhancing efficiency and productivity. Through AI and machine learning integration, repetitive and time-consuming tasks are streamlined, helping healthcare professionals prioritize patient care. This automation extends to various aspects of healthcare, including diagnostics, clinical, and administrative processes, leading to improved patient outcomes and reduced operational costs. Moreover, predictive analytics aid in early intervention and personalized medicine, further revolutionizing patient care.	(Chau, 2001), (Chuttur, 2009) (Holden & Karsh, 2010), (Taherdoost, 2018).
User-Centered Design	In technology design, prioritizing user experience is paramount. A thorough understanding of user needs, behaviors, and challenges is essential to develop solutions that combine functionality with intuitiveness. This user-centered design approach leads to greater usability and acceptance, fostering a sense of satisfaction and loyalty among users. Ultimately, technology designed with the user in mind is more likely to succeed in today's competitive market.	(Chau, 2001), (Holden & Karsh, 2010), (Rahimi, Nadri, Afshar, & Timpka, 2018), (Taherdoost, 2018).

CHAPTER 3
RESEARCH HYPOTHESES

3.1 Conceptual Model

A literature review that delves into Knowledge Management (KM), Leadership Capabilities, and Technology Acceptance is a robust approach to constructing a conceptual model for smart hospitals. KM is crucial as it dictates the efficient handling of information and expertise, the backbone of smart hospital operations. Leadership Capabilities ensure that the strategic direction and change management processes are well-guided, adapting to new technologies and methodologies effectively. Lastly, Technology Acceptance is vital for integrating advanced systems into healthcare settings, as it measures the willingness of staff to embrace new tools and processes. Together, these elements contribute to a framework that can significantly improve smart hospitals' performance and service delivery, ultimately leading to enhanced patient care and operational excellence.

Knowledge Management (KM) is a pivotal element in the healthcare sector, where it important to improving patient care and operational efficiency. The systematic management of knowledge assets, including their creation, sharing, and application, is key to promoting a culture of ongoing improvement and innovation. Effective KM practices, such as developing comprehensive knowledge repositories, enable healthcare professionals to access and utilize vital information swiftly, leading to better decision-making and more personalized patient care. Moreover, KM supports the advancement of smart hospitals by streamlining the flow of information, which is vital for delivering high-quality healthcare services. As healthcare environments become increasingly

complex, the emphasis on KM becomes more pronounced, with a clear correlation between well-implemented KM strategies and improved patient outcomes and satisfaction. KM is the backbone of a learning healthcare system, propelling organizations towards excellence in service delivery and patient care.

This hypothesis suggests that effective handling of knowledge within hospital settings plays a significant role in boosting both operational efficiency and the quality of patient care. Common approaches include the use of digital tools to organize and access information, cultivating a workplace culture that encourages sharing insights, and fostering trust among team members to support collective learning. Strong leadership is essential in guiding these efforts, particularly in engaging staff and aligning knowledge initiatives with the broader goals of the organization. Moreover, providing resources for staff training and promoting collaborative platforms are important for generating, preserving, and distributing knowledge. Altogether, these strategies help hospitals navigate complex environments, incorporate input from various contributors, and enhance their ability to make informed decisions, deliver high-quality services, and manage risks effectively.

Hypothesis 1: Knowledge Management positively impacts upgrading the smart hospital level.

Transformational leadership represents a pivotal role in the modernization of healthcare, particularly within smart hospitals. These leaders are at the forefront, championing the integration of cutting-edge technologies while ensuring that such advancements go hand-in-hand with the professional development of their teams. They are the catalysts for change, inspiring and motivating staff to embrace innovation and adapt to the evolving healthcare landscape. Their vision is to implement new tools and

foster a culture where technology enhances patient care and aligns with the hospital's mission. This research highlights the significance of leadership in driving digital transformation, showing the strong leadership contributes to higher efficiency and better patient outcomes. This blend of human insight and technological advancement forms the cornerstone of a proactive and resilient healthcare system.

In modern smart hospitals, effective leadership is key in shaping a culture that supports innovation and encourages teamwork. Skilled leaders help create an environment where patient-focused care is prioritized, ensuring that technology is used primarily to meet patients' needs. Those with strong vision and problem-solving skills are better equipped to manage the challenges that come with integrating advanced technologies into traditional healthcare systems. Through their guidance, hospitals can expand their capabilities and improve the overall delivery of care—making it more precise, streamlined, and widely accessible. At its core, leadership in smart healthcare settings involves guiding organizations toward a future where digital tools and human insight work hand in hand to achieve optimal outcomes.

Hypothesis 2: Leadership skills positively impact upgrading the smart hospital level.

The Technology Acceptance Model (TAM) serves as a key theoretical lens for understanding the adoption of new technologies within healthcare settings. It highlights the importance of perceived ease of use and usefulness, which are fundamental in influencing healthcare professionals' acceptance of technology. However, as the literature indicates, these are not the sole factors. The intricacy of integrating new systems and the requisite staff training are also critical to successfully deploying technology in healthcare. Challenges in transitioning from traditional to technological

communication methods can impede the implementation of smart hospital initiatives. Thus, cultivating a technology-friendly culture among staff is crucial. Organizations must prioritize comprehensive training and foster an environment conducive to technology acceptance. This approach facilitates the adoption of new tools and ensures that the digital transformation in healthcare translates into enhanced patient care and operational efficiency. Investing in such supportive measures can significantly amplify the benefits of advance technology in healthcare.

The conceptual model described is a comprehensive framework that captures the dynamic relationship between Knowledge Management, Leadership Capabilities, and Technology Acceptance. The integration of these components is crucial for the evolution of smart hospitals. By fostering a culture where knowledge is effectively managed, leadership is visionary, and technology is embraced, healthcare institutions can significantly enhance their service delivery. This model serves as a strategic guide for healthcare leaders to navigate the complexities of digital transformation, ensuring that adopting new technologies goes hand-in-hand with developing human and organizational capabilities. These elements contribute to the smart hospital's ability to deliver high-quality care efficiently. Examining the interplay between these factors could offer valuable insights into upgrading the level of smart hospitals.

Hypothesis 3: Technology acceptance positively impacts upgrading the smart hospital level.

The conceptual model is shown in Figure 3.1.

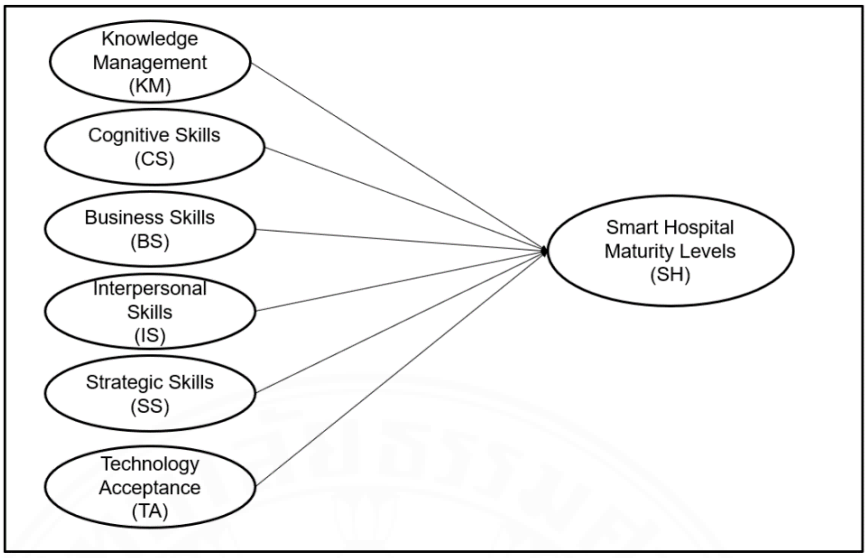

Figure 3.1 Conceptual Model.

CHAPTER 4
METHODOLOGY

4.1 Research Methodology

The outlined research methodology presents a comprehensive approach to understanding the evolution of smart hospitals within Thailand's public healthcare system. The study identifies pivotal factors such as Knowledge Management, Leadership Skills, and Technology Acceptance by integrating a systematic literature review and insights from expert interviews. These elements are crucial in driving the progress of smart hospitals. Developing a structured questionnaire, carefully crafted to be reliable and valid, serves as the cornerstone for gathering extensive data aligned with the research objectives. The survey's segmentation into various sections allows for a detailed analysis of demographics and the hospitals' smart development stages. The administration of this questionnaire across public hospitals, in concert with the Ministry of Public Health's directives, underscores the significance of a methodical data collection process. This approach facilitates a deeper understanding of the factors influencing smart hospital development and provides valuable insights that could propel the enhancement of healthcare services across the region.

The research targeted for this project belongs to the public hospitals in Thailand because the smart hospital project is for public hospitals based on the Ministry of Public Health. The consideration of selected factors is based on the literature as the previous part, the results of reviewing the literature and interview extracted three factors affecting the level of a smart hospital. The four factors are 1) Knowledge Management, 2) Leadership Skills, and 3) Technology acceptance.

4.2 Qualitative Research

This research aims to gather factors affecting the digital transformation of smart hospitals in Thailand. This includes of leadership capabilities, knowledge management, and technology acceptance by using thematic analysis of semi-structured interviews. As (De Paoli, 2023) mentions that Thematic analysis plays an importance role in qualitative research in social sciences. The Thematic analysis methods represent a technique to analyzing the qualitative data which describe the “themes” (Braun & Clarke, 2006). In this research semi-structured interview were conducted with four experts from smart hospitals project in Thailand. All four interviewees are in the management level of hospital. The interviewees provided the information about their hospital, technology usage in hospital, and influencing factors for upgrading the smart hospital level. Each of interviews were use approximately one hour, was conduct either face-to-face or via phone. The four experts from smart hospital project are in the management levels and at various level of care and hospital size to take into the diverse perspective on success and failure factors of the implementing of smart hospital.

4.3 Quantitative Research

The questionnaire, a key tool in this study, is precise designed to capture a comprehensive range of data pertinent to the research objectives. The development and administration of the questionnaire are critical steps that ensure the reliability and validity of the data collected. The questionnaire's structured nature facilitates a systematic method to data collection, allowing for a robust quantitative analysis.

4.3.1 Questionnaire Survey

The survey is divided into six sections, each crafted to probe specific research areas. Section A is instrumental in gathering essential demographic and organizational data, which includes the respondents' roles, the size of the hospitals they represent, and the standards they adhere to. This foundational data provides context for the subsequent analysis and helps segment the data for more nuanced insights.

Section B delves into evaluating the hospital's progression in smart development, a key aspect of the study. It categorizes the development into six stages, from essential smart places to advanced smart hospitals. This level is measured using a 4-point Likert scale, offering a nuanced understanding of the hospital's current status and efforts towards becoming a smart hospital. The scale ranges from 'not tried yet' to 'success,' capturing the various stages of implementation and the effectiveness of the strategies employed.

Sections C, D, and E are mainly focused on assessing the internal dynamics of the hospitals. Section C evaluates the practices of Knowledge Management, a crucial component that influences the hospital's operational efficiency and innovation capabilities. Section D scrutinizes the leadership skills of hospital directors, an influential factor in driving the hospital's vision and smart development initiatives. Section E investigates the staff's attitudes towards Technology Acceptance, a determinant of the level of acceptance and utilization of new technologies within the hospital setting. All three sections employ a 5-point Likert scale, providing a spectrum of responses from 'strongly disagree' to 'strongly agree,' thus enabling a detailed assessment of these critical areas.

