Literature Review

The adoption and integration of information systems (IS) have had a significant impact on the transformation of the healthcare industry in the United States. Electronic health records (EHRs), big data analytics, blockchain, and telemedicine are all examples of information systems (Krawiec & White, 2023). The technological revolution is very relevant because of its capacity to improve patient care, maximize operational efficiency, reduce costs, and efficiently address critical issues regarding security and privacy in healthcare data (Mann et al., 2020). Alotaibi and Federico (2017) report that putting IS into healthcare has had a big effect on patient safety. Because of this, it is important to look into how IS has helped improve patient safety and what problems may have come up along the way (Alotaibi & Federico, 2017). Also, Keshvari et al. (2018) found that implementing health information technology might cause problems in the healthcare system. These problems must be investigated to find workable solutions for putting IS in place efficiently (Keshvari et al., 2018). IS has also changed the healthcare field through telemedicine, especially after the COVID-19 pandemic (Mann et al., 2020). Because of this, it is important to look at the proof of this change and how it affects healthcare delivery (Mann et al., 2020). Further, the advantages of health information exchange (HIE) have been discussed in the literature (Menachemi et al., 2018); hence, a literature study will aid in understanding the benefits and problems of HIE (Menachemi et al., 2018). As healthcare information technology advances, it is necessary to critically evaluate the available literature to comprehend the present state of affairs and possible future developments. The purpose of this literature review is to examine the existing body of research on the use of information systems in the healthcare sector within the United States, synthesize and analyze the key findings, trends, and challenges identified in the selected literature, and shed light on the advancements and limitations of IS adoption in healthcare.

The historical development of information systems within the healthcare sector has been

characterized by notable achievements and advancements that have fundamentally revolutionized the provision and administration of healthcare services in the United States (Rainer & Prince, 2022). According to Thakkar and Gordon (2019), the origins of healthcare information systems can be traced back to the mid-20th century, during which the initial iterations of electronic data processing systems were introduced within healthcare environments. Wager and Glaser (2021) note that the initial systems were predominantly developed to facilitate administrative functions and fundamental record-keeping activities with activities such as appointment scheduling and billing. However, the early designs were constrained by their reliance on punch cards and batch processing, consequently restricting their ability to operate in real-time (Braithwaite, 2018). Abouelmehdi et al., (2018) assert that the emergence of Hospital Information Systems (HIS) during the 1960s represented a significant turning point in the development of healthcare information systems.

The advent of Electronic Health Records (EHRs) in the 1980s and 1990s marked a significant turning point in healthcare information systems as it led to a paradigm shift by seamlessly integrating clinical and administrative data, thereby empowering healthcare providers with the ability to access comprehensive patient information in real-time (Alotaibi & Federico, 2017). With the turn of the century came a sea change in Health Information Technology (HIT) and the implementation of standardized formats for transferring health records (Michie et al., 2017). Wager et al. (2021) have published several articles on cutting-edge healthcare information systems. These systems' sophisticated features include clinical decision assistance, telemedicine integration, and big data analytics (Mann et al., 2020). According to Braithwaite (2018), the evolution of these systems has resulted in numerous new characteristics, including those that benefit patient care, research, policymaking, and population health management.

Electronic health records are only one sort of information system (IS) that plays an important role in enhancing the quality and efficiency of healthcare in the United States (Chien et al., 2016). Electronic health records (EHRs), according to Chen et al. (2016), enhance

healthcare delivery by providing clinicians instant access to essential patient information, supporting informed decision-making, and reducing mistakes. Gaardboe et al. (2017) also note that Hospital Information Systems (HIS) represent another crucial type of IS in healthcare. HIS encompasses various modules and functionalities, including patient registration, billing, laboratory management, and pharmacy, streamlining administrative and clinical processes within healthcare institutions (Gaardboe et al. (2017), and plays a vital role in hospital management, resource allocation, and patient care coordination. Furthermore, Gaardboe et al. (2017) found that emerging technologies have brought forth Business Intelligence (BI) systems tailored for healthcare. Gaardboe et al. (2017) also reports that, these systems leverage data analytics to extract actionable insights from healthcare data, facilitating evidence-based decision-making and performance monitoring and empowering healthcare organizations to optimize resource allocation, identify trends, and improve patient outcomes.

