

Determinants of Digital Adoption Capability for Service Performance in Indonesian Hospitals: A Conceptual Model

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Abstract. With large budget support in the health sector, Indonesia has made significant progress in realizing Universal Health Coverage (UHC). However, there are weaknesses in the quality of service with regard to technology and information support, especially in lower-middle-class hospitals. This study aims to examine the role of digital technology on hospital performance from a service perspective. This study was compiled using a systematic literature review method, and conducting bibliometric analysis on several selected papers, it was seen that there was a link between hospital performance and the adoption of digital technology in the aspect of care services to patients. Therefore, this study proposes a new conceptual model consisting of six constructs: digital adoption capability, hospital performance, digital leadership, ICT literacy, patient-centric, and environmental dynamism to improve hospital performance. This model is very important for hospital organizational management and has contributed to providing insight into increasing the role of digital technology to connect health workers and patients to produce safe and quality health services. This study is one of the first to examine the adoption of digital technology in the aspect of service in lower middle-class hospitals and lays the foundation for academics for the scope of their future research.

Keywords: Hospital Performance, Digital Leadership, ICT Literacy, Patient-Centric, Digital Adoption Capability, Environmental Dynamism

1. Introduction

Welfare has a very close relationship with health (Lowery & Cassidy, 2022; Sattar, Yusoff, Arifin, Mohd Yasin, & Mat Nor, 2023) and is widely discussed in society. Many countries encounter difficulties in managing public health, this is also the case in Indonesia (Sparrow, Dartanto, & Hartwig, 2020). Indonesia has promising hospital business prospects, indicators of which include an increase in population growth (Badan Pusat Statistik, 2021), delayed health care due to the COVID-19 pandemic (World Bank, 2021), the high priority of Indonesian people's spending on the health category (61 %) which occupies the second largest position after food needs (74%) (Deloitte Consumer Insights, 2021), a 35% increase in the use of telemedicine in Indonesia (Hamsal & Ichsan, 2020; McKinsey & Company, 2021), and the magnitude of Government budget for the health sector (Kementerian Komunikasi dan Informasi Republik Indonesia, 2021; Kementerian Sekretariat Negara Republik Indonesia, 2021).

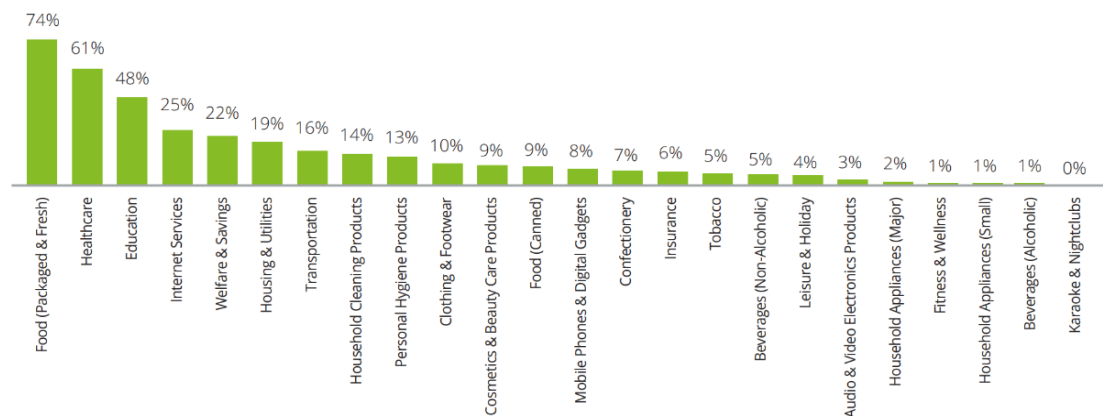


Fig. 1: Indonesian people's spending priorities by category (Source : Deloitte Consumer Insights, 2021)

According to the World Bank (World Bank, 2021), Indonesia has made significant progress in realizing Universal Health Coverage (UHC). However, despite these achievements, there is a weakness in the quality of care. The low quality of hospital health services in Indonesia is often associated with patient service problems, such as the availability of beds, availability and discipline of doctors' schedules, and long queues for services. Hospital performance has received serious attention from the community and government (Noto, Lo Verso, & Barresi, 2021). According to Minvielle et al. (2008), hospital performance, or the ability to treat patients effectively. One of the ways to overcome performance in health management is through the use of digital technology (Rubbio, Bruccoleri, Pietrosi, & Ragonese, 2020). The study of digital technology adoption on hospital performance (Bijoylaxmi Sarmah, Shampy Kamboj, 2022) is important as stated by Harlow (Harlow, 2018), who said the lack of interoperability in the healthcare system is a problem that can be solved with existing technology. Digital technology can increase efficiency (Binsar, Eryanto, Wahyudi, Sugandi, & Suroso, 2020; Sproson et al., 2022), improve quality (Al-Hattami, Senan, Al-Hakimi, & Azharuddin, 2022) and reduce response time by providing benefits to stakeholders such as the national health system, doctors, and patients (Laurenza, Quintano, Schiavone, & Vrontis, 2018). However, technology adoption in the health sector is still lagging behind compared to other fields (Gandhi, Khanna, & Ramaswamy, 2016). Studies related to business model transformation and digital utilization in healthcare organizations are also lacking interest, including external business development, unknown questions around the digital divide, and financing options (Kraus, Schiavone, Pluzhnikova, & Invernizzi, 2021). Not only related to managing digital capabilities for its employees (Binsar, Kartono, Bandur, & Kosasih, 2022; Layman, Sasmoko, Hamsal, & Sanny, 2022), but leadership in health organizations must also be able to provide arrangements and the best way to utilize digital technology to providing space for patient engagement through digital adoption (Esmaeilzadeh, Dharanikota, & Mirzaei, 2021). Patient involvement is not only in terms of direct communication (face-to-face) with health workers, but communication remains

smooth without face to face through ICT media (Al-Hattami et al., 2022; Binsar, Riantono, Kartono, Bandur, & Kosasih, 2023). The Covid-19 pandemic with health protocols that require social distancing will certainly increase the role of ICT as a means (Binsar & Legowo, 2020; Thulesius, 2020).

We conducted this research concerning the following two questions:

1. Research question 1 (RQ 1): Can digital adoption capability affect hospital performance?
2. Research question 2 (RQ 2): How can digital adoption capabilities be implemented in hospital management?

The first question is “What”, and what factors encourage hospital organizations to adopt digital technology in providing services to patients? With the development of technology today, where everyone already has a mobile device and is always connected to the internet. Can this be used to change how to make a reservation and visit the hospital? Likewise, how do health professionals interact with patients?

The second question is “How”, how digital technology adoption strategies can be implemented to encourage the utilization and use of information systems for various service needs and decision-making? This description explains how the leadership factor becomes important in moving the organization to change to digital, an information system that requires the digital knowledge and skills of health professionals such as doctors and nurses. As well as utilizing the ability of the internet to reach patient needs to improve quality and safety in providing services.

The research is structured as follows: Section 2 presents a thorough literature review on digital capabilities, organizational performance, and what drives digital capabilities can affect organizational performance. Section 3, describes the methods we used to collect and analyze the literature and to generate research questions. Section 4 discusses the elements that drive the successful adoption of digital technology in hospitals with their effect on service performance shown in a conceptual model. Finally, conclusions and suggestions are presented in section 5.

2. Literature Review

2.1. Theoretical Foundations of Strategic Management and its relationship to digital adoption and hospital performance

Performance is the most central topic in strategic management (Hitt et al., 2017). Hannan and Freeman (1989) emphasize the need for organizations to adapt to ever-changing changes to maintain their relevance in line with the changing competitive environment. The ability to adapt is strongly influenced by the resources owned by the organization. As stated by Peter F. Drucker (1954), the management of human resources and employees makes it possible to efficiently address the evolving needs and preferences of customers. Technology is seen as a key input underlying the functioning of service for end users, and most organizations devote their resources to developing and bringing new services to market (users) (Ansoff & Stewart, 1967) so that the organization's products or services, processes, and technology management become the final product. the organization (Capon & Glazer, 1987).

By considering the role of technology in an organization as well as changing customer needs and changing competitive landscapes, the author develops the main concept of research using the Technology-Organization-Environment (TOE) theory proposed by Tornatzky & Fleischer (1990) to explain how the process of adoption and implementation technological innovation within an organization that is influenced by the environment.

As a derivative of TOE, we use three theories, namely Resource-Based Theory (RBT) (Wernerfelt, 1984), Theory of Planned Behavior (TPB), and Disruptive Innovation. RBT is used in this technology adoption model, evaluated based on an individual's evaluative assessment approach to technology (attitudes), and beliefs about technology adoption in organizations (Ajzen, 2002). Organizational resources help improve the efficiency and effectiveness of the organization's operations (Barney, 1991). This theory is also used to explain the inherent ability to adapt and utilize change to survive and thrive, organizations must develop and modify the way they operate (Helfat et al., 2007) through leadership

skills (Digital Leadership) and technology adoption (Digital adoption capability).

TPB itself is used to consider individual behavior, self-identity, attitudes, and normative pressures in shaping one's actions (Ajzen, 1991; Smith et al., 2008) to adopt digital technology. TPB further explains the behavior and acceptance of technology adoption through the Technology Acceptance Model (TAM) (Davis, 1986). The successful adoption of digital technology, as stated by Delone and McLean (1992) is multidimensional and must be implemented efficiently, effectively, and accurately. To complete the understanding of acceptance and desire for technology adoption, in addition to TAM, the Unified Theory of Acceptance and Use of Technology (UTAUT) theory is also used (Venkatesh, Morris, Davis, & Davis, 2003).

The adoption of digital technology is strongly influenced by external factors that result in continuous changes in technology, giving rise to many innovations described using the Disruptive Innovation theory (Christensen, 1997; Christensen, Raynor, & McDonald, 2015). This change certainly provides benefits for some organizations. Therefore, every organization is required to be able to follow the flow and be flexible in technological developments. It turns out that healthcare organizations are opposed to radical change (Wallin & Fuglsang, 2017). However, external pressures also require technological advances in the health sector. The importance of IT (information technology) services in the health sector has become increasingly clear after the COVID-19 Pandemic hit the world (Robert F. Lusch, 2015). Although policymakers aim to make the healthcare system safer, more affordable, and more accessible (Agarwal, Gao, DesRoches, & Ashish K. Jha, 2010), service innovation often comes from outside and changes the dominant system (Geels, 2006). Because it can improve three aspects which include the provision of health services, better and faster disease diagnosis, and surveillance; system functioning through change logistics and management; communication about health with all stakeholders (Lahiri, 2013).

