เรียนรู้เพื่อรับใช้สังคม

DIGITAL LEADERSHIP IN HOSPITAL CONTEXT

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ABSTRACT

Today, digitalization is ubiquitous and pervasive in our lives, and its impact is enormous; capable of changing organizational structures in all industries. In this ever-changing digital organizational environment, hospital leaders need to understand what kind of impact their actions have on the hospital. The aim of this thesis is to use exploratory and Confirmatory Factor Analysis (CFA) to investigate the factorial structure of digital leadership in a hospital context. The hospital management problem in hospital leadership behavior is that leaders do not have the concept of coordinating and participating in the management of the organization and do not know how to communicate and solicit input from employees. Therefore, digital leaders must be made aware of how to use digital technology to manage the hospital implementation plans. Furthermore, leaders themselves need to manage the digital organization well using the right leadership support behaviors and mentoring behaviors for the organization to continue to grow.

The researcher drew the sample for the study survey from the existing 3302 people in the First Affiliated Hospital of Gannan Medical College. The Yamane formula with 95% confidence limits yielded a minimum sample size of 357 persons. However, data will be collected from 80-100% of the target group as sample size is considered a top priority issue for CFA (Shumacker & Lomax, 2012) because CFA is a method essentially based on correlation coefficients. Whether the coefficient is an adequate estimate of the population correlation affects statistical inferences and validity, i.e. the more stable the sample correlations, the more valid the scores (Schumacker & Lomax, 2015; Finch et al., 2016). In contrast, smaller samples potentially produce more unstable correlation estimates and are more prone to outliers

(Finch et al., 2016). The researcher posted the questionnaire and collected the survey data on WeChat Questionnaire Star (APP). The survey questionnaire is a closed-ended questionnaire that consists of three parts. The first part is about the demographic information of the sample. For example, gender, age, department, position, etc. The second contains options for specific questions related to leadership behaviors. The third contains options for questions related to digital leadership behaviors. In addition to this, the researcher will employ video interviews with two vice presidents and three physician directors. The respondents will be asked about their responses to the questionnaire and data will be collected to analyze the characteristic behaviors of the study participants.

Keywords: Digitization, Digital Leadership, Leadership Behavior, Hospital Leadership, Digital Organization

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Mo Yongjian

Abbreviations

DLB	Digital Leadership Behavior
DOB	Digital Organizational Behavior
SL	Supportive leaders

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Chapter 1
Introduction

1.1 Background

As a result of the coronavirus outbreak in 2020, the Chinese government and digital agencies have joined forces to use digital technologies to effectively prevent and control the outbreak. These digital technologies can ensure that the supply chain can play a critically important role during the outbreak and process international relief resources through remote control and remote processing (Chinese Government, 2021). At the macro level, digitization increases social productivity and changes the management model of organizations. At the micro level, digital technologies are also improving organizational efficiency. Due to the impact of digitalization on all industries, the importance of leadership in managing digital organizations is unparalleled (Chreim et al., 2013). For example, hospitals identify patients through medical technology in telemedicine (Meskó et al., 2017).

1.1.1 Background of Ganzhou Hospital

The history of Ganzhou Hospital began in 1924. At that time, American nuns founded the first hospital in the southern part of Ganzhou Sunan area, officially named "Ganzhou Catholic Hospital of Charity". In 1951, after the People's Government of Ganzhou City announced the official takeover of the hospital, it was renamed as "Ganzhou Municipal Hospital" in 1999. As of September 2021, Ganzhou City, Jiangxi Province has 9503 health service institutions, including 257 hospitals. There are 153 general hospitals, including 9 tertiary general hospitals and 36 secondary general hospitals; 23 Chinese Medicine hospitals, including 2 tertiary Chinese hospitals and 15 secondary Chinese hospitals; 20 maternal and child health care institutions, including 2 tertiary women's health care institutions and 17 secondary women's health care institutions; 1 infectious disease hospital and 1 dermatology hospital. Divided by level there are: 9 tertiary general hospitals, 3 "3A" general hospitals; 5 "3A" specialty hospitals; 36 secondary general hospitals, including 15 "2A" general hospitals. Nowadays, Ganzhou City has a large number of large scale modern hospitals with, powerful technical force, excellent medical equipment and good service concepts,

which provide quality and comprehensive guarantee for the healthy life of Ganzhou people.

1.1.2 Hospital Leader's Management Capabilities

As a result of the complexity of leadership, scholars' definitions of leadership vary, but most emphasize the two main concepts of competence and influence, for example, the ability of leadership to achieve the organization's objectives (Bennis, 1984). In turn, leadership can influence others to achieve the goals set by the organization through motivation (Kouzes and Posner, 1987). Therefore, this study explores the relationship between digital leadership behavioral factors and hospitals based on leadership theory.

Under the new epidemic, Chinese hospitals are replacing "human flow and logistics" with "information flow" through telemedicine to avoid cross-infection, reduce outpatient pressure and crowd gathering, and build a brick wall of general epidemic prevention measures. While healthcare organizations are transforming traditional management practices and improving organizational performance through digital technology, they are also creating challenges for hospital leaders to manage digital organizations. Therefore, the combination of organizational management and medical knowledge has become a unique challenge for hospital leaders (Pillay, 2008). However, some problems in hospital management are mainly due to poor communication and the lack of professional management skills of leaders (Weberg, 2012 and Vaghee, 2013). The main problem with leadership is due to the absence appropriate coaching behaviors and successful support behaviors (Fleming and Kayser, 2008). The results of the study show that the success of hospital organizations cannot be achieved without the strong support of senior management (Ghiasipour et al., 2017). The findings indicate that hospital leaders themselves lack effective leadership behaviors and leadership qualities (Griest and Belles, 1990).

Consider leadership to be one of the most important responsibilities of a hospital administrator (Arab, 2000), it is evident that hospital managers possess few leadership skills, so hospital management needs successful leaders (Eubanks, 1990). Although effective leaders are primarily found in business organizations, they are equally relevant for hospital management (Sonsale, 2017).

1.1.3 Research Opportunity

The researcher's review of domestic and international literature and online sources revealed a large body of literature examining leadership theory. However, for research on hospital leadership, it is only in recent years that scholars have begun to study it and add to the literature on related theories. Compared to foreign countries, Chinese scholars lack research on the theoretical aspects of hospital leadership. In particular, there is little literature examining the factors of digital leadership behavior in hospitals. The researcher hopes that the study in this thesis will add to the literature on relevant aspects of digital leadership behaviors.

1.2 Problem statement

1) To understand the key elements of digital leadership behavior that will bring benefits to the organization in the future.

2) To develop a theoretical framework for digital leadership behavior that will serve as a theoretical foundation.

1.3 Objectives

1) To test the relevance of the factors of digital leadership behavior in hospitals.

2) To determine the relationships between digital leadership behaviors in hospitals.

1.4 Research Questions

1) What are the main factors affecting digital leadership behavior?

2) What is the role of digital leadership behavior in hospitals?

1.5 Limitations of the study

Most of the relevant research in the field of hospital leadership is focused on USA and UK, while there are few studies on hospital leadership in developing countries (Antunes and Moreira, 2013). Secondly, when the researcher conducted the questionnaire, some respondents did not fill out the questionnaire carefully, which led to invalid questionnaires. Therefore, the limitations of these above factors may cause bias in the questionnaire data, which may lead to some errors in the survey results.

1.6 Definition of terms

1) Leadership: Leaders influence their followers to achieve the organizational vision by the way they behave (Northouse, 2007).

2) Supportive leaders (SL): Supportive leaders care about their subordinates and actively create a team atmosphere of openness, joy and goodwill (Hanson, 2003).

3) Directive leadership (DL): The act of giving employees substantially complete instructions on the content of their work tasks (House, 1971).

4) Digital organization behavior: The organization has improved organizational efficiency by using digital technology to ensure the coordination of members' work and increase task participation rates (Ivanova, 2018).

5) Digital leaders: Leaders who master digital technologies and use digital skills wisely in the process of digital transformation (Kollmann, 2020).

6) Digital Leadership Behavior: digital leadership behaviors can be classified as digital support, digital decision making, digital implementation, digital support, digital engagement, digital encouragement and digital guidance (Peng, 2021).

1.7 Expectations

Throughout this paper, the researcher attempts to better understand the impact of leadership-related theories on digital leadership behavior in Ganzhou Hospital. The researcher wishes to study the factors associated with digital leadership behavior variables.

1.8 Conclusion

This paper focuses on digital leadership behavior in the First Affiliated Hospital of Gannan Medical College, Ganzhou City. Through the results of the study, the researcher hopes to show the impact of digital leadership behavior factors on the hospital.

Chapter 2
Literature review

The literature review is structured in three parts: first, leadership theory is described, and a theoretical framework is developed; second, the issues of hospital leadership and management are described. Finally, the main factors of digital leadership behavior in hospitals are discussed and the findings are summarized.

2.1 Leadership

The researcher summarized and synthesized the literature from various scholars to understand the definition of leadership and the evolution of leadership behavior theory and leadership power change theory is then described. Finally, the role of leadership is examined.

2.1.1 The role of leadership

1) Definition of Leadership

In regard to the concept of leadership, scholars in different countries have conducted in-depth research and practical exploration of leadership theories at different times, which eventually evolved into various leadership theories, but no universally agreed leadership concept has been formed.

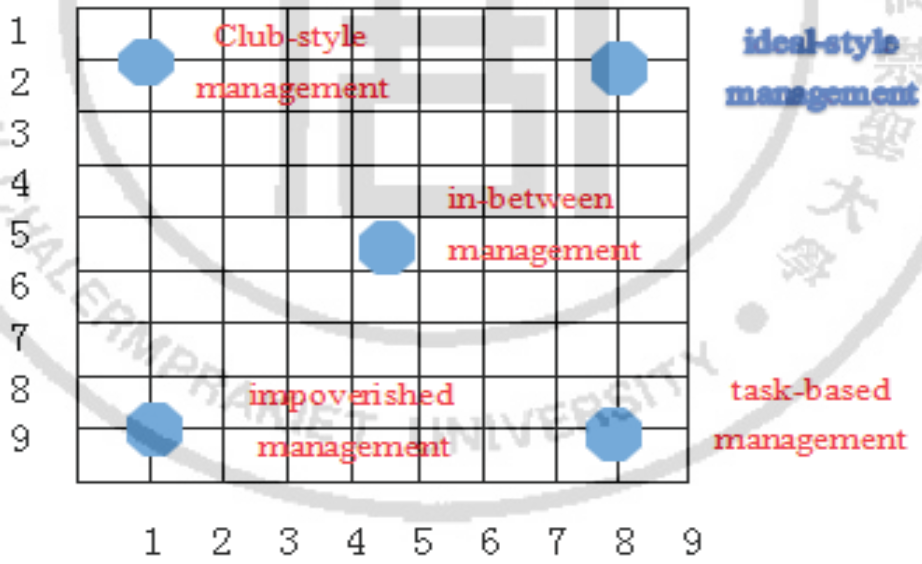
A leader is defined as one who promotes the conviction, admiration and collaboration of his followers through his own abilities (Moore, 1927). Defining leadership in terms of a group approach is able to instruct the intention of organizing all relevant activities (Hemphill, 1949), and also followers to achieve organizational goals (Seeman, 1960). At the same time, economic and political resources are used to achieve the common interests of leaders and followers (Burns, 1978). Leadership is defined by behaviors that have an impact on the work goals of followers (Yukl, 1989). Regarding leadership behavior, leadership is the process of giving power to the members of the organization, uniting the members needed for the strategy and setting the future direction of the organization together (Kotter, 1990). Members are encouraged to hold together to accomplish the goals of the organization (Rost, 1991). Leadership is a special kind of interpersonal influence to encourage others to do what they may otherwise not do for the common goal of the organizational group (James and

Barry, 2006). Leadership is considered to be the accomplishment of organizational goals by directing the group (Northouse, 2007). Leadership, therefore, works by influencing the behavior of individuals or groups in order to accomplish the goals of all (Breuer and Szillat, 2019).

2) Theories of Leadership Behavior

Leadership behavior focuses on the work and behavior areas of the leadership process and can be divided into authoritative, participative and permissive leadership styles (Lewin et al., 1939). Behaviorally it can be further divided into "structure" and "care" (Fleishman, 1953 and Stogdil & Coons,1957) and can be, "employee-oriented" and "production-oriented" (Kahn & Katz, 1952 and Likert, 1961). Based on early studies of leadership behavior, the "management grid theory" was developed to change the absolute view of production-centered and people-centered theories. As shown in the figure below, the degree of focus on people is indicated by the vertical coordinate and the degree of focus on production is indicated by the horizontal coordinate (Blake and Mouton, 1964).

Figure 1 Management Grid Theory



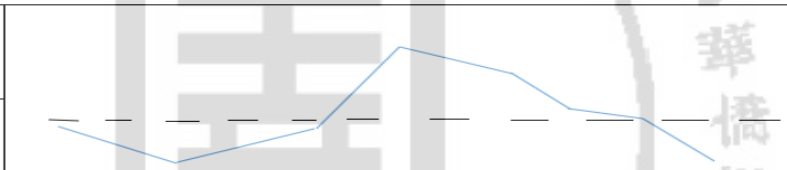
Reference: Blake, R. R., Mouton, J. S. (1964).

Through the development of weighted leadership theory and leadership behavior, the two-dimensional conformational theory evolved into three-dimensional conformational theory (Task oriented, Relationships-oriented, Leadership effectiveness). Following this, the theories focusing on people and work were divided into four basic leadership styles. 1. Interpersonal: leaders who focus on relationships rather than work tasks; 2. Neutral: leaders who are neutral about work and relationships; 3. Dedicated: leaders who focus on getting things done; and 4. Integrated: leaders who achieve work goals through teamwork based on employee and task needs (Reddin, 1970).

3) Leadership Change Theory

Compared to behavioral theory, power change theory focuses more on leadership skills and situations to provide a more effective theory of leadership. As shown in the figure below, the Contingency Model of Leadership Effectiveness combines leadership attributes and leadership behaviors for research (Fiedler, 1962).

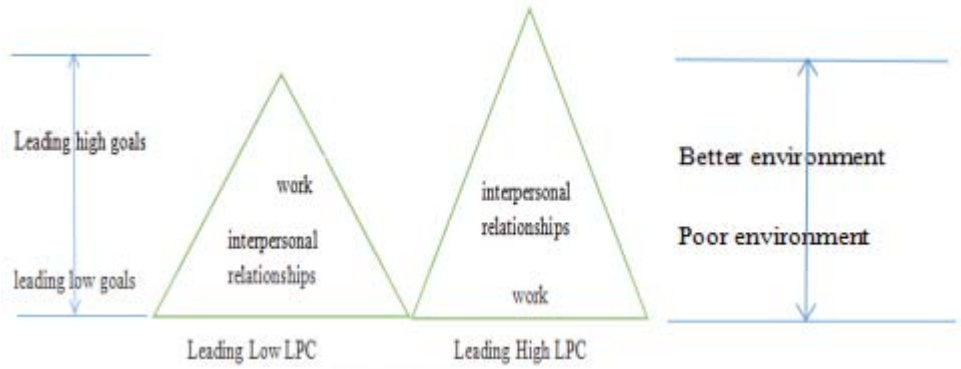
Figure 2 Contingency Model of Leadership Effectiveness

Easy-going, supportive and caring leadership style Control, initiative, organizational regulations of the leadership style								
leader-employee relationship	good	good	good	good	poor	poor	poor	poor
clear task structure	clear			clear			Unclear	
leader's job authority	Strength	weakness	Strength	weakness	Strength	weakness	Strength	weakness
effective leadership style	Task-based	Task-based	Task-based	care-based	care-based	no information	no found	Task-based
numbering	1	2	3	4	5	6	7	8
Control over situations	High			medium			low	

Reference: Fiedler, E. Fred. (1966).

As shown on the LPC scale, the degree of control a leader has over a "group-task" situation depends on how relationships, task structure, and positional authority interact to work together (Fiedler, 1962).

Figure 3 LPC Model



Reference: Fiedler, E. Fred. (1972).

Following Fiedler's power change theory, Howes proposed Path Goal theory. Leaders enable subordinates to accomplish set objectives by caring for tasks and meeting their needs in a way that enables them to do so. For this purpose, directive leadership, supportive leadership, participative leadership and achievement leadership were proposed (Howse, 1971). Situational Theory involves the "maturity" of the subordinate, who has an unparalleled role in the leadership style of the leader. It should be pointed out that employees with different "maturity levels" have different leadership styles (Hersey et al., 1979).

4) Transformational leadership

Based on Burns' exploration of change, transformational leadership theory began to emerge in the 1980s. He defined transformational leadership as the process of making employees understand the necessity of the task, motivating the higher needs of organizational members, and creating a climate of trust among members to move beyond aspirations (Burns, 1978). The concept of transformational leadership was further expanded by Bass, (1994) who summarized it as idealized influence, personalized care, intellectual stimulation, and inspirational motivation (Avolio, 2007). Burns saw transactional leadership as motivating followers by reward or punishment, and transformational leadership as motivating followers primarily by linking with them and increasing mutual intimacy (Burns, 1978). Research shows that transformational leadership is more strongly linked to employee effectiveness (Hater and Bass, 1988). The findings also indicate that transformational leaders have a stronger effect on team effectiveness than transactional leaders (Sosik et al., 1997).