4.3.2 Index of Item Objective Congruence (IOC)

The Index of Item Objective Congruence (IOC) is a crucial statistical tool for developing questionnaires to measure content validity. It involves a systematic process where experts assess review of each item with the intended objectives. The IOC analysis ensures that each question contributes meaningfully to the goals of the questionnaire and that the items collectively cover the domain of interest comprehensively. In this process, experts rate each item based on relevance and clarity, which is essential for the respondents to understand and answer the questions accurately. The scores from the experts are then aggregated to derive an IOC score for each item, reflecting its quality and relevance. An overall IOC score for the questionnaire can also be calculated to measure the instrument's overall validity. This score is instrumental in identifying items needing revision or removal, thus refining the questionnaire to serve its purpose better. The use of IOC analysis is a testament to the rigorous development process of the questionnaire and its commitment to effectively capturing the essence of the research objectives.

4.3.3 Sampling Method

The sampling method described is a structured approach to gathering data from a specific population, in this case, the top management staff of a public hospital in Thailand. The sample size using (Krejcie & Morgan, 1970) formula, resulting in 274 sets from a population of 950 hospital in the smart hospital project. to determine the sample size is a statistically sound method, ensuring that the sample is representative of the larger population involved in the smart hospital project. Distributing questionnaires via post and Google Forms is an effective strategy to reach respondents,

especially considering the varying levels of access to digital platforms. Requesting each hospital to complete a set number of questionnaires is a good practice to ensure a wide range of input while aiming to minimize bias. The requirement for respondents to be senior managers arrange with the focus of the study, which likely revolves around decision-making processes and the implementation of smart technologies in hospital settings. This methodical approach to data collection is crucial for obtaining reliable and valid data, which can inform strategic decisions and policy-making in the healthcare sector. It reflects a thorough understanding of research design and showcases a commitment to rigorous academic standards.

Table for Determining Sample Size from a Given Population

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size.
S is sample size.

Figure 4.1 Determining Sample Size from a Given Population (Krejcie & Morgan, 1970)

4.3.4 Data Screening

Data screening is an important step in the data analysis process, serving as a form of quality assurance for the data being used. It involves meticulous examination to verify the accuracy, reliability, and suitability of the dataset for analysis. The process typically includes checking for errors that may have occurred during data collection or entry, such as inconsistencies or duplicates. Outliers, or data points that differ significantly from other observations, can indicate measurement errors or novel insights and thus require careful consideration. Missing values are another common issue in

data sets; they can arise from non-responses in surveys or gaps in data collection and can lead to biased results if not properly handled. Violations of normality, where data does not fit the expected normal distribution, can affect statistical tests that assume normality, leading to incorrect conclusions.

4.3.4.1 Normality Test

Normality tests are a fundamental statistical analysis aspect, as many parametric tests assume the underlying data distribution is normal. The study highlights the importance of numerical and graphical methods in assessing this assumption. Numerical methods often involve calculating skewness and kurtosis (Razali & Wah, 2011), which provide measures of symmetry and tail heaviness, respectively. Skewness values close to zero suggest a symmetrical distribution, whereas kurtosis values show how the tails of the distribution differ from those of a normal distribution (Chen & Yu, 2013). The thresholds suggested by (Curran, West, & Finch, 1996) serve as guidelines for acceptable skewness levels between ±2 and kurtosis within ±7.

4.3.4.2 Outlier Test

Identifying outliers is a crucial step in data analysis, ensuring the integrity and accuracy of statistical results. Using a 5% trimmed mean, the described method effectively mitigates the influence of extreme values. By removing the top and bottom 5% of data points, the trimmed mean provides a more robust measure of central tendency, less affected by outliers. This approach aligns with (Pallant, 2020) recommendation, where a discrepancy of 0.2 or more between the mean and trimmed mean suggests the presence of outliers.

Additionally, the box plot serves as a complementary visual tool, clearly depicting data distribution. As noted by (Williamson, Parker, & Kendrick, 1989), it encapsulates the data's range and quartiles, allowing for a quick assessment of potential outliers, which typically lie outside the 'whiskers' of the plot. Together, these methods form a comprehensive framework for outlier detection, combining statistical calculation with graphical representation to enhance the decision-making process in data analysis.

4.3.4.3 Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis (EFA) is a valuable statistical method to determine the underlying relationships among large set of variables. It is commonly applied in psychology, social sciences, and business, where researchers are interested in identifying latent constructs that are not directly observable. The process begins with a researcher collecting data on observable variables and then applying EFA to determine if there are connections between them that suggest the existence of underlying factors.

The Kaiser-Meyer-Olkin (KMO) test evaluates the proportion of variance among variables that may be attributed to underlying common factors. A higher KMO value suggests greater suitability of the dataset for factor analysis, with values above 0.5 generally deemed acceptable and those approaching 1 indicating strong interrelationships among variables.
Similarly, Bartlett's Test of Sphericity complements the KMO measure by assessing whether the correlation matrix significantly differs from an identity matrix. If the test is significant ($p < 0.05$), the null hypothesis—that the variables are uncorrelated—is rejected, confirming that the data are appropriate for exploratory factor analysis (EFA).

Once the data have passed these preliminary tests, the researcher can proceed with EFA to interpret the factors. This involves examining the factor loadings to understand what each factor represents. High loadings (absolute value) indicate a variable is strongly associated with a factor. Researchers label the factors based on the variables that load highly on them, thus identifying the latent constructs within the data.

CHAPTER 5
RESULTS AND DISCUSSIONS

5.1 Qualitative Results and Discussion

5.1.1 Thematic Analysis (Interviewees' Profile)

The implementation of smart hospital initiatives in Thailand represents a significant advancement in healthcare delivery, integrating advanced technologies to improve patient care and operational efficiency. The qualitative phase of this study played a crucial role in uncovering practical challenges and potential benefits from the perspectives of key stakeholders. Insights gained from semi-structured interviews, summarized in Table 5.1, offer detailed information about participants' professional backgrounds, providing essential context for interpreting their responses and enabling a deeper understanding of the project's impact across various professional domains.

Table 5.1 Interviewees' Profile

No.	Position	Workplace	Responsibility
1	Deputy Director	General Hospital	It directs the hospital's technology implantation to ensure a smooth transition toward becoming a smart hospital.
2	Board of Director	Community Hospital (Medium Size)	Accountable for the policy regarding the transition into a smart hospital in accordance with the Ministry of Public Health's directives.

No.	Position	Workplace	Responsibility
3	Public Health Specialist	Health Promoting Hospital	They are evaluating the hospital's readiness to transitioning into a Smart Hospital.
4	President of Public Health Specialist	Association of Health Administrators	Accountable for developing guidelines for the transition to a smart hospital and disseminating these guidelines within hospital networks governed by the Ministry of Public Health.

The triangulation method was applied to ensure the authenticity and credibility of the data. The interviews were transcribed and analyzed using thematic analysis, which reveals two key themes influencing the transition to smart hospitals: Leadership and Knowledge Management.

5.1.2 Thematic Analysis (Leadership)

A key challenge identified in the study was the inconsistency of the Ministry of Health's policies, which tend to fluctuate with changes in leadership positions and administrative rotations. This issue emerged from interviews with the Deputy Director, members of the Board of Directors, and Public Health Specialists, who emphasized that differing perspectives and management approaches among directors often lead to variation in project execution. Frequent policy shifts disrupt continuity and reduce overall project effectiveness. Therefore, strong leadership is crucial for motivating and guiding team members, establishing a clear vision, and ensuring effective implementation of actions to achieve project objectives.

Table 5.2 Thematic Analysis (Leadership)

No.	Position	Theme (Factors)	Code	Transcription
1	Deputy Director	Leadership Skill	Cognitive Skills Strategic Skills Business Skills Interpersonal Skills	The position of hospital director is temporary, demanding a leader with strong cognitive abilities to understand and navigate the hospital's complex environment. As policies evolve with each change in leadership, the director must demonstrate business acumen to maintain operational and financial stability, interpersonal competence to communicate effectively with stakeholders, and strategic foresight to align the hospital's vision with shifting policy directions.
2	Board of Director			As hospital leadership changes, new directors frequently implement different policies. This situation requires a director with strong cognitive skills to grasp the nuances of these policies, business acumen to maintain operational continuity, interpersonal skills to communicate effectively with staff and stakeholders, and strategic foresight to preserve a stable long-term vision throughout leadership transitions.
3	Public Health Specialist			Under the new Ministry of Public Health policy, hospital directors must interpret the policy's implications, adapt hospital operations as necessary, ensure effective communication with staff and stakeholders, and align the hospital's long-term strategy with the updated directives.

5.1.3 Thematic Analysis (Knowledge Management)

Another major theme that emerged was the vital role of knowledge transfer and continuous learning in improving healthcare quality. Interviewees stressed how supervisors play a crucial part in sharing expertise and experiences with their teams, and highlighted the value of ongoing training to keep staff current with the latest medical knowledge and Ministry of Public Health guidelines. As noted by the Deputy Director, Board of Directors, and Public Health Specialists, strong knowledge management enhances professional skills, boosts confidence, and elevates overall healthcare performance.

Table 5.3 Thematic Analysis (Knowledge Management)

No.	Position	Theme (Factors)	Code	Transcription
1	Deputy Director	Knowledge Management	Knowledge Capture and Sharing	This hospital encourages department leaders to participate in new technology training and to share their knowledge and insights with colleagues.
2	Board of Director			This hospital provides annual training programs to help staff remain up to date and enhance their knowledge.
3	Public Health Specialist			This organization organizes seminars and encourages staff to

				participate in order to gain new knowledge and share their insights with colleagues.

5.2 Quantitative Results and Discussion

There are 370 responses from top management, representing 37 hospitals (13.50% of the hospitals). The data collection methods were postal surveys (200) and online surveys (170). Phone interviews were conducted to address any missing values in the questionnaires.

The study presents a comprehensive analysis of feedback from top management across 37 hospitals, constituting 13.50% of the hospitals surveyed. The data collection was meticulously carried out through two primary methods: postal surveys, which accounted for 200 responses, and online surveys, which contributed 170 responses. To ensure the integrity and completeness of the data, phone interviews were strategically conducted to supplement any missing or unclear information from the questionnaires.

5.2.1 Descriptive Statistics

Table 7 presents a detailed overview of the respondents' distribution by hospital size. Medium-sized community hospitals constitute the largest share of respondents, reflecting their prominent role as healthcare providers that balance service capacity with accessibility, catering to a large segment of the population. In comparison, small community hospitals represent about one-fifth of the respondents, highlighting the notable participation of smaller facilities that often serve local communities or deliver specialized care. Understanding this demographic distribution is crucial for

interpreting the survey results and ensuring that the findings accurately represent the broader healthcare landscape.

Table 5.4 Descriptive Statistics for Hospital Size

Hospital Sizes	**Size (beds)**	**Actual Number**	**Sampling (Frequency)**	**Sampling (Percentage)**
Regional Hospital (A)	500 – 800	4	-	-
General Hospital (S)	300 - 500	9	4	11
General Hospital (M1)	180 - 300	8	1	3
Community Health Center (M2)	120 - 180	0	2	5
Community Hospital (Large size) (F1)	90 - 120	0	1	3
Community Hospital (Medium size) (F2)	60 - 90	509	21	57
Community Hospital (Small size) (F3)	30 – 60	88	8	21
Total		950	37	100

Table 5.5 presents the distribution of respondents by position, categorized into twelve groups. The majority of respondents (63%) are registered nurses. Nutritionists represent the smallest proportion at 1%, while plan and policy analysts and academic statisticians each account for 7%. Other positions include medical physicians (5%), as well as physiotherapists, computer technical officers, and dentists (3% each). Finally, medical technologists, radiological technologists, general administrators, and pharmacists each comprise 2% of the respondents.