2.2. Digital Capability

Digitalization is lower in the healthcare sector than in other areas and innovation has not been adopted by healthcare organizations as fast as technology advances (Laurenza et al., 2018). Thus, there is a need to better identify and understand the systems factors associated with digital technology adoption in complex socio-technical healthcare systems (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Xie et al., 2016). Digital technology capabilities play a key role in increasing the effectiveness of healthcare entities (Sproson et al., 2022). Digital technology capabilities are generally related to the knowledge and skills required for an individual to develop, use, adapt, absorb, and transfer technology (De Mori et al., 2016). Technology is changing the way organizations and individuals interact, create and receive services to become more flexible, which can generate a need for continuous innovation that is increasingly dynamic and competitive (Jahanmir et al., 2020; Zeike et al., 2019). The adoption of digital technologies regarding surgical performance is limited by system factors related to inconsistent normative and regulatory requirements and requires the development of further system innovations (Apell & Hidefjäll, 2022).

Healthcare services (similar to other sectors) are becoming increasingly dependent on digital innovation, whether in terms of treatment efficiency or diagnostic communication and optimization, change management is increasingly important in this area, as early involvement of all stakeholders, appropriately defined rules, adaptation to context and local culture (Hospodková et al., 2021). Therefore, it is important to have a skilled workforce capable of adopting and dealing with changes such as digital transformation (Nikou, De Reuver, & Mahboob Kanafi, 2022). Important soft skills are needed to embrace digital transformation and its potential impact on successful implementation (Gulati & Reaiche, 2020). There are still many obstacles faced by doctors against the use of electronic medical records with the help of libraries, books, conference proceedings, data banks, and also search engines such as Google (Ajami & Bagheri-Tadi, 2013).

2.3. Organization Performance

Organizational performance is largely focused on the organization's ability to efficiently utilize available resources (Hess, Zhu, Fang, & Liepa, 2021) to achieve performance that is consistent with the goals set by the company and considers its relevance to its users (Wilks, 2003). Performance is influenced by several factors, including (Ivancevich et al., 2012) namely individual factors, organizational factors, and psychological factors. Individual performance as a subordinate can affect the performance of the entire organization in the short, medium, or long term in a positive or negative direction (Conțu, 2020).

Performance is defined as doing the right thing in the right way (Engwall et al., 2016). Performance equals the volume of savings as measured by the relationship between the results achieved and the expenditures incurred (Engwall et al., 2016). Organizational performance is also a concept of the success or effectiveness of an organization and an indication of how the organization works effectively to achieve its goals successfully (Jenatabadi, 2015).

Research by Tangchareonsamut et al (Tangchareonsamut, Wongrathanandha, Khamsee, & Aekplakorn, 2022) shows that performance in hospitals is closely related to stress and burnout factors, hospital management needs to consider healthy conditions for its employees. There is a need to support healthcare research on the importance of staff adequacy in terms of both numbers and competence for service quality (Aiken, Clarke, & Sloane, 2002), and a focus on "sharp end" individual skills, i.e. situations in which health professionals interact with patients, can lead to better clinical performance and outcomes (David Woods, Sidney Dekker, Richard Cook, Leila Johannesen, 2017). The same thing was also expressed by Mohamed (Mohamed, 2021), namely that there is a significant influence of social intelligence on the performance of health service providers, social intelligence competence provides the basis for collective self-efficacy and service provider performance for doctors in Egyptian government hospitals. Meanwhile, Naciti's research (Naciti, Noto, Vermiglio, & Barresi, 2022) focuses more on the gender factor, showing that, in hospitals, gender diversity is related to performance at every level.

A system-level approach is needed for the management of healthcare operations to improve healthcare delivery (Dai & Tayur, 2019). Organizational changes were made to overcome obstacles to the quality of hospital services (performance barriers and doctor job satisfaction) both directly and indirectly through participation in decision-making (Øygarden, Olsen, & Mikkelsen, 2020). And it is important to consider the Lean Thinking approach to improve the quality of the inpatient process and patient management, which allows for reduced costs and minimizes the Length of Hospital Stay (LOS) (Samuelsson, 2023).

The national quality indicator system defines elements of an adequate and functioning medical system, ICT and other types of equipment, adequate and competent staff, and work organization ensuring coordination, collaboration, and communication as indicators of structural quality (NDH, 2019). Despite an increase in clinical performance, simulation-based training with VR technology is still not being used optimally in healthcare organizations (Aggarwal, 2017). Accessibility to technology is very important for modern medicine (Carayon et al., 2006).

3. Methods

The purpose of this study is to develop a conceptual model to describe the basic relationship between the important parameters of digital technology adoption in healthcare delivery activities in hospitals. We conducted a systematic literature review (SLR) in compiling this study. The SLR process is illustrated in Figure 2. As a starting point, we define our research objectives. Second, we define the boundaries of our study according to the considerations of the definitions presented above. We focus on the adoption of digital technology in healthcare sector services in hospitals.

The literature review helped us identify the “what” factors and the “how” strategies. There are four different scientific categories that we used in our literature search in this study. the first relates to digital technology which is the focus of this research. Second, we conducted a specific search on the adoption

or capability of digital technology itself, in the third category we used hospitals where digital technology would be analyzed, and we used the keyword performance in the fourth category. We obtained literature based on searches in relevant publications such as Elsevier, Springer, SAGE, Emerald Insight, MDPI, IGI Global, BioMed, Nature Research, and others through the website www.scopus.com. We focused our search on titles, abstracts, and keywords with a publication year period from 2013 to 2023. We focus our search on titles, abstracts, and keywords with the publication year period from 2013 to 2023. We select publications from the last ten years to get conditions that are relevant today and in the future.

The search terms were constructed by combining synonyms with AND operators for each element. We used the keywords “digital OR ICT OR IT” for the first category, “adoption OR capability” for the second category, “hospital” for the third category, and “performance” for the fourth category. The results of the search by only selecting journals and conference proceedings found 524 papers. Next, we selected only papers that focus on the areas of “Business, Management, and Accounting”, “Decision Sciences”, “Social Sciences”, “Health Professions”, “Nursing” and “Environmental Science” so that 174 papers were obtained, with the number of publications each year shown in figure 3.