2.1.2 Hospital Leadership and Management

The Medical Leadership Framework was first presented by the Royal College of Physicians and the NHS Institute for Innovation and Improvement in 2008 (Swanwick and McKimm, 2011). It demonstrates that the physician has excellent personal competence in managing services with a clear direction (Rouhani et al., 2018). Traditionally, physicians are responsible for treating patients and leaders are responsible for managing the organization (Flaig et al., 2020). However, hospitals may have the greatest need for leadership due to the shortage of hospital administrators (Eubanks, 1990). Some scientists consider medical leadership as the role of physicians in managing healthcare through administration (Witman, 2011 and Vinot, 2014). Most health systems have adopted a system where, to some extent, physicians are leaders (Spurgeon et al., 2011). That is, there are physicians taking on important roles of management and leadership in the organization (Warren and Carnal, 2011).

The problem with hospital leadership management is that leaders do not understand the concept of coordination and participation in the management of the organization; they do not know how to communicate and solicit input from employees (Flaig et al., 2020). The knowledge of hospital leaders about management issues is lacking (Lega et al., 2013). A survey of pharmacy managers in two hospitals in the United States and three hospitals in Canada revealed that they did not possess management knowledge and lacked management skills (Musing, 2008). The findings indicated that most healthcare leaders felt that they lacked some effective leadership behaviors and leadership qualities (Griest and Belles, 1990). The findings indicate that hospitals are failing because of a perceived absence of effective leadership behaviors, which contributes to a poor patient care process (Francis, 2013). Hospital leaders need to explain to staff that organizational transformation initiatives can be challenging (Williamsson et al., 2016).

Leaders have a great role in the dispute resolution process and they are able to manage the hospital properly by identifying and using effective leadership behaviors (Weil, 1984). Therefore, leadership behaviors are very important for hospitals because they promote organizational development and effectively guide employees to achieve organizational goals (Flaig et al., 2020). In order to accomplish

these goals, hospitals must have leaders who properly guide and support scientifically sound management systems (Pezeshkian, 2002).

2.1.3 Leadership Behavior

1) Task-oriented behavior and relationship-oriented behavior

Task-oriented and relationship-oriented behaviors are studied from a psychological perspective. In particular, relationship-oriented leadership behavior establishes a friendly organizational environment by promoting coordination and cooperation in an interactive manner while, task-oriented leadership behavior can be used to encourage subordinates to accomplish organizational goals through communication when implementing plans. These studies were able to consolidate existing classifications and enhance the concept of leadership behavior for leadership behavior theories (Behrendt et al., 2017). In the theoretical explanation of leadership relationship-oriented behavior, the weight of interpersonal relationships is preferred. Managers act by building emotional bridges with subordinates and giving emotional support to help them feel comfortable in the work environment. These leadership behaviors create good relationships with subordinates that not only improve team cohesion, but also promote the organizational climate (Northouse, 2010). Leadership task-oriented behavior, on the other hand, is mainly task-oriented and focuses more on the progress and quality of the employee's work and how to achieve the organization's goals. Unlike relationship-oriented behaviors, managers do not interact too frequently with employees or pay attention to their emotions during the work process (Yukl et al., 2009).

2) Transformational Leadership Behavior

In the study of transformational leadership behaviors, it was noted that an executive is able to fulfill the roles of a vision setter, motivator, analyst, and taskmaster. The leadership behavior of the vision setter is mainly to explain the future direction of the organization and to focus on the trends within the industry. The leadership behavior of a motivator is usually to inspire subordinates to accomplish the purpose of the organization. The leadership behavior of an analyst is mainly to make operational decisions and control the management process. The leadership behavior of the task manager is to allocate resources appropriately and to think about how to improve the organization's performance and to develop relevant work tasks (Tsui et al.,

2006). Explanation of leadership behavior in terms of transformational leadership behavior can involve the establishment of a shared vision and taking relevant practical actions to give the organization the promise of a better future (Mischel, 1973). Podsakoff further investigated the concept of group-oriented work by managers, supporting the needs of subordinates and setting higher expectations for subordinates to stimulate more thinking (Davis and Podsakoff, 1989).

3) Supportive Leadership and Directive Leadership

As mentioned earlier, it is evident that no business or organization can continue to grow without the profound influence of leadership behaviors on it. Therefore, hospital leaders need to have supportive and guiding behaviors to manage. Supportive leadership builds an organizational climate of trust, mutual support and goodwill (Hernandez et al, 2011). Leaders communicate with subordinates and provide resources to support their work (Rollinson and Broadfield, 2002). Not only that, but supportive leaders also care about their subordinates and actively create a team atmosphere of openness, goodwill, and joy (Lunenburg and Ornstein, 2000).

The process by which directive leaders guide employees through their work tasks is as follows (Sagie, 1997). During the work process, the content of the task is explained, and direction is provided to the members (Fiedler, 1968). These directions include the act of providing essentially complete guidance on the content of work tasks (House, 1971), as well as telling subordinates what to do while, planning and controlling the achievement of goals (Hanson, 2003). Also, it involves following the procedures of the job, providing guidance to the employee task on its purpose, how to do it, when to do it, and by whom, and expecting the employee to obey (Lorinkova et al, 2013). Based on previous management difficulties, leaders can identify the changing needs of the environment and take different actions (Sakiru et al, 2013). Therefore, leaders guide their subordinates to perform relevant work through the right behaviors (Hogan and Kaiser, 2005).

4) Digital Organizational Behavior (DOB)

The advent of the transistor in 1940 led an exponential increase in computing power, which invited the proliferation of digital technology in organizational applications. Because of its inseparable relationship with our lives, research on it has received more attention from scholars. The increased digitization of

goods and services due to the networking of technology components and digital processes has led to a fully digital business environment (Lasi et al., 2014). The use of digital resources is the way through which the organization improves its business (D€orner and Elman, 2015). In regard to how to use digital resources to run the organization's business and transform business models using digital technology (Gartner, 2021), digitalization is defined as situations in which organizational members operate in a smarter way to reach business goals through the processes of digital technology (Birje, 2021). Furthermore, digitization has an integrated IT infrastructure that improves organizational efficiency by transforming digital resources into new processes (Accenture, 2015).

Digital organizational behavior refers to leaders or members who are responsible for managing all activities of digitalization, who are committed to developing plans and strategies for digital organizational management activities, and who have dedicated teams to perform tasks related to digital organizational management activities. Copenhagen Business School (CBS)'s study on "digital organizations", noted the lack of organizational descriptions of digital technologies by scholars (Plesner and Husted, 2020). Organizations are being dominated by digital technologies in a pervasive manner (Yoo et al., 2012). The digital organization is seen as a change in which digital technology acts as the locomotive of change (Ananyin et al., 2018). Digitalization is transforming the character of organizations (Zammuto et al., 2007) and organizational structures are being changed through digital technology (Urbach & Röglinger, 2019).

Organizations use cloud computing to evaluate processes and applications to optimize work, such as supply chain management or assessing employee performance (Foerster et al., 2018). It allows information to be shared with employees through technologies such as sharing platforms, chat software, and intranets to improve employee awareness of relevant activities and change the way organizations collaborate and communicate (Francis and Scheers, 2013). These digital technologies serve as a bridge between employees, work, and services in the organization, bringing them closer together (Oestreicher, 2013). With the profound impact of digital technologies on products and services, it makes them more dependent on information technology (Bharadwaj, 2013), for example, by providing information based on Internet big data

records and user preferences to recommend relevant products based on their preferences and ability to pay. Thus, digitization can help to ensure the coordination of members' work and to increase the rate of task participation, thus improving organizational efficiency (Ivanova, 2018). In a complex digital environment, organizations have to implement digital initiatives in order to adapt to the acceleration of flexibility and agility brought about by digital technology innovations in order for them to maintain their competitive advantage (Gruia et al., 2020).

5) Digital Organizational Transformation

Gartner's report identified digital resources as a priority option in the industry (Gartner, 2017). According to a recent study, organizations are impacted by digital technology and digital transformation has become a key player (Fitzgerald et al., 2014). To some extent, it has changed the way the organization is structured (Wessel et al., 2020). As a result, it has become more difficult than ever for leaders to manage digital organizations (Berghaus and Back, 2017). Consequently, there is an urgent need for companies to adjust their business processes (Wiesböck and Hess, 2020), and reorganize their organizations through digital technologies (Vial, 2019). Therefore, organizations need digital technology approaches to accomplish digital transformation (Schwarzmüller et al, 2018).

As mentioned above, technology has accelerated digital transformation (Buntak et al., 2020). Digital transformation is more of a leadership challenge than a technological challenge (Plesner and Husted, 2020). Organizations are caught in a leadership quagmire, not a technology renewal crisis (Barnato, 2016). Leaders face the challenge of helping organizations become familiar with new technologies and digital transformation (Meffert and Swaminathan, 2018). As a consequence, leaders have an unparalleled challenge in managing organizational processes (Todnem et al., 2012).

6) Digital Leadership Behavior

This study collected literature on digital leadership in the past few years and found that the definition of digital leadership and its related contents by relevant authors are not uniform while attempting to depict the framework of digital leadership. At the same time, there is varied but limited research on leadership behaviors. The behavioral framework of digital leadership is summarized by assessing the research results of previous research and comparing them with the actual situation

of the health care industry. Digital leadership is mainly composed of the following factors: guidance, support, engagement, and innovation.

The fundamental explanation of digital leadership is based on digital thinking, which consists mainly of digital insight, digital decision making, digital execution and digital directives. Research shows that these factors can help digital leaders to modernize processes (Peng, 2021). However, the digitalization of organizations cannot be achieved without the support of digital leadership. The supportive behavior of digital leaders is mainly a set of motivations about digital behavior, support for employees' use of new technologies, and support for employees' digital innovation proposals. In the study of digital leadership characteristics in the construction industry, the findings revealed the types of digital leaders and that leaders in the industry include forward-looking and proactive leaders, supportive leaders, uncoordinated leaders, cautious leaders, resistant leaders, and leaders who lack vision and motivation (Zulu and Khosrowshahi, 2021).The study was focused on the characteristics and behaviors of digital leaders and identified the relevant factors based on exploratory analysis. The study showed that the components that determine the behavioral roles of digital leadership are inspiration, innovation, absorbing uncertainty, adaptation, and vision (Mwita and Joanthan 2019). The impact of digital leadership and innovation management on existing telecommunication companies in Indonesia to face digital disruption and to transform into digital telecommunication companies was studied. The results of the study revealed that both digital leadership and innovation management have an impact on sustainable competitive advantage, with digital leadership having a greater impact than innovation management (Wasono and Furinto, 2018). Digital leadership competencies can be classified as follows: engagement, digital literacy, support, feedback, information, encouragement, application (Claassen et al 2021).

Table 1 Digital leadership classification

No	Author (s) & Year	Title of Paper	Methodology	Main Findings/Outcome	Limitation/Gaps in Literature	TBL Scope
1	Khan (2016)	Leadership in the digital age – A study on the effects of digitalization on top management leadership	Based on qualitative research using a literature survey and 13 in-depth interviews with executives and organizational leaders.	The interconnectedness, reduced time lag and information richness, increased transparency and complexity, elimination of hierarchy and removal of personal barriers, facilitation of decision making, and increased integrity and humanizing effects of digital systems have implications for value-based, transformational and authentic leadership.	Some arguments lack relevant theory.	Leadership
2	Lin (2016)	The Effectiveness of Digital Leadership at K-12 Schools in Mississippi Regarding Communication and Collaboration During CCRS Implementation College-and Career-Readiness Standards	Data were analyzed using qualitative and quantitative studies	Professional development and digital citizenship are more effective than visionary leadership, cultural learning in the digital age, and system improvement.	The context of the school's technology environment can influence teachers' responses.	Leadership

Table 1 (Continued)

No	Author (s) & Year	Title of Paper	Methodology	Main Findings/Outcome	Limitation/Gaps in Literature	TBL Scope
3	Temelkova (2018)	Skills for Digital Leadership - Prerequisite for Developing a High-tech Economy	A descriptive study using relevant literature to justify the results	Future focused primarily on business, information skills for digital leaders (information technology systems, cloud technology, internet of things, social media and big data analytics).	Lack of research on specific measurements of digital leadership	Leadership
4	Wasono & Furinto (2018)	The effect of digital leadership and innovation management for incumbent telecommunication company in the digital disruptive era	The study was conducted using a quantitative approach (PLS) on 100 existing telecommunication companies in Indonesia.	The dominant role of digital leadership on innovation management.	The information or data obtained from cross-sectional/ one-time observations are the results of a study conducted at a specific time.	Leadership
5	Bolte et al (2018)	Digital Leadership 4.0	Interviews with 72 digital leaders from companies of all sizes.	Digital leaders' communication, expectations & positioning, and methods & standards can support company digitization.	The biggest difference is between the employee's perspective and the manager's perspective.	Leadership

Table 1 (Continued)

No	Author (s) & Year	Title of Paper	Methodology	Main Findings/Outcome	Limitation/Gaps in Literature	TBL Scope
6	Zupancic et al (2018)	A Research Framework of Digital Leadership	A mixed qualitative and quantitative study of digital leadership frameworks	The digital leadership framework focuses on human resources and leadership; architectural design processes; digital ecology; and collaborative environments.	Research frameworks and reports on digital leadership are not complete.	Leadership
7	Zeike et al (2019)	Digital Leadership Skills and Associations with Psychological Well-Being	Stepwise logistic regression analysis (SPSS) was used on 368 top executives of a large German ICT company.	Better digital leadership skills were significantly associated with higher levels of well-being.	This study is the first to analyze this association, and research related to the Digital Leadership Scale is incomplete.	Leadership
8	Tiekam (2019)	Digital Leadership Skills that South African Leaders need for Successful Digital Transformation	The research methodology took the form of a qualitative and exploratory research design.	Digital leaders need cognitive skills, business skills, influencing/interpersonal skills, and strategic skills to perform digital transformation.	The research was limited to digital transformation and the skills of senior and executive leaders in organizations	Leadership

Table 1 (Continued)

No	Author (s) & Year	Title of Paper	Methodology	Main Findings/Outcome	Limitation/Gaps in Literature	TBL Scope
9	Mihardja (2019)	The influence of digital leadership on innovation management based on dynamic capability with market orientation as a moderator	Questionnaire data were collected from 88 senior managers of Indonesian telecommunication companies and analyzed using quantitative methods	Digital leadership dynamic capabilities can influence the development of innovation.	Limitations in research model, sample size and time.	Leadership
10	Rüth & Torsten (2019)	The key elements of cultural intelligence as a driver for digital leadership success	Used literature to discuss and examine the results	Cultural intelligence is a critical tool for digital leadership success and is essential for planning, communicating, understanding, and leading cultural boundaries.	Relying only on literature and website sources, the study lacks qualitative or quantitative argumentative results.	Leadership
11	Lubis (2019)	Digital Leadership in Managing Work Motivation of Millenial Employees	This study used a qualitative approach of study cases.	Digital leadership characteristics included creativity, motivation, trustworthiness, knowledge, collaborative and interactive leadership, and trust in subordinates.	The results of the study were not representative and lacked relevant theoretical research underpinnings.	Leadership

Table 1 (Continued)

No	Author (s) & Year	Title of Paper	Methodology	Main Findings/Outcome	Limitation/Gaps in Literature	TBL Scope
12	Yusof et al (2019)	Digital Leadership Among School Leaders in Malaysia	This quantitative study used a cross-sectional survey design and analysis using CFA.	Digital leadership is divided into communication (virtual technology) and school ethos (degree of digitization)	The digital leadership research model is the initial phase	Leadership
13	Mwita & Joanthan (2019)	Digital Leadership for Digital Transformation	This study uses quantitative research and CFA data to analyze the characteristics and behaviors of digital leadership constructs.	Digital leaders' inspirational, innovative, visionary, and Absorb behaviors are better suited for digital transformation.	The predominance of males in the sample may have skewed the study's findings to some extent.	Leadership
14	Damayanti & Mirfani (2020)	An Analysis of Digital Leadership in the Covid-19 Pandemic Era	A qualitative study was conducted using questionnaires as well as semi-structured interviews with faculty, staff and students of MA Nurul Falah University.	The digital skills of digital leaders help to control Covid-19 in the school in the teaching and learning process.	The sample was limited to one university, MA Nurul Falah	Leadership

Table 1 (Continued)

No	Author (s) & Year	Title of Paper	Methodology	Main Findings/Outcome	Limitation/Gaps in Literature	TBL Scope
15	Stana (2020)	Review for future research in digital leadership	Identified literature related to digital leadership in IS journals to describe and analyze.	Described the main factors of digital leadership: strategy and business transformation.	Lack of new theoretical basis for digital leadership research	Leadership
16	Mas & Darma (2020)	Revealing the Digital Leadership Spurs in 4.0 Industrial Revolution	Interviews were conducted with informants and qualitative research was conducted using phenomenological methods.	Digital leadership is not about the digital capabilities one possesses, but how one makes technology work for many people.	The focus of this study was on the informant's personal	Leadership
17	Araujo1 et al (2021)	Digital leadership in business organizations: an overview	Use relevant literature for discussion and research	There is a strong relationship between digital leadership and business success and productivity.	No questionnaires or interviews were used, only relevant literature and examples to explain the results.	Leadership