Table 5.5 Descriptive Statistics for Respondent Position

Respondent Position	Frequency	Percentage
Registered Nurse	234	63
Medical Technology	9	2
Medical Physician	19	5
Physiotherapist	12	3
Radiological Technologist	7	2
Nutritionist	3	1
Computer Technical	10	3
Academic Statistic	25	7
Plan and Policy Analyst	27	7
General Administration	6	2
Dentist	10	3
Pharmacist	8	2
Total	370	100.00

The assessment of Smart Hospital Maturity Levels across 37 hospitals, as presented in Table 5.6, offers valuable insight into the current stage of digital integration within Thailand's healthcare system. Most hospitals are in transition toward more innovative operations, adopting Smart Services and Smart Tools. The increasing use of digital technologies to enhance service delivery and integrate healthcare tools reflects a proactive movement toward modernization. However, achieving full digital transformation remains a complex and multifaceted process.

Approximately 45.95% of hospitals are positioned at the Smart Services stage, indicating a strong emphasis on patient-centered care supported by technology to streamline processes and improve outcomes. Likewise, 32.43% of hospitals have adopted Smart Tools, contributing to greater efficiency and accuracy in diagnostics and

treatment. In contrast, only 5.41% of hospitals have reached the Advanced Smart Hospital stage, underscoring that comprehensive digital transformation within the sector is still in its early stages.

Table 5.6 Descriptive Statistics of Smart Hospital Maturity Level (37 Hospitals)

Maturity Level	Frequency	Percentage
Smart Place (Maturity Level 1)	0	0
Smart Tools (Maturity Level 2)	12	32.43
Smart Service (Maturity Level 3)	17	45.95
Smart Outcome (Maturity Level 4)	5	13.51
Smart Hospital (Maturity Level 5)	1	2.70
Advance Smart Hospital (Maturity Level 6)	2	5.41
Total	37	100.00

5.2.2 Normality Test

A normality test is a fundamental statistical procedure employed to determine whether a sample or dataset conforms to the characteristics of a conventional normal distribution. Understanding whether data follow a normal distribution is crucial for many statistical analyses, as numerous parametric tests assume normality. Normality tests can be performed using numerical and visual methods, providing researchers with flexible approaches to assess data distribution. Numerical tests typically involve calculating specific statistical values, notably skewness and kurtosis, essential in quantifying deviations from normality (Razali & Wah, 2011).

Skewness measures the symmetry of the data distribution; a perfectly normal distribution has a skewness of zero, indicating that the data are symmetrically distributed around the mean. Positive skewness indicates a longer or fatter tail on the right side, while negative skewness indicates a longer or fatter tail on the left side. On

the other hand, kurtosis assesses the "tailedness" of the data, comparing whether the data have heavier or lighter tails than a normal distribution (Lyu, 1996). High kurtosis implies that the data have heavy tails or outliers, while low kurtosis suggests light tails or fewer outliers. (Curran et al., 1996) provide specific thresholds for these measures, defining a normal distribution as having a skewness value around 2 and a kurtosis value near 7. However, these values may vary depending on the context and sample size.

It is essential to accurately interpret these values when assessing normality, as deviations can significantly impact the validity of statistical inferences drawn from the data. For instance, in regression analysis, the assumption of normality underpins the reliability of the results. Table 5.7 in the current study confirms that all variables tested exhibit acceptable levels of skewness and kurtosis, indicating that they are approximately normally distributed. This suggests that the dataset meets the assumptions necessary for parametric statistical analyses, enhancing the robustness of the findings. Ensuring data normality is a critical step in the preparation and analysis of data, guiding the appropriate selection of statistical tests and strengthening the overall validity of the research conclusions.

Table 5.7 Normality Test Results of 37 Hospitals Respondents

Factors	Items	Min	Mean	Max	SD	Skewness	Kurtosis
Knowledge Management	Organizational Competency (KM1)	3.30	4.l392	4.70	.30982	-0.605	0.405
	Knowledge Repositories and Libraries (KM2)	3.40	4.0262	4.70	.33901	0.028	-0.777
	Knowledge Capture and Sharing (KM3)	3.30	4.0314	4.50	.30882	-0.741	-0.090
	Culture of Knowledge Sharing (KM4)	3.50	4.1259	4.70	.32200	-0.150	-0.510
	Strategic Knowledge Management in Talent Acquisition (KM5)	3.40	3.9968	4.50	.30286	-0.147	-0.892
	Learner-Centric Development (KM6)	3.30	3.9516	4.60	.30155	0,019	0.122
Cognitive Skill	Communication Skills (CS1)	3.30	4.0881	4.60	.29779	-0.242	-0.162
	Listening Skills (CS2)	3.40	4.0535	4.50	.31209	-0.619	-0.758
	Writing Skills (CS3)	3.20	3.9103	4.40	.28404	-0.377	-0.150
	Reading Comprehension skills (CS4)	3.40	4.0132	4.40	.25285	-0.354	-0.302
Business Skill	Operation Analysis (BS1)	3.40	4.0403	4.50	.24766	-0.378	-0.324
	Management of Personal Resources (BS2)	3.60	4.0478	4.40	.20536	-0.320	-0.264
	Management of Financial (BS3)	3.60	4.1154	4.70	.27589	0.331	-0.464
	Management of Material Resources (BS4)	3.60	4.1797	4.90	.30720	-0.304	0.337
Interpersonal Skill	Social Perceptiveness (IS1)	3.40	3.9989	4.40	.26191	0.198	-0.321
	Negotiation (IS2)	3.40	4.0827	4.60	.25531	0.438	0.935
	Persuasion (IS3)	3.60	4.1386	4.80	.31188	-0.183	-0.236

Factors	Items	Min	Mean	Max	SD	Skewness	Kurtosis
Strategic Skill	Vision (SS1)	3.30	4.0424	4.60	.27670	-0.179	0.484
	System Evaluation (SS2)	3.70	4.1419	4.50	.20122	-0.330	-0.784
	Identification of Key Causes (SS3)	3.60	3.9643	4.50	.18524	0.179	-0.680
	Solution Appraisal (SS4)	3.40	3.9427	4.50	.25281	-0.080	-0.204
Technology Acceptance	Technology Ease of Usage (TA1)	3.40	4.1076	4.60	.28888	-0.650	-0.080
	Strategic Technology Integration (TA2)	3.80	4.2046	4.50	.18813	-0.124	-0.786
	Process Optimization (TA3)	3.40	4.2473	4.70	.26613	-0.550	1.621
	Data-Driven Decision-Making (TA4)	3.60	4.2392	4.60	.24070	-0.690	0.433
	Automation Driven Workplace Efficiency (TA5)	3.70	4.2203	4.80	.28271	-0.178	-0.720
	User-Centered Design (TA6)	3.10	4.0197	4.40	.26877	-1.098	2.366
Smart Hospital Maturity Level	Smart Hospital	3.70	2.9324	5.90	.96236	1.464	2.550

5.2.3 Outlier Test

In this study, outliers are identified through a 5% trimmed mean and box plot analysis, two robust statistical techniques commonly employed to minimize the impact of extreme values on data interpretation. The 5% trimmed mean is designed to reduce the influence of the extreme tails of distribution by removing the top and bottom 5% of scores and calculating the mean of the remaining data points (Tukey, 1977). This approach effectively minimizes the effect of outliers and provides a more accurate representation of the central tendency for skewed distributions. According to (Pallant, 2020), a significant discrepancy of 0.2 or more between the overall mean and the 5% trimmed mean suggests the presence of outliers within the data. This measure helps maintain the integrity of the dataset by ensuring that extreme values do not disproportionately skew the results, thus improving the reliability of subsequent analyses.

Combining the 5% trimmed mean and box plot analysis offers a comprehensive approach to outlier detection. It ensures that extreme values are appropriately managed to enhance the validity of statistical analyses. By utilizing these methods, the study aims to maintain the data's integrity, thereby improving its findings' accuracy and reliability.

Table 5.8 Outlier Test Results of 37 Hospitals Respondents

Factors	Items	Mean	5% Trimmed Mean	Δ 5% Trimmed Mean
Knowledge Management	Organizational Competency (KM1)	4.1392	4.1521	0.0129
	Knowledge Repositories and Libraries (KM2)	4.0262	4.0210	0.0052
	Knowledge Capture and Sharing (KM3)	4.0314	4.0459	0.0145
	Culture of Knowledge Sharing (KM4)	4.1259	4.1314	0.0055
	Strategic Knowledge Management in Talent Acquisition (KM5)	3.9968	3.9994	0.0026
	Learner-Centric Development (KM6)	3.8516	3.8483	0.0033
Cognitive Skill	Communication Skills (CS1)	4.0881	4.0958	0.0077
	Listening Skills (CS2)	4.0535	4.0676	0.0141
	Writing Skills (CS3)	3.9103	3.9174	0.0071
	Reading Comprehension skills (CS4)	4.0132	4.0207	0.0075
Business Skill	Operation Analysis (BS1)	3.9989	4.0074	0.0085
	Management of Personal Resources (BS2)	4.1098	4.0992	0.0916
	Management of Financial (BS3)	4.1386	4.1336	0.0050
	Management of Material Resources (BS4)	4.0424	4.0502	0.0078
Interpersonal Skill	Social Perceptiveness (IS1)	4.1419	4.1440	0.0021
	Negotiation (IS2)	3.9643	3.9599	0.0044
	Persuasion (IS3)	3.9427	3.9470	0.0043

Factors	Items	Mean	5% Trimmed Mean	Δ 5% Trimmed Mean
Strategic Skill	Vision (SS1)	4.0403	4.0452	0.0049
	System Evaluation (SS2)	4.0478	4.0532	0.0054
	Identification of Key Causes (SS3)	4.1797	4.1770	0.0027
	Solution Appraisal (SS4)	3.9989	4.0074	0.0085
Technology Acceptance	Technology Ease of Usage (TA1)	4.1076	4.1195	0.0119
	Strategic Technology Integration (TA2)	4.2046	4.2081	0.0035
	Process Optimization (TA3)	4.2473	4.2590	0.0117
	Data-Driven Decision-Making (TA4)	4.2392	4.2521	0.0129
	Automation Driven Workplace Efficiency (TA5)	4.2203	4.2221	0.0018
	User-Centered Design (TA6)	4.2038	4.2108	0.0007
Smart Hospital Maturity Level	Smart Hospital	2.9324	2.8462	0.0086

5.2.4 Exploratory Factor Analysis

The exploratory factor analysis (EFA) is a robust statistical method used to uncover the underlying structure of a relatively large set of variables (Yadav, Tandel, & Ahammed, 2022). EFA is used to identify the number of common factors that influence the data and to which extent. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of Sphericity are preliminary tests that validate the appropriateness of the data for factor analysis(Hemmatpour, Heydari, & Rabieenia, 2024). The KMO index measures how well the variables correlate with each other, with a value closer to 1 indicating a more robust correlation and, hence, more suitable for EFA. On the other hand, Bartlett's test checks for any redundancy among variables that can be summarized with some lesser underlying factors. A KMO of 0.701 and Bartlett's test p-value of less than 0.001 suggest that data is indeed suitable for factor analysis, as it indicates that the variables are interrelated and not an identity matrix, thus allowing for a meaningful factor analysis to be conducted (Brown & Onsman, 2010).