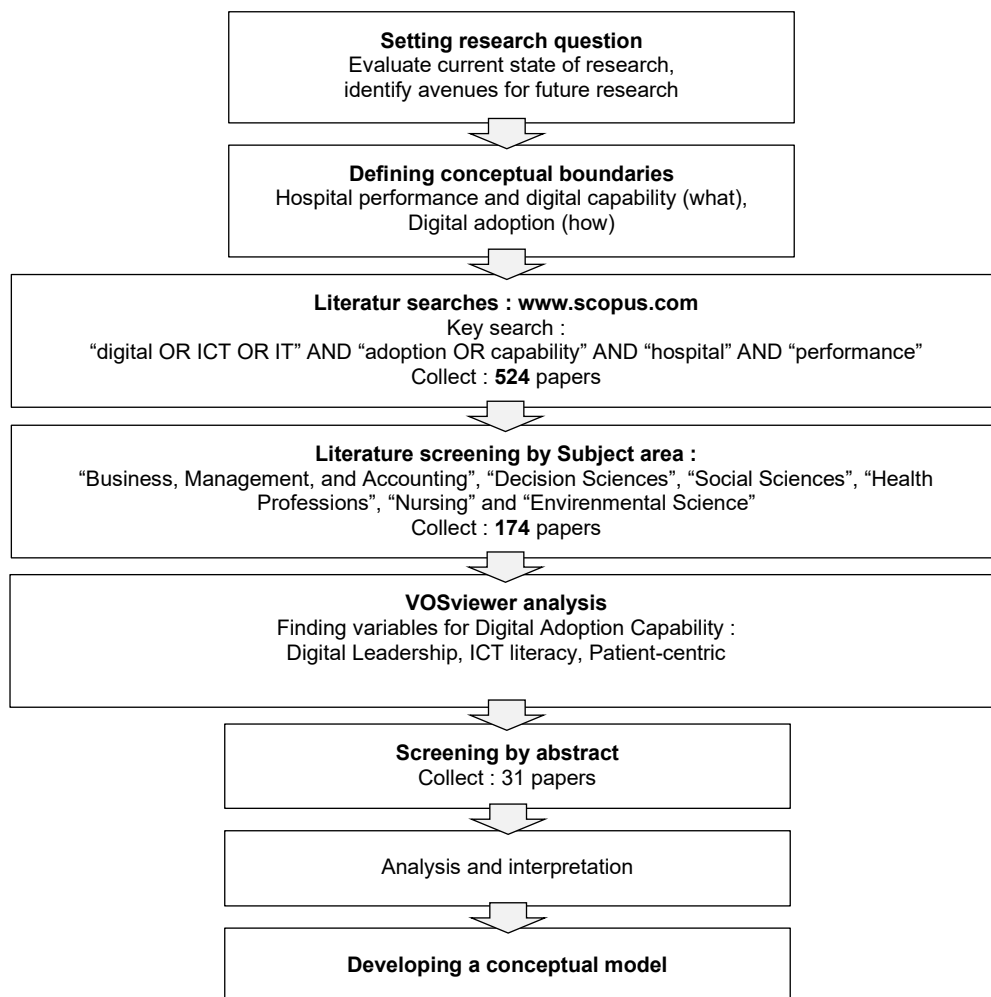


Fig. 2: SLR Stage

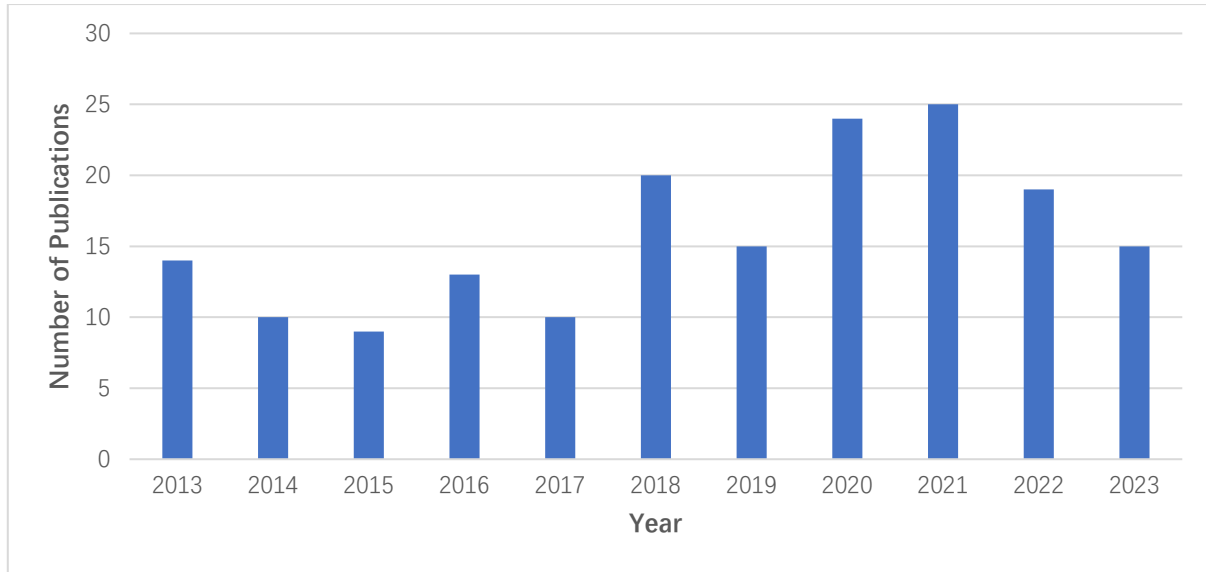


Fig. 3: Publication distributions

Since 2015, the number of studies related to the adoption of digital technology in measuring hospital performance has increased, but suddenly there was a drastic decline in 2019. This decline seems to have something to do with the Covid-19 pandemic. However, from 2020 until now, it continues to experience a significant increase, which shows a high need for the adoption of digital technology in health services in hospitals. The number of papers based on the research subject area is shown in Table 1. Based on the number of papers shown in Table 1, it shows that this study focuses more on management and social issues by raising cases in the health sector.

Table 1: Research Subject Areas

No	Subject Area	Qty
1.	Business, Management and Accounting	61
2.	Social Sciences.	36
3.	Decision Sciences	27
4.	Health Professions	40
5.	Nursing	34
6.	Environmental Science	23

This research conducts a bibliometric exploration (Kirby, 2023) to generate new avenues of inquiry. VOSviewer was applied to perform a bibliometric analysis of this article to establish and display bibliometric relationships between various variables. VOSviewer can create publication maps, country maps, and network-based journal maps (co-citation), build keyword maps based on shared networks and create maps with lots of items (Kalibatiene & Miliauskaitė, 2021; Qiang, Tao, Gou, Lang, & Liu, 2022). The number of keywords used is adjusted to the wishes and keywords that are less relevant can be removed. Many bibliometric analysis studies use VOSviewer, such as economic analysis of data as a strategic asset for companies and academics (Olaleye, Mogaji, Agbo, Ukpabi, & Gyamerah Adusei, 2023), the impact of climate change on mental health (Leal Filho et al., 2023), blockchain technology for managerial and accounting (Lardo, Corsi, Varma, & Mancini, 2022), the role of social media in human resource management (Hosain, 2023).

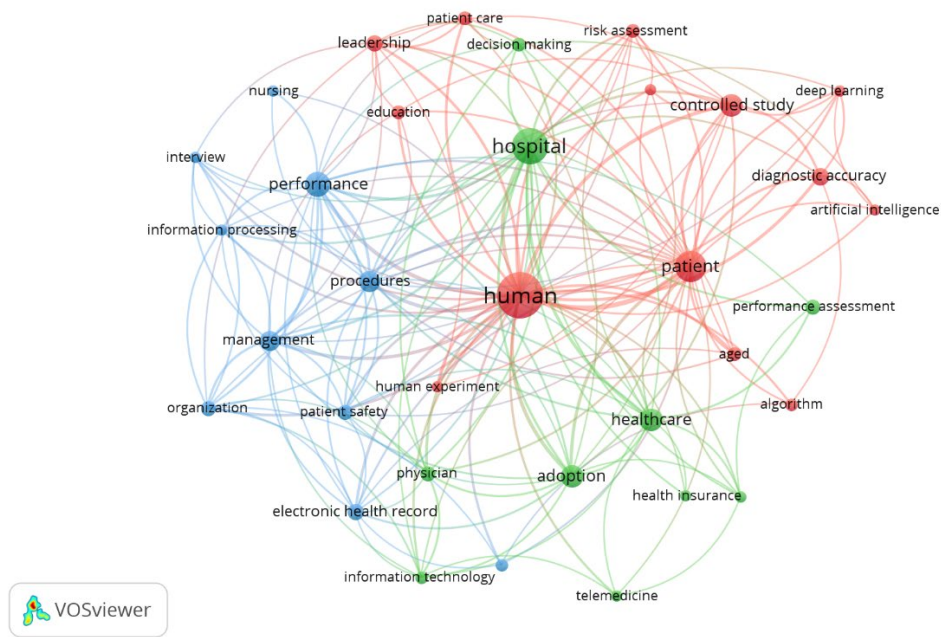


Fig. 4: VOSviewer Network Visualization

We use these 174 papers as the basis for VOSviewer to analyze bibliometrics, look for topics that still have opportunities to be researched, and look for the most widely used references in certain fields and others. The results of the analysis using VOSviewer show that there are 3 clusters (Figure 4), namely:

- Cluster 1 (red) consists of 14 items, namely *human*, *human experiment*, *patient*, *patient care*, *leadership*, *algorithm*, *artificial intelligence*, *controlled study*, *deep learning*, *diagnostic accuracy*, *education*, *hospital mortality*, *risk assessment*, and *aged*.
- Cluster 2 (green) consists of 10 items, namely *hospital*, *healthcare*, *adoption*, *health service*, *information technology*, *telemedicine*, *decision making*, *health insurance*, *performance assessment*, and *physician*.
- Cluster 3 (blue) consists of 10 items, namely *management*, *organization*, *performance*, *procedures*, *patient safety*, *electronic health records*, *information processing*, *reproducibility*, and *interviews*.

Figure 5 shows the results of keyword analysis based on overlay visualization. This figure shows trends from year to year related to this research, which shows that management studies are relatively abandoned at this time, dominantly carried out in 2017 (purple color). Research related to humans (employees) and their relationship with patient care occurred in the range 2018 to 2019 (green color), while research related to artificial intelligence by utilizing deep learning has been mostly carried out lately (yellow color). From this description, it can be predicted that future research in the domain of hospitals and health services will move towards the use of digital technology to improve performance and service quality (Bhatt & Chakraborty, 2021; Krause & Cross, 2019; Rubbio et al., 2020).

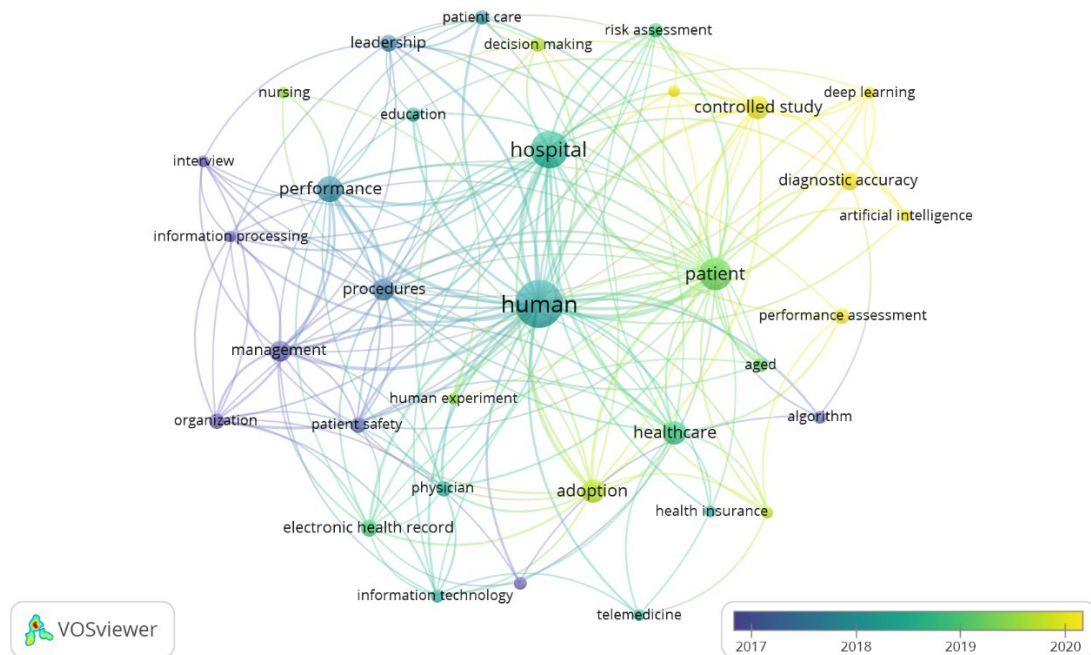


Fig. 5: VOSviewer Overlay Visualization

From the number of papers, then we selected several papers based on the suitability of the abstract with the focus of this research, we got 31 papers as shown in Table 2. We read more in-depth on the selected papers to serve as the main reference in building the conceptual model of this research.

Papers that review the role of leadership in the hospital health industry for the adoption of digital technology are still very minimal, as well as those related to the focus of service on patients. Generally, the adoption of digital technology is associated with performance and use on the internal management side of the hospital.