Table 1 (Continued)

No	Author (s) & Year	Title of Paper	Methodology	Main Findings/Outcome	Limitation/Gaps in Literature	TBL Scope
18	Cahyadi & Magda (2021)	Digital Leadership in the Economies of the G20 Countries: A Secondary Research	The 2019 Global Digital Readiness Index, Global Innovation Index, and Global Competitiveness 4.0 Index were used to conduct the study and analysis	Digital readiness, innovation, and Competitiveness 4.0 are positively correlated with each other.	All data were cross-sectional for 2019.	Leadership
19	Zulu & Khosrowshahi (2021)	A taxonomy of digital leadership in the construction industry	Qualitative data from 41 construction industry professionals were analyzed using an inductive thematic analysis.	Six types of digital leadership were used: proactive and forward thinking; supportive; uncoordinated; cautious; resistant and visionless and unmotivated leadership.	The first study of a taxonomy of digital leadership styles in the construction industry is not representative of the entire construction industry.	Leadership
20	Bach & Sulíková (2021)	Leadership in the Context of a New World: Digital Leadership and Industry 4.0	Collect relevant information and literature to analyze and argue for digital leadership	The results of the study show that digital leadership and mission leadership are one and the same.	The methodology of the study is descriptive and lacks relevant findings.	Leadership

Table 1 (Continued)

No	Author (s) & Year	Title of Paper	Methodology	Main Findings/Outcome	Limitation/Gaps in Literature	TBL Scope
21	Tareque & Islam (2021)	Digital Leadership: The Perspectives of the Apparel Manufacturing	Visited 50 RMG factories in Bangladesh and talked to factory owners and managers and collected raw data.	The digital leaders of RMG Bangladesh lacked some of the technical knowledge needed to lead digitalization projects.	Limitations of the study: it was based are only on the textile industry in Bangladesh	Leadership
22	Saputra (2021)	Digital Skills during COVID-19: Effects of Digital Leadership and Digital Collaboration	Sampling methods were used, and the collected data was structured into a first-order structure through PLS structural equation modeling.	Digital skills are directly influenced by digital collaboration and indirectly by digital leadership.	The limitation of this study is the non-probability of the sampling method	Leadership
23	Suksai (2021)	A Digital Leadership Development Model for School Administrators in Basic Education to Fulfill the Thailand 4.0 Policy	Quantitative Analysis of the Components of Digital Leadership for Thai School Administrators	Components of digital leadership: visionary leadership; digital technology in teaching and learning; digital technology in administration; digital technology in support and management in education; digital technology in measurement and assessment; and ethics in the use of digital technology.	Some research samples were identified through selectivity and purposefulness.	Leadership

Table 1 (Continued)

No	Author (s) & Year	Title of Paper	Methodology	Main Findings/Outcome	Limitation/Gaps in Literature	TBL Scope
24	Peng (2021)	Digital leadership: State governance in the era of digital technology	Collection of web materials and related literature to analyze digital leadership.	Digital leadership is supported by digital thinking consisting of digital insight, digital decision making, digital implementation, and digital guidance.	Digital leadership theory lacks relevant research findings	Leadership

Table 2 Digital Leadership Summary

Digital Leadership	Definition of this thesis	Source
	In the context of leadership, digital leadership refers to core competence in communication, content, and computing as a contribution toward a knowledge society (Goethals et al 2002). Defined in terms of the digital leadership functional area, it can be divided into strategic leadership, digital skills ands business entrepreneurship (Temelkova, 2018). Defined by digital leadership characteristics: Creative, Deep Knowledge, Global Vision, Inquisitive, Thinker (Wasono and Furinto, 2018).	Goethals et al (2002) Temelkova (2018) Wasono and Furinto(2018)

Table 3 Digital leadership Behavior Summary

No	Author (s) & Year	Title of Paper	Methodology	Main Findings/Outcome	Limitation/Gaps in Literature	TBL Scope
1	Mwita & Joanthan (2019)	Digital Leadership for Digital Transformation	This study uses quantitative research and CFA data to analyze the characteristics and behaviors of digital leadership constructs.	Inspirational role, Innovation role, Absorbing uncertainty role, Adaptation role, and Visionary role are the digital leadership behaviors required for an organization's digital transformation process.	The predominance of males in the sample may have skewed the study's findings to some extent.	Leadership
2	Cahyadi & Magda (2021)	Digital Leadership in the Economies of the G20 Countries: A Secondary Research	The 2019 Global Digital Readiness Index, Global Innovation Index, and Global Competitiveness 4.0 Index were used to conduct the study and analysis	Digital readiness, innovation, and Competitiveness 4.0 are positively correlated with each other.	All data are cross-sectional for 2019.	Leadership

Table 3 (Continued)

No	Author (s) & Year	Title of Paper	Methodology	Main Findings/Outcome	Limitation/Gaps in Literature	TBL Scope
3	Zulu & Khosrowshahi (2021)	A taxonomy of digital leadership in the construction industry	Qualitative data from 41 construction industry professionals were analyzed using an inductive thematic analysis.	Six types of digital leadership were used: proactive and forward thinking; supportive; uncoordinated; cautious; resistant and visionless and unmotivated leadership.	The first study of a taxonomy of digital leadership styles in the construction industry is not representative of the entire construction industry.	Leadership
4	Peng (2021)	Digital leadership: State governance in the era of digital technology	Collection of web materials and related literature to analyze digital leadership.	Digital leadership is supported by digital thinking consisting of digital insight, digital decision making, digital implementation, and digital guidance.	Digital leadership theory lacks relevant research findings.	Leadership
5	Claassen et al(2021)	How to evaluate digital leadership: a crosssectional study	Using CFA to examine and analyze data from an online survey of 546 employees at VDU workstations in the City Administration in 2020.	The competencies of digital leadership can be divided into: engagement, digital literacy, support, feedback, information, encouragement, application.	Standardized instruments for measuring digital leadership perform well in terms of discriminant power, unidimensionality, homogeneity, reliability, and construct validity.	Leadership

Table 4 Digital leadership Behavior Summary

Digital Leadership Behavior	Definition of this thesis	Source
	Digital leadership behaviors include inspiration, innovation, uncertainty absorption, adaptation and vision(Mwita and Joanthan, 2019). In terms of digital leadership behaviors, digital readiness, innovation and competitiveness 4.0 are positively related to each other (Cahyadi and Magda, 2021). Digital leadership behaviors are classified into six types: proactive, forward-thinking leadership; supportive leadership; uncoordinated leadership; cautious leadership; resistant and visionless, unmotivated leadership (Zulu and Khosrowshahi, 2021). From a thinking perspective, digital leadership behaviors can be classified as digital support, digital decision making, digital implementation and digital guidance (Peng 2021).	Mwita and Joanthan(2019) Cahyadi and Magda (2021) Zulu and Khosrowshahi (2021) Peng (2021) Claassen et al(2021)
	Research in digital leadership competencies shows that digital leadership behaviors can be classified as: engagement, digital literacy, support, feedback, information, encouragement, application (Claassen et al 2021). In general, digital leadership behaviors are the behaviors of leaders in guidance, supporting, implementing, engagement and innovating all digital activities (including digital insight, digital decision making, digital readiness, etc).	

Table 5 Observer Variables

Digital Leadership Behavior	Definition of this thesis	Source
Digital support	As the problem with hospital leadership management is that leaders do not employ the concept of coordination and participation in the management of the organization; they do not know how to communicate and solicit input from employees (Flaig et al., 2020) Digital support is service delivered via digital channels such as email, chat, mobile apps, social media, and more. This allows teams to interact with businesses using their smartphones, tablets and computers. Digital support is considered to be convenient for team members because it provides choices that match their digital lifestyles. Each channel has its own characteristics in terms of speed and level of agent support, so there's a channel for just about every support scenario. Digital support is the process by which leaders guide employees through their work tasks (Sagie, 1997). During the work process, the content of the task is explained, and direction is provided to the members (Fiedler, 1968). These directions include the act of providing essentially complete guidance on the content	Sagie (1997) Fiedler (1968) House (1971) Hanson(2003) Lorinkova et al (2013)
	of work tasks (House, 1971), as well as telling subordinates what to do, planning and controlling the achievement of goals (Hanson, 2003). Also, it is the act of following the procedures of the job, providing guidance to the employee task on its purpose, how to do it, when to do it, and by whom, and expecting the employee to obey (Lorinkova et al, 2013)	

Table 5 (Continued)

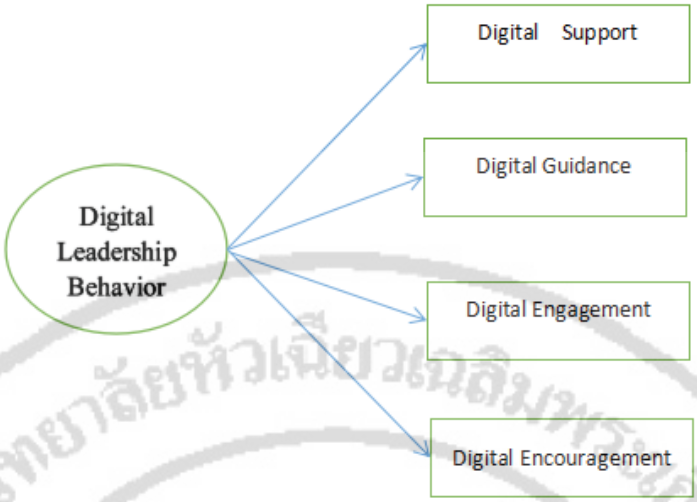
Digital Leadership Behavior	Definition of this thesis	Source
Digital Guidance	As the problem with hospital leadership management is that leaders do not employ the concept of coordination and participation in the management of the organization; they do not know how to communicate and solicit input from employees (Flaig et al., 2020) In the theoretical explanation of leadership relationship-oriented behavior, it prefers the weight of interpersonal relationships. They act by building emotional bridges with subordinates and giving emotional support to help them feel comfortable in the work environment. These leadership behaviors create good relationships with subordinates that not only improve team cohesion, but also promote organizational climate (Northouse, 2010) Leadership task-oriented behavior, on the other hand, is mainly task-oriented and focuses more on the progress and quality of the employee's work and how to come to achieve the organization's goals. Unlike relationship-oriented behaviors, they do not interact too frequently with employees and pay attention to their emotions during the work process (Yukl et al., 2009).	Flaig et al (2020) Northouse (2010) Yukl et al (2009)
Digital Engagement	Explanation of leadership behavior in terms of digital engagement can be the establishment of a shared vision of the good and taking relevant practical actions to give the organization the promise of a better future (Mischel, 1973). Podsakoff further investigated the concept of group-oriented work, supporting the needs of subordinates and setting higher expectations for subordinates to stimulate more thinking (Davis and Podsakoff, 1989).	Mischel (1973) Davis and Podsakoff (1989)

Table 5 (Continued)

Digital Leadership Behavior	Definition of this thesis	Source
Digital Encouragement	Task-oriented leadership behaviors can encourage subordinates to accomplish organizational goals through communication when implementing plans. These studies were able to consolidate existing classifications and enhance the leadership behavior concept of leadership behavior theory (Behrendt et al., 2017). It also stimulates the higher needs of organizational members and creates a climate of trust among members, thus transcending the process of aspiration (Burns, 1978).	Behrendt et al (2017) Burns (1978)

2.2 Theoretical framework

Diagram 1 Digital Leadership Behavior Framework



2.3 Research question

1. What are the main factors affecting digital leadership behavior?
2. What is the role of digital leadership behavior in hospitals?

2.4 Conclusion

The researcher learned from the literature that scholars at different times have offered various definitions of leadership. The definition of leadership mainly refers to the leader's ability to influence individuals or groups to achieve a common vision through his or her own abilities. Regarding Leadership Behavior Theory, the researcher found that leadership behavior mainly refers to the process by which leaders focus on employee orientation and task orientation. In Leadership Change Theory, leaders choose different leadership styles based on the maturity of their employees.

Through related studies, researchers found that the main problems in hospital leadership and management are lack of coordination, lack of involvement in organizational management, lack of management knowledge, and lack of management skills among leaders. Therefore, it is important that digital leaders in hospitals have effective leadership behaviors to support and guide the development of the hospital. Through the related literature, it was found that various factors are employed by

researchers to study digital leadership behaviors. Based on the relevant literature, the researcher concluded that the main digital leadership behaviors are digital support, digital guidance, digital engagement, and digital encouragement.

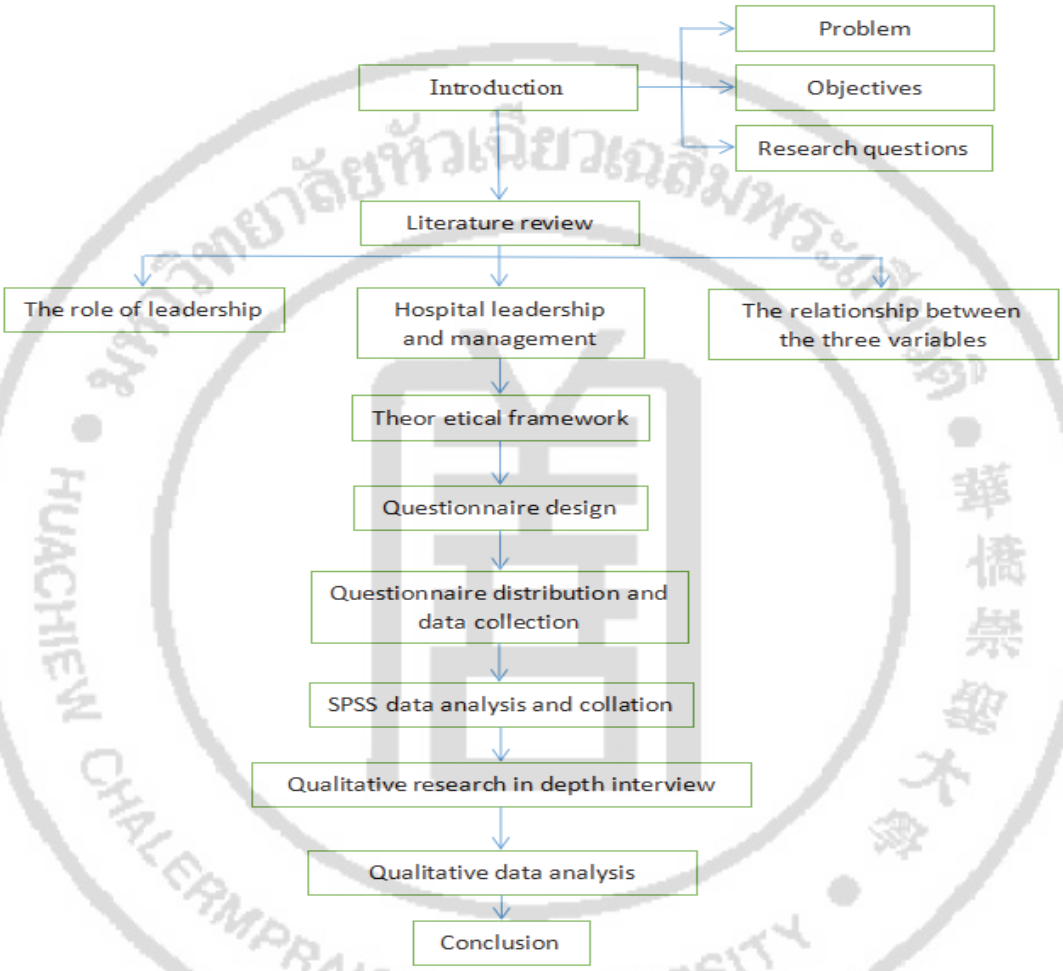
In summary, it is evident that digital leadership behaviors are important for hospital and the findings suggest that digital leadership behaviors are related to digital support, digital guidance, digital engagement, and digital encouragement. Leaders can have some degree of influence on hospitals through these leadership behaviors.

Chapter 3

Research methodology

3.1 Research methodology and type

Figure 4 Research framework



The thesis "Digital Leadership in a Hospital Context" aims to develop and examine the Goodness-of-fit Index of Confirmatory Factor Analysis (CFA) in digital leadership for different working groups in the hospital. A mixed method research methodology was employed (Dominat-less Dominant Design) employing both quantitative research and qualitative research methods to confirm the findings.

The thesis procedures are as follows:

1. Concepts, theories, and related research on digital leadership behavior is analyzed to synthesize and summarize the related concepts and theories.

2. A questionnaire was created to determine the definitions and meanings of digital leadership behavior, with validity testing by Konbach's Alpha Coefficient with a value of 0.70 or higher.

3. The sample was collected from one general hospital and is not fully representative of the entire Chinese hospital industry. Quantitative data were collected from the target sample group who were the employees at the First Affiliated Hospital of Gannan Medical College.

4. Quantitative data analysis was conducted with SPSS (Statistical Package for the Social Science for Windows), and Confirmatory Factor Analysis was then employed.

