Enhancing Efficiency and Accuracy in Medical Record Keeping Through Digital Transformation

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Abstract

Digital transformation (DT) has become a prominent catalyst for change across numerous sectors, including the healthcare industry. The implementation of digital solutions in medical record management to improve the efficacy and precision of healthcare settings is the subject of this study. Through an examination of the potential advantages and obstacles linked to the digitalization of medical record management, this study aims to assess the effects of such a transition on operational efficiency, data accuracy, and the quality of patient care. Utilizing a systematic literature review approach, the research investigated scholarly journals that underwent peer review between the years 2012 and 2023. Keywords including "digital" and "healthcare" were incorporated into the search criteria for titles and abstracts. For analysis, 130 articles were chosen from the EBSCOhost databases and supplementary sources. The results underscore the importance of big data and electronic health records (EHRs) within the healthcare industry. By integrating personal information obtained from selfmonitoring devices, clinical research findings, and medical records, EHRs provide a comprehensive view of patient information. The application of big data in the healthcare sector facilitates sophisticated data analysis and decision-making, thereby resulting in enhanced research outcomes and patient care. Secure data management systems and advanced communication platforms are also components of the digital transformation of medical record keeping. These technologies facilitate the streamlined compilation of reports, promote effective information exchange among stakeholders, and optimize record-keeping procedures within healthcare facilities. Additionally, the incorporation of digital solutions promotes the uniformity and preservation of substantial quantities of data, which empowers the creation of inventive analytics methodologies that yield insights derived from data. This study makes a significant scholarly contribution to the expanding field of digital transformation in healthcare through the provision of insightful analysis regarding the advantages and difficulties linked to the adoption of digital solutions for medical record management. The results underscore the significance of adopting digital technologies in order to improve operational effectiveness, data accuracy, and the standard of patient care as a whole. Additionally, prospective future research avenues are identified, and the necessity for ongoing investigation into digital transformation in healthcare environments is emphasized.

Keywords: Digital revolutionization, Medical record administration, electronic health records, Big data examination, medical secretarial services.
INTRODUCTION:

Digital transformation (DT) is defined as "a procedure that seeks to enhance an organization by instigating substantial modifications to its attributes via the integration of data, communication, computing, and connection platforms" (Vial, 2019). DT influences numerous facets of businesses, including the definition of appropriate metrics and objectives, the procurement of digital resources, and the development of digital expansion strategies (Verhoef et al., 2019). This occurrence is transforming the business industry as a whole and is now an extremely common subject in numerous fields of business study (for instance, computer systems, strategy, and marketing). Healthcare (HC), encompassing all services provided by healthcare providers to safeguard individuals' physical and mental health, has been a significant sector impacted by DT for an extended period of time (Marques and Ferreira, 2020). In addition to generating value creation and addressing challenges associated with the geriatric population, the advancement of technology in healthcare generates new company possibilities and models (Elton and O'Riordan, 2016).

Researchers and practitioners alike have recognized the increasing significance of DT in this particular sector (Reis et al., 2018). A recently published comprehensive review of the literature on DT in HC emphasizes the most prevalent technology-related topics of study in this field and demonstrates the exponential growth of studies on this subject over the past two decades (Marques and Ferreira, 2020). Nevertheless, the overemphasis on technological aspects fails to sufficiently underscore the diverse managerial implementations and organizational ramifications of DT on the numerous stakeholders within this sector (Nudurupati et al., 2015). Knowing how all aspects of an HC the environment (individuals, pharmaceutical firms, healthcare facilities, government organizations, and many others) utilize DT technologies and methods to address the standard of care, generating value, and numerous other managerial challenges requires a multi-stakeholder context. The stakeholder perspective is rarely examined in traditional scholarship on digital transformation (DT). It is generally stated that a company of value creation, development, technological advancement, and DT requires a diverse group of network stakeholders (Verhoef et al., 2019).