Table 2: Selected paper as a result of screening based on Abstract

No	Authors	Year	Publisher	Leadership	Employee	Patient	Performance
1.	Babamohamadi, H., Davari, H., Safari, A.-A., Alaei, S., Pordanjani, S.R.	2023	BMC Nursing		v		v
2.	Yu, W., Liu, Q., Zhao, G., Song, Y.	2023	IEEE Transactions on Engineering Management				v
3.	Al Wali, J., Muthuveloo, R., Teoh, A.P., Al Wali, W.	2023	International Journal of Innovation Science		v		v
4.	Liu, J., Gong, X., Weal, M., Dai, W., Hou, S., Ma, J.	2023	Digital Health			v	
5.	Tortorella G.L., Fogliatto F.S., Kurnia S., Thürer M., Capurro D.	2022	Elsevier Inc.			v	v
6.	Buckman J.R., Woutersen T., Hashim M.J.	2022	Elsevier B.V.		v	v	v
7.	Apell P., Hidefjäll P.	2022	Emerald Group Holdings Ltd.		v		v
8.	Al Wali J., Muthuveloo R., Teoh A.P., Al Wali W.	2022	Emerald Group Holdings Ltd.		v		v
9.	Ippolito A., Sorrentino M., Capalbo F., Di Pietro A.	2022	Emerald Group Holdings Ltd.				v
10.	Pandey N., Jha S., Rai V.	2021	SAGE Publications Ltd		v		v
11.	Campanella F., Serino L., Mustilli M., Crisci A., D'Ambra A.	2021	Elsevier Ltd			v	v
12.	Yujing X., Yu T., Shaoyi L.S., Guangquan Z.	2021	Zhejiang University		v		v
13.	Menon S.R., Jaffer N.M.	2021	Society of Sytematic Innovation	v			
14.	Suresh M., Vaishnavi V., Pai R.D.	2020	Emerald Group Holdings Ltd.				v
15.	Oppi C., Vagnoni E.	2020	Emerald Group Holdings Ltd.				v
16.	Engin M., Gürses F.	2019	World Scientific Publishing Co. Pte Ltd		v		v
17.	Bhatt V., Sashikala P., Chakraborty S.	2019	Blue Eyes Intelligence Engineering and Sciences Publication				v
18.	Karahanna E., Chen A., Ben Liu Q., Serrano C.	2019	University of Minnesota				v
19.	Prema Kumar P.S., Rambabu G.	2019	IAEME Publication				v
20.	Chakraborty S., Kalepu R.	2019	Inderscience Publishers		v	v	v
21.	Mandal S.	2018	Emerald Group Holdings Ltd.		v		v
22.	Bancroft J., Saha K., Li D., Lukacs G., Pierron X.	2018	Emerald Group Publishing Ltd.				v
23.	Lee J.Y., McFadden K.L., Gowen C.R.	2018	Lippincott Williams and Wilkins				v
24.	Dewi S., Kasali R., Balqiah T.E., Widjaja A.W.	2018	Growing Science	v			v
25.	Cho N.-E., Ke W., Atems B., Chang J.	2018	Lippincott Williams and Wilkins				v

No	Authors	Year	Publisher	Leadership	Employee	Patient	Performance
26.	Baldassarre F.F., Ricciardi F., Campo R.	2018	Emerald Group Publishing Ltd.				v
27.	Nair A., Nicolae M., Dreyfus D.	2018	Emerald Group Publishing Ltd.				v
28.	Mandal S.	2017	Emerald Group Publishing Ltd.				v
29.	Ford E.W., Silvera G.A., Kazley A.S., Diana M.L., Huerta T.R.	2016	Emerald Group Publishing Ltd.		v		v
30.	Dobrzykowski D.D., McFadden K.L., Vonderembse M.A.	2016	Elsevier B.V.		v	v	v
31.	McIntosh B., Sheppy B., Cohen I.	2014	Emerald Group Holdings Ltd.	v		v	v

4. Results And Discussion

VOSviewer's analysis shows that there is a relationship between hospital performance and digital technology adoption in aspects of patient care. As previously explained, each resulting cluster shows groups that have a lot in common and behavior marked with the same color. The red clusters show health workers and their expertise in providing services, supported by their ability to adopt technology to produce patient satisfaction. Figure 4 shows several interconnected items, namely humans, electronic health records, big data, diagnostic accuracy, and reproducibility. This shows that digital adoption itself is largely determined by human and management factors. The human factor is closely related to skills in using electronic medical records and utilizing big data to assist in decision-making and in making a diagnosis.

The second green cluster shows groups that have the same items in terms of hospitals and their management. From this figure, VOSviewer shows the emergence of several items relevant to management such as "management" itself, "healthcare", "performance", "digital leadership" and the use of "information technology". As the hospital grows, top management will create various areas of responsibility called responsibility centers, and assign tasks to the managers below to control these areas. During the decision-making process, all accurate information is required. To maintain or improve the consistency of hospital performance, it is necessary to evaluate the existing management control system where control is also an important part of the hospital management itself.

The third cluster, shown in blue, shows several items related to electronic medical record data. This is shown by the items "decision making", "machine learning", "diagnosis", and "eHealth". Adoption of digital technology can improve the performance of key health business processes, especially processes that can be simplified by adopting information technology. More specifically, digital technologies can increase efficiency and, at the same time, enable better quality delivery and reduce response times, which has many benefits for many stakeholders, such as national health systems, doctors, and patients (Laurenza et al., 2018). The availability of ICT infrastructure such as computer equipment, laboratories, radiology technology equipment, computer network installations, and internet network connections in hospitals is not the only indicator of successful adoption of digital technology in health care, but leadership, encouragement, willingness, and ICT management skills are very important.

4.1. Conceptual Model

As the results of the analysis found through VOSviewer, it can be shown that there are four main variables in this study, namely: digital adoption, hospital performance, digital leadership (management), and digital skills of the workforce (human). We add two other variables that are no less important and make the study different from previous research, namely patient-centric and environmental dynamism (Dess & Beard, 1984; Li, Dai, & Cui, 2020). Patients-centric, who represent the consumer element in the business, need special attention to know the progress of their health services (Häggglund et al., 2022) and are expected to gain a lot of experience to improve quality and safety in services (du Plessis et al., 2017). Kuipers et al. (2019) said that patient-centered care and co-creation of care were positively related to patient satisfaction. While the capability of digital adoption in hospitals is also strongly influenced by external factors that result in uncertain organizational performance (Pandit et al., 2018) as the authors stated at the beginning of the preparation of this framework, which is influenced by the Ministry of Health and Health Social Security Organizing Agency (BPJS) which is categorized as government regulations, other parties involved in the implementation of services, as well as environmental conditions. Factors external conditions affect the policies and actions that must be taken by the leadership, as well as changes to the flow of services in the management of ICT. Carroll (2020), mentions technological change as analogous to transformation, which in turn relates to fundamental changes to doing different jobs, given market pressures or new opportunities.

Based on this logic, the author formulates a research model as a problem-solving framework as shown in Figure 6.

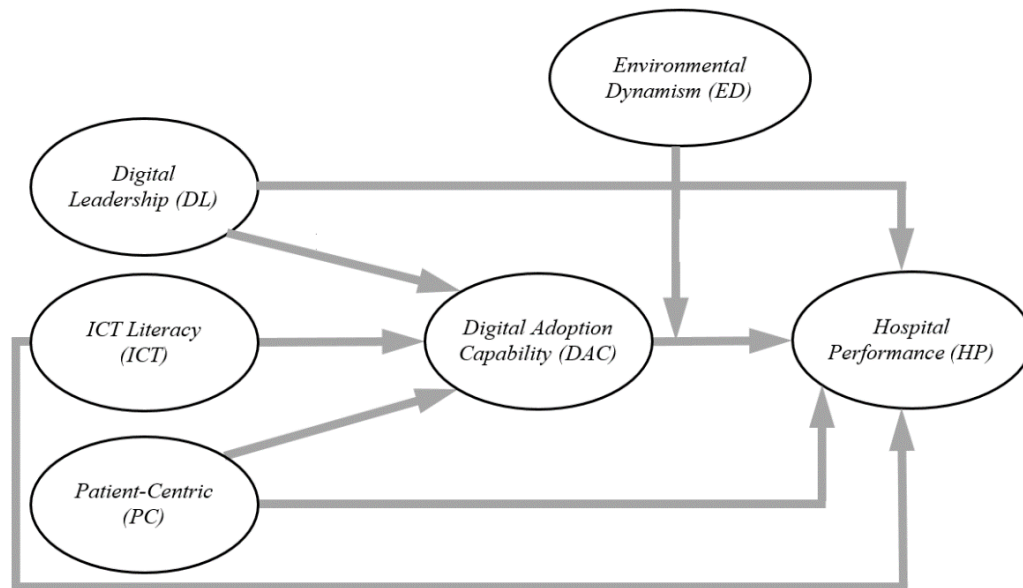


Fig. 6: Conceptual Model

From the conceptual model, it is shown that three variables that the authors summarize are the main elements that must be considered to encourage the ability to adopt digital technology in hospitals as shown in Figure 7. on the customer (patient) and driven by services using technology (digital adoption).

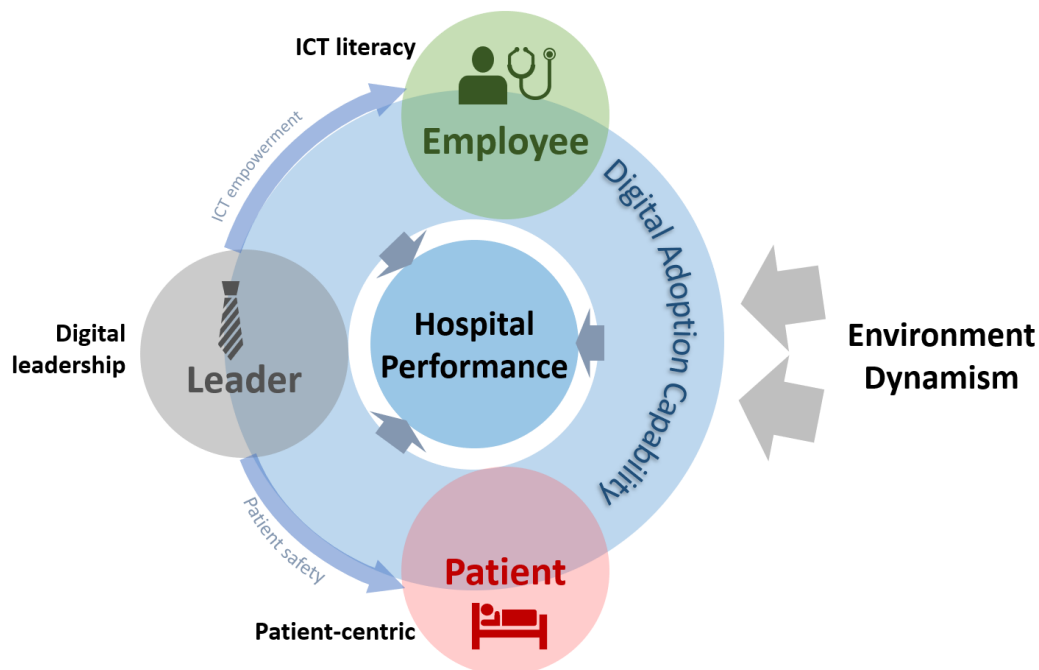


Fig. 7: Role of leader, employee, and patient

The first is a Leader as an agent of change in the organization's wheels with his digital leadership capabilities (Westerman, Bonnet, & McAfee, 2014) leading all hospital officers and staff to empower ICT through understanding and skills. The second element of employees who become direct service to patients with digital adoption requires understanding and skills to be able to use ICT in service activities and patient care (Hoang, 2019; Samsor, 2021). The third element is the patient who must get the main attention as consumers who get health services.