5. Qualitative analysis was employed by using in-depth interview with a semi structure questionnaire which consisted of several key questions that helped to define the areas to be explored, but also allowed the interviewer and interviewees to digress in order to answer in more detail (Britten, 1999) In this interview and questionnaire survey, senior managers of the hospital, as well as middle and lower-level managers of each department and general employees of the hospital were included.

Summary of the Research Results

The main literature for this study are the conceptual definitions of Digital Leadership theory, Digital Organization theory and practice, and other issues of management. By summarizing the in-depth interviews on issues related to digital leadership and hospital management, the research objectives are met to provide theoretical support for the role of digital leadership on digitalization in Ganzhou Hospital.

3.2 The Main Variables of the Study

This thesis aims to study the meanings and factors that can explain the main variable “digital leadership behavior” with the observer parameters as digital support, digital guidance, digital engagement and digital encouragement.

3.3 Population and Sample

3.3.1 Population and research site

Respondents and questionnaire respondents were mainly from the existing 3302 personnel (formal + contract) of the First Affiliated Hospital of Gannan Medical College. Among them, 1057 were doctors (including 55 physicians in administrative departments); 1576 were nurses (including 150 nurses in administrative departments); 348 were medical technicians; and 321 were in the organ departments as shown in the table below.

Table 6 Total hospital staff

Department	Population
Doctors	1057
Nurses	1576
Medical Technicians	348
Organ Department	321
Total hospital staff	**3302**

Using the First Affiliated Hospital of Gannan Medical College as the study site, the researchers plan to conduct in-depth interviews with two current vice presidents and three chief physicians at the First Affiliated Hospital of Gannan Medical College via WeChat video. Questionnaires are then developed to distribute to physicians (surgery, gastroenterology, orthopedics, neurology, etc.), nurses, medical technicians, and agency department personnel in various hospital departments through the Questionnaire Star (APP) on WeChat software. However, the language factor of the questionnaire could cause some misunderstanding for the respondents and might cause some errors in the survey results. Therefore, the researcher will use both Chinese and English versions of the questionnaire so that the respondents can understand the content and information expressed in the questionnaire more clearly.

3.3.2 Sample-method to select the sample and sample size

The researchers drew the sample size for the study survey from the existing 3302 staff at the First Affiliated Hospital of Gannan Medical College. The researchers used Yamane's theoretical formula to determine the overall sample size

$n=N/(1+N(e)^2)$ (Yamane, 1967) where n denotes the sample size, N denotes the population being studied (3302), and E denotes the margin difference (0.05). The researchers used a total of 3302 respondents and to determine the sample size, the following formula was calculated as: $n=3302/(1+3302(0.05)^2)$, n=356.75. From the calculations, the sample size of 357 for 3302 people is the lower number of respondent responses that maintains the 95% confidence interval. The final number of samples collected was 458 (n=458).

3.4 Data gathering methods

The researcher uses a designed questionnaire from Questionnaire Star (APP) and collected the survey data through the questionnaire on WeChat Questionnaire Star (APP). The survey questionnaire is a closed-ended questionnaire that consists of three parts. The first part is about the demographic information of the sample, for example, gender, age, department, position, etc. The second includes specific questions related to leadership behaviors. The third includes questions related to digital leadership behaviors. In addition to this, the researcher will use video interviews with two vice presidents and three physician directors. The respondents will be asked about their responses to the questionnaire and data will be collected to analyze the characteristic behaviors of the study participants.

The researcher will then organize the data collected from the respondents' answers and use SPSS CFA software for data analysis and processing. Second, a Likert scale is used to ensure standardization and comparability of generic data. For example, the options in the questionnaire were "strongly agree", "agree", "not necessarily", "disagree", and "strongly disagree", which were recorded as 5, 4, 3, 2, and 1 (Likert, 1932).

3.5 Data analysis

Descriptive statistics such as percentage, mean and standard deviation will be used. The researcher drew the sample size of the study survey from the existing 3302 people in the First Affiliated Hospital of Gannan Medical College. The Yamane formula with 95% confidence limits determined the minimum sample size as 357 persons. However, researcher will try to collect 80-100% of data from the target group

as the CFA sample size is considered a top priority issue (Shumacker and Lomax, 2012) because CFA is a method essentially based on correlation coefficients. Whether the coefficient is an adequate estimate of the population correlation affects statistical inference and validity, i.e., the more stable the sample correlations, the more valid the scores (Schumacker and Lomax, 2015; Finch, French, & Immekus, 2016; Tabachnick and Fidell, 2013). In contrast, smaller samples potentially produce unstable correlation estimates and are more prone to outliers (Finch et al., 2016).

The main purpose of using CFA is to perform validity verification, for example, content validity, structural validity, convergent validity, and discriminant validity. Content validity is a textual description of the validity of a scale, such as references, expert approval scales, and other textual descriptions. Structural validity is the correspondence between a factor and a measure (scale item), and if it meets the expectation, then it has structural validity. Convergent validity analysis uses two indicators, AVE and CR, and indicates good convergent validity if the AVE value for each factor is greater than 0.5 and the CR value is greater than 0.7, and generally requires a factor loading value greater than 0.7 for each measure. If the square root of AVE is greater than the correlation coefficient between the factor and the other factors, then the validity is good.

3.6 Research quality

3.6.1 Reliability

The researcher spent a significant amount of time collecting and reviewing the data and providing feedback to all participants using Yamane's theoretical sampling method. To ensure the reliability of the questionnaire, the researcher first administered the questionnaire to a sample of 30 to check whether the questions of the questionnaire could collect accurate data and meet the requirements of this study. If there were some problems with the initial draft of the analysis questionnaire, the researcher would correct these problems. For example, the respondents' ambiguous responses will be clarified by the researcher through WeChat contact. In addition to this, the researcher will analyze and review the questionnaire questions and content to further ensure the reliability of the content and results.

Table 7 Descriptive Statistical Analysis

Reliability Statistics	
Cronbach's Alpha	N of Items
0.931	30

3.6.2 Validity

Validity represents the value of the research question and can accurately measure the direction of the research. When research lacks validity, it can lead to results that deviate from reality. This thesis employed model measurement by using Exploratory Factor Analysis as shown in Figure 4.1

3.6.3 Ethical issues

The investigators provided adequate information about the study objectives, data confidentiality, and study optionality to all participants in the survey. In addition, the thesis proposal will be examined and approved by Huachiew Chalermprakiet Research Ethical Committee.

3.7 Duration of research

The study period for this thesis was from September 2021 to February 2022.

3.8 Conclusion

Both qualitative and quantitative research methods are employed to collect the data. The researchers sought the support of respondents in questionnaires and interviews. The privacy of respondents' personal information is strictly enforced, and the data collected are used only for personal academic research.

Chapter 4
Results and Discussion

The researcher employed quantitative research methodology and CFA to analyze the degree of association between digital leadership behaviors and digital support, digital guidance, digital engagement, and digital encouragement. The results showed that digital leadership behavior and digital guidance had the highest level of association, digital engagement and digital encouragement had about the same level of association with digital leadership behavior, and digital support and digital leadership behavior had the lowest level of association. Based on the purpose of the study, a validated factor analysis goodness-of-fit index (CFA) for digital leadership behaviors in different work groups in hospitals was developed using our conceptual model. The factors affecting digital leadership behaviors and the role of digital leadership behaviors were examined.

Part 1. Quantitative analysis

4.1. Descriptive Analysis

4.1.1 Basic information of the sample

A total of 458 valid samples were collected in this study. The basic information of the valid samples is shown in Table 4.1. From the perspective of gender, males (51.3%) are slightly greater in number than females (48.7%); from the perspective of age, the proportions of each age group are relatively balanced; from the perspective of working years, the proportions of 1-5 years and 6-10 years are slightly higher, accounting for about 33.4% and 32.1% of the total sample, respectively. From the perspective of educational background, the proportion of master degree holders and doctors is the highest. accounting for about 42.4% and 24.7% of the total sample, respectively; from the perspective of department, the proportion of each department is relatively balanced; from the perspective of position, the proportion of grassroots staff is the highest, accounting for about 93% of the total sample, followed by grassroots managers (4.1%), middle managers (1.7%), and senior managers (1.1%). Overall, the sample is representative of the population.

Table 8 Basic information of the sample

Demographic	Detail	N	%
Gender	Male	235	51.3
	Female	223	48.7
Age	Under 30 years old	105	22.9
	31- 40 years old	141	30.8
	41-50 years old	120	26.2
	51 years old and above	92	20.1
Work years	Within 1 year	26	5.7
	1-5 years	153	33.4
	6-10 years	147	32.1
	More than 10 years	132	28.8
Education	College and below	75	16.4
	Bachelor's degree	76	16.6
	Master's degree	194	42.3
	Doctoral degree	113	24.7
Department	Nursing Department	75	16.3
	Medical Service	104	22.7
	Outpatient Department	79	17.2
	Logistics Department	70	15.3
	Science and Technology Department	36	7.9
	Information Service	47	10.3
	Medical Equipment Department	47	10.3
Position	Senior Managers	5	1.1
	Middle Managers	8	1.7
	Grassroots Managers	19	4.1
	Grassroots staff	426	93.0
	Total	**458**	**100.0**

4.1.2 Descriptive Statistics

First, the individual constructs of digital leadership behavior were defined, which involved a procedure that defines constructs theoretically. This involves a pretest to evaluate the construct items, and a confirmatory test of the measurement model that is conducted using Confirmatory Factor Analysis (CFA), The descriptive statistics for each variable in this study are shown in the following table, where it can be seen that

the mean values of the observed variables of digital leadership behavior are concentrated between 3 and 4, which generally shows that the respondents have upper-middle levels of evaluation for these variables. Secondly, from the distribution of each index, the maximum absolute value of kurtosis is less than 10, and the absolute value of maximum skewness is less than 3, indicating that the data in this study basically meet the requirements of a normal distribution, which can be further analyzed by parameter estimation (Park, 2015).

Table 9 Descriptive analysis results of variables

Construct	Items	Mean	SD	Mean	SD
	DS1	3.734	1.033		
Digital support (DS)	DS2	3.679	0.988	3.724	1.036
	DS3	3.672	0.978		
	DS4	3.668	1.087		
	DS5	3.869	1.095		
Digital guidance (DG)	DG1	3.972	1.051	4.115	1.073
	DG2	4.201	1.080		
	DG3	4.131	1.121		
	DG4	4.105	1.039		
	DG5	4.168	1.073		
Digital engagement (DENG)	DENG1	3.504	1.040	3.611	1.104
	DENG2	3.498	1.171		
	DENG3	3.697	1.053		
	DENG4	3.683	1.153		
	DENG5	3.675	1.102		
Digital encouragement (DENC)	DENC1	3.821	1.186	3.756	1.200
	DENC2	3.747	1.199		
	DENC3	3.729	1.193		
	DENC4	3.771	1.192		
	DENC5	3.710	1.229		

The variables with the highest mean are digital guidance (4.115), digital encouragement (3.756), digital support (3.724), and digital engagement (3.611). respectively.

Table 10 Kurtosis & skewness of variables

Items	kurtosis	skewness
DS2	-1.073	1.324
DS3	-1.154	1.465
DS4	-0.596	0.062
DS5	-0.963	0.577
DG1	-1.046	0.813
DG2	-1.420	1.446
DG3	-1.365	1.291
DG4	-1.341	1.614
DG5	-1.279	1.071
DENG1	-0.375	-0.433
DENG2	-0.627	-0.546
DENG3	-0.656	-0.147
DENG4	-0.746	-0.099
DENG5	-0.602	-0.422
DENC1	-0.874	0.066
DENC2	-0.941	0.249
DENC3	-0.808	0.022
DENC4	-0.812	-0.023
DENC5	-0.725	-0.197

As skewness is a measure of symmetry, or more precisely, the lack of symmetry, a distribution, or data set, is symmetrical if it looks the same to the left and right of the center point. Kurtosis is a measure of whether the data are heavy-tailed or light-tailed relative to a normal distribution. That is, data sets with high kurtosis tend to have heavy tails, or outliers. Data sets with low kurtosis tend to have light tails, or a lack of outliers. A uniform distribution would be the extreme case.

Our parameters show skewness in the range of -0.546 to 1.465 and kurtosis in the range of -1.420 to -0.375 which indicates normality with -3 to +3 skewness (Finney & DiStefano, 2006) and -3 to +3 kurtosis (Westfall & Henning, 2013).

4.2 Reliability Analysis

In this study, Cronbach's α was used to test the reliability of the questionnaire. It is generally believed that when Cronbach's α>0.9, the reliability is very good; when 0.7<Cronbach's α<0.9, the reliability is relatively good; when 0.6<Cronbach's α<0.7, the reliability is acceptable. If Cronbach's α is lower than 0.6, it indicates that the reliability of the questionnaire is poor, and it is necessary to re-collect the data after the questionnaire is revised. The Cronbach's α for each variable of digital leadership behavior in this study is above 0.7, indicating that the internal consistency of each variable in this study is high and the variable has good reliability (Gliem & Gliem, 2003).

Table 11 Reliability analysis results

Variables	Cronbach's α	Average Cronbach's α
Digital Support	0.867	0.903
Digital Guidance	0.956	
Digital Engagement	0.894	
Digital Encouragement	0.895	

4.3 Validity Analysis

This study employed Confirmatory Factor Analysis to test the validity of digital leadership behavior. The specific test process and results are as follows:

4.3.1 Digital leadership behavior

The CFA result for digital leadership behavior is shown in the table below. CR is a less biased estimate of reliability than Cronbach's Alpha, and the acceptable value of CR is 0.7 and above. AVE measures the level of variance captured by a construct versus the level due to measurement error. Values above 0.7 are considered very good, whereas the level of 0.5 is acceptable. From the table, it can be seen that the standardized loading of each variable is greater than 0.5, the CR is greater than 0.7, and the AVE is greater than 0.5, indicating that the validity of digital leadership behavior is good (Fornell and Larcker, 1981).

Figure 5 The Confirmatory Factor Analysis (CFA)

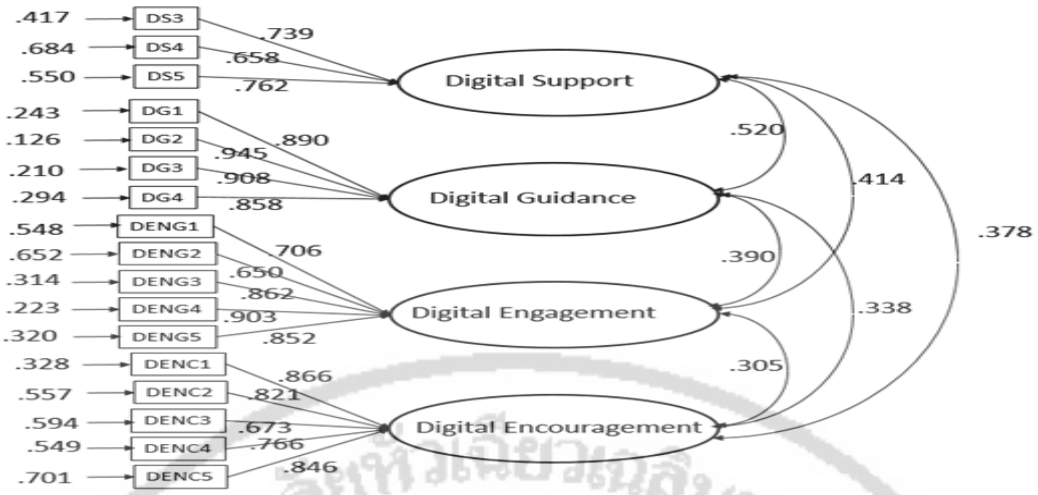


Table 12 Confirmatory Factor Analysis Results for Digital leadership behavior

Digital Leadership Behavior Constructs		Loading	CR	AVE
Digital Support	DS3	0.739	0.869	0.572
	DS4	0.658		
	DS5	0.762		
Digital Guidance	DG1	0.890	0.956	0.814
	DG2	0.945		
	DG3	0.908		
	DG4	0.858		
Digital Engagement	DENG1	0.706	0.898	0.641
	DENG2	0.650		
	DENG3	0.862		
	DENG4	0.903		
	DENG5	0.852		
Digital Encouragement	DENC1	0.866	0.897	0.636
	DENC2	0.821		
	DENC3	0.673		
	DENC4	0.766		
	DENC5	0.846		

As can be seen from the table below, the correlation coefficients between the variables of digital leadership behavior are all significant and less than the AVE square root of variables, indicating that the variables of digital leadership behavior have good discriminant validity.

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	DENC3	0.673		
	DENC4	0.766		
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As can be seen from the table below, the correlation coefficients between the variables of digital leadership behavior are all significant and less than the AVE square root of variables, indicating that the variables of digital leadership behavior have good discriminant validity.

Table 14 Pearson Correlation Analysis and Discriminant Validity

	Digital Support	**Digital Guidance**	**Digital Engagement**	**Digital Encouragement**
Digital Support	1			
Digital Guidance	0.691	1		
Digital Engagement	0.504	0.466	1	
Digital Encouragement	0.441	0.418	0.342	1

The test for multicollinearity and the correlation estimate of pairs of variables were calculated and it was found that the correlation factor was positive and, in the range, 0.342-0.691 with $p<0.01$. Those with less than 0.8 were agreed upon (Hair et al., 2010).