Verhoef et al. (2019) make a primary contribution to the existing body of literature on DT by providing a comprehensive illustration of the functions and engagements of various stakeholders, including but not limited to employees, consumers, and service providers, throughout this process. Furthermore, our results make a valuable contribution to the expanding
field of DT in healthcare (Marques and Ferreira, 2020) by demonstrating, from the perspective of stakeholders, how health service providers can enhance operational efficiency and develop strategies through the implementation of digitalization. Prior research on DT in HC is categorized into five categories, according to the results of our SLR: patient-centered methods; corporate variables and administrative consequences; workforce policies; and socioeconomic elements. These groups are interconnected to create a model that illustrates how the introduction of these diverse technologies by HC service providers results in enhanced operational efficiencies.

A multitude of potential avenues for future study and managerial ramifications are proposed. Digital disruption has emerged as a transformative occurrence in the twenty-first century, impacting all tiers of society and enterprise (Schallmo and Williams, 2018), and transforming all conventional business settings (Ford et al., 2017). Businesses must systematically modify their "employed, duties, and business providing" in order to implement digital solutions (Parviainen et al., 2017). The efficiency of a business is impacted by the integration of emerging technologies and the interaction of all stakeholders throughout the value-added link (Schallmo and Williams, 2018). Digital trends at various levels, involving processes, technology, organizational elements, business model interruption, and the community, are incorporated into the DT concept (Klewes et al., 2017).

At present, four innovative digital-enabled notions are providing assistance for organizations' DT: Industry 4.0 (I4.0), also known as the latest industrial revolution, pertains to the "organized integration of logistical aspects into supply and company interactions, technological elements, and procedures". The framework is founded upon the I4.0 principle, also known as the Internet of Things (IoT), which delineates the interdependence of computing resources and data transmissions among devices with intelligence to facilitate the independent regulation of routine activities (Klewes et al., 2017). Artificial Intelligence (AI) refers to the automation of service processes through the use of intelligent computers or computer-controlled machines, eliminating the need for human intervention in carrying out intelligencerelated tasks (Lu, 2019). The phrase "Big Data" was employed to delineate the "volume, speed, and wide range of data" that poses a growing challenge for traditional data analysis methods for analysis. At present, digital technologies facilitate the standardization and retention of substantial quantities of data through the implementation of big data analytics, which refers to "advanced methodologies and instruments for storing, processing, and examining an enormous amount of data" (Manogaran et al., 2017).
Since the middle of the twentieth century, the implementation of ICT has had an impact on the HC sector (Ford et al., 2017). Enhanced care delivery and research are two examples. The advent of the Internet during the mid-1990s brought about a profound transformation in the manner in which stakeholders exchange information (Arni and Laddha, 2017). Over the past two decades, the HC industry has been only marginally impacted by the paradigm shift in HC organizations (Tuzii, 2017). The implementation of novel technologies that facilitate the transition to secure, high-quality healthcare is referred to as "DT in HC" (Haggerty, 2017). "New advancements as self-tracking, big information and forecasting, e-health, mobile healthcare, participatory studies in medicine, e-patient groups and collaborative choice-making in evaluation and e-therapy" are additional points made by Belliger and Krieger (2018). DT in HC is an idea that aligns with electronic health, which is defined as "the utilization of technology for communication and information to enhance well-being, medical care, and human health for populations" (Kostkova, 2015). Latest studies by Marques and Ferreira (2020) identified seven technology-related areas of study: the Integrated Administration of Information Technology (IT) in Health; Healthcare Images; Digital Medical Information; Information Innovation and Portable Instruments in Health; Getting to E-Health; Telemedicine; and Safety of Health Information.