The last two elements must get direction, escort, and motivation from both top leaders and middle leaders. Without these three elements or ignoring one of them, hospital management will find it difficult and find many failures in implementing digital technology. The element of patient centricity is one of the considerations for the adoption of digital technology in hospitals because patients as consumers will be involved in the health service process through ICT facilities and feel directly the benefits of the services provided.

4.2. Digital leadership

VOSviewer shows leadership in the blue cluster which has a relationship with “performance”, “technology adoption” and “healthcare quality”. Leadership is also seen to have a relationship with many items in the red cluster, including the “human” and “reproducibility” items which are also connected to “big data” and “electronic health records”. This shows the role of leadership in managing human resources in terms of utilizing ICT for work activities (Alanazi, 2022). The hospital as a large organization has various structures with various functions such as pharmacy units, laboratories, radiology, surgery, inpatient units, emergency installations, admissions, and so on. Each unit has its way of managing data and information as well as the use of ICT, but many units do not use ICT at all. For example, only using Microsoft Office in its recording activities. The use of ICT is generally done based on the will of the staff or the needs of each unit. Utilization of ICT in carrying out their duties, but still running independently (information silo) and has not been coordinated and integrated with other units.

Digital adoption in hospitals cannot be carried out alone, therefore a leadership role is needed in encouraging all units to utilize ICT facilities (Kopp, 2015). Top leaders need to be the driving force in directing the use of ICT which must also be supported by the role of all middle leaders. Generally, leaders in hospitals, both top leaders and middle leaders, have academic backgrounds in the health sector and may not understand ICT very well. So ICT knowledge is needed to be a driving force for the adoption of digital technology.

Digital adoption in an organization is also not an easy thing to do. Many hospitals have been disrupted by technological advances and economic trends, which are introducing digital technology into existing processes. Management faces various challenges, problems with scalability and interoperability, and low staff knowledge and motivation which creates uncertainty in reacting and causes frustration (Kupiek, 2021). It takes a leadership role that can change and move the organization to be heavily involved with ICT (Westerman et al., 2014).

A leadership role is needed to cope with rapidly changing patient expectations and the many external competitors willing to meet patient expectations. This suggests that market conditions are driven by the need for knowledgeable and informed patients to make decisions. In this context, leadership becomes an important factor in the modern digital environment, where technology is used to create different business models to meet patient expectations.

The key to the success of digital leadership is Culture, largely dependent on people sharing information, partnering, and continuously making improvements, which can occur when building a collective, transparent, and sharing culture (Bersin, 2016). To improve culture, Kopp (2015) also stated the need to empower health workers to do their best as a strategic priority that must be carried out by global health

leaders.

4.3. Understanding and skills of ICT (ICT literacy)

Utilization of ICT in hospitals aims to facilitate work, cost efficiency, and increase productivity in providing services. ICT includes two aspects, namely aspects of information technology and aspects of communication technology. This aspect is shown in the VOSviewer on the blue cluster, namely the "eHealth", "digital medical record", "machine learning" and "decision making" items. We can see in Figure 4 that this aspect has a good relationship with "nursing" and "patient care". This shows the ability and understanding of health workers toward ICT in activities and services (Dornan et al., 2019). Information technology is all-encompassing things related to a process. In addition, it is also used as a tool for assisting, manipulating, and managing information. While aspects of communication technology are things that include the use of assistive devices. To process and transfer data from one device to another. Therefore, information and communication technology is an inseparable unit.

Not all officers in hospitals have the understanding let alone skilled in using ICT. Since most of the staff in hospitals employ health workers, understanding and skills related to ICT (ICT literacy) are needed. Not only be, able to interpret but also must be able to respond correctly. So that all personnel or staff in hospitals must have basic abilities that include knowledge, skills, and attitudes to be able to adapt to ICT. It covers at least three aspects of ICT literacy, namely digital literacy or skills in using devices, information literacy, and media literacy.

Doctors and health professionals in developing countries do not yet have the ability, understanding, and good capacity to deal with ICT (Koivu et al., 2016; Olok et al., 2015). This is also emphasized by Martins (2019), where hospital management has difficulty finding health professionals (doctors, nurses, and health technicians) who can carry out ICT functions. It requires understanding and skills related to ICT (ICT literacy). Not only be, able to interpret but also must be able to respond correctly. Not only nurses, Konsil Kedokteran Indonesia (2019) as stated in the document "The National Standard for Indonesian Doctors' Professional Education" emphasizes the necessity of doctors to have information technology and digital literacy competencies, where a doctor must be able to find, retrieve, open and read medical record information. presented digitally using communication technology and utilized for clinical decision-making. Because it takes talent, skills, and attitude to work in an environment that supports technology. And this is a challenge because it requires nursing personnel to develop certain skills in the digital space (Woods et al., 2021).

ICT devices such as PCs, laptops, smartphones, internet tend to be simpler and easier to use (user-friendly) so they are very helpful in increasing ICT literacy because the use of devices tends to be easier. However, this is not the case with information literacy, with the easier it is to obtain information, the higher literacy skills are needed. Information literacy is not limited to the ability to read, process, and present information alone. But it also requires the ability to select, filter, manage, and benefit from the information received. Health workers are not allowed to simply copy and paste related information or records of patient care actions, this can pose a safety risk that can harm patients and violate the ITE Law. Therefore, in this literacy terminology, the ability to copy and paste, and share is not sufficient to be called information literacy. A person is considered to have information literacy if he can filter whether the information is true, important, useful, contains risks, and is detrimental to other parties (patients, doctors, hospitals, and others).

Likewise, media literacy can include the ability to read, analyze, evaluate, and communicate information in the form of symbols, symbols, graphics, images, photos, videos, animations, multimedia, and others that are received digitally or non-digitally. of various media/devices used in hospitals. This can

be seen in the different types of information and media used in laboratories, radiology, pharmacy, surgical equipment, and so on.

4.4. Patient-centric

According to a survey conducted by Deloitte Insights (2021), 92% of respondents indicated that patient satisfaction and engagement are the main things organizations want to achieve from digital transformation, followed by improving the quality of care (56%). They discuss a "consumer-centric" approach, which focuses on digital investments in improving the patient experience and newer forms of care delivery. This is reinforced by the results of a report by McKinsey & Company (Dash et al., 2019) which says that patients are increasingly value-conscious, demand high quality, and increasingly compare healthcare providers to leaders in customer experience such as Amazon and Apple. The use of health information technology directly or indirectly improves patient safety by reducing medication errors through data documentation and data completeness (Tubaishat, 2019).

Patient-centric is a process of designing services or providing solutions that focus on patients, and patient care, empowering patients to be actively involved in managing their health, and collaborating with health services, with beneficial results and providing better health to patients. Patient-centric ecosystems can offer patients a more efficient and holistic healthcare experience without sacrificing time and value. Thus bridging the ineffectiveness between healthcare providers and patients. This better experience requires all content and delivery of health services to be efficient and effective on the patient side and the hospital side as the health care provider (Ciesluk et al., 2022). A patient can get all the desired content and instructions from doctors and nurses through the capabilities of digital technology (Esmaeilzadeh et al., 2021). Therefore, healthcare providers can receive the healthcare experience that patients want more efficiently, and adopt the instructions given more effectively (Dornan et al., 2019). In Figure 4, the VOSviewer visually shows "patient care" in the middle connected to all clusters, where "patient care" is the focus of care, as well as a concern for management and also connected to "information systems".

One thing that has always been the main concern of every healthcare provider with digital adoption capabilities is the need to get personalized from patients in every aspect. Through a personalized experience with a patient-centric digital system, one can get all the information and access based solely on his preferences. This benefits patients because there is no redundancy, time-wasting information, and advice centered on the healthcare process.

Health care with the adoption of patient-centric digital technology will increase achievement and high respect for patient privacy and preferences. It goes back to helping patients achieve better health in a better way.

4.5. Digital Adoption Capability

Digital technology capabilities play a key role in increasing the effectiveness of healthcare entities in terms of innovation and providing healthcare. Digital technology capabilities are generally related to the knowledge and skills required for an individual to develop, use, adapt, absorb, and transfer technology (De Mori et al., 2016). Technology in medical service entities, one of which is related to the development of telemedicine. Digital technology capabilities can determine how an entity can successfully adopt digital solutions in crises to design and modify digital solutions, improve patient care processes, and promote innovation, collaboration, and mobility for doctors, medical staff, and administrative staff in implementing digital solutions.

The healthcare sector is a complex environment, so introducing technological and digital innovations requires careful and well-designed change management. To digitize business processes in health and care, new concepts and innovative solutions are needed. The digitization of individual health enables data

analysis methods to support healthcare professionals with important goals in the digitization process for decision-making. The digital state or condition of health is equivalent to health itself (Serbanati, 2020). The use of digital electronics will be able to interact with healthcare professionals, be able to provide information about every aspect of an individual's health, proactively offer solutions, and help them diagnose and decide on the appropriate treatment.

4.6. Environmental Dynamism

The use of ICT in hospitals is heavily influenced by external factors. In Indonesia, the main driver of the use of ICT in hospitals is strongly influenced by government regulations through laws and regulations such as the Ministry of Health Regulation (Kementerian Kesehatan Republik Indonesia, 2013) BPJS as the implementing operator of JKN, and the Accreditation Commission. The Ministry of Health and BPJS in several aspects have made it mandatory for hospitals to utilize ICT tools in sharing data and submitting reports. Meanwhile, the Accreditation Commission, which in this case has long been run by the Hospital Accreditation Commission (KARS), has also included elements of ICT in several aspects as an indicator of its assessment. In addition, the use of ICT in health services during the COVID-19 pandemic since the end of 2019 has several years effectively utilized ICT resources to implement health protocols by maintaining distance and presence in public places.

The existence of regulations and conditions that occur are seen as environmental dynamics (Environmental Dynamism) which encourages hospital management to adopt digital both in internal administrative activities and for services to patients. Digital adoption experienced a very significant increase during the COVID-19 pandemic where the need for remote consultations such as telehealth and telemedicine services began to be used. Not only that but to prevent the accumulation of patients in the waiting room, online registration, and reservation services have also been implemented for outpatients.

Environmental Dynamism conditions allow future hospitals to be different from the existing hospitals (Dash et al., 2019; Gordon et al., 2017). The influence of technological developments and changes in the pattern of higher needs of patients trigger disruption in hospitals. The condition of the Covid-19 pandemic that has occurred since the end of 2019 has changed inpatient services, which so far only occurred at hospital hospitals, slowly shifting to outside hospitals, such as inpatient services at hotels and patients' homes.