Part 2. Qualitative analysis

4.4 Interview qualitative data Analysis

This study used in-depth interviews using WeChat voice and purposive sampling for the qualitative research method with three key informants who are leaders at the hospital. The positions of the interviewees included the Director of the Party and Administration Office, the secretary of the Mission Committee, and the Vice President. The interview questionnaire was designed to help to explain and confirm the quantitative results in a Chinese hospital context (EMIC). After that, digital data were collected based on the information given by the respondents and the data were then analyzed and summarized.

4.4.1 Digital Leadership Behavior

Digital leadership behaviors are divided into six types: proactive leadership, forward-looking leadership; supportive leadership; uncoordinated leadership; cautious leadership; resistant leadership and leadership without vision. The first two digital leadership behaviors are imbued with a proactive and aggressive approach to digital management, and the remaining four digital leadership behaviors have a pessimistic and negative attitude toward digital-related activities. From a

thinking perspective, digital leadership behaviors can be categorized into digital support, digital decision making, digital execution, and digital direction. Digital leadership competencies are mainly reflected in participation, digital knowledge, support, feedback, information, encouragement, and application. Overall, digital leadership behavior refers to the leader's behavior in directing, supporting, encouraging, and participating in all digital activities. This is supported by the following:

"For hospital leaders, effective guidance can effectively solve some deep-seated problems of the hospital, and then promote the sustainable development of the hospital. The hospital must be more intelligent and digital in the future". Ms. XU.

There needs to be "effective use of our corresponding medical equipment, which in turn improves the operational efficiency and promotes the growth of our hospitals". Mr. HUA.

"Digital mentoring is used more often and more effectively among our hospitals. Its leadership behavior involves the approach to the digital future development of hospitals and can train better employees for our hospitals. These leadership behaviors are very important for the construction of hospital digitalization, with which we can improve the efficiency of all our hospital staff and create a good environment". Mr. WEI.

4.4.2 Digital Support

Digital support is a service provided through digital channels such as email, chat, mobile apps, social media, etc. It allows teams to use their smartphones, tablets and computers to interact with the business. Digital support is considered convenient for team members because it provides options that fit their digital lifestyles. In the explanation of leadership behavior theory, it is the process by which leaders provide employees with explanations of task content to guide them through their work tasks.

"At the digital support level, such as the intelligent appointment consultation launched by our hospital now, especially in the current epidemic situation, this online Internet hospital application allows the hospital advanced interoperability of doctor-patient information to improve the efficiency of our diagnosis and treatment, and it can simplify some of the offline workflow within our hospital. It creates a better

working environment for our hospitals and provides patients with a better and more convenient access to medical care". Ms. XU

"We have implemented our intelligent appointment booking system. Through our intelligent appointment consultation, there is an information interaction between doctors and patients on our platform, and when they come to our clinic for a specific treatment, we will have had an information interaction in advance". Mr. HUA

"At the digital support level, we have the official WeChat applet capable of providing online follow-up consultations to renew prescriptions. The hospital provides online consultation through picture transmission, online video and voice, and patients can individually evaluate doctors, pharmacists and courier services". Mr. WEI.

4.4.3 Digital Guidance

The theoretical explanation of leadership relationship-oriented behavior tends to weight interpersonal relationships. The main focus is on building emotional bridges with subordinates, giving emotional support and helping them to feel comfortable in their work environment. On the other hand, it is concerned with the progress and quality of employees' work and how to achieve the organization's goals.

"The hospital is training this subordinate on the surgery by showing the successful cases of this surgery online. Through online video detailed explanation, letting junior staff understand more about some problems that can occur in surgery, can effectively improve this awareness, and some skills". Ms. XU

"For example, our medical data center, through data analysis, can be closely connected to the construction of our hospital's key disciplines, which gives full play to our clinical data to support services and our sample preservation services. Secondly, through the analysis of our marketing data by a clinical researcher at our university, we can realize the demand-oriented service of our basic experiment and our corresponding clinical experiment". Mr. HUA

"Regarding the role of pharmaceutical big data in the hospital, our hospital has some summaries in the meeting, mainly led by the discipline construction and hospital high-quality development needs, to further improve the functional positioning of the department, refine the service process, expand the scope of data-assisted services and service recipients, and make more contributions to the high-quality development of the school and hospital". Mr. WEI

4.4.4 Digital Engagement

Explaining digital engagement from a leadership behavior perspective is about building a good shared vision and taking relevant practical actions to give the organization a better future. The concept of team-oriented work to support subordinates' participation in digital activities carried out by the company is further examined.

“Digital tools for digital engagement can facilitate frequent communication among hospital staff and make it easier for us to designate and reach each staff member quickly. In hospital work, we can always feel or solve the work schedule and work content changes at any time, and then also can improve the flexibility and mobility of our work. Of course, for this online service for patients, we can also realize our patients' home appointment and consultation, and then make an online registration and payment. This can reduce the waiting time for medical treatment and improve our work efficiency”. Ms. XU.

“Regarding digital engagement, WeChat can promote frequent communication among our staff in this hospital. Secondly, it facilitates the communication of information and information sharing among our employees. When working in our hospital, we can personally feel the solution to a work schedule or work content change at any time, and then we can improve the flexibility and changeability of our hospital work”. Mr. HUA.

“We discuss activities related to digital technology and healthcare technology at our hospital's annual meeting or bring the healthcare team to digital events held at different units. These events keep our staff informed about healthcare digital literacy and the opportunities that come with the development of digital technology”. Mr. WEI.

4.4.5 Digital Encouragement

Explaining digital encouragement from the perspective of leadership behavior can encourage subordinates to accomplish organizational goals through communication in the execution of their plans. It is a process that goes beyond aspirations by stimulating higher needs of organizational members and creating a climate of trust among them.

“Our hospital focuses on the reality of the internal processes of this work in order to achieve the implementation and working model of hospital development”. Ms. XU.

“Each year our hospital has a blueprint similar to a Digital Project Work Plan to implement our future plans”. Mr. HUA.

“At the Digital Technology Conference, we encouraged all of the hospital’s researchers to continue their innovations in artificial intelligence and health information technology, and we appreciate and support the hospital’s researchers’ innovations in health technology research”. Mr. WEI.

4.5 Conclusion

This paper focuses on the basic concept of digital leadership behavior and reveals that the four key factors of digital leadership behavior are digital support, digital guidance, digital engagement, and digital encouragement. During the researcher's study of the degree of association between digital leadership behavior and digital support, digital guidance, digital engagement, and digital encouragement, the quantitative data analysis showed that digital leadership behavior was most associated with digital guidance, digital leadership behavior was essentially the same as digital engagement and digital encouragement, and digital leadership behavior was least associated with digital support. For the qualitative data analysis, interviews with three hospital leaders were conducted. The study revealed that the three leaders used digital guidance behaviors the most in managing the hospital. They thought that digital guidance could train better hospital trainees, improve the efficiency of all hospital staff and create a good environment. Secondly, the hospital's continued purchase of medical equipment to improve the efficiency of hospital operations can drive hospital growth and improve hospital intelligence. Finally, effective digital guidance not only solves deep-rooted hospital problems, but also drives sustainable development, making hospitals smarter and more digital in the future. Regarding the leaders' views on the use of digital engagement and digital encouragement in hospitals, their view is that digital support creates a platform for communication between hospitals, staff and patients. It promotes the relationship between all hospital staff and communication between the hospital and patients. Secondly, digital encouragement supports the whole staff to participate in the

digital activities in the hospital and makes them understand the importance of digitalization for the future development of the hospital. Regarding the digital support behaviors of leaders in the hospital, digital leaders are mainly related to digital work and provide relevant facilitation for digital activity work. These are simple executive actions that employees are able to use on their own initiative to familiarize themselves with their work and it is not necessary for leaders to spend time to guide them. Therefore, digital support has the weakest relationship with digital leadership behavior.

Chapter 5
Discussion and Conclusion

5.1 Introduction

The study investigated the degree to which digital guidance, digital encouragement, digital support, and digital engagement are associated with digital leadership behaviors in the First Affiliated Hospital of Gannan Medical College. The researchers analyzed the questionnaire data to understand which variables had the most important role in digital leadership behaviors in the hospital. Based on the variable description analysis, the variables with the highest mean values were digital guidance (4.115), digital encouragement (3.756), digital support (3.724), and digital engagement (3.611), respectively. The findings show that digital guidance is the most important factor influencing digital leadership behavior. Conversely, digital support had the least impact on digital leadership behavior. The researchers wanted to test the degree of relationship between digital leadership behavior and digital support, digital guidance, digital encouragement and digital engagement. Information from the qualitative study shows that digital guidance is mainly concerned with the future direction of the hospital and can contribute to the sustainable development of an intelligent and digital hospital. Digital encouragement and digital engagement are mainly about creating a platform for communication between the hospital, staff and patients to achieve hospital execution and work patterns where the future plans of the hospital are being executed according to the guidance. Digital support is mainly a function related to lead digital work and to facilitate digital activities.

5.2 Summary

In regard to the distribution of each index, the maximum absolute value of kurtosis was less than 10 and the maximum absolute value of skewness was less than 3, indicating that the data in this study basically satisfy the requirements of a normal distribution. The standardized loadings of each variable are greater than 0.5, the CR is greater than 0.7, and the AVE is greater than 0.5, indicating the validity of digital leadership behaviors (Gracja, 2019). Therefore, the researchers learned from the results of the validated factor analysis of digital leadership behavior that all four factors

correspond to AVE values greater than 0.5, with the highest at 0.814 and the lowest at 0.572, which is significantly higher than the 0.5 criterion; and the combined reliability CR values are greater than 0.8, which is higher than the 0.7 criterion. Thus, it indicates that the data have excellent convergent validity.

The test for multicollinearity and the correlation estimate of pairs of variables were calculated and it was found that the correlation factor was positive and, in the range, 0.342-0.691 with $p<0.01$. Those with less than 0.8 are acceptable (Hair et al. 2010).

5.3 Discussion

The findings in this study clarify the definition of digital leadership behaviors and provide insights into digital leadership behaviors in the healthcare industry. The results of the study showed that the highest relational intimacy with digital leadership behavior was digital guidance, digital encouragement and digital engagement were basically the same, and digital support was the lowest. It indicates that digital guidance has more influence on digital leadership behavior in hospitals in digital work. In contrast, digital support had the least impact on hospital digital leadership behavior. There was consistency between the qualitative study interview results and the quantitative study results, with respondents indicating that leaders use digital guidance behaviors the most when they focus on their subordinates' digital efforts. Digital encouragement and digital engagement are more along the lines of digital guidance, so they are consistent while digital support is the least used behavior by leaders in their hospital work.

The findings show that digital leaders (principals) provide digital technology to facilitate school transformation and create digital learning communities for them (Zhong, 2017). In targeting the management level, principals should mentor teachers and improve their digital skills. Their findings indicate that digital support and digital guidance are strongly associated with digital leadership behaviors. The results of another study show that digital leadership behaviors provide employees with training sessions, access to digital channels, expanded e-learning platforms and the creation of flexible work models that make digital work more engaging (Klassen, 2021). It shows that digital support, digital guidance, digital engagement and digital encouragement are

strongly associated with the degree of digital leadership behavior. These findings validate the extent to which digital leadership behaviors and digital guidance, digital encouragement, digital engagement, and digital support are related. Meaningful research data is provided for researchers.

5.4 Implications

Through the analysis of questionnaire data and interview information, the study of digital leadership behavior relationships has been conducted. Digital leadership behaviors can be defined as the behaviors of leaders in terms of guidance, support, encouragement, and engagement in the implementation of all digital activities. They can be categorized as digital guidance, digital encouragement, digital support, and digital engagement.

On a national level, digital guidance guides various parties to collaborate with each other in the process of national governance in order to assist in its digital development (Peng, 2021). It also helps us to understand the concept of digital encouragement, which can encourage subordinates in implementing plans to achieve organizational goals through communication (Behrendtetal., 2017). The leaders support digital work by supporting, guiding, engaging and encouraging behaviors.

The researcher did not identify any studies on digital leadership behaviors in the healthcare industry in the literature review. Most of the studies were about examining the basic functions and characteristics of digital leaders in which researchers have used both quantitative and qualitative research. The findings are useful to understand the extent to which digital leadership behaviors are relevant to digital guidance, digital encouragement, digital support and digital engagement, and the importance of digital leaders in implementing effective behaviors. Therefore, this study promotes the development and further research on digital leadership behaviors in the healthcare industry.

5.5 Conclusions

The study investigated the degree of digital guidance, digital encouragement, digital support, and digital engagement associated with digital leadership behaviors in the First Affiliated Hospital of Gannan Medical College. The researchers analyzed the

questionnaire data to understand which variables showed the most important role in digital leadership behaviors in the hospital. The analysis of the data based on the variables showed that digital support and digital mentoring had a higher impact on all the models than digital engagement and digital encouragement. This implies that the digital support and digital guidance aspects of digital leadership behavior are evident but people need more digital engagement and digital encouragement. These findings enhance our understanding of the relationship between digital guidance, digital encouragement, digital support, and digital engagement in digital leadership behaviors and may help to improve the application of hospital leadership behaviors in digital work and the exercise of effective leadership digital behaviors in digital work.

5.6 Recommendations

The role of digital leadership behaviors in hospital management is crucial in the face of digital developments and the need for enhanced information technology in hospitals. To fully demonstrate the digitization of hospitals, leaders should enhance the digital mentoring of staff and encourage them to use digital resources in their jobs. For example, hospitals can launch an image campaign "Trust" on media platforms through cartoon image spokespersons and hospital slogans, which can bring them closer to the public and improve the friendly image of hospitals. Secondly, in response to the problems of the digital system, a reliable professional technical team should be established to take measures such as staggered nucleic acid testing sampling, strengthening system operation monitoring, and enhancing problem response, in an effort to ensure smoother nucleic acid testing. In addition, leaders should hold regular digital events to encourage more staff participation, understand the latest status and development of medical digital technology, and better respond to potential crises brought about by future changes in digital technology. Furthermore, digital leaders should support and motivate employees to enhance their innovative behavior at work (Erhan et al, 2022). Finally, digital leaders should promote the use of digitalization and information technology with patients in mind to create the smart hospitals of the future.

Bibliography

Accenture. (2015). Accenture dijitalleşme endeksi Türkiye sonuçları. In Türkiye'nin endijital şirketleri 2015 (pp. 1-44).

Anak Agung Sagung, M. A., and Sri Darma, G. (2020). Revealing the digital leadership spurs in 4.0 industrial revolution. International Journal of Business, Economics & Management, 3(1), 93-100.

Ananyin, V. I., Zimin, K. V., Lugachev, M. I., Gimranov, R. D. and Skripkin, K. G. (2018). Digital organization: Transformation into the new reality. Business Informatics, (2), 45-54.

Andreessen, M. (2011). Why software is eating the world. Wall Street Journal, 20(C2), 1-9.

Antunes, V. and Moreira, J. P. (2013). Skill mix in healthcare: An international update for the management debate. International Journal of Healthcare Management, 6(1), 12-17.

Arab, M. (2000). A Survey about effect of organizational structure and managerial approach on hospital indicators and determining proper model for general hospitals in Iran [PhD thesis, School of Public Health, Tehran University of medical sciences]. Iran.

Avolio, B. J. (2007). Promoting more integrative strategies for leadership theory-building. American Psychologist, 62(1), 25-33.

Bach, C. and Sulíková, R. (2021). Leadership in the Context of a NewWorld: Digital Leadership and Industry 4.0. Managing Global Transitions, 19(3), 209-226.

Barnato, K. (2016). Is the world suffering a leadership crisis? Available.

Bass, B. M. and Avolio, B. J. (1994). Improving organizational effectiveness through transformational leadership. Sage.

Behrendt, P., Matz, S. and Göritz, A. S. (2017). An integrative model of leadership behavior. The Leadership Quarterly, 28(1), 229-244.

Bennis, W. (1984). The four competencies of leadership. Training and Development Journal, 38(8), 14-19.

Bennis, W. G. and Townsend, R. (1989). On becoming a leader (Vol. 36). Addison-Wesley Reading.

Bibliography (Continued)

Berghaus, S. and Back, A. (2017). Disentangling the fuzzy front end of digital transformation: Activities and approaches. 38th International Conference on Information Systems (ICIS 2017), Seoul, South Korea.

Berman, S. J. (2012). Digital transformation: opportunities to create new business models. Strategy & Leadership, 40(2), 16-24.

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A. and Venkatraman, N. v. (2013). Digital business strategy: toward a next generation of insights. MIS Quarterly, 37(2), 471-482.

Birje, A. (2021). Digital & Analytics Services.

Blake, R. R. and Mouton, J. S. (1964). The Managerial Grid. Gulf Publication.

Blumenthal, D. M., Bernard, K., Bohnen, J. and Bohmer, R. (2012). Addressing the leadership gap in medicine: residents' need for systematic leadership development training. Academic Medicine, 87(4), 513-522.

Bohmer, R. (2012). The instrumental value of medical leadership: Engaging doctors in improving services. The Kings Fund.