It is critical to comprehend the ramifications of the digital revolution on medical administrative services and record-keeping procedures in order to enhance healthcare settings' operational efficacy, data precision, and quality of patient care. The primary objective of this research investigation is to offer significant perspectives on the advantages and obstacles associated with the implementation of digital solutions in medical record management. By doing so, it hopes to assist in the enhancement of clinical secretary services and the general provision of healthcare. The objective of this research study is to investigate the potential of digital transformation in healthcare settings to enhance the effectiveness, precision, and confidentiality of medical record keeping. The purpose of this study is to examine how the implementation of secure communication platforms, advanced data management systems, and electronic health records (EHRs) affects medical administrative services, report generation, and general record-keeping processes in healthcare facilities.

**Methodology:**

The literature review described in the preceding section included consultation reports, investigations, book chapters, and peer-reviewed and non-refereed articles. In accordance with
an established methodology applied to various types of research, an SLR selected papers in peer-reviewed academic journals that met or exceeded a predetermined standard of quality (Vallaster et al., 2019). The subsequent SLR was conducted in accordance with specific criteria. A systematic research methodology was implemented in order to obtain a comprehensive comprehension of the context and connections between DT and HC (Cook and West, 2012). The literature review commenced by consulting the EBSCO host databases 'Business Source Ultimate' and 'Business Source Complete' (Mas-Tur et al., 2020). The period 2000–2019 was designated as the period during which digitalization in HC, defined as the application of information technology to manage and process data, information, and processes, gained prominence in the early 2000s. The search did not include conference papers, book chapters, or non-refereed articles.

An introductory search was conducted using the keyword combinations 'digital*' AND 'healthcare' exclusively in titles, with the intention of identifying publications that addressed both fundamental domains. This initial query returned 31 articles. In order to augment the scope of the SLR, conducting an even more comprehensive search ought to yield a more substantial quantity of articles: As a result, the combination 'digital*' in titles AND 'healthcare' in abstracts was applied, despite the fact that many of the articles were inferior to the current subject.

The search was performed using the identical search criteria that were mentioned earlier, including the publication date, category of source, and language. An additional inquiry resulted in the discovery of 114 manuscripts. Following the exclusion of 15 duplicate entries, the EBSCOhost search sample comprised 130 journal articles. Additionally, in order to enhance the diversity of the article sample in this particular discipline, searches were conducted on the databases Elsevier ScienceDirect and SpringerLink using the aforementioned keywords. The examination of descriptive characteristics within the sampled publications indicates that the articles fall within the time span of 2012 to 2023.

Electronic Healthcare Records:

The utilization of big data in healthcare is founded upon clinical research findings, medical record data (EHR), and personal information obtained from self-monitoring instruments (such as sports or work-monitoring sensors) by consumers (Belliger and Krieger, 2018). Patient information generally comprises every document pertaining to treatment, including written and visual health records, letters from physicians, electronic prescriptions, and insurance applications (Haggerty, 2017). Four primary sources of HC data are identified by Kraus et al.
(2021): HC suppliers, ancillary providers of services (such as pharmaceutical corporations), public and private organizations, and patients. In light of the reality that population growth is occurring in developing regions, health data analytics are propelling changes in wellness methods worldwide. This is significant because, among other things, it drives the unrealized potential of data from contemporary HC models (Reddy and Brahm, 2016). Accurate data collection and analysis are essential components for the effective utilization of medical big data. This includes medical records, genetics, and data obtained from various applications. The analysis of big data can facilitate the development of predictive models for large population groups and personalized individual care.

Electronic health records (EHR), which are "a collection of information about patients in digital format, securely stored and exchanged, and readily available to various users", are founded upon the use of data analytics and big data in HC. Electronic Medical Records (EMR) had been widely adopted and utilized by numerous autonomous entities, such as healthcare providers, insurers, and patients, by 2015 (Evans, 2016). Electronic medical records (EMRs) are defined as "digitized systems that offer clinicians with patient history, demographic data, and registration information" (Chakravorty et al., 2018). These systems are frequently implemented in telemedicine settings. Telemedicine as a concept was first introduced in the nineteenth century (Arni and Laddha, 2017). Telemedicine is defined as "the provision of healthcare services, with distance being a significant consideration, through the utilization of information and communication technology [ICT] for the avoidance and management of wounds and diseases, study and assessment, and continuing education of healthcare providers, with the ultimate goal of improving the health of groups and individuals". Remote consultations, telecare, remote monitoring or telehealth services, and telediagnoses are all practical areas of telemedicine that are interconnected (Arni and Laddha, 2017; Ford et al., 2017).