The adoption of Information Systems (IS) in the healthcare sector of the United States has yielded many significant benefits, transforming the landscape of healthcare delivery, cost-effectiveness, and decision-making Bogaert and Van Oyen (2017). In their research, Menachemi et al. (2018) highlight improved patient care as a central benefit of IS adoption, noting that it enhances care coordination, reduces medical errors, and allows timely access to patient records, leading to improved healthcare outcomes. A related study by Dehnavieh et al. (2019) found that efficiency gains are another compelling advantage. Dehnavieh et al. (2019), in their analysis of The District Health Information System (DHIS2), exemplify how IS streamlines data collection

and reporting. The meta-synthesis of experiences across 11 countries underscores how IS enhances efficiency in data management, resource allocation, and health program monitoring (Dehnavieh et al., 2019). Further, according to Bogaert and Oyen (2017), cost-effectiveness is closely tied to efficiency improvements since IS enables better resource allocation and decision-making, ultimately leading to cost savings. Based on their findings, Bogaert and Van Oyen (2017) emphasize the potential benefits of an integrated EU health information system, which could lead to more efficient public health initiatives and reduced healthcare costs.

While healthcare information systems (IS) offer substantial benefits towards transformation of healthcare sector in United States, they still face challenges and barriers that healthcare organizations encounter during adoption (Dehnavieh et al., 2019). Galavi et al. (2022), in their systematic review, highlight concerns regarding data breaches and unauthorized access resulting from data security and privacy, highlighting the need to comply with stringent regulations, such as the Health Insurance Portability and Accountability Act (HIPAA), adds complexity to data security efforts. According to Gesulga et al. (2017), achieving seamless data exchange among various IS components and healthcare providers remains a significant challenge. In their structured review, Gesulga et al. (2017) note the interoperability issues that hinder the smooth flow of patients, asserting that incompatibilities between different EHR systems can lead to fragmented care and hinder coordinated decision-making.

In another qualitative design study, Keshvari et al. (2018) found that human factors, including resistance to change among healthcare professionals, can impede IS implementation. Keshvari et al. (2018) note that healthcare staff may be reluctant to transition from paper-based practices to digital systems, which can disrupt established routines and workflows. Dehnavieh et al., (2019) reports that, implementing admaintaining healthcare IS systems can be financially and resource-intensive as limited budgets and the need for skilled IT personnel pose challenges, particularly for smaller healthcareorganizations.

The challenges have significant implications for transforming the healthcare sector; for example, data security breaches can erode patient trust and result in legal repercussions, highlighting the importance of robust security measures (Galavi et al., 2022). Interoperability issues can hinder the potential benefits of IS, such as care coordination and data-driven decision-making (Gesulga et al., 2017). Resistance to change can slow down the adoption process and delay the realization of efficiency gains Keshvari et al. (2018), while Dehnavieh et al. (2019) suggest that resource constraints may limit the ability of healthcare organizations, particularly those in underserved areas, to leverage the advantages of IS fully.