Bolte, S., Dehmer, J. and Niemann, J. (2018). Digital Leadership 4.0. Acta Technica Napocensis-Series: Applied Mathematics, Mechanics, And Engineering, 61(4), 637-646.

Borowska, G. B. (2019). Digital leadership for digital transformation. Współczesna Gospodarka, 10(4), 11-19.

Breuer, S. and Szillat, P. (2019). Leadership and digitalization: Contemporary approaches towards leading in the modern-day workplace. Dialogue, (1), 24-36.

Britten, N. (1999). Qualitative interviews in healthcare. In C. Pope & N. Mays (Eds.), Qualitative research in health care (2nd ed., pp. 11-19). BMJ Books.

Buntak, K., Kovačić, M. and Martinčević, I. (2020). Impact of digital transformation on knowledge management in organization. Advances in Business-Related Scientific Research Journal, 11(1), 36-47.

Burns, J. (1978). Leadership. Harper and Row.

By, R. T., Burnes, B. and Oswick, C. (2012). Change management: Leadership, values and ethics. Journal of Change Management, 12(1), 1-5.

Bibliography (Continued)

Cahyadi, A. and Magda, R. (2021). Digital leadership in the economies of the G20 countries: A secondary research. Economies, 9(1), 32.

Chinese Government. (2021). Digital China Development Report. Cyberspace Administration of China.

Chreim, S., Langley, A., Comeau-Vallée, M., Huq, J.-L. and Reay, T. (2013). Leadership as boundary work in healthcare teams. Leadership, 9(2), 201-228.

Chreim, S., Williams, B. E. B. and Coller, K. E. (2012). Radical change in healthcare organization: mapping transition between templates, enabling factors, and implementation processes. Journal of Health Organization and Management, 26(2), 215-236.

D€orner, K. and Edelman, D. (2015). What 'digital' really means. Mckinsey & Company.

Damayanti, F. P. and Mirfani, A. M. (2021). An Analysis of Digital Leadership in the Pandemic Covid-19 Era. 4th International Conference on Research of Educational Administration and Management (ICREAM 2020).

Davis-Blake, A. and Pfeffer, J. (1989). Just a mirage: The search for dispositional effects in organizational research. Academy of Management Review, 14(3), 385-400.

De Araujo, L. M., Priadana, S., Paramarta, V. and Sunarsi, D. (2021). Digital leadership in business organizations. International Journal of Educational Administration, Management, and Leadership, 2(1), 45-56.

Dorgan, S., Layton, D., Bloom, N., Homkes, R., Sadun, R. Van R and eenen, J. (2010). Management in Healthcare: Why good practice really matters.

Erhan, T., Uzunbacak, H. H., & Aydin, E. (2022). From conventional to digital leadership: exploring digitalization of leadership and innovative work behavior. Management Research Review.

Eubanks, P. (1990). The new hospital CEO: many paths to the top. Hospitals, 64(23), 26-31.

Fiedler, F. E. (1962). Leader attitudes, group climate, and group creativity. The Journal of Abnormal and Social Psychology, 65(5), 308-318.

Bibliography (Continued)

Fiedler, F. E. (1966). The effect of leadership and cultural heterogeneity on group performance: A test of the contingency model. Journal of Experimental Social Psychology, 2(3), 237-264.

Fiedler, F. E. (1968). Personality and Situational Determinants of Leadrship Effectiveness. In D. Cartwright & A. Zander (Eds.), Group dynamics: Research and theory (pp. 362-380).

Fiedler, F. E. (1972). Predicting the effects of leadership training and experience from the contingency model. Journal of Applied Psychology, 56(2), 114-119.

Fitzgerald, M., Kruschwitz, N., Bonnet, D. and Welch, M. (2014). Embracing digital technology: A new strategic imperative. MIT Sloan Management Review, 55(2), 1-12.

Finney, S. J. and DiStefano, C. (2006). Non-normal and categorical data in structural equation modeling. Structural equation modeling: A second course, 10(6), 269-314.

Flaig, J., Alam, A., Huynh, J., Reid-Hector, J., & Heuer, A. (2020). Examining how formal leadership development programs positively influence hospital leaders' individual competencies and organizational outcomes–An evidence-based literature review. Journal of Healthcare Leadership, 12, 69-83.

Fleishman, E. A. (1953). The description of supervisory behavior. Journal of Applied Psychology, 37(1), 1-6.

Fleming, M. L., & Kayser-Jones, J. (2008). Assuming the mantle of leadership: Issues and challenges for directors of nursing. Journal of Gerontological Nursing, 34(11), 18-25.

Foerster-Metz, U. S., Marquardt, K., Golowko, N., Kompalla, A., & Hell, C. (2018). Digital transformation and its implications on organizational behavior. Journal of EU Research in Business, 2018, (S3), 1-14.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39-50.

Bibliography (Continued)

Finch, H. W., Immekus, J. C., & French, B. F. (2016). Applied Psychometrics Using SPSS and AMOS. Charlotte, NC: Information Age Publishing Inc.

Francis, J. and Scheers, C. (2013). The future workplace of young Europeans. European View, 12(2), 199-204.

Francis, R. (2013). Report of the Mid Staffordshire NHS Foundation Trust public inquiry: executive summary (Vol. 947). The Stationery Office.

Gartner. (2017). 2018 CIO Agenda: Industry Insights Overview.

Gartner. (2021). Digitalization Strategy for Business Transformation.

Ghiasipour, M., Mosadeghrad, A. M., Arab, M., & Jaafaripooyan, E. (2017). Leadership challenges in health care organizations: The case of Iranian hospitals. Medical Journal of the Islamic Republic of Iran, 31, 96.

Gliem, J. A. and Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, Columbus, Ohio: Ohio State University.

Griest, D. L. and Belles, D. R. (1990). Health care executives: A personality profile. Hospitals, 64(3), 74-75.

Gruia, L. A., Bibu, N., Nastase, M., Roja, A. and Cristache, N. (2020). Approaches to Digitalization within Organizations. Review of International Comparative Management/Revista de Management Comparat International, 21(3), 287-297.

Hair, J. F., Ortinau, D. J. and Harrison, D. E. (2010). Essentials of marketing research (Vol. 2). New York, NY: McGraw-Hill/Irwin.

Hanson, E. M. (2003). Educational Administration and Organizational Behavior. Pearson Education.

Hater, J. J. and Bass, B. M. (1988). Superiors' evaluations and subordinates' perceptions of transformational and transactional leadership. Journal of Applied Psychology, 73(4), 695-702.

Hemphill, J. K. (1949). The leader and his group. Educational Research Bulletin, 28(9), 225-246.

Bibliography (Continued)

Hernandez, M., Eberly, M. B., Avolio, B. J., & Johnson, M. D. (2011). The loci and mechanisms of leadership: Exploring a more comprehensive view of leadership theory. The Leadership Quarterly, 22(6), 1165-1185.

Hersey, P., Blanchard, K. H. and Natemeyer, W. E. (1979). Situational leadership, perception, and the impact of power. Group & Organization Studies, 4(4), 418-428.

Hogan, R. and Kaiser, R. B. (2005). What we know about leadership. Review of General Psychology, 9(2), 169-180.

House, R. J. (1971). A path goal theory of leader effectiveness. Administrative Science Quarterly, 16(3), 321-339.

Ilcus, M. A. (2018). Impact of digitalization in business world. Revista de Management Comparat International, 19(4), 350-358. Ivanova, I. (2018). A 2018 Electronic communications in the system of socio-psychological interaction of personnel in an organization Actual problems of social and economic psychology: methodology, theory, practice. In Collection of scientific articles (pp. 68-84).

Kahn, R. L. and Katz, D. (1952). Leadership practices in relation to productivity and morale. Institute for Social Research, University of Michigan Ann Arbor, MI.

Khan, S. (2016). Leadership in the digital age: A study on the effects of digitalisation on top management leadership [Master thesis, Stockholm University]. Stockholm.

Klassen, Ehmig. Katharina (2021). Daniel Schallmo.Digital Leadership: Approaches and Practical Insights from the B2B Sector.ISPIM Conference Proceedings, 1-21.

Kollmann, T. (2020). Digital Leadership. Springer.

Kotter, J. P. (1990). A Force for Change: How Leadership Differs from Management. The Free Press.

Kouzes, J. and Posner, B. (1987). The Leadership Challenge (Vol. 550). Josses Bass.

Kouzes, J. M., & Posner, B. Z. (2006). The leadership challenge (Vol. 3). John Wiley & Sons.

Bibliography (Continued)

Lasi, H., Fettke, P., Kemper, H.-G., Feld, T. and Hoffmann, M. (2014). Industry 4.0. Business & Information Systems Engineering, 6(4), 239-242.

Lega, F., Prenestini, A., & Spurgeon, P. (2013). Is management essential to improving the performance and sustainability of health care systems and organizations? A systematic review and a roadmap for future studies. Value in Health, 16(1), S46-S51.

Lewin, K., Lippitt, R., & White, R. K. (1939). Patterns of aggressive behavior in experimentally created "social climates". The Journal of Social Psychology, 10(2), 269-299.

Likert, R. (1932). A technique for the measurement of attitudes. Archives of Psychology, 22(140), 1-55.

Likert, R. (1961). New Patterns of Management. McGraw-Hill Book Company.

Lorinkova, N. M., Pearsall, M. J., & Sims Jr, H. P. (2013). Examining the differential longitudinal performance of directive versus empowering leadership in teams. Academy of Management Journal, 56(2), 573-596.

Lubis, F. M. (2019). Digital leadership in managing work motivation of millenial employees. Asia Proceedings of Social Sciences, 4(2), 108-110.

Lunenburg, F. C. and Ornstein, A. (2000). Educational administration: Concepts and practices. Wadsworth/Thomson Learning.

Meffert, J. and Swaminathan, A. (2018). Leadership and the urgency for digital transformation. Leader to Leader, 2018(88), 44-49.

Meskó, B., Drobni, Z., Bényei, É., Gergely, B. and Győrffy, Z. (2017). Digital health is a cultural transformation of traditional healthcare. Mhealth, 3, 38.

Mihardjo, L., Sasmoko, S., Alamsyah, F. and Elidjen, E. (2019). The influence of digital leadership on innovation management based on dynamic capability: Market orientation as a moderator. Management Science Letters, 9(7), 1059-1070.

Mischel, W. (1973). The Interaction of Person and Situation. In D. Magnusson & N. Endler (Eds.), Personality at the Crossroads: Current Issues in International Psychology. NJ7 Erlbaum.

Bibliography (Continued)

Moore, B. V. (1927). The May conference on leadership. Personnel Journal, 6, 124-128.

Musing, E. L. S., Wong, M., Jackson, L., Lee, J. and Slote, C. (2008). A focus on leadership: CSHP's 2007 national leadership survey. The Canadian Journal of Hospital Pharmacy, 61(1), 70-75.

Northouse, P. G. (2007). Leadership: Theory and practice (4th ed.). Sage Publications.

Northouse, P. G. (2010). Leadership: Theory and practice (5th ed.). Sage Publications.

Oestreicher-Singer, G. and Zalmanson, L. (2013). Content or community? A digital business strategy for content providers in the social age. MIS Quarterly, 591-616.

Park, H. M. (2015). Univariate analysis and normality test using SAS, Stata, and SPSS.

Peng, B. (2021). Digital leadership: State governance in the era of digital technology. Cultures of Science, 2096608321989835.

Pezeshkian, M. (2002). Articles book in 1st conference of resources management in hospital. Health Ministry of Iran.

Pillay, R. (2008). Defining competencies for hospital management: A comparative analysis of the public and private sectors. Leadership in Health Services, 21(2), 99-110.

Plesner, U. and Husted, E. (2020). Digital organizing: Revisiting themes in organization studies. Red Globe Press.

Reddin, W. J. (1970). Managerial effectiveness. McGraw-Hill Book Company.

Rollinson, D. and Broadfield, A. (2002). Organizational Behavior and Analysis, An Integrated Approach. Pearson Education.

Rost, J. C. (1991). =Leadership for the twenty-first century. Greenwood Publishing Group.

Rouhani, M. J., Burleigh, E. J., Hobbis, C., Dunford, C., Osman, N. I., Gan, C., Gibbons, N. B., Ahmed, H. U. and Miah, S. (2018). UK medical students' perceptions, attitudes, and interest toward medical leadership and clinician managers. Advances in Medical Education and Practice, 9, 119-124.

Bibliography (Continued)

Rüth, R. and Netzer, T. (2020). The key elements of cultural intelligence as a driver for digital leadership success. Leadership, Education, Personality: An Interdisciplinary Journal, 2(1), 3-8.

Sagie, A. (1997). Leader direction and employee participation in decision making: Contradictory or compatible practices? Applied Psychology: An International Review, 46(4), 387-416.

Sakiru, O. K., D'Silva, J. L., Othman, J., DaudSilong, A. and Busayo, A. T. (2013). Leadership styles and job satisfaction among employees in small and medium enterprises. International Journal of Business and Management, 8(13), 34-41.

Saputra, N., Nugroho, R., Aisyah, H. and Karneli, O. (2021). Digital Skill During Covid-19: Effects of Digital Leadership and Digital Collaboration. Jurnal Aplikasi Manajemen, 19(2), 272-281.

Schumacker, R. E. and Lomax, R. G.(2012). A Beginner's Guide to Structural Equation Modeling : Third edition (3 ed.). Hoboken: Taylor and Francis.

Schumacker, R. E. and Lomax, R. G. (2015). A Beginner's Guide to Structural Equation Modeling (4th ed.). New York, NY: Routledge.

Schwarzmüller, T., Brosi, P., Duman, D. and Welpe, I. M. (2018). How does the digital transformation affect organizations? Key themes of change in work design and leadership. Management Revue, 29(2), 114-138.

Seeman, M. (1960). Social Status and Leadership: The Case of the School Executive Columbus.

Sonsale, A. and Bharamgoudar, R. (2017). Equipping future doctors: incorporating management and leadership into medical curriculums in the United Kingdom. Perspectives on Medical Education, 6(2), 71-75.

Sosik, J. J., Avolio, B. J. and Kahai, S. S. (1997). Effects of leadership style and anonymity on group potency and effectiveness in a group decision support system environment. Journal of Applied Psychology, 82(1), 89-103.

Spurgeon, P., Clark, J. and Ham, C. (2011). Medical leadership: from the dark side to centre stage. Radcliffe Publishing.

Bibliography (Continued)

Spurgeon, P., Long, P., Clark, J. and Daly, F. (2015). Do we need medical leadership or medical engagement? Leadership in Health Services, 28(3), 173-184.

Stana, R. A. B., Fischer, L. H. and Nicolajsen, H. W. (2018, August). Review for future research in digital leadership. Information Systems Research Conference in Scandinavia (IRIS41).

Stevenson, A. (2010). Oxford dictionary of English. Oxford University Press.

Stogdill, R. M., & Coons, A. E. (1957). Leader behavior: Its description and measurement.

Suksai, T., Suanpang, P. and Thangchitcharoenkhul, R. (2021). A Digital Leadership Development Model for School Administrators in Basic Education to Fulfill the Thailand 4.0 Policy. PSAKU International Journal of Interdisciplinary Research, 10(2), 11-20.

Swanwick, T. and McKimm, J. (2011). What is clinical leadership… and why is it important? The Clinical Teacher, 8(1), 22-26.

Tareque, A. and Islam, N. (2021). Digital Leadership: The Perspectives of the Apparel Manufacturing. International Business Research, 14(2).

Temelkova, M. (2018). Skills for digital leadership-Prerequisite for developing high-tech economy. International Journal of Advanced Research in Management and Social Sciences, 7(12), 50-74.

Tiekam, A. (2019). Digital leadership skills that South African leaders need for successful digital transformation [Doctoral dissertation, University of Pretoria]. South Africa.

Tsui, A. S., Zhang, Z. X., Wang, H., Xin, K. R. and Wu, J. B. (2006). Unpacking the relationship between CEO leadership behavior and organizational culture. The Leadership Quarterly, 17(2), 113-137.

Urbach, N. and Röglinger, M. (2019). Introduction to digitalization cases: how organizations rethink their business for the digital age. In N. Urbach & M. Röglinger (Eds.), Digitalization Cases (pp. 1-12). Springer.

Vaghee, S. and Yavari, M. (2013). The effect of communication skills training on the quality of nursing care of patients. Evidence Based Care, 2(4), 37-46.

Bibliography (Continued)

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. The Journal of Strategic Information Systems, 28(2), 118-144.

Vinot, D. (2014). Transforming hospital management à la francaise: the new role of clinical managers in French public hospitals. International Journal of Public Sector Management, 27(5), 406-416.

Warren, O. J. and Carnall, R. (2011). Medical leadership: why it's important, what is required, and how we develop it. Postgraduate Medical Journal, 87(1023), 27-32.

Wasono, L. W. and Furinto, A. (2018). The effect of digital leadership and innovation management for incumbent telecommunication company in the digital disruptive era. International Journal of Engineering and Technology, 7(2.29), 125-130.

Weberg, D. (2012). Complexity leadership: A healthcare imperative. Nursing Forum, 47(4), 268-277.

Weil, P. (1984). The evolving role of the hospital chief executive officer.