Prioritization of patient-centered methodologies:

As a result of the increased autonomy granted to them by digital technologies, patients are assuming an increasingly proactive role in determining their own medical care. In their study, Gray et al. (2013) analyze the impact of DT on the provider-patient relationship in healthcare by calculating the cumulative value of three cutting-edge models: value chains, value stores, and value networks. The primary attributes that define this relationship are cycles of selfservice and feedback. As demonstrated by the results of their detailed empirical investigations, HC is
well-positioned for an essential center-edge transformation as a consumer-centric industry. Mende (2019) demonstrates that with regard to this matter, HC consumers are "partial employees" and "co-producers of service" who are required to actively engage in the management of their own health. Mende (2019) asserts that while study of patient-based methods is still in its infancy, it is critically important for technological advancements in healthcare, such as determining the repercussions of the imminent use of anthropomorphic service-robots on aged patients and service providers.

Issues among medical professionals and patients resulting from conflicts of interest have been shown to have a negative impact on patients' health (Jefferies et al., 2019). As a consequence, scholarly inquiries have begun to center on value co-creation and servicedominant logic (SDL): Jefferies et al. (2019) and Leonard (2004) examine the impact of participatory design approaches on the performance of HIT, respectively. A fundamental aim of HIT is to enable the exchange of information among interest groups. Electronic health records (EHRs), which pose the greatest financial burden in healthcare at present (Agnihothri et al., 2020), are particularly pertinent when it comes to the management of chronic illnesses. In pursuit of establishing a nationwide electronic medical record (EMR) system, Patrício et al. (2019) similarly recognize the necessity for interest group-driven participatory decisionmaking approaches and discover that participatory service design facilitates innovation in institutional HC. Jeffries et al. (2019) examine the incorporation of patients' feedback and perceptions regarding technology, administration, and professionalism within healthcare organizations, with a particular emphasis on telehealth. Jeffries et al. (2019) identify working, interpersonal, and integrative characteristics that challenge the boundaries between healthcare organizations and boundary workers, as determined by patient inquiries regarding heart disease.

An additional stream of data reveals how individuals utilize web-enabled services for health-related intentions. With an examination of the content of digitized profiles on social media platforms, Cavusoglu and Demirbag-Kaplan (2017) intend to ascertain consumers' perspectives regarding health. Instagram, in particular. A four-quadrant model is constructed, which is based on processes of commercialized meaning-making. The authors discover that interpretations of health on online platforms are frequently reinforced in relation to material possessions; as a result, they employ conceptualizations pertaining to particular topics, including food, exercise, style, and emotions. Other scholars investigate the influence of online networks on the interconnectedness of elderly Spanish consumers and their pursuit of healthrelated information (Sanders et al., 2015). The research conducted by the authors...
indicates that in contrast to conventional in-person consultations, the internet functions as a supplementary and non-essential service. However, the relationship between consumers' multi-channel health information seeking and value co-creation has received scant attention in the scientific literature. As a result, the study conducted by Dahl et al. (2019) examines the implications of autonomous seeking knowledge on the health awareness of consumers and the flow patterns of health service systems. Their comprehension of patient empowerment reveals a shift from digital information sources controlled by providers to those controlled externally; this shift is primarily the result of patients' active participation in networks.