5. Conclusions

The use of digital technology in generating and transforming business processes, culture, and patient experiences to stay afloat in the competition in the healthcare sector. Many people have used digital technology to manage their health. People are already using social media and online support communities for their healthcare needs, this has been seen since the emergence of the Covid-19 pandemic, where there has been an increase in isolation and social distancing restrictions.

The connectedness of social media and many other online applications for many people as patients produces a lot of data that can be utilized and maximized by hospital management to capture various patient experiences, making health management and health professionals always connected with patients. The existence of this data becomes one of the bases for clinical decision-making to improve the quality and efficiency of health care. This answers the first research question (RQ1), digital technology capabilities can improve operational decision-making for patients, staff, and healthcare professionals, scheduling arrangements, and supply chain management.

The conceptual model of the results of this study shows the relationship between the adoption of digital technology and the performance of business processes in health services, simplifying the process through the adoption of digital technology. For patients, hospital performance with the adoption of digital technology can increase cost efficiency, improve service quality, and can reduce the length of service time.

The adoption of digital technology is not an easy thing to do, especially in a health organization environment where the health professionals, staff, and policymakers involved are generally not digitally literate people. The availability of technology infrastructure and equipment is not the only indicator of the successful adoption of digital technology, but digital knowledge and skills are one of the main requirements for technology to be used. All resources involved, starting from the leadership, health professionals, and staff in all units must have a digital understanding, know the benefits of technology and data used, as well as understand the risks if it is wrong or even not used correctly. The leadership role is key in realizing a digitally literate workforce. Leaders must have good digital understanding, have the courage to take risks towards innovation and change in work culture and be able to collaborate both with the workforce and with patients who become consumers. Patients are the main focus of care, just as consumers are the focus of the business. It is impossible to provide appropriate health services if you do not understand the patient's health conditions and needs. Therefore, patient involvement through the provision of access rooms to provide and obtain information is an important element in the adoption of digital technology in hospitals.

The existence of the three elements described is the answer to the second question (RQ2) in this study.

6. Implications

This study examines the determinants that influence the adoption of the use of digital technology in providing services to patients in hospitals. Therefore, this research significantly contributes to and adds to the literature on digital adoption, especially for lower-middle-class hospitals. Seriousness to carry out digital adoption is becoming increasingly important to provide satisfaction from the service side to patients. With digital adoption, all related parties, from hospital management, doctors and health workers, and patients, will benefit and benefit. However, the success of digital adoption is largely determined by digital leadership factors that move all units to engage with digital technology, and digital understanding for all health workers on duty and services by focusing on patients.

7. Limitations

The author conducts the analysis produced by VOSviewer on selected papers only as a co-occurrence analysis, more in-depth bibliometric research needs to be carried out on the history of publication year, country of origin, the authors of the paper, and others. This bibliometric analysis certainly produces other important information that can be used as a study.

This study also only analyzes the needs of the variables that are elements in the successful adoption of digital technology in hospitals. This study has not analyzed in more detail the operationalization of the variables mentioned, so further studies are needed in developing a conceptual model to produce dimensions and indicators that can be used to make hypotheses and measure the relationship between variables. The research model produced in our study can be tested through further quantitative research, supplemented by survey questions to the appropriate unit of analysis to find out the relationship between the variables that are used as hypotheses. Besides that, it is also necessary to conduct in-depth interviews at several hospitals in Indonesia to find out the real conditions that occur in the field.

This research also has limitations in collecting data, in this case, it only collects papers from www.scopus.com, in discussions there will certainly be a possibility of bias due to limitations in sample selection. In order for research results to be better and more general in nature, we suggest using data from more sources such as www.sciencedirect.com and others.

References

- Agarwal, R., Gao, G. (Gordon), DesRoches, C., & Ashish K. Jha. (2010). The Digital Transformation of Healthcare: Current Status and the Road Ahead. *Information System Research*, 21(4), 796–809. <https://doi.org/10.1287/isre.1100.0327>
- Aggarwal, R. (2017). Surgical Performance: A Pathway to Excellence. *Annals of Surgery*, 266(2), 220–222. <https://doi.org/10.1097/SLA.0000000000002237>
- Aiken, L. H., Clarke, S. P., & Sloane, D. M. (2002). Hospital staffing, organization, and quality of care: Cross-national findings. *Nursing Outlook*, 50(5), 187–194. <https://doi.org/10.1067/mno.2002.126696>
- Ajami, S., & Bagheri-Tadi, T. (2013). Barriers for adopting electronic health records (EHRs) by physicians. *Acta Informatica Medica*, 21(2), 129–134. <https://doi.org/10.5455/aim.2013.21.129-134>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/https://doi.org/10.1016/0749-5978(91)90020-T)
- Ajzen, I. (2002). Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior1. *Journal of Applied Social Psychology*, 32(4), 665–683. <https://doi.org/https://doi.org/10.1111/j.1559-1816.2002.tb00236.x>
- Al-Hattami, H. M., Senan, N. A. M., Al-Hakimi, M. A., & Azharuddin, S. (2022). An empirical examination of AIS success at the organizational level in the era of COVID-19 pandemic. *Global Knowledge, Memory and Communication*, ahead-of-p(ahead-of-print). <https://doi.org/10.1108/GKMC-04-2022-0094>
- Alanazi, A. T. (2022). Digital Leadership: Attributes of Modern Healthcare Leaders. *Cureus*, 14(2). <https://doi.org/10.7759/cureus.21969>
- Ansoff, H. I., & Stewart, J. M. (1967). Strategies for a Technology-Based Business. *Harvard Business Review*, 45, 71–83.
- Apell, P., & Hidefjäll, P. (2022). Quality improvement: understanding the adoption and diffusion of digital technologies related to surgical performance. *International Journal of Quality & Reliability Management*, 39(6), 1506–1529. <https://doi.org/10.1108/IJQRM-07-2021-0234>
- Badan Pusat Statistik. (2021). Hasil Sensus Penduduk 2020, Berita Resmi Statistik No. 7/01/Th. XXIV, 21 Januari 2021. Retrieved July 27, 2022, from Badan Pusat Statistik website: <https://www.bps.go.id/pressrelease/2021/01/21/1854/hasil-sensus-penduduk-2020.html>
- Barney, J. B. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Bersin, J. (2016). Digital Leadership Is Not an Optional Part of Being a CEO. *Harvard Business Review Digital Articles*, (December), 2–5. Retrieved from <https://hbr.org/2016/12/digital-leadership-is-not-an-optional-part-of-being-a-ceo#comment-section>
- Bhatt, V., & Chakraborty, S. (2021). Improving service engagement in healthcare through internet of things based healthcare systems. *Journal of Science and Technology Policy Management*, ahead-of-p(ahead-of-print). <https://doi.org/10.1108/JSTPM-03-2021-0040>
- Bijoylaxmi Sarmah, Shampy Kamboj, N. K. P. (2022). Determinants of RFID Adoption Intention in the Healthcare Industry for Patient Monitoring: A Special Reference to COVID-19. *Handbook of Research on*

Emerging Business Models and the New World Economic Order. <https://doi.org/10.4018/978-1-7998-7689-2.ch010>

Binsar, F., Eryanto, E., Wahyudi, I., Sugandi, Y., & Suroso, J. (2020). Risk of Invalidation of Data in Hospital Information Systems in Indonesia. 2020 International Conference on Information Management and Technology (ICIMTech), 777–782. <https://doi.org/10.1109/ICIMTech50083.2020.9211200>

Binsar, F., Kartono, R., Bandur, A., & Kosasih, W. (2022). Digital Transformation of Information Fulfillment and Patient Engagement for Health Service Safety. 2022 4th International Conference on Management Science and Industrial Engineering (MSIE), 229–236. <https://doi.org/https://doi.org/10.1145/3535782.3535813>

Binsar, F., & Legowo, N. (2020). Design of Cloud Computing Outpatient Registration Model Through SMS Messages at Hospitals using TOGAF ADM. *International Journal of Recent Technology and Engineering*, 8(5), 3857–3865. <https://doi.org/10.35940/ijrte.e4885.018520>

Binsar, F., Riantono, I. E., Kartono, R., Bandur, A., & Kosasih, W. (2023). Gamification to Grow Motivation for Interactive Engagement of Health Nurses in Using Health Information Systems: A Conceptual Framework. *Proceedings of Asia Pacific Computer Systems Conference 2021*, 99–120. https://doi.org/https://doi.org/10.1007/978-981-19-7904-0_10

Capon, N., & Glazer, R. (1987). Marketing and Technology: A Strategic Coalignment. *Journal of Marketing*, 51(3), 1. <https://doi.org/10.2307/1251644>

Carayon, P., Schoofs Hundt, A., Karsh, B.-T., Gurses, A. P., Alvarado, C. J., Smith, M., & Flatley Brennan, P. (2006). Work system design for patient safety: the SEIPS model. *Quality & Safety in Health Care*, 15 Suppl 1(Suppl 1), i50-8. <https://doi.org/10.1136/qshc.2005.015842>

Carroll, N. (2020). Theorizing on the normalization of digital transformations. *Proceedings of the 28th European Conference on Information Systems (ECIS 2020)*, (May), 1–17.