Table 5.9 KMO and Baerlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.701
	Approx. Chi-Square	676.062
	df	190
	Sig.	<.001

The exploratory factor analysis (EFA) is a robust statistical method used to identify the structure within a set of observed variables by applying the principal component method with varimax rotation, which enhances the interpretability of the factors, ensuring that each factor represents a distinct construct. The decision to use a

factor loading threshold of 0.7 aligns with best practices in the field, as it helps retain only the most significant items, thereby improving the clarity and reliability of the resulting factor structure. Removing items with principal component values below the threshold has likely led to a more parsimonious and interpretable model. The organic derivation of the four distinct factors from the data suggests that these factors are inherent to the dataset and not influenced by external assumptions, which can be crucial for the validity of the findings. It is essential to consider the implications of these factors and how they might inform subsequent analyses or interventions. The summary in Table 5.10 will serve as a valuable reference for understanding the dimensions that emerged from EFA.

The first factor, knowledge management (KM), comprises items related to organizational competency, knowledge repositories, knowledge capture and sharing, culture of knowledge sharing, and strategic knowledge management in talent acquisition. The second factor, Cognitive Skills (CS), includes communication skills, listening skills, writing skills, and reading comprehension. The third factor, Strategic Skills (SS), encompassed vision and system evaluation. The fourth factor, Technology Acceptance (TA), covered ease of use, strategic technology integration, process optimization, data-driven decision-making, and automation-driven workplace efficiency.

The exclusion of the "User-Centered Design" item from the Exploratory Factor Analysis (EFA) due to its principal component value falling below the 0.7 threshold is a common practice to ensure the reliability and validity of the factor structure. This threshold is often used as a criterion for the adequacy of factor loadings, and items falling below this value are typically considered for removal to enhance the

interpretability and robustness of the factor solution. As presented in Table 13, the EFA results confirm the solidity of the remaining factor structure, an essential aspect of constructing a reliable measurement instrument. This process helps refine the scale by retaining only those items that contribute meaningfully to the underlying measured constructs.

Table 5.10 Exploratory Factor Analysis

(The principal component method with varimax rotation and factor loading of 0.7)

Factors	**Items**	**Component**			
		KM	**CS**	**LS**	**TA**
Knowledge Management	Organizational Competency (KM1)	.724			
	Knowledge Repositories and Libraries (KM2)	.903			
	Knowledge Capture and Sharing (KM3)	.876			
	Culture of Knowledge Sharing (KM4)	.878			
	Strategic Knowledge Management in Talent Acquisition (KM5)	.795			
Cognitive Skills	Communication Skills (CS1)		.744		
	Listening Skills (CS2)		.798		
	Writing Skills (CS3)		.835		
	Reading Comprehension skills (CS4)		.795		
Strategic, Business, Interpersonal skills	Vision (SS1)			.841	
	System Evaluation (SS2)			.802	
	Identification of Key Causes (SS3)			.510	
Technology Acceptance	Technology Ease of Usage (TA1)				.834
	Strategic Technology Integration (TA2)				.905
	Process Optimization (TA3)				.817
	Data-Driven Decision-Making (TA4)				.796

	Automation Driven Workplace Efficiency (TA5)				.748

The researcher also tests the Exploratory Factor Analysis with using principal component method with varimax rotation and a factor loading of 0.4. We eliminated 4 items with a principal component lower than 0.4. The eliminate items are Strategic Knowledge Management in Talent Acquisition (KM5), Management of Personal Resources (BS2), Management of Financial (BS3), Persuasion (IS3), and Solution Appraisal (SS4). The results are presented in Table 5.11.

Table 5.11 Exploratory Factor Analysis

(The principal component method with varimax rotation and factor loading of 0.4)

Factors	**Items**	**Component**			
		KM	**CS**	**LS**	**TA**
Knowledge Management	Organizational Competency (KM1)	.727			
	Knowledge Repositories and Libraries (KM2)	.886			
	Knowledge Capture and Sharing (KM3)	.865			
	Culture of Knowledge Sharing (KM4)	.871			
	Patient-Centric Knowledge Management (KM6)	.791			
Cognitive Skill	Communication Skills (CS1)		.681		
	Listening Skills (CS2)		.801		
	Writing Skills (CS3)		.835		
	Reading Comprehension skills (CS4)		.773		
Strategic, Business, Interpersonal skills	Vision (SS1)			.860	
	System Evaluation (SS2)			.794	
	Identification of Key Causes (SS3)			.651	
	Operation Analysis (BS1)			.673	

	Management of Financial (BS3)			.500	
	Management of Material Resources (BS4)			.767	
	Social Perceptiveness (IS2)			.460	
	Persuasion (IS3)			.701	
Technology Acceptance	Technology Ease of Usage (TA1)				.843
	Strategic Technology Integration (TA2)				.895
	Process Optimization (TA3)				.836
	Data-Driven Decision-Making (TA4)				.781
	Automation Driven Workplace Efficiency (TA5)				.936

5.2.5 Multiple Linear Regression

As the recommendation of (Dien, Beal, & Berg, 2005) by using the principal component method with varimax rotation and a factor loading of 0.7. This section by using the data from factor loading 0.7 examines the relationships among various factors and their impact on the development of smart hospitals through multiple regression analysis. Previous research has identified critical elements that can substantially improve healthcare facilities' performance, aiding their transition into smart hospitals. These factors encompass knowledge management, leadership skills, and technology acceptance.

Our analysis produced an R square value of 0.703, suggesting that these factors collectively account for approximately 70.3% of the variance in smart hospital development. This significant explanatory power highlights the crucial role of these elements in the transformation process.

Table 5.12 Multiple Regression Results for Smart Hospital Level (Factor Loading 0.7)

Factors	Items	B	Beta	SE	t
Knowledge Management	Organizational Competency (KM1)	-.711	-.229	.708	-1.004
	Knowledge Repositories and Libraries (KM2)	2.239*	.789	.867	2.584
	Knowledge Capture and Sharing (KM3)	-.564	-0.181	0.946	-0.596
	Culture of Knowledge Sharing (KM4)	-1.009	-.337	1.130	-.893
	Strategic Knowledge Management in Talent Acquisition (KM5)	.812	.255	1.091	.744
Cognitive Skills	Communication Skills (CS1)	-3.567*	-1.104	1.316	-2.711
	Listening Skills (CS2)	.970	.314	.687	1.410
	Writing Skills (CS3)	-.272	-.080	.971	-.280
	Reading Comprehension skills (CS4)	3.644**	.958	1.015	3.590
Strategic Skill	Vision (SS1)	1.677	.432	1.013	1.656
	System Evaluation (SS2)	-1.853	-.395	1.316	-1.408
Technology Acceptance	Technology Ease of Usage (TA1)	-2.252*	-.676	.842	-2.676
	Strategic Technology Integration (TA2)	-2.720	-.532	1.864	-1.459
	Process Optimization (TA3)	.958	.265	.966	.992
	Data-Driven Decision-Making (TA4)	.744	.186	1.200	.621
	Automation Driven Workplace Efficiency (TA5)	2.334	.686	1.801	1.296
	(Constant)	1.476			0.333

R^2 = .703, SEE = .70352, F = 2.960, Sig of F = .012, * P<.05, ** P<.01

The findings presented in Table 5.12 indicate that certain items significantly influence the level of smart hospitals. Notably, knowledge repositories and libraries (KM2), technology ease of use (TA1), communication skills (CS1), and reading comprehension skills (CS4) emerge as key contributors.

Knowledge Repositories and Libraries (KM2): This factor significantly boosts smart hospital performance ($\beta = 2.239$, $p = 0.018$). Effective knowledge management practices allow hospitals to maintain and leverage extensive knowledge bases, enhancing decision-making and fostering innovation.

Technology Ease of Use (TA1): Interestingly, this factor harms the smart hospital level ($\beta = -2.252$, $p = 0.015$). This suggests that while ease of use is important, it may not be the only factor influencing successful technology adoption. Other elements, such as staff training and the complexity of integration, could also be critical.

Communication Skills (CS1): This factor negatively impacts the smart hospital level ($\beta = -3.567$, $p = 0.013$). This outcome may reflect difficulties adapting traditional communication methods to new technological contexts.

Reading Comprehension Skills (CS4): This factor positively influences the smart hospital level ($\beta = 3.644$, $p = 0.002$). Strong reading comprehension skills are vital for staff to understand and implement new technologies effectively.

In the other hand, to examines the relationship between knowledge management, leadership skills, and technology acceptant factors and the impact of upgrading the smart hospital level. The result of R square by using the principal component method with varimax rotation and factor loading at 0.4 the results show that R square value at 0.779. It means that these factors collectively account for

approximately 77.9% of the variance in smart hospital development. The result of multiple regression at factor loading 0.4 in the table 5.13 below

Table 5.13 Multiple Regression Results for Smart Hospital Level (Factor Loading 0.4)

Factors	Items	B	Beta	SE	t
Knowledge Management	Organizational Competency (KM1)	-.490	-.158	.771	-.635
	Knowledge Repositories and Libraries (KM2)	1.518	.535	1.209	1.255
	Knowledge Capture and Sharing (KM3)	-.761	-.244	1.093	-.696
	Culture of Knowledge Sharing (KM4)	-1.258	-.421	1.287	-.978
	Patient-Centric Knowledge Management (KM6)	1.147	.361	1.204	.953
Cognitive Skills	Communication Skills (CS1)	-3.216	-.995	1.513	-2.125
	Listening Skills (CS2)	1.240	.402	.889	1.395
	Writing Skills (CS3)	-.632	-.187	1.084	-.583
	Reading Comprehension skills (CS4)	3.395**	.892	1.130	3.005
Business, Interpersonal, Strategic Skill	Vision (SS1)	.796	.205	1.614	.493
	System Evaluation (SS2)	-1.833	-.391	1.821	-1.007
	Identification of Key Cause (SS3)	-.209	-.060	.960	-.218
	Operation Analysis (BS1)	.686	.187	1.503	.457
	Management of Financial (BS3)	-.370	-.120	.750	-.493
	Management of Material Resources (BS4)	1.015	.292	1.661	.611
	Social Perceptiveness (IS2)	-.440	-.085	1.213	-.362

Factors	Items	B	Beta	SE	t
Technology Acceptance	Technology Ease of Usage (TA1)	-3.176	-.953	2.406	-1.320
	Strategic Technology Integration (TA2)	-3.394	-.664	3.746	-.906
	Process Optimization (TA3)	.075	.021	2.545	.030
	Data-Driven Decision-Making (TA4)	-1.218	-.305	2.880	-.423
	User-Centered Design (TA6)	6.569	1.495	10.325	.636
(Constant)		2.337			.431

R^2 = .779, SEE = .72581, F = 2.240, Sig of F = .061, * P<.05, ** P<.01

In Table 5.13 show only one item significantly influenced the level of smart hospital which is reading comprehension skills (CS4) as key contributors.

Reading Comprehension Skills (CS4): This factor positively influences the smart hospital level ($\beta = 3.395$, $p = 0.009$). Strong reading comprehension skills are vital for staff to understand and implement new technologies effectively.

From the analysis it was found that two different factor loading threshold with a factor loading at 0.4 resulting in one significant factor and other with a factor loading of 0.7 resulting in four significant factors. Based on this, the decision to select a factor loading threshold of 0.7 over 0.4, there are several reasons why the model with the lower threshold might produce a high R square. As mention of Hair (2014) suggest that a model with a single comprehensive factor (factor loading 0.4) may encapsulate more variance than multiple high threshold (factor loading 0.7). The single factor can represent a broader underlying construct, thus explaining a larger proportion of variance in the dependent variable. Moreover, Stevens (2009), explain that if the single factor with low factor loading and has a strong correlation with dependent variable, it can lead to a higher R square. In additional, a simple model with fewer dimensions can yield cleaner results with less noise, allowing for a relationship between the predictor and the dependent variable (Tabachnick, 2013).