The influence of m-health technologies on the advancement of diseases is specifically investigated in the works of Agnihothri et al. (2020) and Yousaf et al. (2020). Agnihothri et al. (2020) employ two indicators—average life expectancy and anticipated total lifetime earnings—to quantify benefits. The focus of the subsequent literature review is the identification and evaluation of mobile memory devices in relation to their utility for Alzheimer's disease or dementia patients, as well as the advantages they provide for caregivers (Yousaf et al., 2020). In contrast to Agnihothri et al. (2020), who construct a market chain to model disease progression based on a variety of factors, both studies highlight that the value of mobile health (m-health) is contingent on a number of variables, including the present health status, the frequency of assessment and intervention, the support of caregivers, and disease progression patterns (Yousaf et al., 2020). The exhaustive study by Yousaf et al. (2020) demonstrates that m-health-based technologies benefit both physicians and patients by providing cognitive training, monitoring, and socializing, and screening, respectively. Furthermore, Agnihothri et al. (2020) find that the personal benefits of mobile health are linearly correlated with the seriousness of illnesses suffered by the patient.

**Efficiency in the operations of healthcare organizations:**

Operations and processes are impacted by technological advancements in HC, and research reveals multiple trends in this area. The influence of HIT on value creation and operational efficiencies has been the subject of numerous studies (Hong and Lee, 2017). Hong and Lee (2017) conduct an analysis to determine the impact of HIT and aided knowledge abilities on customer loyalty and HC quality. A positive correlation was observed among operational creativity and patient happiness, suggesting that loyalty is the underlying factor. This correlation can be primarily attributed to enhanced workflows and cost reductions (Hong and
An additional contribution to this facet is made by Laurenza et al. (2018), who examine the impact of technological advances on the efficacy of business processes (BP) within the healthcare sector, using MSD Italy as a case study. The results indicate that the implementation of digital technologies has a positive effect on the quality of care by decreasing clinicians' reaction time and, more generally, by enhancing the administrative processes of HC institutions.

Additionally, scientists investigate concerns regarding innovations in HC. An instance that can be classified within this cluster is the assessment of operational efficacy. This issue in hospital emergency departments is investigated by Mazor et al. (2016) using design science research as the foundation. The developers create an initial iteration of a digital interface that evaluates the effects on the length of time that patients are admitted. The simulation outcomes of their inquiries indicate that there is potential for a 34% reduction in the average duration of stay, which would consequently enhance productivity. Kohl et al. (2019) propose Data Envelopment Analysis (DEA) as the preferred method for assessing the efficacy of hospitals with respect to performance measurement. They examine the efficacy of DEA across 262 publications in their SLR. Despite the considerable quantity of literature (n = 99) devoted to methodologies for estimating operational performance, it is evident that practical implementations have frequently disregarded research findings.

A significant advancement in this domain is the research conducted by Taiminen et al. (2018), which examines the viewpoints of physicians regarding the generation of value via digital self-services. While the findings of their survey (n = 412) indicate that physicians concur that digital self-services have a positive impact on service quality, the authors assert that the healthcare industry is still too young to fully incorporate them. This is consistent with the conclusions drawn in previous research. Also considering the viewpoints of clinicians, Ozdemir et al. (2011) examine countermeasures for challenges associated with EMR adoption and data sharing. As a result of the prevailing hesitancy among clinicians to embrace electronic medical records (EMR) at that time, particularly due to a lack of confidence in suppliers, the researchers examine how legal obligations could improve PHRs and highlight the value-added benefits of data sharing for HC providers. The endorsement of these platforms by physicians seems essential, particularly when the objective is to improve the administration of chronic illnesses.

From a technological standpoint, Sultan's (2015) theoretical paper strengthens the subject matter: he considers the potential of ubiquitous technologies for health data access and surveillance and implies that their impact on the quality of healthcare is positive, particularly
in regards to health data reporting. Sultan (2015) cites enhanced efficacy in heart rate and arterial pressure measurement through the utilization of eye-based or wrist-based devices, i.e. The Apple iWatch. Finally, Rubbio et al. (2019) provide a particular emphasis on operational mistakes and the function of DT in enhancing the resilience of HC organizations. Significantly, the authors discover via a multiple-cases analysis involving two Italian hospitals that resilience-oriented practices are deficient in the capacity to enhance patient safety. In relation to operational failures, a differentiation is made between workflow dysfunctions caused by equipment unavailability and operational breakdowns resulting from improper task execution or usage.