In an effort to mitigate the above challenges, government initiatives and regulatory frameworks play a pivotal role in shaping the adoption of Information Systems (IS) in the U.S. healthcare sector, influencing the transformation of healthcare delivery and safeguarding patient data (Pesapane et al., 2018). Cousins (2016) examined The Health Information Technology for Economic and Clinical Health Act (HITECH Act) and the Meaningful Use program, noting that they have been instrumental in promoting IS adoption in the United States. These initiatives offer financial incentives to healthcare providers who demonstrate the "meaningful use" of EHRs and establish guidelines for adopting and implementing IS, driving healthcare organizations to adopt

and optimize digital systems (Cousins, 2016:7). As a result, the use of EHRs has become more widespread, facilitating better data sharing, care coordination, and improved patient outcomes (Cousins, 2016). Pesapane et al. (2018) further assert that, on the regulatory front,the HIPAA Act framework is paramount for safeguarding patient information. HIPAA mandates strict standards for the security and privacy of healthcare data, imposing legal requirements on healthcare organizations and technology vendors. (Pesapane et al., (2018) notes that, this regulation ensures that IS implementationgoes hand in hand with robust security measures to protect patient confidentiality.

The effectiveness of government policies in driving healthcare transformation in the United States through Information Systems is evident in the increased adoption of digital health records and the enhanced security of patient data (Christodoulakis et al., 2017). However, in their report, Christodoulakis et al. (2017) note challenges such as the burden of compliance with regulatory requirements, encouraging ongoing efforts to address emerging technologies, data sharing across systems, and interoperability to realize the potential of IS in healthcare fully.

The future of healthcare Information Systems (IS) in the United States is marked by several emerging trends, such as the rapid expansion of telemedicine, which gained significant traction during the COVID-19 pandemic that is set to reshape the healthcare landscape (Koonin et al., 2020). Telemedicine enables remote patient consultations, enhancing access to healthcare services and reducing the burden on traditional healthcare facilities, and the trend is expected to persist, resulting in increased accessibility to healthcare services, particularly in underserved or rural areas (Koonin et al., 2020). In their empirical investigation research, Yuan etal. (2021) note that another significant trend is the integration of Artificial Intelligence (AI) in healthcare. AI-driven diagnostic tools that can enhance the accuracy and efficacy of medical

diagnoses and treatment planning, empowering clinicians to make more informed decisions, are gaining prominence and are poised to revolutionize healthcare delivery (Yuan et al., 2021). Yuan et al., (2021) also asserts that, AI has the potential to improve patient outcomes and personalized care by providing more accurate insights into patient conditions.

In an econometric study, Sharma et al. (2016) investigated the impact of health information technology bundles on hospital performance, revealing that the development of patient portals contributes to the future of healthcare IS. Patient portals facilitate patients' access to their health information, allowing them to take a more active role in managing their healthcare (Sharma et al., 2016). The increased patient engagement fosters collaboration with healthcare providers and supports preventive care (Kruse & Beane, 2018). Alotaibi and Federico (2017), found that these emerging trends such as AI hold immense promise and raise ethical and privacy concerns. Therefore, Sharma et al. (2016) concluded that balancing innovation with ethical and privacy considerations is a critical challenge that must be addressed in the evolving landscape of healthcare information systems.

In conclusion, the use of information systems (IS) has had a big effect on the US healthcare industry, leading to many benefits, such as better care for patients, more efficient operations, lower costs, and fewer problems with data security and privacy (Abouelmehdi et al., 2018). Even with these benefits, some major problems need to be solved. Data security flaws, interoperability issues, reluctance to adopt new technology, a lack of funds, and regulatory compliance are some of the challenges that must be overcome (Thakkar & Gordon, 2019). The adoption of IS, the improvement of healthcare quality, and the protection of sensitive information have all benefited from government measures (Koonin et al., 2020). Prospects for the healthcare industry are bright thanks to innovations like telemedicine, AI, and patient portals that are expected to drastically alter the current model of healthcare provision in future (Alotaibi & Federico, 2017). However, it should be noted that this ever-changing setting calls for cautious thought about ethical and privacy problems (Thakkar & Gordon, 2019). An important barrier to

developing healthcare information systems in the United States is the capacity to successfully

manage the conflict between innovation and these concerns (Pesapane et al., 2018). Benefiting

both patients and healthcare providers, the continual development of IS offers the chance to

improve healthcare service delivery in terms of efficiency, security, and patient-centeredness.

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