Even though, the different in R square is relatively small (0.703 vs 0.779), both models explain nearly the same amount of variance. Therefore, this research decided to choose the factor loading 0.7 because a loading of 0.7 is commonly used in research as a threshold for significant factor loading, indicating a strong relationship between the factor and the items represents (Hair, Sarstedt, Ringle, & Mena, 2012). As using factor loading 0.7n in this model provides clearer, more distinct factors that are easier to

interpret and likely mor aligned with theoretical constructs. Factors with strong factor loading (0.7) are more reliable and less likely to capture noise.

5.3 Discussion

5.3.1 Leadership Capability

The emphasis of the study on transformational leadership within the framework of smart hospitals is a significant reflection of a growing consensus in organizational behavior research. Transformational leaders possess a unique capacity to inspire and motivate their teams, positioning themselves not merely as catalysts for change but as foundational pillars that cultivate an environment conducive to innovation and creativity. In the rapidly evolving and technologically sophisticated landscape of smart hospitals, the presence of such leadership is of paramount importance. It fosters a culture that embraces forward-thinking strategies and encourages a proactive stance in addressing the myriad challenges faced in healthcare delivery.

This approach ensures that the integration of new technologies is seamless and aligned with the staff's ongoing professional development, ultimately leading to enhanced patient care. Effective leadership and technological advancement create a powerful synergy that can markedly improve operational efficiency and patient outcomes. Consequently, the role of transformational leaders becomes indispensable in the contemporary healthcare environment as they guide their organizations through the complexities of digital transformation while simultaneously nurturing a workforce equipped to meet modern healthcare demands.

5.3.2 Knowledge Management

Incorporating Knowledge Management (KM) practices within smart hospitals represents a crucial element in their overall development and success. By creating comprehensive and robust knowledge repositories, hospitals can ensure that vital information is systematically captured and readily accessible. Furthermore, by fostering a culture that encourages knowledge sharing among staff members, healthcare institutions can facilitate collaboration and communication, essential for effective teamwork and improved service delivery. Implementing strategic KM initiatives streamlines processes and empowers healthcare professionals to leverage collective insights and experiences, thereby significantly enhancing organizational performance.

As a direct consequence of these improvements in organizational performance, the quality of patient care is elevated, and an environment conducive to innovation in healthcare services is cultivated. The findings of (Darroch & McNaughton, 2002) resonate with current research trends, underscoring the notion that such KM practices are not merely advantageous but indispensable for healthcare institutions striving to navigate and adapt to the rapidly changing technological landscape. As the concept of smart hospitals continues to gain traction, the importance of KM in bolstering clinical decision-making and enhancing operational efficiency becomes increasingly apparent, highlighting its integral role in the future of healthcare delivery.

5.3.3 Technology Acceptance

The relationship between the complexity of technology and user acceptance emerges as a fundamental consideration in technology adoption within healthcare environments. This interplay is particularly significant, as evidenced by the observed

negative correlation between the perceived ease of technology usage and the willingness of healthcare professionals to transition to advanced smart hospital systems. Such findings highlight the critical importance of designing user-friendly technologies that facilitate seamless integration into existing workflows.

This perspective aligns with the principles outlined in the Technology Acceptance Model, which posits that perceived ease of use is a pivotal factor influencing the decision to adopt new technologies. The preference exhibited by healthcare professionals for intuitive and straightforward technologies further reinforces the notion that developers must prioritize simplicity and clarity in the design of new systems. By adhering to user-centered design principles, technology developers can significantly increase the likelihood of successful implementation and widespread adoption of these systems in the inherently complex and dynamic environments characteristic of hospitals.

Ultimately, a focus on creating technologies that are not only functional but also accessible and easy to navigate will empower healthcare professionals to leverage these innovations effectively, thereby enhancing overall operational efficiency and improving patient care outcomes.

CHAPTER 6
CONCLUSION

6.1 Conclusion

The primary objective of this research was to systematically explore and identify the critical roles played by various elements, including leadership, knowledge management, and technology acceptance, in facilitating the development and implementation of smart hospitals in Thailand. The study aimed to address a significant gap in the existing literature by concentrating on these specific factors. Previous research efforts have often concentrated on the broader themes of technological adoption and integration, frequently overlooking the nuanced and specific factors that influence the successful implementation of smart hospital initiatives, particularly within the Thai public healthcare sector. In undertaking this investigation, the research sought to comprehensively understand how effective leadership can drive the digital transformation process. Leadership is a pivotal component in any organizational change initiative, and its influence is particularly pronounced in healthcare, where the stakes are high and the margin for error is minimal. The study aimed to elucidate how transformational leadership styles can inspire and motivate healthcare professionals to embrace new technologies and practices, fostering an environment conducive to innovation and improvement.

Additionally, the research emphasized the role of knowledge management as a critical success factor in the transition to smart hospitals. Knowledge management encompasses organizations' processes and practices to create, share, and utilize knowledge effectively. In healthcare, effective knowledge management can lead to

improved decision-making, enhanced collaboration among staff, and, ultimately, better patient outcomes. The study aimed to highlight their importance in supporting the digital transformation journey by investigating how knowledge management practices can be strategically implemented within hospitals. Furthermore, technology acceptance was examined as a vital component influencing the successful adoption of smart hospital technologies. Understanding the factors that affect healthcare professionals' willingness to accept and utilize new technologies is essential for ensuring that digital transformation efforts are met with enthusiasm rather than resistance. The research sought to identify the critical determinants of technology acceptance within the Thai public healthcare context, thereby providing valuable insights for stakeholders looking to facilitate smoother transitions to smart hospital systems. This research endeavors to fill a critical void in the literature by focusing on the specific factors that influence the implementation of smart hospitals in Thailand's public healthcare sector. By addressing the interconnected roles of leadership, knowledge management, and technology acceptance, the study aims to contribute to a deeper understanding of how these elements can collectively drive the successful digital transformation of healthcare institutions. Ultimately, the findings of this research are expected to offer practical recommendations for policymakers, healthcare administrators, and practitioners, enabling them to navigate the complexities of digital transformation and enhance the overall quality of healthcare delivery in Thailand.

The research undertaken in this study employed a robust mixed-methods approach, which was meticulously designed to provide a comprehensive examination of the various factors that influence the development of smart hospitals in Thailand. This methodological framework was particularly advantageous as it allowed for

integrating qualitative and quantitative research methods, facilitating a well-rounded and nuanced understanding of the subject matter. To initiate this process, the research team conducted semi-structured interviews with four experts actively involved in smart hospital projects within Thailand. These interviews were instrumental in gathering qualitative insights that encompassed a broad spectrum of topics, including general hospital information, the current usage of technology within healthcare settings, and the underlying motivations that drive hospitals to upgrade their systems to become smart hospitals. The qualitative data obtained from these interviews were subjected to thematic analysis, which involved identifying, analyzing, and reporting patterns or themes within the data. This analysis was then compared with existing literature in the field to highlight and corroborate key themes that emerged, such as the critical roles of leadership and knowledge management in the context of smart hospital development. By synthesizing the insights gained from the interviews with established research, the study was able to draw meaningful conclusions about the factors that are pivotal to the successful transformation of hospitals into smart facilities. Following the qualitative phase, the research proceeded to the quantitative aspect, which involved administering a comprehensive survey to top management personnel across 37 hospitals in Thailand. This survey was designed to capture a wide array of data, yielding a total of 370 responses from participants who hold significant positions within their respective organizations. The primary aim of the survey was to assess the relationships between key variables, explicitly focusing on leadership, knowledge management, technology acceptance, and the overall development of smart hospitals. Various statistical techniques were employed to analyze the data collected from the survey, including Exploratory Factor Analysis (EFA) and multiple regression analysis. These analytical

methods were crucial for validating the findings and establishing the strength and nature of the relationships among the identified factors. By employing this mixed-methods approach, the research not only enriched the understanding of the dynamics at play in the development of smart hospitals but also provided empirical evidence that supports the theoretical frameworks discussed in the literature. The combination of qualitative insights and quantitative data allowed for a more holistic view of the challenges and opportunities associated with the transition to smart hospital systems in Thailand, ultimately contributing to the body of knowledge in this critical area of healthcare innovation. Through this comprehensive examination, the study aims to inform stakeholders, including policymakers and healthcare administrators, about the essential elements that must be considered to facilitate successful digital transformation in the public healthcare sector.

The quantitative analysis conducted in this research yielded compelling evidence of significant relationships among several critical factors, namely leadership capabilities, knowledge management practices, technology acceptance, and the overall development of smart hospitals. The findings from this analysis underscored the notion that effective leadership is not merely a beneficial attribute but a fundamental driver of digital transformation within healthcare facilities. Leaders who can inspire and guide their teams are essential in fostering an environment conducive to innovation and change, which is particularly vital in transitioning to smart hospital systems. Furthermore, the research illuminated the importance of robust knowledge management practices, which serve as a backbone for the successful implementation of smart technologies. Specifically, well-established knowledge repositories and libraries were found to enhance the performance of smart hospitals significantly, enabling healthcare

professionals to access critical information and resources that facilitate informed decision-making and operational efficiency. In addition to these factors, the study highlighted the pivotal role of reading comprehension skills among healthcare staff and the strategic integration of technology into hospital operations. These elements are crucial for advancing the maturity of smart hospitals, as they ensure that personnel are equipped to understand and utilize new technologies effectively and capable of adapting to the evolving landscape of healthcare delivery. However, the analysis revealed an unexpected finding regarding the ease of technology use, which was shown to harm the development of smart hospitals. This outcome suggests that while user-friendly technologies are generally perceived as advantageous, they may inadvertently lead to complacency or a lack of engagement among staff.

Consequently, this highlights the pressing need for comprehensive training programs and well-thought-out integration strategies that can address these challenges. Organizations can mitigate the adverse effects of ease of use and foster a more proactive approach to digital transformation by equipping healthcare professionals with the necessary skills and knowledge to navigate new technologies. Overall, the insights gained from this quantitative analysis provide valuable guidance for healthcare administrators and policymakers seeking to enhance the effectiveness of smart hospital initiatives and ensure that the transition to digital healthcare is both successful and sustainable.

The qualitative research conducted in this study yielded two prominent themes that are pivotal to understanding the dynamics of healthcare service quality: the critical importance of consistent leadership and the essential role of knowledge transfer. Through in-depth interviews with hospital leaders, it became evident that frequent

changes in policy and leadership rotations pose significant barriers to the continuity of projects to enhance healthcare services. This instability disrupts the strategic vision necessary for effective implementation and creates an environment where initiatives may falter due to a lack of sustained direction and commitment. Consequently, the findings underscore the pressing need for stable and effective leadership within healthcare organizations, as such leadership is fundamental to navigating the complexities of healthcare delivery and ensuring that projects are carried through to fruition. Moreover, the research highlighted the significance of knowledge management practices, including annual training sessions and ongoing knowledge sharing among staff. These practices are crucial for maintaining staff competency and ensuring that healthcare professionals are well-equipped to implement smart hospital technologies successfully. The qualitative data collected from the interviews supported the quantitative findings, illustrating the interconnectedness of leadership, knowledge management, and technology acceptance as driving forces behind the development of smart hospitals. In addition to these themes, the research uncovered several significant findings that contribute to a deeper understanding of the strategic factors necessary to develop smart hospitals successfully. The study emphasized the critical role of leadership in guiding the strategic vision of healthcare organizations and fostering a culture of innovation that encourages the adoption of new technologies. Influential leaders are instrumental in ensuring that technological advancements are implemented to align with the organization's goals and enhance overall service delivery.