**Aspects of the organization and managerial implications:**

Research examining the managerial implications and organizational factors could be located (Cucciniello et al., 2016). Cucciniello et al. (2016) present a comprehensive analysis of the interconnectedness between environmental management system (EMR) implementation and organizational circumstances. The latter attributes to EMR systems a significant capacity to improve data sharing and safeguard operational processes, thus establishing a connection to earlier recommendations for variables in their comparative analysis. Consequently, their analysis identifies two considerations: first, the HC entity's different degrees of current competence with HIT; and second, the variety of change management strategies. Anticipated benefits of electronic medical record (EMR) systems can be realized when clinical personnel endorse their implementation and administrators embrace a "bottom-up approach" characterized by active participation from the moment of initial selection until completion (Cucciniello et al., 2016). Conversely, the DT of HC entities is adversely affected when administrators impose requirements and healthcare workers are not adequately involved in the co-development. At last, Laurenza et al. (2018) provide a significant contribution to the field of business model transformation. By assisting with administrative duties and fostering collaboration with other stakeholders, IT is crucial to the authors' analysis of BP's progress and the transition to value-oriented HC.

**Consequences for labor practices:**

On the alteration of personnel within HC organizations, only two studies (Eden et al., 2019) can be identified. To establish a connection between workforce transformation (DT) and hospitals, it is necessary for hospitals to initially "engage in flexing, deepening, and
revitalizing" (Eden et al., p.16). "Flexing" pertains to the manner in which hospitals and employees react to external limitations and utilize health information technology (HIT) to attain flexibility. "Deepening" concerns the conduct of employees and their reevaluation of their professional responsibilities. "Revitalizing" describes the impact of persistent disruptions on tasks and competencies. The interdependence of these three practices has an impact on the strategic orientation of an organization. In their study on the bottom-up strategy, Eden et al. (2019) ascertain the implementation of cooperative imagining and evidence-based creativity as two behavioral capacities. Concerning the administration of tensions among revitalization initiatives at all hierarchical levels, competency development is required. Leaders ought to strive for fast victories in order to maintain employee motivation.

In an effort to ascertain the impacts of health information systems (HIS) on the operating room module within a medium-sized hospital in Germany, Huber and Gartner (2018) undertake an investigation. The authors examine the distinctions among control and autonomy in both routine and high-pressure surgical scenarios, as well as the effect that transparent management has on accountability. HIS appear to enhance routine work procedures in "normal" circumstances by virtue of the recording of guidelines and intricate guidelines. In situations characterized by unforeseen circumstances that necessitated the suspension of routine conduct (Huber & Gartner, 2018, p.150), the HIS was determined to be excessively laborious on account of the absence of explicit directives. Therefore, HC professionals utilize the technologies in order to preserve their professional autonomy. Digital technology expedites work processes and enhances the capacity for individual exercise. Furthermore, the ease with which team members of varying hierarchies can access medical results facilitates enhanced coevaluation and comprehension of dynamic situations. Finally, it is believed that digital technologies influence the redistribution of labor and the transfer of authority, particularly among nurses, physicians, and radiologists.

**Socioeconomic factors:**

The remaining four articles in the sample pertain to social issues and financial solutions for mitigating them. Geiger and Gross (2017) present a comprehensive analysis of the correlation between technological enthusiasm and investments in the HC market. Direct market investments in the European electronic health records market have been intricately tied to policy initiatives and socioeconomic and technological commitments for the past fifteen years. Mishra et al. (2019) develop a conceptual framework on the basis of their SLR in order to
comprehend the challenges and opportunities that digitalization presents for the future of health care professionals (CHWs4) in the field of social services. Opportunities exist in the form of decision support and simple peer-to-peer communication, whereas deficiencies in digital health literacy must be addressed.