Christensen, C. M. (1997). The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail. Retrieved from <https://www.hbs.edu/faculty/Pages/item.aspx?num=46>

Christensen, C. M., Raynor, M. E., & McDonald, R. (2015). What Is Disruptive Innovation? *Harvard Business Review*, 93(12), 44–53. Retrieved from <https://hbr.org/2015/12/what-is-disruptive-innovation>

Ciesluk, A., Voorhaar, M., Barrett, L., Baldasaro, J., Griebisch, I., & Marquis, P. (2022). Measuring the Patient Experience in Rare Disorders: Benefit of Pragmatic Mixed-Methods Research in NUT Carcinoma. *Oncology and Therapy*, 10(1), 263–277. <https://doi.org/10.1007/s40487-022-00192-6>

Conțu, E. G. (2020). Organizational performance – theoretical and practical approaches; study on students' perceptions. *Proceedings of the International Conference on Business Excellence*, 14(1), 398–406. <https://doi.org/10.2478/picbe-2020-0038>

Dai, T., & Tayur, S. (2019). OM Forum—Healthcare Operations Management: A Snapshot of Emerging Research. *Manufacturing & Service Operations Management*, 22(5), 869–887. <https://doi.org/10.1287/msom.2019.0778>

Dash, P., Henricson, C., Kumar, P., & Stern, N. (2019). The hospital is dead, long live the hospital! McKinsey & Company, (May). Retrieved from https://www.mckinsey.com/~media/McKinsey/Industries/Healthcare/Systems_and_Services/Our_Insights/The_hospital_is_dead_long_live_the_hospital/The-hospital-is-dead-long-live-the-hospital.ashx

- David Woods, Sidney Dekker, Richard Cook, Leila Johannesen, N. S. (2017). Behind Human Error (2nd ed.). <https://doi.org/https://doi.org/10.1201/9781315568935>
- Davis, F. D. (1986). A technology acceptance model for empirically testing new end-user information systems : theory and results. Massachusetts Institute of Technology, Massachusetts, USA.
- De Mori, C., Batalha, M. O., & Alfranca, O. (2016). A model for measuring technology capability in the agrifood industry companies. In *British Food Journal* (Vol. 118). <https://doi.org/10.1108/BFJ-10-2015-0386>
- Deloitte Consumer Insights. (2021). Deloitte Consumer Insights Adapting to the new normal in Indonesia. Deloitte Consumer Insights, (2), 1–46.
- Deloitte Insights. (2021). Digital Transformation- From a buzzword to an imperative for health systems. Retrieved from <https://www2.deloitte.com/us/en/insights/industry/health-care/digital-transformation-in-healthcare.html>
- DeLone, W. H., & McLean, E. R. (1992). Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research*, 3(1). <https://doi.org/10.1287/isre.3.1.60>
- Dess, G. G., & Beard, D. W. (1984). Dimensions of organizational task environments. *Administrative Science Quarterly*, 29(1), 52–73. <https://doi.org/https://doi.org/10.2307/2393080>
- Dornan, L., Pinyopornpanish, K., Jiraporncharoen, W., Hashmi, A., Dejkriengkraikul, N., & Angkurawaranon, C. (2019). Utilisation of Electronic Health Records for Public Health in Asia : A Review of Success Factors and Potential Challenges. *BioMed Research International*, 2019.
- Drucker, P. F. (1954). *The Practice of Management*. Harper Business.
- du Plessis, D., Sake, J. K., Halling, K., Morgan, J., Georgieva, A., & Bertelsen, N. (2017). Patient Centricity and Pharmaceutical Companies: Is It Feasible? *Therapeutic Innovation and Regulatory Science*, 51(4), 460–467. <https://doi.org/10.1177/2168479017696268>
- Engwall, L., Kipping, M., & Üsdiken, B. (2016). *Defining Management : Business Schools, Consultants, Media* (1st Editio). <https://doi.org/https://doi.org/10.4324/9781315851921>
- Esmaeilzadeh, P., Dharanikota, S., & Mirzaei, T. (2021). The role of patient engagement in patient-centric health information exchange (HIE) initiatives: an empirical study in the United States. *Information Technology & People*, ahead-of-p(ahead-of-print). <https://doi.org/10.1108/ITP-05-2020-0316>
- Gandhi, P., Khanna, S., & Ramaswamy, S. (2016). Which Industries Are the Most Digital (and Why)? Which Industries Are the Most Digital (and Why)? Retrieved June 19, 2022, from Harvard Business Review website: <https://hbr.org/2016/04/a-chart-that-shows-which-industries-are-the-most-digital-and-why>
- Geels, F. W. (2006). Co-evolutionary and multi-level dynamics in transitions: The transformation of aviation systems and the shift from propeller to turbojet (1930–1970). *Technovation*, 26(9), 999–1016. <https://doi.org/https://doi.org/10.1016/j.technovation.2005.08.010>
- Gordon, R., Perlman, M., & Shukla, M. (2017). The hospital of the future: How digital technologies can change hospitals globally. Deloitte. Retrieved from <https://www.ehcos.com/en/the-transformation-of-hospitals-in-digital-world-2/%0Ahttps://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sciences-Health-Care/us-lshc-hospital-of-the-future.pdf>

- Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: systematic review and recommendations. *The Milbank Quarterly*, 82(4), 581–629. <https://doi.org/10.1111/j.0887-378X.2004.00325.x>
- Gulati, R., & Reaiche, C. H. (2020). Soft Skills : A Key Driver for Digital Transformation. *ICDS 2020 : The Fourteenth International Conference on Digital Society Soft*, (c), 40–43. Retrieved from https://www.researchgate.net/publication/346171713_Soft_Skills_A_Key_Driver_for_Digital_Transformation/citations
- Häggglund, M., Cajander, Å., Rexhepi, H., & Kane, B. (2022). Editorial: Personalized Digital Health and Patient-Centric Services. *Frontiers in Computer Science*, 4(March), 1–4. <https://doi.org/10.3389/fcomp.2022.862358>
- Hamsal, M., & Ichsan, M. (2020). The COVID-19 Pandemic and Telemedicine Adoption: Challenges and Opportunities. *Proceedings of the First International Conference of Economics, Business & Entrepreneurship, ICEBE 2020*, 324. <https://doi.org/DOI.10.4108/eai.1-10-2020.2304933>
- Hannan, M. T., & Freeman, J. (1989). *Organizational Ecology*. <https://doi.org/10.2307/j.ctvjz813k>
- Harlow, D. (2018). Health data access regulatory initiatives hold promise, but rollout remains unclear. Retrieved June 19, 2022, from Healthcare IT News website: <https://www.healthcareitnews.com/blog/health-data-access-regulatory-initiatives-hold-promise-rollout-remains-unclear>
- Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., & Winter, S. G. (2007). *Dynamic Capabilities: Understanding Strategic Change in Organizations*. Wiley-Blackwell.
- Hess, L. M., Zhu, Y. E., Fang, Y., & Liepa, A. M. (2021). Health care resource utilization and treatment variability in the care of patients with advanced or metastatic colorectal or gastric cancer. *Journal of Medical Economics*, 24(1), 930–938. <https://doi.org/10.1080/13696998.2021.1958607>
- Hitt, M. A., Ireland, R. D., & Hoskisson, R. E. (2017). *Strategic management : competitiveness and globalization* (12th ed.). Canada: Cengage Learning.
- Hoang, M. T. (2019). Employers' attitudes to HOU postgraduates' qualities and skills. *Asian Association of Open Universities Journal*, 14(1), 28–38. <https://doi.org/10.1108/aaouj-02-2019-0013>
- Hosain, M. S. (2023). Integration of social media into HRM practices: a bibliometric overview. *PSU Research Review*, 7(1), 51–72. <https://doi.org/10.1108/PRR-12-2020-0039>
- Hospodková, P., Berežná, J., Barták, M., Rogalewicz, V., Severová, L., & Svoboda, R. (2021). Change Management and Digital Innovations in Hospitals of Five European Countries. *Healthcare*, 9(11), 1–21. <https://doi.org/https://doi.org/10.3390/healthcare9111508>
- Ivancevich, J. M., Gibson, J. L., Donnelly, J. H., & Konopaske, R. (2012). *Organizations: Behavior, Structure, Processes*. McGraw-Hill.
- Jahanmir, S. F., Silva, G. M., Gomes, P. J., & Gonçalves, H. M. (2020). Determinants of users' continuance intention toward digital innovations: Are late adopters different? *Journal of Business Research*, 115, 225–233. <https://doi.org/https://doi.org/10.1016/j.jbusres.2019.11.010>
- Jenatabadi, H. S. (2015). An Overview of Organizational Performance Index: Definitions and Measurements. *SSRN Electronic Journal*, (May). <https://doi.org/10.2139/ssrn.2599439>

- Kalibatiene, D., & Miliauskaitė, J. (2021). A Systematic Mapping with Bibliometric Analysis on Information Systems Using Ontology and Fuzzy Logic. *Applied Sciences*, Vol. 11. <https://doi.org/10.3390/app11073003>
- Kementerian Kesehatan Republik Indonesia. (2013). Permenkes RI No 82 Tentang Sistem Informasi Manajemen Rumah Sakit.
- Kementerian Komunikasi dan Informasi Republik Indonesia. (2021). Pemerintah Anggarkan Rp2.708,7 Triliun dalam RAPBN 2022. Retrieved July 27, 2022, from Kementerian Komunikasi dan Informasi Republik Indonesia website: <https://portal.kominfo.go.id/berita/kini/5992>
- Kementerian Sekretariat Negara Republik Indonesia. (2021). Enam Fokus Utama untuk RAPBN Tahun 2022. Retrieved July 27, 2022, from Kementerian Sekretariat Negara Republik Indonesia website: https://www.setneg.go.id/baca/index/enam_fokus_utama_untuk_rapbn_tahun_2022
- Kirby, A. (2023). Exploratory Bibliometrics: Using VOSviewer as a Preliminary Research Tool. *Publications*, Vol. 11. <https://doi.org/10.3390/publications11010010>
- Koivu, A., Mavengere, N., Ruohonen, M. J., Hederman, L., & Grimson, J. (2016). Exploring the Information and ICT Skills of Health Professionals in Low- and Middle-Income Countries BT - Stakeholders and Information Technology in Education (T. Brinda, N. Mavengere, I. Haukijärvi, C. Lewin, & D. Passey, Eds.). Cham: Springer International Publishing.
- Konsil Kedokteran Indonesia. (2019). Standar Nasional Pendidikan Profesi Dokter Indonesia.
- Kopp, M. (2015). A Future in Digital Health Transforming Healthcare for. *SAP Digital Healthcare White Paper*, 01(16), 1–28.
- Kraus, S., Schiavone, F., Pluzhnikova, A., & Invernizzi, A. C. (2021). Digital transformation in healthcare: Analyzing the current state-of-research. *Journal of Business Research*, 123, 557–567. <https://doi.org/10.1016/j.jbusres.2020.10.030>
- Krause, B., & Cross, S. (2019). Healthcare's Next Frontier: The Omnichannel Patient. Retrieved December 1, 2019, from www.cmo.com website: <https://www.cmo.com/opinion/articles/2019/4/30/healthcares-next-frontier-the-omnichannel-digital-consumer.html#gs.jucs68>
- Kuipers, S. J., Cramm, J. M., & Nieboer, A. P. (2019). The importance of patient-centered care and co-creation of care for satisfaction with care and physical and social well-being of patients with multimorbidity in the primary care setting. *BMC Health Services Research*, 19(1), 1–9. <https://doi.org/10.1186/s12913-018-3818-y>
- Kupiek, M. (2021). Digital Leadership in the Agile World and the Present of Change Management BT - Digital Leadership, Agile Change and the Emotional Organization: Emotion as a Success Factor for Digital Transformation Projects (M. Kupiek, Ed.). https://doi.org/10.1007/978-3-658-33489-5_1
- Lahiri, K. (2013). Telemedicine, e-Health and Health related IT enabled Services: the Indian Situation. *Galen Medical Journal* VII, 1 & 2, 1–16.
- Lardo, A., Corsi, K., Varma, A., & Mancini, D. (2022). Exploring blockchain in the accounting domain: a bibliometric analysis. *Accounting, Auditing & Accountability Journal*, 35(9), 204–233. <https://doi.org/10.1108/AAAJ-10-2020-4995>