Furthermore, the research illuminated the importance of knowledge management practices in enhancing decision-making processes, improving operational efficiency, and promoting a culture of continuous improvement within healthcare settings.

Additionally, the study underscored the significance of technology acceptance, driven by factors such as perceived usefulness and ease of use. These elements are crucial in facilitating the integration of advanced systems and tools within healthcare environments, as they directly influence the willingness of staff to embrace new technologies. The findings from this research provide valuable insights into the intricate relationships between leadership, knowledge management, and technology acceptance and their collective impact on hospital development, operational efficiency, and, ultimately, patient outcomes. By understanding these dynamics, healthcare administrators and policymakers can better strategize and implement initiatives that foster the successful transformation of healthcare facilities into smart hospitals, thereby enhancing patient care quality.

This study's findings yield practical insights essential for the strategic implementation of smart hospital technologies within Thailand's public healthcare sector. By highlighting the significance of effective leadership, robust knowledge management practices, and the cultivation of high levels of technology acceptance, healthcare providers are positioned to expedite their transition towards more digitally integrated and efficient operational frameworks. This research presents a comprehensive framework that stakeholders and policymakers can utilize to foster innovation, enhance patient care, and improve the overall delivery of healthcare services. By adopting these insights, organizations can navigate the complexities of digital transformation and ensure that their initiatives are aligned with the evolving demands of the healthcare landscape.

6.2 Further Study

Future research endeavors should investigate the long-term impacts of smart hospital initiatives by implementing longitudinal studies. Such an approach is essential, as it allows researchers to systematically examine changes and developments over extended periods, thereby understanding how various factors—including leadership dynamics, shifts in policy, and the adoption of new technologies—affect outcomes within healthcare settings. By adopting this longitudinal perspective, researchers can derive valuable insights into the different stages of implementation, the evolution of technology over time, and the sustainability of both the benefits and challenges associated with smart hospital initiatives, as highlighted by Ebrahim et al. (2020).

Moreover, longitudinal studies have the potential to meticulously track critical factors such as Knowledge Management (KM2) and Technology Ease of Use (TA1), enabling researchers to assess their enduring impact on hospital performance. This comprehensive analysis can illuminate the intricate relationships between these factors and their contributions to the overall effectiveness of smart hospital systems. By examining these elements over time, researchers can provide a nuanced understanding of how they influence operational efficiency, patient care quality, and the overall success of digital transformation efforts within healthcare organizations, as evidenced by the findings of (S.-Y. Wu & Wang, 2023) and (Ayatulloh, Nursalam, & Kurniawati, 2021). Ultimately, such research will be instrumental in informing best practices and guiding future initiatives to enhance the effectiveness and sustainability of smart hospitals in the evolving healthcare landscape.

Furthermore, it is imperative to expand the scope of research to encompass private hospitals to achieve a more comprehensive understanding of the factors

contributing to the success of smart hospital initiatives. Private hospitals frequently exhibit significant differences in available resources, management structures, and the demographics of the patient populations they serve. By conducting comparative analyses across these diverse healthcare settings, researchers can obtain a holistic perspective on the factors that influence the successful implementation and operation of smart hospital technologies (Ghaleb et al., 2020).

This broader research scope would not only illuminate private hospitals' unique challenges and opportunities but also provide valuable insights into how various organizational structures and funding models impact the adoption of smart technologies. Such an analysis would be instrumental in identifying transferable best practices across different types of healthcare institutions, thereby enhancing the overall effectiveness of smart hospital initiatives. By understanding the nuances of how private hospitals operate and the specific contexts in which they function, researchers can contribute to developing tailored strategies that optimize the integration of smart technologies in diverse healthcare environments (Hyrkäs et al., 2020). Ultimately, this expanded research focus will enrich the existing body of knowledge and facilitate the sharing of effective practices that can be adapted to improve healthcare delivery across public and private sectors.

Financial resources play a vital role in developing smart hospitals, making it essential for future research to investigate the impact of funding availability and investment strategies on implementation and sustainability. Understanding how financial constraints or incentives influence technology adoption is significant (Esmaeilzadeh et al., 2013). Additionally, the role of patient engagement should be examined, particularly how education programs and patient portals can enhance the

effectiveness of smart hospitals (Venkatesh et al., 2003). Lastly, exploring partnerships with technology vendors, academic institutions, and healthcare providers can provide insights into how collaborative efforts support smart hospital initiatives, ultimately leading to more practical implementations (Hyrkäs et al., 2020).

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APPENDICES

APPENDIX A

QUESTIONNAIRE SURVEY (ENGLISH VERSION)

Survey of Factors Affecting the Upgrading of Smart Hospitals

Please specify a contact person.

Please fill in the contact information.

Hospital Name			
Address			
Name of the person completing the questionnaire		Position	
Tel		E-mail	
Website			

Survey of Factors Affecting the Upgrading of Smart Hospitals

Section A: Hospital Establishment Information

1. Hospital Operation and Location

1.1 When was your hospital established?		Year:
1.2 Is your hospital government-owned?		1.☐Yes Please specify..... 0.☐No Please specify.....
1.3 Where is your hospital located?	1. Province	
	2. District	
	3. Subdistrict	

2. Hospital Size

2.1 Number of staffs?
1.☐1-19 2.☐ 20-49 3.☐ 55-99 4.☐ 100-199 5.☐ 200-299 6.☐ 300-399 7.☐400-499 8.☐ 500-599 9.☐ 600-699 10.☐ 700-799 11.☐ 800-899 12.☐ 900-999 13.☐ 1,000-1,499 14.☐ 1,500-1,999 15.☐ More than 2,000
2. Hospital size based on the number of patient bed?
1.☐ Large Size (more than 500 beds) 2.☐ Medium Size (100 – 499 beds) 3.☐Small Size (less than 100 beds) 4.☐ Other, Please specify.....
2.3 Hospital Type?
1.☐ Primary 2.☐Secondary 3.☐Tertiary 4.☐Specialized Medical Center

3. Hospitals Standard (Whether the hospital has obtained various certifications)

3.1 ISO 9000 (ISO 9000/9001)	0.☐ Not yet received 1.☐ Yes 2.☐ In progress
3.2 ISO 14000 (ISO 14000/14001)	0.☐ Not yet received 1.☐ Yes 2.☐ In progress
3.3 JCI (Joint Commission International)	0.☐ Not yet received 1.☐ Yes 2.☐ In progress
3.4 MIR (Managing Infection Risk)	0.☐ Not yet received 1.☐ Yes 2.☐ In progress
3.5 A-HA (Advance Hospital Accreditation)	0.☐ Not yet received 1.☐ Yes 2.☐ In progress

B: Level of Smart Hospital Development

4. Has your hospital made efforts to develop into a Smart Hospital in the past 2 years?	1.☐ Yes 0.☐ No
Smart Place (Level 1)	
4.1 Has the hospital implemented policies for environmental hygiene based on the GREEN & CLEAN standards?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3.☐ Completed
4.2 Has your hospital arranged the facilities to be attractive and modern (Digital Look), enhancing the convenience and speed of service delivery	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3.☐ Completed
Smart Tools (Level 2)	
4.3 Does your hospital have a queue display system to reduce congestion in service areas, such as in front of the pharmacy or medical records department?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3.☐ Completed
4.4 Does your hospital have a system for notifying service queues through online channels or other methods such as Line Application, Mobile Application, or SMS?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3.☐ Completed

4.5 Does your hospital have an automated system for integrating medical device data (Vital Signs) into the computer system?"	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
Smart Service (Level 3)	
4.6 Has your hospital discontinued accepting copies of ID cards and other government-issued documents from service recipients?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.7 Does your hospital store patient medical records in an electronic format (EMR: Electronic Medical Records)?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.8 Does your hospital use electronic prescriptions?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.9 Does your hospital have data on waiting times at outpatient service points?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.10 Does your hospital use staggered appointment scheduling, or group patients to receive services on time or with minimal, appropriate variation?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
Smart outcome (Level 4)	
4.11 Does your hospital manage the core business processes of the Department of Health?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.12 Does your hospital have an Enterprise Resource Planning (ERP) system that automatically integrates all core business processes of the Department of Health?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed

4.13 Does your hospital have unit cost data for each department?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.14 Does your hospital manage unit costs to remain within appropriate limits?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
Smart Hospital (Level 5)	
4.15 Does your hospital implement sustainable environmental conservation and energy-saving practices?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.16 Does your hospital have effective management with unit cost data that is within appropriate limits and comparable to other organizations?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.17 Does your hospital provide quality services in all dimensions (safety, quality, and efficiency)?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.18: Does your hospital have effective proactive risk management in all areas?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
Advance Smart Hospital (Level 6)	
4.19 Does your hospital use telemedicine or teleconsultation technologies to provide patient consultations, reduce travel limitations, and facilitate care for patients in remote areas?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.20 Does your hospital integrate patient medical history data with network hospitals using Big Data?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.21 Does your hospital use devices to track portable medical equipment?	0. ☐ Not Yet done 1. ☐ In the planning stage

	2. ☐ In progress 3. ☐ Completed
4.22 Does your hospital use automated machines for dispensing medication and processing payments for medication/services?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.23 Does your hospital have a system to verify the identity of patients receiving medication and the details of the medication they should receive?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed
4.24 Does your hospital have an artificial intelligence (AI) system in place?	0. ☐ Not Yet done 1. ☐ In the planning stage 2. ☐ In progress 3. ☐ Completed

Part C. Knowledge Management

5: Does knowledge management in your hospital have the following characteristics?

(Score 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

	1.	**2.**	**3.**	**4.**	**5.**
5.1 Your hospital establishes strategies, conducts assessments, develops, and creates teams for internal knowledge management.	☐	☐	☐	☐	☐
5.2 Your hospital monitors and controls projects.	☐	☐	☐	☐	☐
5.3 Your hospital conducts training sessions to exchange knowledge.	☐	☐	☐	☐	☐
5.4 The organization’s leaders set the required education, skills, knowledge, and other requirements for all personnel.	☐	☐	☐	☐	☐
5.5 The organization's leaders establish and implement processes for recruitment, evaluation, and staffing, as well as other related practices as defined by the organization.	☐	☐	☐	☐	☐

5.6 Each staff member receives ongoing education and training during their tenure, including continuous education and training, to maintain or enhance their skills and knowledge.	☐	☐	☐	☐	☐

Part D. Leadership Skills

6: Do the skills of your hospital director have the following characteristics? (Score 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)					
Cognitive Skill					
	1.	**2.**	**3.**	**4.**	**5.**
6.1 Communication (Speaking) to achieve work objectives.	☐	☐	☐	☐	☐
6.2 Active listening to genuinely understand problems.	☐	☐	☐	☐	☐
6.3 Writing to clearly convey policies and operations.	☐	☐	☐	☐	☐
6.4 Reading comprehension to gather knowledge for management purposes.	☐	☐	☐	☐	☐
Business Skill					
6.5 Operation analysis.	☐	☐	☐	☐	☐
6.6 Management of Personnel Resources	☐	☐	☐	☐	☐
6.7 Management of Financial Resources	☐	☐	☐	☐	☐
6.8 Management of Material Resources	☐	☐	☐	☐	☐
Interpersonal Skill					
6.9 Social perceptiveness to understand responses to problems and policies within the organization.	☐	☐	☐	☐	☐