Two scholarly articles (Burtch and Chan, 2019; Seddon and Currie, 2017) compare the geographical perspectives of an examination of the correlation among HC financing and digital divisions. Health commercialization has been extensively regulated by law in the European Union, and political leaders are placing a greater emphasis on financial measurement (Seddon & Currie, 2017). As a consequence of their multidimensional statistical examination of crosscountry heath information and ICT infrastructure, the authors identify three country classifications: leaders, followers, and laggards (Seddon & Currie, 2017). In light of recent concerns regarding the equity of financial resources disseminated through medical crowdfunding platforms in the United States, Burtch and Chan (2019) examine the relationship among online health-related funding systems and personal insolvency empirically. Medical crowdfunding, according to the authors, could be a supplementary solution to the reduction of bankruptcies if governmental authorities facilitate marginalized populations to interact with online communities on purpose.

Suggestions for further investigation:

The examination of prior research resulted in the recognition of numerous deficiencies in knowledge concerning HC stakeholders and DT. These are the result of an abundance of qualitative research, an emphasis on hospitals as the majority of analyzed HC institutions, a dearth of studies on external business development and business model transformation, unacknowledged inquiries regarding the digital divide, and financing alternatives. Alternative methodologies ought to be incorporated into future research recommendations. To begin with, there are significant subjects that necessitate a more robust foundation of evidence grounded in tested relevant theories and hypotheses. For example, this pertains to the improvement of electronic health record (EHR) services within the framework of a software-as-a-service (SaaS) business model (Ozdemir et al., 2011), or more precisely, the implementation of "flexing, deepening, and revitalizing" work practices in order to accomplish effective human resource transformation (Eden et al., 2019).

In order to obtain a more comprehensive perspective, it is necessary to conduct additional empirical mixed and quantitative research. In addition, quantitative research is essential for
measuring human impacts and financial returns, particularly during the nascent stages of HIT adoption and solution testing. In contrast to the requirement for larger quantitative samples to enhance the generalizability of prospective strengths and weaknesses, investigating the operational and managerial effects on diverse HC institutions could be accomplished through the utilization of qualitative methods, such as in-depth interviews and multiple case studies.

Additionally, there have been proposals for a shift in the patient experience in the direction of sensor tablets or e-visits (Monti and Coleman, 2016; Tuzii, 2017). Further investigation could explore strategies for improving participatory HIT design methodologies through the integration of quantifiable user experience data and insights derived from online advertising statistics. Participatory design approaches for service robots used in geriatric care to assist with socializing and memory loss would be one potential subject. Therefore, in light of the projected budgetary shifts towards preventive medicine over the next eleven years (Solbach et al., 2019) and the notion of "4P medicine," further investigation is required to identify determinants that enable the implementation of personalized and predictive care that are comparable in nature and quantifiable.

Concerning operational efficiencies achieved through the implementation of digital technologies, the potential risks and expenses associated with emerging innovative drivers, specifically AI, would be an area worthy of further study. In order to facilitate remote services through the automation of cognitive processes and dialogue systems, or more specifically, for medical robotic applications including neurosurgical assistance, medical transportation, and sanitation. Moving forward, researchers should similarly consider concerns regarding the reliability of AI. Critical solutions that are essential in the field of HC. Additionally, it has been observed that administrative procedures and efficiency of hospitals are impacted by the HITs examined in the sample (Laurenza et al., 2018). Despite the fact that operational efficiencies are fundamental to care quality, the influence of medical innovations on the decision-making and knowledge management of physicians appears to be largely overlooked. Complex molecular the use of nanotechnology software digital imaging, and sensing are examples of such medical advancements. Predictive medicine necessitates profound knowledge of EHR and PhD data analytics; major technology firms are capitalizing on this area of HC innovation by utilizing their primary competencies. Given the research void on external company growth that was identified as a consequence of the sample evaluation, it is imperative that HC providers
place greater emphasis on cooperation and collaboration methods with secondary market participants.