- Laurenza, E., Quintano, M., Schiavone, F., & Vrontis, D. (2018). The effect of digital technologies adoption in healthcare industry: a case based analysis. *Business Process Management Journal*, 24(5), 1124–1144. <https://doi.org/10.1108/BPMJ-04-2017-0084>
- Layman, C. V., Sasmoko, S., Hamsal, M., & Sanny, L. (2022). The Prevalence of Information Technology in Indonesia's Accredited Hospitals. *International Journal of Reliable and Quality E-Healthcare*, 11(1), 1–11. <https://doi.org/10.4018/IJRQEH.303674>
- Leal Filho, W., Krishnapillai, M., Minhas, A., Ali, S., Nagle Alverio, G., Hendy Ahmed, M. S., ... Kovaleva, M. (2023). Climate change, extreme events and mental health in the Pacific region. *International Journal of Climate Change Strategies and Management*, 15(1), 20–40. <https://doi.org/10.1108/IJCCSM-03-2022-0032>
- Li, Y., Dai, J., & Cui, L. (2020). The impact of digital technologies on economic and environmental performance in the context of industry 4.0: A moderated mediation model. *International Journal of Production Economics*, 229, 107777. <https://doi.org/https://doi.org/10.1016/j.ijpe.2020.107777>
- Lowery, A., & Cassidy, T. (2022). Health and well-being of first responders: The role of psychological capital, self-compassion, social support, relationship satisfaction, and physical activity. *Journal of Workplace Behavioral Health*, 37(2), 87–105. <https://doi.org/10.1080/15555240.2021.1990776>
- Martins, H. (2019). Digital Transformation and Digital Leadership. *Healthcare Informatics Research*, 25(4), 350–351. <https://doi.org/10.4258/hir.2019.25.4.350>
- McKinsey & Company. (2021). Ten ideas to unlock Indonesia ' s growth after COVID-19. McKinsey & Company, (May).
- Mohamed, E. S. A. (2021). The impact of social intelligence and employees' collective self-efficacy on service provider's performance in the Egyptian governmental hospitals. *International Journal of Disruptive Innovation in Government*, 1(1), 58–80. <https://doi.org/10.1108/IJDIG-07-2020-0003>
- Naciti, V., Noto, G., Vermiglio, C., & Barresi, G. (2022). Gender representation and financial performance: an empirical analysis of public hospitals. *International Journal of Public Sector Management*, 35(5), 603–621. <https://doi.org/10.1108/IJPSM-01-2022-0004>
- NDH. (2019). Kvalitetsbasert Finansiering. Oslo, NO.
- Nikou, S., De Reuver, M., & Mahboob Kanafi, M. (2022). Workplace literacy skills—how information and digital literacy affect adoption of digital technology. *Journal of Documentation*, 78(7), 371–391. <https://doi.org/10.1108/JD-12-2021-0241>
- Noto, G., Lo Verso, A. C., & Barresi, G. (2021). What is the performance in public hospitals? A longitudinal analysis of performance plans through topic modeling. *BMC Health Services Research*, 21(1), 1–11. <https://doi.org/10.1186/s12913-021-06332-4>
- Olaleye, S. A., Mogaji, E., Agbo, F. J., Ukpabi, D., & Gyamerah Adusei, A. (2023). The composition of data economy: a bibliometric approach and TCCM framework of conceptual, intellectual and social structure. *Information Discovery and Delivery*, 51(2), 223–240. <https://doi.org/10.1108/IDD-02-2022-0014>
- Olok, G. T., Yagos, W. O., & Ovuga, E. (2015). Knowledge and attitudes of doctors towards e-health use in healthcare delivery in government and private hospitals in Northern Uganda: a cross-sectional study. *BMC Medical Informatics and Decision Making*, Vol. 15, p. 87. <https://doi.org/10.1186/s12911-015-0209-8>

- Øygarden, O., Olsen, E., & Mikkelsen, A. (2020). Changing to improve? Organizational change and change-oriented leadership in hospitals. *Journal of Health Organization and Management*, 34(6), 687–706. <https://doi.org/10.1108/JHOM-09-2019-0280>
- Pandit, D., Joshi, M. P., Sahay, A., & Gupta, R. K. (2018). Disruptive innovation and dynamic capabilities in emerging economies: Evidence from the Indian automotive sector. *Technological Forecasting and Social Change*, 129, 323–329. <https://doi.org/https://doi.org/10.1016/j.techfore.2017.09.035>
- Qiang, Y., Tao, X., Gou, X., Lang, Z., & Liu, H. (2022). Towards a Bibliometric Mapping of Network Public Opinion Studies. *Information*, Vol. 13. <https://doi.org/10.3390/info13010017>
- Robert F. Lusch, S. N. (2015). Service Innovation: A Service-Dominant Logic Perspective. *MIS Quarterly*, 39(1), 155–175. <https://doi.org/https://doi.org/10.25300/MISQ/2015/39.1.07>
- Rubbio, I., Bruccoleri, M., Pietrosi, A., & Ragonese, B. (2020). Digital health technology enhances resilient behaviour: evidence from the ward. *International Journal of Operations & Production Management*, 40(1), 34–67. <https://doi.org/10.1108/IJOPM-02-2018-0057>
- Samsor, A. M. (2021). Challenges and Prospects of e-Government implementation in Afghanistan. *International Trade, Politics and Development*, 5(1), 51–70. <https://doi.org/10.1108/itpd-01-2020-0001>
- Samuelsson, P. (2023). The effects of innovation types and customer participation on organizational performance in complex services. *European Journal of Marketing*, 57(13), 27–55. <https://doi.org/10.1108/EJM-11-2020-0810>
- Sattar, K., Yusoff, M. S. B., Arifin, W. N., Mohd Yasin, M. A., & Mat Nor, M. Z. (2023). A scoping review on the relationship between mental wellbeing and medical professionalism. *Medical Education Online*, 28(1), 2165892. <https://doi.org/10.1080/10872981.2023.2165892>
- Serbanati, L. D. (2020). Health digital state and Smart EHR systems. *Informatics in Medicine Unlocked*, 21, 100494. <https://doi.org/10.1016/j.imu.2020.100494>
- Smith, J. R., Terry, D. J., Manstead, A. S. R., Louis, W. R., Kotterman, D., & Wolfs, J. (2008). The Attitude–Behavior Relationship in Consumer Conduct: The Role of Norms, Past Behavior, and Self-Identity. *The Journal of Social Psychology*, 148(3), 311–334. <https://doi.org/10.3200/SOCP.148.3.311-334>
- Sparrow, R., Dartanto, T., & Hartwig, R. (2020). Indonesia Under the New Normal: Challenges and the Way Ahead. *Bulletin of Indonesian Economic Studies*, 56(3), 269–299. <https://doi.org/10.1080/00074918.2020.1854079>
- Sproson, L., Mills, N., Pryde, L., Adebajo, A., Coyle, D., Preston, J., ... Lanfranchi, V. (2022). Keeping patient and public partnership at the heart of medical technology development during Covid-19: examples of adaptive practice. *Journal of Medical Engineering & Technology*, 46(6), 472–481. <https://doi.org/10.1080/03091902.2022.2089258>
- Tangchareonsamut, J., Wongrathanandha, C., Khamsee, S., & Aekplakorn, W. (2022). Association of work performance with absenteeism and presenteeism among support workers in a medical school hospital, Thailand. *Journal of Health Research*, 36(4), 746–755. <https://doi.org/10.1108/JHR-01-2021-0045>
- Thulesius, H. (2020). Increased importance of digital medicine and eHealth during the Covid-19 pandemic. *Scandinavian Journal of Primary Health Care*, 38(2), 105–106. <https://doi.org/10.1080/02813432.2020.1770466>
- Tornatzky, L. G. (1990). *The processes of technological innovation*. Lexington Books.

- Tubaishat, A. (2019). The effect of electronic health records on patient safety: A qualitative exploratory study. *Information Health Social Care*, 44(1), 79–91. <https://doi.org/10.1080/17538157.2017.1398753>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/https://doi.org/10.2307/30036540>
- Wallin, A. J., & Fuglsang, L. (2017). Service innovations breaking institutionalized rules of health care. *Journal of Service Management*, 28(5), 972–997. <https://doi.org/10.1108/JOSM-04-2017-0090>
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171–180. <https://doi.org/https://doi.org/10.1002/smj.4250050207>
- Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital: turning technology into business transformation*. In Harvard Business Review Press. Boston, Massachusetts: Harvard Business Review Press.
- Wilks, W. P. G. G. M. (2003). *An Organizational Performance Assessment System for Agricultural Research Organizations: Concepts, Methods, and Procedures*. International Service for National Agricultural Research (ISNAR).
- Woods, L., Cummings, E., Dobroff, N., Nowlan, S., Almond, H., Procter, P., ... Schaper, L. (2021). Intended use of the national nursing and midwifery digital health capability framework. *Studies in Health Technology and Informatics*, 276(276), 106–112. <https://doi.org/10.3233/SHTI210018>
- World Bank. (2021). Bank Dunia Menyetujui Dukungan untuk Memperkuat Jaminan Kesehatan, Meningkatkan Kualitas Perawatan Kesehatan di Indonesia. Retrieved July 27, 2022, from [worldbank.org website: https://www.worldbank.org/in/news/press-release/2021/12/16/world-bank-approves-support-to-strengthen-health-insurance-improve-quality-of-health-care-in-indonesia](https://www.worldbank.org/in/news/press-release/2021/12/16/world-bank-approves-support-to-strengthen-health-insurance-improve-quality-of-health-care-in-indonesia)
- Xie, A., Gurses, A. P., Hundt, A. S., Steege, L., Valdez, R. S., & Werner, N. E. (2016). Conceptualizing Sociotechnical System Boundaries in Healthcare Settings: Within and Across Teams, Organizations, Processes, and Networks. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 60(1), 866–870. <https://doi.org/10.1177/1541931213601198>
- Zeike, S., Bradbury, K., Lindert, L., & Pfaff, H. (2019). Digital Leadership Skills and Associations with Psychological Well-Being. *International Journal of Environmental Research and Public Health*, 16(14). <https://doi.org/10.3390/ijerph16142628>