6.10 Negotiation.	☐	☐	☐	☐	☐
6.11 Persuasion.	☐	☐	☐	☐	☐
Strategic Skill					
6.12 Visioning for individuals at all levels within the organization.	☐	☐	☐	☐	☐
6.13 Systematic evaluation to determine the success of the work (System Evaluation).	☐	☐	☐	☐	☐
6.14 Clear identification of key causes in operations (Identification of Key Causes).	☐	☐	☐	☐	☐
6.15 Continuous evaluation of problem-solving methods (Solution Appraisal).	☐	☐	☐	☐	☐

Part E. Technology Acceptance

7: Do the attitudes of staff towards the acceptance of technology in your hospital have the following characteristics? **(Score 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)**					
	1.	**2.**	**3.**	**4.**	**5.**
7.1. Technology makes tasks easier and less complicated.	☐	☐	☐	☐	☐
7.2. Technology can be applied to the system you are currently using.	☐	☐	☐	☐	☐
7.3. Technology can help reduce operational steps.	☐	☐	☐	☐	☐
7.4. Technology helps you receive information quickly and accurately.	☐	☐	☐	☐	☐
7.5. Technology helps improve work efficiency.	☐	☐	☐	☐	☐

8: What is the level of understanding among your staff regarding the Smart Hospital concept? **(Score 1 = Do not understand at all, 2 = Do not understand, 3 = Neutral, 4 = Understand, 5 = Understand completely)**					
	1	**2**	**3**	**4**	**5**
8.1 Medical staff	☐	☐	☐	☐	☐
8.2 Dental staff	☐	☐	☐	☐	☐
8.3 Pharmacist	☐	☐	☐	☐	☐
8.4 Nursing staff	☐	☐	☐	☐	☐
8.5 Nursing assistant	☐	☐	☐	☐	☐
8.6 IT support staff	☐	☐	☐	☐	☐

Part F. Joint Commission International (JCI)

9: Does the use of JCI standards in your hospital have the following characteristics? **(Score 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)**					
International Patient Safety Goals (IPSG)	**1.**	**2.**	**3.**	**4.**	**5.**
9.1. Your hospital correctly identifies patients.	☐	☐	☐	☐	☐
9.2. Your hospital develops and implements processes to enhance the safety of using high-alert medications.	☐	☐	☐	☐	☐
9.3. Your hospital follows evidence-based hand hygiene practices to reduce the risk of infections related to healthcare services.	☐	☐	☐	☐	☐
9.4. Your hospital develops and implements processes to reduce the risk of patient harm from falls.	☐	☐	☐	☐	☐

Suggestions

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APPENDIX B

QUESTIONNAIRE SURVEY (THAI VERSION)

แบบสำรวจปัจจัยที่ส่งผลต่อการยกระดับ SMART HOSPITAL

โปรดระบุบุคคลที่ติดต่อได้

กรุณากรอกข้อมูลการติดต่อ

ชื่อโรงพยาบาล			
ที่อยู่			
ชื่อผู้กรอกแบบสอบถาม		ตำแหน่ง	
โทรศัพท์		อีเมล	
เว็บไซต์			

แบบสำรวจปัจจัยที่ส่งผลต่อการยกระดับ SMART HOSPITAL

A: ข้อมูลการก่อตั้งโรงพยาบาล

ข้อ 1 ข้อมูลการดำเนินกิจการและที่ตั้งของโรงพยาบาลในปัจจุบัน

ข้อ 1.1 โรงพยาบาลของท่านได้ก่อตั้งขึ้นเมื่อใด		ปี:
ข้อ 1.2 โรงพยาบาลของท่านเป็นโรงพยาบาลรัฐบาล หรือไม่ภายใต้สังกัดใด โปรดระบุ		1.☐ ใช่ โปรดระบุ..... 0.☐ ไม่ใช่ โปรดระบุ.....
ข้อ 1.3 สถานที่ก่อตั้งโรงพยาบาลของท่านอยู่ที่ใด	1.จังหวัด	
	2.อำเภอ	
	3.ตำบล	

2.ขนาดของโรงพยาบาล (โปรดเลือกคำตอบที่ตรงกับการดำเนินงานของท่านมากที่สุด)

ข้อ 2.1 จำนวนเจ้าหน้าที่ประจำในโรงพยาบาลของท่าน (คน)
1.☐ 1-19 2.☐ 20-49 3.☐ 55-99 4.☐ 100-199 5.☐ 200-299 6.☐ 300-399 7.☐ 400-499 8.☐ 500-599 9.☐ 600-699 10.☐ 700-799 11.☐ 800-899 12.☐ 900-999 13.☐ 1,000-1,499 14.☐ 1,500-1,999 15.☐ มากกว่า 2,000
ข้อ 2.2 ขนาดโรงพยาบาล (โปรดอ้างอิงจากจำนวนเตียงผู้ป่วยภายในโรงพยาบาลของท่าน)
1.☐ โรงพยาบาลขนาดใหญ่ (จำนวนเตียงมากกว่า 500 เตียง) 2.☐ โรงพยาบาลขนาดกลาง (จำนวนเตียง 100 – 499 เตียง) 3.☐ โรงพยาบาลขนาดเล็ก (จำนวนเตียงน้อยกว่า 100 เตียง) 4.☐ อื่นๆโปรดระบุ.....
ข้อ 2.3 ประเภทของโรงพยาบาล (โปรดเลือกคำตอบที่ตรงกับโรงพยาบาลของท่านมากที่สุด)
1.☐ ปฐมภูมิ 2.☐ ทุติยภูมิ 3.☐ ตติยภูมิ 4.☐ ศูนย์แพทย์เฉพาะทาง

ข้อ 3. โรงพยาบาลของท่านได้รับมาตรฐานสากลตามนี้หรือไม่

ข้อ 3.1 ประเภท ISO 9000 (ISO 9000/9001)	0.☐ ยังไม่ได้รับ 1.☐ ใช่ 2.☐ กำลังดำเนินการ
ข้อ 3.2 ประเภท ISO 14000 (ISO 14000/14001)	0.☐ ยังไม่ได้รับ 1.☐ ใช่ 2.☐ กำลังดำเนินการ
ข้อ 3.3 มาตรฐาน JCI (Joint Commission International)	0.☐ ยังไม่ได้รับ 1.☐ ใช่ 2.☐ กำลังดำเนินการ
ข้อ 3.4 มาตรฐาน MIR (Managing Infection Risk)	0.☐ ยังไม่ได้รับ 1.☐ ใช่ 2.☐ กำลังดำเนินการ
ข้อ 3.5 มาตรฐาน A-HA (Advance Hospital Accreditation)	0.☐ ยังไม่ได้รับ 1.☐ ใช่ 2.☐ กำลังดำเนินการ

B: ระดับการเป็น SMART HOSPITAL

ข้อ 4. โรงพยาบาลของท่านได้พยายามที่จะพัฒนาสู่การเป็น SMART HOSPITAL ใน 2 ปีที่ผ่านมาหรือไม่	1.☐ ใช่ 0.☐ ไม่ใช่
Smart Place (Level 1)	
ข้อ 4.1 โรงพยาบาลของท่านมีนโยบายจัดทำแผนการขับเคลื่อน พัฒนาศักยภาพและสร้างกระบวนการสื่อสารให้เกิดการพัฒนาด้านอนามัยสิ่งแวดล้อมตามเกณฑ์การประเมินมาตรฐาน GREEN&CLEAN Hospital	0.☐ ยังไม่ได้ทำ 1.☐ อยู่ในแผนดำเนินการ 2.☐ กำลังดำเนินการ 3.☐ สำเร็จ
ข้อ 4.2 โรงพยาบาลของท่านมีการจัดแต่งสถานที่ให้สวยงาม ดูมีความทันสมัย (Digital Look) ช่วยเพิ่มความสะดวกรวดเร็วในการรับบริการ	0.☐ ยังไม่ได้ทำ 1.☐ อยู่ในแผนดำเนินการ 2.☐ กำลังดำเนินการ 3.☐ สำเร็จ
Smart Tools (Level 2)	
ข้อ 4.3 โรงพยาบาลของท่านมีจอแสดงลำดับคิวรับบริการ เพื่อลดความแออัดบริเวณจุดบริการ เช่น หน้าห้องจ่ายยา หน้าห้องเวชระเบียน	0.☐ ยังไม่ได้ทำ 1.☐ อยู่ในแผนดำเนินการ 2.☐ กำลังดำเนินการ 3.☐ สำเร็จ

ข้อ 4.4 โรงพยาบาลของท่านมีระบบแจ้งเตือนคิวรับบริการผ่านช่องทางออนไลน์ หรือช่องท่างอื่น เช่น Line Application, Mobile Application, SMS	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.5 โรงพยาบาลของท่านมีการเชื่อมข้อมูลของเครื่องมือแพทย์ (Vital Sign) เข้าสู่ระบบคอมพิวเตอร์อัตโนมัติ	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
Smart Service (Level 3)	
ข้อ 4.6 โรงพยาบาลของท่านมีการยกเลิกรับสำเนาบัตรประชาชน และเอกสารอื่นที่ออกโดยราชการจากผู้รับบริการ	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.7 โรงพยาบาลของท่านมีการจัดเก็บข้อมูลเวชระเบียนผู้ป่วยด้วยรูปแบบอิเล็คทรอนิกส์ (EMR: Electronic Medical Records)	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.8 โรงพยาบาลของท่านมีการใช้ใบสั่งยาในรูปแบบอิเล็กทรอนิกส์	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.9 โรงพยาบาลของท่านมีข้อมูลระยะเวลารอคอยรับบริการ ณ จุดบริการผู้ป่วยนอก	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.10 โรงพยาบาลของท่านมีการนัดหมายแบบเหลื่อมเวลา หรือมีการจัดกลุ่มผู้รับบริการได้รับบริการตรงเวลา หรือแตกต่างเล็กน้อยอย่างเหมาะสม	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
Smart outcome (Level 4)	
ข้อ 4.11 โรงพยาบาลของท่านมีการจัดการกระบวนการทำงานหลักของกรมอนามัย (Core Business Process)	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ4.12 โรงพยาบาลของท่านมีระบบบริหารจัดการทรัพยากรภายในองค์กร ERP(Enterprise Resource Planning) ที่เชื่อมโยงทุกกระบวนการทำงานหลักของกรมอนามัย (Core Business Process) อัตโนมัติ	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.13 โรงพยาบาลของท่านมีข้อมูลต้นทุน (Unit Cost) ในแต่ละแผนก	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ

ข้อ 4.14 โรงพยาบาลของท่านมีการบริหารจัดการต้นทุน (Unit Cost) ให้อยู่ในเกณฑ์ที่เหมาะสม	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
Smart Hospital (Level 5)	
ข้อ 4.15 โรงพยาบาลของท่านมีการอนุรักษ์สิ่งแวดล้อม และอนุรักษ์พลังงานอย่างยั่งยืน	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.16 โรงพยาบาลของท่านมีประสิทธิภาพในการจัดการ มีข้อมูลต้นทุน (Unit Cost) ในเกณฑ์ที่เหมาะสมที่สามารถเปรียบเทียบกับหน่วยงานอื่นได้	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.17 โรงพยาบาลของท่านมีการให้บริการอย่างมีคุณภาพในทุกมิติ (ด้านความปลอดภัย, ด้านคุณภาพ, ด้านประสิทธิภาพ)	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.18: โรงพยาบาลของท่านมีคาดการณ์การบริหารความเสี่ยง (Proactive Risk Management) ที่ดีในทุกด้าน	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
Advance Smart Hospital (Level 6)	
ข้อ 4.19 โรงพยาบาลของท่านมีการนำเทคโนโลยีโทรเวชกรรม (Telemedicine / Teleconsultation) มาใช้ภายในโรงพยาบาลเพื่อช่วยให้คำปรึกษาผู้ป่วย และลดข้อจำกัดเรื่องการเดินทาง และช่วยอำนวยความสะดวกสำหรับผู้ป่วยที่อยู่ในพื้นที่ห่างไกล	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.20 โรงพยาบาลของท่านมีการเชื่อมโยงข้อมูลประวัติการรักษาพยาบาลของผู้ป่วยกับโรงพยาบาลเครือข่ายโดยใช้ข้อมูลมหัต (Big Data)	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.21 โรงพยาบาลของท่านมีการใช้อุปกรณ์ในการติดตามอุปกรณ์ทางการแพทย์ที่สามารถเคลื่อนย้ายได้	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.22 โรงพยาบาลของท่านมีการใช้ตู้จ่ายเงินหรือยาอัตโนมัติสำหรับการรับยา และชำระค่ายา/ค่าบริการ	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ
ข้อ 4.23 โรงพยาบาลของท่านมีระบบตรวจสอบความถูกต้องของผู้รับยา และรายละเอียดยาที่ต้องได้รับ	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ

ข้อ 4.24 โรงพยาบาลของท่านมีระบบปัญญาประดิษฐ์ (AI) ภายในโรงพยาบาลของท่าน	0. ☐ ยังไม่ได้ทำ 1. ☐ อยู่ในแผนดำเนินการ 2. ☐ กำลังดำเนินการ 3. ☐ สำเร็จ

C. การจัดการความรู้ภายในองค์กร (Knowledge Management)

ข้อ 5: ข้อ 5. การจัดการความรู้ภายในโรงพยาบาลของท่านมีลักษณะดังต่อไปนี้หรือไม่

(คะแนน 1 = ไม่เห็นด้วยอย่างยิ่ง, 2 = ไม่เห็นด้วย, 3 = ปานกลาง, 4 = เห็นด้วย, 5 = เห็นด้วยอย่างยิ่ง)

	1.	2.	3.	4.	5.
ข้อ 5.1 โรงพยาบาลของท่านมีการกำหนดกลยุทธ์,สำรวจ, พัฒนา และสร้างทีมงานการจัดการความรู้ภายในองค์กร	☐	☐	☐	☐	☐
ข้อ 5.2 โรงพยาบาลของท่านมีการติดตาม ควบคุมโครงการ	☐	☐	☐	☐	☐
ข้อ 5.3 โรงพยาบาลของท่านมีการจัดการอบรมเพื่อแลกเปลี่ยนความรู้	☐	☐	☐	☐	☐
ข้อ 5.4 ผู้นำองค์กรกำหนดการศึกษา ทักษะ ความรู้และข้อกำหนดอื่น ๆที่ต้องการสำหรับบุคลากรทุกคน	☐	☐	☐	☐	☐
ข้อ 5.5 ผู้นำองค์กรจัดทำและนำไปปฏิบัติซึ่งกระบวนการสำหรับการสรรหา การประเมิน และการบรรจุบุคลากร รวมถึงวิธีการปฏิบัติที่เกี่ยวข้องอื่น ๆที่องค์กรกำหนด	☐	☐	☐	☐	☐
ข้อ 5.6 บุคลากรแต่ละคนได้รับการศึกษาและฝึกอบรมระหว่างประจำการ รวมถึงการศึกษาและฝึกอบรมอื่น ๆอย่างต่อเนื่อง เพื่อธำรงหรือเพิ่มพูนทักษะและความรู้ของตน	☐	☐	☐	☐	☐

D. ทักษะของผู้บริหาร (Leadership Skills)

ข้อ 6. ทักษะของผู้อำนวยการโรงพยาบาลของท่านมีลักษณะดังต่อไปนี้หรือไม่ **(คะแนน 1 = ไม่เห็นด้วยอย่างยิ่ง, 2 = ไม่เห็นด้วย, 3 = ปานกลาง, 4 = เห็นด้วย, 5 = เห็นด้วยอย่างยิ่ง)**					
ทักษะทางปัญญา (Cognitive Skill)					
	1.	**2.**	**3.**	**4.**	**5.**
ข้อ 6.1 การสื่อสาร (Speaking) เพื่อให้งานบรรลุตามเป้าหมาย	☐	☐	☐	☐	☐
ข้อ 6.2 การฟังเชิงรุก (Active Listening) เพื่อเข้าใจปัญหาอย่างแท้จริง	☐	☐	☐	☐	☐
ข้อ 6.3 การเขียน (Writing) เพื่อถ่ายทอดนโยบาย การดำเนินงานอย่างชัดเจน	☐	☐	☐	☐	☐
ข้อ 6.4 การอ่าน (Reading Comprehension) เพื่อประมวลความรู้นำมาใช้ในการบริหารงาน	☐	☐	☐	☐	☐
ทักษะทางธุรกิจ (Business Skill)					
ข้อ 6.5 การวิเคราะห์การปฏิบัติงาน (Operation Analysis)	☐	☐	☐	☐	☐
ข้อ 6.6 การบริหารด้านทรัพยากรบุคคล (Management of Personnel Resources)	☐	☐	☐	☐	☐
ข้อ 6.7 การบริหารการจัดการด้านการเงิน (Management of Financial Resources)	☐	☐	☐	☐	☐
ข้อ 6.8 การบริหารจัดการทรัพยากร (Management of Material Resources)	☐	☐	☐	☐	☐
ทักษะการติดต่อสื่อสารระหว่างบุคคลภายในองค์กร (Interpersonal Skill)					
ข้อ 6.9 การรับรู้ทางสังคม (Social Perceptiveness) เพื่อรับรู้การตอบสนองต่อปัญหา และนโยบายของคนในองค์กร	☐	☐	☐	☐	☐
ข้อ 6.10 การเจรจาต่อรอง (Negotiation)	☐	☐	☐	☐	☐
ข้อ 6.11 การโน้มน้าวชักจูง (Persuasion)	☐	☐	☐	☐	☐
ทักษะด้านกลยุทธ์ (Strategic Skill)					

ข้อ 6.12 การสร้างวิสัยทัศน์ (Visioning) ให้กับคนในองค์กรแต่ละระดับ	☐	☐	☐	☐	☐
ข้อ 6.13 มีการประเมินเพื่อตัดสินความสำเร็จของงานอย่างเป็นระบบ (System Evaluation)	☐	☐	☐	☐	☐
ข้อ 6.14 มีการระบุสาเหตุสำคัญในการดำเนินงานอย่างชัดเจน (Identification of Key Causes)	☐	☐	☐	☐	☐
ข้อ 6.15 มีการประเมินวิธีการแก้ปัญหาอยู่เสมอ (Solution Appraisal)	☐	☐	☐	☐	☐

E. การยอมรับเทคโนโลยี (Technology acceptance)

ข้อ 7: ทัศนคติของเจ้าหน้าที่ต่อการยอมรับเทคโนโลยีภายในโรงพยาบาลของท่านมีลักษณะดังต่อไปนี้หรือไม่ **(คะแนน 1 = ไม่เห็นด้วยอย่างยิ่ง, 2 = ไม่เห็นด้วย, 3 = ปานกลาง, 4 = เห็นด้วย, 5 = เห็นด้วยอย่างยิ่ง)**					
	1.	**2.**	**3.**	**4.**	**5.**
ข้อ 7.1. เทคโนโลยีช่วยให้ปฏิบัติงานง่ายขึ้น ไม่ยุ่งยากซับซ้อน	☐	☐	☐	☐	☐
ข้อ 7.2. เทคโนโลยีสามารถนำมาประยุกต์ใช้กับระบบที่ท่านใช้อยู่ในปัจจุบัน	☐	☐	☐	☐	☐
ข้อ 7.3. เทคโนโลยีสามารถช่วยลดขั้นตอนการดำเนินงาน	☐	☐	☐	☐	☐
ข้อ 7.4. เทคโนโลยีช่วยให้ท่านได้รับข้อมูลอย่างรวดเร็ว และถูกต้อง	☐	☐	☐	☐	☐
ข้อ 7.5. เทคโนโลยีช่วยเพิ่มประสิทธิภาพในการทำงาน	☐	☐	☐	☐	☐

ข้อ 8: ความเข้าใจของกลุ่มเจ้าหน้าที่เกี่ยวกับ Smart Hospital ของท่านอยู่ในระดับใดต่อไปนี้ **(คะแนน 1 = ไม่เข้าใจอย่างยิ่ง, 2 = ไม่เข้าใจ, 3 = ปานกลาง, 4 = เข้าใจ, 5 = เข้าใจอย่างยิ่ง)**					
	1	**2**	**3**	**4**	**5**
ข้อ 8.1 กลุ่มแพทย์	☐	☐	☐	☐	☐
ข้อ 8.2 กลุ่มทันตแพทย์	☐	☐	☐	☐	☐
ข้อ 8.3 กลุ่มเภสัชกร	☐	☐	☐	☐	☐
ข้อ 8.4 กลุ่มพยาบาล	☐	☐	☐	☐	☐
ข้อ 8.5 กลุ่มผู้ช่วยทันตแพทย์	☐	☐	☐	☐	☐

ข้อ 8.6 กลุ่ม IT support staff	☐	☐	☐	☐	☐

F. การใช้มาตรฐาน Joint Commission International ภายในองค์กร (JCI)

ข้อ 9: การใช้มาตรฐาน JCI ภายในโรงพยาบาลของท่านมีลักษณะดังต่อไปนี้หรือไม่ **(คะแนน 1 = ไม่เห็นด้วยอย่างยิ่ง, 2 = ไม่เห็นด้วย, 3 = ปานกลาง, 4 = เห็นด้วย, 5 = เห็นด้วยอย่างยิ่ง)**					
International Patient Safety Goals (IPSG)	**1.**	**2.**	**3.**	**4.**	**5.**
ข้อ 9.1. โรงพยาบาลของท่านมีการระบุผู้ป่วยถูกต้อง	☐	☐	☐	☐	☐
ข้อ 9.2. โรงพยาบาลของท่านพัฒนา และจัดทำกระบวนการเพื่อเพิ่มความปลอดภัยในการใช้ยาที่ต้องระมัดระวังสูง	☐	☐	☐	☐	☐
ข้อ 9.3. โรงพยาบาลของท่านมีการปฏิบัติตามแนวทางการทำความสะอาดมือที่อิงหลักตามวิชาการเพื่อลดความเสี่ยงต่อการติดเชื้อเนื่องจากการบริการสุขภาพ	☐	☐	☐	☐	☐
ข้อ 9.4. โรงพยาบาลของท่านพัฒนาและดำเนินการบวนการเพื่อลดความเสี่ยงต่อการเกิดอันตรายของผู้ป่วยอันเนื่องจากการพลัดตกหกล้ม	☐	☐	☐	☐	☐

ข้อเสนอแนะ

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BIOGRAPHY

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Publications

Chansanguan, S., Rittippant, N., Ueki, Y., & Jeenanunta, C. (2025). Sustainable Digital Transformation in Public Hospitals: Strategic Enablers for Smart Healthcare Systems. *Sustainability*, *17*(19), 8614. https://doi.org/10.3390/su17198614

Chansanguan, S., Jeenanunta, C., & Rittippant, N. (2022). The Success Factors for Digital Transformation to become a Smart Hospital: Case Study in Thailand. *Journal of Intelligent Informatics and Smart Technology*, *7*(April), 25. https://doi.org/10.14456/jiist.2022.12