In terms of organizational structure, the SLR demonstrated that the majority of extant scholarly articles focused on technological advancements, whereas DT encompasses a more extensive domain. Additional research into the administration of effective transformation of business models and the implementation of strategic initiatives that facilitate disruptive changes could prove to be especially beneficial. The SLR consistently notes that the integration of digital technologies necessitates a reevaluation of the concept of health, which in turn requires a more thorough analysis of novel determinants of fundamental values (Cavusoglu and Demirbag-Kaplan, 2017; Dahl et al., 2019). Furthermore, our SLR noted that the impact of DT on organizational elements of HC supplying establishments besides hospitals are not sufficiently addressed in depth; therefore, it is evident that the pharmaceutical industry should investigate opportunities associated with the expansion of the e-commerce market. An investigation into the effects of changing the business model on client retention, switching expenses, and acquiring clients at pharmacies would be of comparable value.

Furthermore, to determine the necessary training for nursing staff to effectively utilize system integration, robots, and A.I., and to upskill healthcare professionals, it is imperative to conduct research that investigates the potential for transfer of knowledge from other developed industries in I4.0 and IoT, including automotive manufacturing, to inform the implementation of best workforce practices in healthcare. The skills of clinical nurses in relation to the implementation of HIS and digital training programs for CHWs (Mishra et al., 2019) have been investigated by authors from the sample. However, considering the market projections for robotics and connectivity, it appears imperative to conduct additional research on the disruptions that may affect elderly nursing and community-based care. In particular, qualitative research could be conducted to assess the requirements of physicians and nurses and to revise curricula; this would provide a suitable framework for connecting traditional medical practice and medication in the age of technology.

Fifth, the return on investment (ROI) of technological advancements is challenging to calculate due to the substantial costs associated with research and development and the intricate interrelation of numerous variables. Regardless, the HC sector must increase the transparency of its profit and cost information with regard to consumers, providers, and payers. For example, efforts to assess the effectiveness of DEA approaches (Kohl et al., 2019) are still in their conceptual stages; thus, it appears that additional research into the knowledge of hospital
administrators is required. Additionally, further research is required to examine investment strategies for cost management associated with digitalization. Opportunities for evaluating the performance of HIS and e-health technologies should ultimately be investigated in light of the development of health outcomes and customer satisfaction. Additionally, for the advancement of pharmacogenomics as a discipline, academics should examine the significance of commercial opportunities for pharmaceutical companies in greater depth.

A final suggestion pertains to the investigation of the impact of DT in HC on intellectual capital management (Huang, Leone, Caporuscio, & Kraus, 2020). As an illustration, scholars may examine the ways in which healthcare-listed organizations can leverage conventional DT mechanisms to disclose their intellectual property externally on a voluntary basis, as well as the ways in which such digital-based disclosure could enhance the efficacy of their operational processes (Giacosa et al., 2017).

**Conclusion:**

This article sought to identify a prospective future research agenda, offer a comprehensive assessment of the state of the art of digitalization in HC literary works, and identify the primary leadership and commercial uses of DT technologies as perceived by HC stakeholders. The analysis yielded five overarching clusters in an effort to identify potential advantages of digital technologies that have been introduced earlier for healthcare offering companies and other stakeholders. These clusters are as follows: the influence of innovative health information technology adoption on productivity and hospital resilience; patient-center edness in HC administration, with a particular focus on empowering patients and the effects of multi-channel actions on consumers' health and well-being; and the implications of hospitals adopting such technologies.

In conclusion, this article demonstrates that the majority of understanding of DT in HC entails the implementation of HIT in conventional HC structures and the digitization of information. In order to develop a more comprehensive understanding of the DT in HC, it is critical to undertake research on the implications of business model transformation for the management of various interest groups. In conclusion, the integration of patient empowerment, strategic application of digital technologies, and data-driven and forecasting will facilitate the transition to digital healthcare models. This will result in a transformed patient experience and improved outcomes for insurers, providers, and patients alike.
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