Westfall, P. H. and Henning, K. S. S. (2013). Texts in statistical science: Understanding advanced statistical methods.

Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J. and Blegind-Jensen, T. (2021). Unpacking the difference between digital transformation and IT-enabled organizational transformation. Journal of the Association for Information Systems, 22(1), 102-129.

Wiesböck, F. and Hess, T. (2020). Digital innovations. Electronic Markets, 30(1), 75-86.

Williamsson, A., Eriksson, A. and Dellve, L. (2016). Organization of change agents during care process redesign in Swedish health care. Journal of Hospital Administration, 5(3), 20-32.

Witman, Y., Smid, G. A. C., Meurs, P. L. and Willems, D. L. (2011). Doctor in the lead: balancing between two worlds. Organization, 18(4), 477-495.

Yamane, T. (1967). Statistics: An Introductory Analysis. In. New York: Harper and Row.

Bibliography (Continued)

Yoo, Y., Boland Jr, R. J., Lyytinen, K. and Majchrzak, A. (2012). Organizing for innovation in the digitized world. Organization Science, 23(5), 1398-1408.

Yukl, G. (1989). Managerial leadership: A review of theory and research. Journal of Management, 15(2), 251-289.

Yukl, G., O'Donnell, M. and Taber, T. (2009). Influence of leader behaviors on the leader- member exchange relationship. Journal of Managerial Psychology, 24(4), 289-299. Yusof, M. R., Yaakob, M. F. M., & Ibrahim, M. Y. (2019). Digital leadership among school leaders in Malaysia. Journal of Innovative Technology and Exploring Engineering (IJITEE), 8(9), 1481-1485.

Zammuto, R. F., Griffith, T. L., Majchrzak, A., Dougherty, D. J. and Faraj, S. (2007). Information technology and the changing fabric of organization. Organization Science, 18(5), 749-762.

Zeike, S., Bradbury, K., Lindert, L. and Pfaff, H. (2019). Digital leadership skills and associations with psychological well-being. International Journal of Environmental Research and Public Health, 16(14), 2628.

Zhong, L. (2016). The Effectiveness of Digital Leadership at K-12 Schools in Mississippi Regarding Communication and Collaboration During CCRS Implementation [Doctoral Dissertation, The University of Southern Mississippi]. USA.

Zhong, Lin (2017).Indicators of digital leadership in the context of K-12 education.Journal of Educational Technology Development and Exchange (JETDE) 10 (1), 3, 2017.

Zulu, S. L. and Khosrowshahi, F. (2021). A taxonomy of digital leadership in the construction industry. Construction Management and Economics, 39(7), 565-578.

Zupancic, T., Herneoja, A., Schoonjans, Y. and Achten, H. (2018). A research framework of digital leadership. Computing for a Better Tomorrow, 2, 641-646.

Appendix A

Approval of ethical committee

Acquire Knowledge to Serve Society

THE CERTIFICATE OF ETHICAL APPROVAL
(CERTIFICATE OF EXEMPTION)
THE ETHICS COMMITTEE OF RESEARCH
HUACHIEW CHALERMPRAKIET UNIVERSITY

September 4th, 2022

Project Title	Digital Leadership in Hospital Context
Principal Investigator	Mr. Mo Yongjian
Faculty / Program	Master of Business Administration Program in Digital Business

This is to certify that the research project above has been approved in accordance with the Declaration of Helsinki by the Research Ethics Committee at Huachiew Chalermprakiet University.

Signature

(Wirat Tongrod , Ph.D.)
Chairman of the Board
Research Ethics Committee
Huachiew Chalermprakiet University

Approval Date	September 4th, 2022
Certificate Number	อ.1229/2565

This approval is valid until 3rd September 2024.

Appendix B

Consent form

เรียนรู้เพื่อรับใช้สังคม

Questionnaires for the study on

Digital Leadership in Hospital Context

My name is Mo Yongjian—a graduate student at the Master of Business Administration (M.B.A.) in Digital Business at Huachiew Chalearmprakiet University in Thailand. As a part of this degree, I am conducting a thesis on the topic "Digital Leadership in Hospital Context". The purpose of this study is to explore digital leadership in a hospital context. To complete this study, we needed employees of the First Affiliated Hospital of Gannon Medical College to answer the questionnaire. Data collection started from January to June 2022.

This research is conducted on a strictly anonymous with the confidentiality of participants. Your name will not be identified in this report and data collected will be seen only the researcher and thesis advisor. Your participation is voluntary. If you are willing to answer the questionnaires, please tick to declare that you consent to give the data for this research. The data you provide will be used for this study only.

Further information and questions about this project, please contact me at e-mail address 1369647693@qq.com and my thesis advisor, Dr. Chatcharawan Meesubthong at e-mail address Luckychat36@gmail.com.

Regards

(Mr. Mo Yongjian)

Researcher

เรียนรู้เพื่อรับใช้สังคม

Consent to Participation in Research
Digital Leadership in Hospital Context

I have been given and have understood an explanation of this research project. I understand that I may withdraw myself (or any information I have provided) from this project (before data collection and analysis is complete) without having to give reasons.

☐ I understand that the data collected will be visible only to the researcher and thesis advisor, and my name will not be identified in this report.

☐ I understand that the data I provide will be used only for this study and will not be used for any other purpose, nor will it be released to others without my written consent.

☐ I understand that answering the questions in the questionnaire means that I have read the consent form and volunteered to participate in this research without any enforcement from anyone.

Appendix C
Questionnaire

This questionnaire has two parts, the first part is about the demographic information of the sample. For example, gender, age, department, position, etc. The second part contains options for questions related to digital leadership behavior.

Section 1: Please indicate your information by tick (√) in the box that matches your information.

1. Your gender?

A. Male B.Female

2. What is your age?

A. Under 30 years old B. 31-40 years old

C. 41-50 years old D. 51 years old and above

3. How long have you worked at the hospital so far?

A. Within 1 year B. 1-5 years

C. 6-10 years D. More than 10 years

4. What is your education?

A. College and below B. Bachelor's degree

C. Master's degree D. Doctoral degree

5. What is your position currently?

A. Nursing Department B. Medical Service

C. Outpatient Department D. Logistics Department

E. Science and Technology Department

F. Information Service

G. Medical Equipment Department

6. What is your current position?

A. Senior Managers B. Middle Managers

C. Grassroots Managers D. Grassroots staff

Section 2: Digital leadership behavior

2.1 Please indicate your opinion on digital leadership behavior of yours leader by checking (√) the box that matches your opinion.

Items	Lowest	Low	Middle	High	Highest
	1	2	3	4	5
2.1.1Digital Support					
1. He will provide access to digital channels					
2. He will recommend the use of digital tools in the workflow					
3. He will streamline internal workflows through digitization and automation					
4. He will create a good digital work atmosphere					
5. He will use digital tools to improve productivity					
2.1.2 Digital Guidance					
6. Hospital's social media creates a good atmosphere for organizational work					
7. Digital systems can create a good working environment.					
8. Hospital's application system improvement enables employees to use digital systems effectively					
9. Digital can help employees to work more efficiency.					
10. Digitization can help employees improve their skills					
2.1.3 Digital Engagement					
11. Online media can facilitate communication between doctors and patients					
12. Hospital's social media can quickly communicate information to employees					
13. Hospital's digital tools can inspire employees to be innovative					
14. Hospital uses digital tools to create channels for employees to communicate their ideas.					
15. Employees use digital communication tools at work (QQ, WeChat, etc.)					

Items	Lowest	Low	Middle	High	Highest
	1	2	3	4	5
2.1.4 Digital Encouragement					
16. Hospital has digital systems for employees to build relationship within departments and among other departments.					
17. Recognition or acknowledgement of employees' creativity in their digital work have been adopted in departments.					
18. Participate in digital media events organized by the organization					
19. Experience organization-related digital health activities					
20. Promote the development of digital healthcare projects					

2.2 Please indicate your opinion upon your own job satisfaction by checking (√) the box that matches your opinion.

Items	Lowest	Low	Middle	High	Highest
	1	2	3	4	5
2.2.1 Workplace					
21. I like the people I work with.					
22. I have a safe workplace.					
23. I know how to measure the quality of my work.					
24. I have opportunity to take part in trainings, webinars, meetings and outreach activities.					
2.2.2 Communication					
25. Communications seem good within this hospital.					
26. As it plans for the future, my department or agency asks for my ideas					
27. I have the opportunity to give input on decisions affecting my work					
28. I know how my organization measures its success					
2.2.3 Supervisor and management					
29. My department or agency has the right people and skills to do its work					
30. My supervisor shows interest in my feelings and acknowledges my concerns.					
31. My supervisor treats me with dignity and respect					
32. I can rely on my supervisor					

2.3 Please indicate your scale upon the factors of employees work performance by checking (√) the box that matches your opinion.

Items	Lowest	Low	Middle	High	Highest
	1	2	3	4	5
2.3.1 Task performance scale					
33. I managed to plan my work so that it was done on time.					
34. I knew how to set the right priorities.					
35. I was able to perform my work well with minimal time and effort.					
36. Collaboration with others was very productive.					
2.3.2 Contextual performance scale					
37. I took on extra responsibilities.					
38. I worked at keeping my job knowledge up-to-date.					
39. I actively participated in work meetings.					
40. I kept looking for new challenges in my job.					

Name:Ms. Xu Position :Director of Party and Government Office

Name:Mr Hua Position:Secretary of Mission Committee

Name:Mr Wei Position:Vice President

Question no 1: How do you feel that digital coaching is most associated with digital leadership behaviors, digital encouragement and digital engagement are about equally associated with digital leadership behaviors, and digital support is least associated with digital leadership behaviors?

Ms. XU: First of all, this digital guide, now with the development of this medical industry, the number of this hospital medical equipment growth and renewal. In this process of upgrading and iterating the use of medical equipment management and maintenance, there are many more and more problems. For hospital leaders, effective guidance of this figure can effectively solve some deep-seated problems of the hospital, and then promote the sustainable development of the hospital. The hospital must be more intelligent and digital in the future. So, this digital guidance can better influence and improve the hospital's intelligence and digitalization, so that the hospital in the future on the road to better development. The second one is about the digital encouragement and digital participation. He is more focused on the actual situation of this work internal process to achieve the execution and working model of the hospital development. It's like executing the future plan of this hospital according to the digital guidance. For example, this promotion of hospital digital projects and participation in related hospital digital activities. So, they are basically consistent in the degree of correlation of leadership behavior. And then the third one is digital support. He presents more of a phenomenon of leaders supporting the work of the hospital. The goal is to make the workflow of the staff more efficient and simpler than in a traditional hospital. In the case of our hospital, this leader uses digital support for employees less often than the other three factors. For digital support, digital leader behavior is less relevant. For example, recommending employees to use this digital tool in their work and improving digital channel services. Regarding these phenomena, an employee can use them proficiently by themselves and they are used on a regular basis. So, employees have less need for these, and the degree of relevance of digital support behaviors provided by leaders will be relatively lower.

Mr. HUA: For digital guidance, this is how I personally understand it. With the development of our medical industry, our hospitals continue to purchase medical equipment or some other medical devices. There are more problems about the use of medical equipment management. That how to efficiently use, for example, efficient use of our corresponding medical equipment. And then make our operational efficiency more efficient, to promote the development of our hospital. So, this digital guidance is to better influence the hospital, and to improve the intelligence of our hospital. About digital encouragement and digital engagement. I personally feel that we should follow this digital guidance is to implement, equivalent to our hospital has a similar work plan blueprint every year to implement a plan for our future next year. For example, promoting our digital projects in this hospital and participating in related digital activities. So, this level of correlation between them in this digital leadership behavior, I think, is basically the same. Regarding digital support, I personally think that this is digital support is more of a phenomenon of leaders supporting the work of our hospitals. However, it is the same as the traditional hospital, which aims to make the workflow of our staff more efficient and improve the operational efficiency of our hospital. In our hospital, the number of times our hospital leaders use digital support for our staff is less than the other three factors. So, the correlation between digital support and the behavior of digital leaders is much lower. For example, we recommend our staff to use this digital tool actively at work and improve the digital channel service piece. (For example, QQ and WeChat) Regarding this phenomenon, our employees in this hospital can use it independently and often. So, I personally think that employees have even less need for digital support. Finally, the degree of relevance of leaders to digital support behavior is relatively low.

Mr. WEI: Digital mentoring: Digital mentoring is used more often and more effectively among our hospitals. Its leadership behavior involves the approach to the digital future development of hospitals and can train better trainees for our hospitals. For example, our hospital trains general practice trainees online, and through theoretical training, simulation tests, and analysis of important points and easy mistakes, we can improve the ability of general practice trainees to treat diseases in various disciplines and to manage chronic diseases professionally and build a holistic general practice thinking and "big health" concept. Secondly, we can understand the difficulties and

doubts in surgery through surgery-related videos and improve the knowledge and skills for hospital general practice trainees. Then, we need the right digital guidance to lead the future development of our hospital. These leadership behaviors are very important for the construction of hospital digitalization, which can improve the efficiency of all our hospital staff and create a good environment. Digital participation is more to show the communication between the whole staff of the hospital, the relationship between the hospital and the patient communication. At the same time, it builds a platform for academic communication for hospital staff and allows all hospital staff to express their views and ideas. Digital Encouragement, on the other hand, supports the whole staff to participate in relevant hospital digital activities knowledge, promote the importance of digitalization in the hospital, and let them understand the importance of digitalization for the future development of the hospital. So digital participation and digital encouragement have a basic consistency in the degree of association of digital leadership behaviors. Digital support: Digital leadership mainly supports the content related to digital work and facilitates the related functions for digital activity work. It will create a work environment with a relaxed atmosphere for employees, focusing on an efficient and simplistic workflow. Therefore, the digital leadership behavior in our hospital is least associated with digital support. Most of the digital support is about the workflow of the staff, and the staff will use WeChat and QQ to communicate with each other or other digital tools within the hospital, which are simple and do not require our time to guide them. Therefore, I think digital support is the least relevant to digital leadership behavior.

Question no 2: How do you employ digital technology to support the work of your subordinates?

Ms. XU: At the digital support level, such as the intelligent appointment consultation launched by our hospital now, especially in the current epidemic situation, this online Internet hospital to carry out the advance interoperability of doctor-patient information to improve the efficiency of our diagnosis and treatment. It can simplify some of the offline workflow within our hospital. It creates a better working environment for our hospitals and provides patients with a better and more convenient access to medical care.

Mr. HUA: Regarding digital support, we have also implemented a series of measures in this hospital. For example, we have implemented our intelligent appointment booking. Through our intelligent appointment consultation, there is an information interaction between doctors and patients on our platform, and when they come to our clinic for a specific treatment, we will have an information interaction in advance. This piece of information allows our doctors to have a preliminary understanding and judgment of the patient's condition before he arrives at our hospital. This can improve the efficiency of our corresponding integration, which can streamline some offline workflow within our hospital and create a better and more favorable medical work environment. I think all these can be reflected in the digital support level.

Mr. WEI: At the digital support level, we have the official WeChat applet capable of providing online follow-up consultations to renew prescriptions. The hospital provides online consultation through picture transmission, online video and voice, and patients can individually evaluate doctors, pharmacists, and courier services. There are currently 15 specialties of doctors sitting online, with a total of 297 doctors providing online consultation specialty services for patients. Secondly, our hospital provides the service of purchasing medicines online. While patients pay for their medicines online, they can also choose the way to pick up their medicines according to their own situation. The pharmacy of the Internet hospital platform picks up the medicines from the pharmacy (which is medically insurable) and also supports the delivery of medicines to their homes. Patients with chronic diseases such as diabetes, hypertension, cardiovascular disease, and kidney disease can buy their medications online. These digital platforms save time and space costs for patients, greatly facilitating people's lives and improving efficiency for hospital work. It is worth mentioning that in 2019, the first da Vinci robotic surgical system outside the national capital city was settled in our hospital, which has provided high-quality surgical services to nearly 1,000 patients in three years, including complex/highly difficult urological, gynecological, thoracic, gastrointestinal, hepatobiliary, and pediatric surgeries.

Question no 3: In what ways do you digitally coach employees in digital leadership behaviors?

Mr. XU: The hospital is training this subordinate on the surgery by showing the successful cases of this surgery online. Through online video detailed explanation, let the following people understand more about some problems that are easy to occur in surgery, can effectively improve this awareness, and some skills. Then in this consultation service, the mobile Internet-based patient intelligence and consultation service is carried out. Then all medical institutions can realize the interconnection of medical data to further improve the efficiency and quality of treatment. It can promote the work of graded diagnosis and treatment that we are now promoting in China. Then we learned that in recent years, this medicine data center has made some achievements in promoting a high-quality development of our hospital's discipline construction work. It is closely connected to the construction of key disciplines in this hospital and has given full play to its data support services and sample preservation. To this our clinical research, played a supporting role. Secondly. Our affiliated hospital has docked this clinical research staff of our school to meet the demand of our clinical consultation data mining service. The third is docked to this information section of our own hospital, which can deeply integrate the generation and use of our clinical data and provide more data support services for our hospital's high-quality development, indicating that this digital system can create a very good working environment for our hospital. So digital guidance can drive the development of our hospital and make our hospital more digital and intelligent.

Ms. HUA: In fact, our hospital has more ways of digital guidance for our staff. One of them is that our hospital will conduct a surgical training for our subordinates through a kind of online display of successful surgical cases. Through this online training, our staff will have a clearer understanding of the problems that are likely to occur in our surgeries, and it will also enhance our subordinates' overall knowledge of surgery and give them a platform to learn their skills. Another one is to pilot our Internet hospital medical services in this hospital. For example, we have just mentioned the appointment service system. Through the Internet, we can achieve the interoperability of hospital information at all levels. For example, our tertiary hospitals can realize an interconnection of our data diagnosis and treatment with the county secondary

hospitals. For example, if they have some test sheets, test sheets or some imaging reports in the county hospital, we can share and mutually recognize them. For our patients, we can save the corresponding costs. In addition, it can also improve the efficiency and quality of our treatment, realize the interconnection between doctors and patients, and make the connection between doctors and patients closer. At the same time, it can also promote the efficiency of graded treatment that our country is responding to. In addition, we have learned that in recent years, our unit medical data center has made great efforts to promote the work of our hospital disciplines. For example, our medical data center, through data analysis, can be closely connected to the construction of our hospital's key disciplines. Then give full play to our clinical data to support services and our sample preservation services. Secondly, through the analysis of our marketing data to a clinical researcher in our university, we can realize the demand-oriented service of our basic experiment and our corresponding clinical experiment. Then, we also use our pharmaceutical big data information and our hospital corresponding inside the new internal system for a docking. For example. "HRHIS", and the system we call "PASS", will be integrated. For example, the electronic case and the "PASS" system will operate more efficiently. So, our digital system can create a very good working environment for our hospital. I think digital mentoring and digital leadership behavior are the most closely related. Because it can drive the development of our hospital and make our hospital more digital and smarter.

Mr. WEI: Like I said before, hospitals can improve the surgical knowledge and skills of their staff by showing successful video cases of surgery online. Secondly, in terms of hospital consultation services, our hospital provides an intelligent pre-consultation service system for patients based on the Internet, and medical institutions at provincial level, city level, county level and town level interconnect and share patient information. Regarding the role of pharmaceutical big data in the hospital, our hospital has some summaries in the meeting, mainly led by the discipline construction and hospital high-quality development needs, to further improve the functional positioning of the department, refine the service process, expand the scope of data-assisted services and service recipients, and make more contributions to the high-quality development of the school and hospital.

Question no 4: Regarding digital engagement, what digital methods do you use to support employee engagement?

Mr. XU: Digital tools for digital engagement can facilitate frequent communication among hospital staff and make it easier for us to designate and reach each staff member quickly. In hospital work, we can always feel or solve the work schedule and work content changes at any time, and then also can improve the flexibility and mobility of our work. Of course, for this online service for patients, we can also realize our patients' home appointment and consultation, and then make an online registration and payment. Reduce our waiting time for medical treatment and improve our work efficiency.

Mr. HUA: Regarding digital engagement, WeChat can promote a frequent communication among our staff in this hospital. Secondly, it facilitates the communication of information and information sharing among our employees. When working in our hospital, we can personally feel the solution to work schedule or work content change at any time, and then we can improve the flexibility and changeability of our hospital work. At the same time, patients can make home appointments and pay for registration, reducing our waiting time.

Mr. WEI: Regarding digital engagement, we mainly use QQ and WeChat to support communication between hospital staff. These digital tools are more flexible in terms of assigning tasks and work. It is possible to change work and tasks at any time, which is more convenient and easier for our staff to work in the hospital. Secondly, our hospital discusses digital technology and medical technology related events at our annual meetings or takes medical teams to digital events held in various units. These are some of the things that our hospital does to support our employees in digital technology activities. These events bring relevant healthcare digital knowledge and digital technology developments to our staff, opening their eyes and raising their awareness.

Question no 5: How do you set digital technology expectations to motivate your team?

Mr. XU: About this digital encouragement. In our hospital, we have been doing this "Internet + nursing service" for the past two years. This one is relatively successful and relatively advanced in the country. Like us, we often offer some continuing

education programs, such as the provincial-level continuing education program that we carry out. This is about "Internet + nursing services", he can take this combination of online and offline a way. Then, our "Internet + nursing service" can play a leading and model role in the prefecture-level city or in the province, forming our Ganzhou model with characteristics. Because our current city is Ganzhou, we can solve the problem that it is difficult for the empty nest elderly, the disabled elderly and the patients who have difficulty in moving to seek medical treatment.

Mr. HUA: Regarding the digital encouragement, then we have been encouraged by the national policy in the past two years to create "Internet+" hospitals, or "Internet+ service" activities. Then our hospital took this opportunity to actively respond to the national policy and some measures proposed by the provincial health care commission. Then we did a deep excavation of "Internet + nursing services" specifically in this area of nursing, and when we did this "Internet + nursing services", we also carried out a series of training courses, and then through offline training and online invited experts to We also carried out a series of training courses, and then invited experts to give lectures offline and online as a pilot project. We made our "Internet + Nursing Service" a feature of our hospital and even a feature of Ganzhou. Through the "Internet + Nursing Service", our hospital can really let the residents of our community experience and get a benefit. Through the platform, we are able to provide care for the elderly in the community and at the grassroots level, especially for the elderly with mobility problems. Through "our Internet + nursing services", let family members or their own appointment, our nursing staff to take the initiative to visit them for a change of medicine, or to deal with some hemorrhoids and so on. Our hospital nursing services can be migrated to the community to solve the problem of their difficulties in accessing medical care.

Mr. WEI: Regarding digital encouragement, our hospital mainly promotes "Internet + Nursing Service". This is our hospital's "Internet + Nursing Service" model in Ganzhou City, which can solve the problem of difficult access for all patients with mobility problems. At the same time, our hospital encourages and supports the innovation of digital technology for all staff. For example, at the Digital Technology Conference, we encourage the hospital's entire research staff to continue to innovate in

artificial intelligence and medical information technology, and we appreciate and support the hospital's research staff's innovation in medical technology research.

Question no 6：What trends do you see in the future of digital leadership in hospitals?

Mr. XU: Digital transformation is a much-discussed topic in our hospitals. As a practitioner in this healthcare industry, we should grasp these basic concepts and methods more thoroughly, and then convince our senior leaders and some related functional departments to form some correct understanding together. Avoid some unnecessary misleading factors. The first word is definitely to accelerate the pace of our digital and intelligent construction. The second word is that we should establish a new concept of digital development. The last word is that we definitely want to build this new technology of digitalization. These are a trend of our digital leadership behavior in the inevitable development of talent. We should also follow this development trend and do a good layout of our future hospital development in advance.

Mr. HUA: I think digital technology has brought about this change, and we are feeling it more and more. Digital transformation has become such a topic of discussion in our medical institutions. Then as a medical staff, I think the first should be more in-depth and thorough to master the basic concept of our digital leadership approach. Then we can communicate with our leaders and relevant departments to report, so that we can form a more correct understanding. It can avoid our traditional specific thinking mode cognition and concept. First of all, I think we need to accelerate this pace of digitalization and intelligence in hospitals. Another is that emerging technologies bring some new opportunities for development, and we should establish a new concept of digitalization. Furthermore, it is by creating a new pattern of our digitalization. These are an inevitable trend of our hospital digital leadership in the future development. Therefore, I think we should follow the trend of this era, do a good job of our pre-planning layout, so that we can make a successful digital transformation of the hospital. It is also said to follow a law of our social development. The main thing is to understand the rules and regulations, and then make some preparations in advance.

Mr. WEI: The future of health care delivery is likely to be very different from today's hospital model and will certainly be more digital and intelligent, as is the trend of the times. As hospitals become more digital and intelligent, these changes will also have a very significant impact on digital leaders. First of all, digital leaders are facing

more workloads and more severe tests in hospitals. This is because as healthcare facilities age and become more up-to-date, choices must be made as digital leaders. Second, is the need for digital leaders to consider the integration of digital technology into hospital services to truly create a healthcare system without walls. Then, there are many obstacles that digital leaders encounter when they want to accelerate the pace of digitization and intelligence in hospitals. For example, the conflicts that arise from traditional hospital functions and digitally transformed hospitals. Finally, as a national key hospital, the digital development of our hospital needs to follow the national policy and move forward slowly, not too fast. The digitalization and intelligence of the future hospital is the trend of future development, and we, as leaders, should follow the laws of the development of society.

Question no 7: And do you think there are problems with their digital leadership behaviors at work? (If so, what are the problems they have?)

Mr. XU: Digital leadership behaviors are definitely being used more in the workplace. Especially now this epidemic, we "Internet +" online consultation has become a mainstream medical platform. Although it can help the people and facilitate the purchase of drugs for chronic diseases, there are certain drawbacks. For example, the patient's participation is significantly reduced, many diseases are not treated in depth, and then most of the diseases need to be diagnosed by means of examination and testing. This kind of "Internet+" online consultation will lead to some difficult and critical diseases. For example, some rare diseases are easily misdiagnosed and missed. Then the new crown epidemic, Baidu's big data shows that since the outbreak of the epidemic, people's willingness to obtain information is getting stronger and stronger. For example, this kind of search and browse through Baidu. He was delaying this kind of information on average more than 100,000 times a day. So how to carry out a better deployment of resources, for effective digital guidance behavior has a certain provocative war.

Mr. HUA: Regarding digital leadership behavior in our work, we actually had this exploration up front. We have some issues that are more evident in the moment. For example, we have some of them in terms of the epidemic and in terms of media outreach. For example, we are on the epidemic side. We now have a lot of back-and-

forth outbreaks of neo crown pneumonia across the country. Therefore, the current domestic epidemic prevention and control situation is still relatively serious and complex. Then the medical institutions should be born under the call of our national health commission and provincial health commission, actively in the promotion of our Internet hospital so a work. Then our hospital in the early words, in order to create our Internet publicity has done a lot of efforts. In 2021, the hospital also obtained the qualification of "Internet+" hospital. Then, we actively help our people to solve their problems on this platform. Because of the epidemic, people have chronic disease closed loop, they just can't come to our hospital in the first place. We provide convenience to patients through this Internet plus online consultation. For example, it is possible to make an appointment online, and then after the consultation and transfer of fees online. We can also provide him with some medicines through the corresponding platform. However, one obvious disadvantage is that the "Internet+" hospital is not able to solve the problems of patients with acute and serious illnesses. For patients who can participate on the Internet+ online consultation, they can indeed consult with doctors face to face through this platform. However, our medical staff has no way to do the corresponding examination for internal medicine patients, which is equivalent to the decrease of patient participation. We can only ask questions; we do not have the ability to do palpation and other tests. So, there are some cases of underdiagnosis and misdiagnosis of diseases. This is a problem that we face in terms of the epidemic. We now search through news media platforms to understand the situation of epidemic release. For example, Weibo, Friends, and Shake. Many residents are using their browsers to search for unofficially announced epidemics. This unverified information can give them the wrong picture of the epidemic and lead us to have a poor grasp of the epidemic. The media will have a more obvious problem with epidemic propaganda.

Mr. WEI: I think digital leadership behaviors can be problematic in the workplace. The main manifestation is that during the epidemic, people get relevant epidemic information on the Internet. Some false information about the epidemic can lead to social panic, and these false information on the Internet can lead to a decrease in the public credibility of governmental work agencies and hospital institutions. For example, in Chongqing, someone posted false information on Weibo and WeChat that the government needed to carry out a city closure due to the seriousness of the epidemic,

causing the surrounding citizens to buy food in large quantities and hoard supplies in supermarkets. The second issue is the digital system. On September 2, the nucleic acid system of Chengdu's "Tianfu Health Pass" became "jammed", causing the registration of information and collection of nucleic acid tests to fail. The medical staff on site tried various methods but were unable to resolve the "network signal" or "nucleic acid testing system" problem. These unexpected situations led to long queues for sampling and slow progress of nucleic acid testing, causing great distress and inconvenience to the public. Then there are the problems brought by the use of the Internet. Although "Internet+" online consultation can improve efficiency and facilitate many people to buy medicines, there are also certain disadvantages. Because most diseases need to be diagnosed by means of medical mechanical examinations, the online consultation provided by the Internet is not conducive to difficult and critical diseases, rare diseases, and so on. The problems that arise in these efforts pose certain challenges to digital leadership behavior.

Question no 8: What kind of advice would you give about the existence of digital leadership behaviors?

Mr. XU: First of all, the first to build this digital health city, and then create this intelligent medical city integration. The main purpose is to promote the hierarchical treatment in China, to give full play to the advantages of our disease-specific medical community, and to form a better treatment system for large patients, major diseases, serious diseases, and minor diseases, even in the community. Then the second is to select some representative medical institutions. Patient-centered to promote this digital and intelligent applications. For example, to promote the construction of some national medical centers, and then the core of this leading hospitals, the establishment of such health examination files, to achieve the interoperability of our examination and testing, to reduce our duplication of examination, to reduce the burden of our people to seek medical care.

Mr. HUA: First, as the country vigorously promotes medical association hospitals, we can integrate digital health city and innovative smart city through medical association. The integration of high-quality medical resources and the implementation of the national medical policy. The more common diseases of cold and minor injuries,

we can stay inside the community through the corresponding medical association to solve or go to the medical center to buy some drugs. Diseases that are difficult to treat are concentrated in our higher-level hospitals to solve. Secondly, we can preferably select some representative institutions to promote our digital and intelligent applications to create our future hospitals with patients as the center. We should respond to the national medical center policy and establish corresponding patient health records with the leading hospitals as the center. Through close medical center workers in the region to achieve interoperability of examination, for our patients to reduce the burden, efficient for our patients to save time and cost.

Mr. WEI: On August 18, our hospital held the "80th Anniversary Hospital Culture Construction Achievement Conference", in which the hospital's White Heron Culture, cartoon image spokesperson, hospital slogan and image film were unveiled. At the conference, the hospital's "White Heron Culture", the hospital's cartoon spokespersons Gan Xiaobai and Gan Xiaolu, the hospital's slogan, and the image film "Trust" were premiered on the media platform. These cartoon images can close the distance with the public and improve the image of the hospital. Then, our hospital's Jitterbug or WeChat public number is often updated with science and health knowledge to make people more aware of some disease knowledge and improve their general knowledge of medical life. For example, in the news, someone saved a child by using the "Heimlich maneuver" that he learned on the Internet. It is necessary to acquire such medical emergency knowledge. In response to problems with the digital system, our hospital has a professional technical team that staggers nucleic acid testing sampling, strengthens system operation monitoring, and enhances problem response to ensure smooth nucleic acid testing. Our hospital's professional technical team will always identify problems with the digital system and resolve them in a timely manner so as not to inconvenience the public or patients. As we said earlier, we need to build a more digital and intelligent hospital to improve the efficiency of our work and optimize the management of the hospital by our leaders.

Appendix D

Expert validity test

เรียนรู้เพื่อรับใช้สังคม

01 May 2022

Dear Dr. Chatcharawan Meesubthong

Attachment 1) Thesis proposal "Digital Leadership in Hospital Context"
2) Questionnaire

My name is Mo Yongjian—a graduate student at the Master of Business Administration (M.B.A.) in Digital Business at Huachiew Chalearmprakiet University in Thailand. As a part of this degree, I am conducting a thesis on the topic “Digital Leadership in Hospital Context”. The study has objectives. As in the proposal, theoretical framework, and research methodology. The study will collect data from the Hospital Staff. To ensure the quality of the study, I would like to ask you to check the questi onnaire to conduct the study.

I would like to thank you in advance for your kind support my study.

Best Regards

(Mr. Mo Yongjian)
Researcher

เรียนรู้เพื่อรับใช้สังคม

หนังสือยินยอมการเผยแพร่ผลงานวิจัย
Letter of Consent for Publication of Research
论文发表同意书

เขียนที่ มหาวิทยาลัยหัวเฉียวเฉลิมพระเกียรติ

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หลักสูตร Courses 课程 บริหารธุรกิจมหาบัณฑิต

สาขาวิชา field of study 专业 ธุรกิจดิจิทัล

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ชื่อเรื่อง (ดุษฎีนิพนธ์/วิทยานิพนธ์/การศึกษาอิสระ Title (dissertation/Thesis/Independent study (申请检查学位论文/毕业论文/选修)

(ชื่อภาษาอังกฤษ) (English Title)(英文名称) DIGITAL LEADERSHIP IN HOSPITAL CONTEXT

✓ **อนุญาต** ให้ศูนย์บรรณสารสนเทศ มหาวิทยาลัยหัวเฉียวเฉลิมพระเกียรติ เผยแพร่งานวิจัยของข้าพเจ้าสู่สาธารณะ เพื่อเป็นผลงานทางวิชาการ ผ่านระบบฐานข้อมูลงานวิจัย ThaiLIS

❒ **Permit** the Information Center at Huachiew Chalermprakiet University to publish my research to the public as an academic achievement through the ThaiLIS research database system

❒ 我同意將本人論文透過华侨崇圣大学信息管理中心發表至泰国文献数据库 ThaiLIS

❒ **ไม่อนุญาต Not permitted 不同意**

ลงชื่อ Sign Mo Yongjian ผู้วิจัย Researcher 作者签名

(Mr. Mo Yongjian)