

Assess the Preparedness for Artificial Intelligence (A.I.) Implementation in Private Hospitals in Melaka, Malaysia.

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ABSTRACT

The incorporation of A.I. in healthcare can improve patient care, optimize operations, and decrease expenses. This research seeks to evaluate the degree of A.I. deployment, ascertain the acceptance level of target elements influencing attitudes and patient involvement and experience, and analyze the obstacles and benefits experienced by healthcare professionals, specifically via the lens of the technology acceptance model. Data were gathered via semi-structured interviews with an administrator, a physician, and a nurse from different private hospitals in Melaka, with participants chosen based on their experience, job responsibilities, and expertise in the private hospital environment. The findings indicate an increasing interest in the implementation of A.I., especially in diagnostic imaging and patient management systems. Nonetheless, obstacles such as elevated implementation expenses impede extensive adoption. Notwithstanding this challenge, the study underscores the considerable potential of A.I. to revolutionize healthcare service in Melaka, contingent upon strategic investments and policy backing.

Keywords: Artificial Intelligence, Healthcare, Adoption, Technology Acceptance Model

INTRODUCTION

Artificial intelligence (AI) is a nascent technology that possesses the capacity to significantly transform human interactions and potentially reshape the planet. Artificial intelligence (AI) refers to the implementation of automated systems that utilize external data to accurately understand, learn from, and achieve certain objectives (Singh et al., 2020). Artificial intelligence (AI) has undergone a significant evolution over several decades, characterized by pivotal events and transformative advancements in research and development. Artificial intelligence (AI) is an extraordinary journey throughout the decades characterized by transformative advances and significant milestones. Beginning with Alan Turing's conceptual framework for the Turing Machine in the 1930s, neural network theory developed in subsequent decades, and the Turing Test was introduced in 1950, so establishing the initial foundations of artificial intelligence (Chaitin, 2013).

The progression of Artificial Intelligence (AI) in the medical field during the 21st century represents a significant and transformative era, marked by innovative technologies that have the potential to fundamentally alter healthcare delivery (Karnam Vanishya Krishna & K. Uma, 2023). The digitalization of medical records, along with the extensive availability of medical imaging and genomic data, has generated substantial datasets suitable for artificial intelligence systems.

The inadequate integration of AI's potential in healthcare presents considerable barriers to its implementation in private hospitals in Melaka, Malaysia. This lack of understanding may lead to delayed access to breakthrough diagnostic and treatment approaches for patients, since hospitals may hesitate to invest in modern technologies. This results in delayed diagnosis, inadequate treatment methods, and poorer patient outcomes. Moreover, the limited acceptance of artificial intelligence's capacity to enhance hospital operations may result in the perpetuation of obsolete methods, thus diminishing productivity and efficiency. Moreover, the inability to acknowledge the advantages of AI in data analysis, image recognition, and personalized medicine may result in lost chances to enhance the quality of patient treatment and results (Vladyka, 2023). Realizing AI's complete potential in transforming private hospital services in Malaysia hinges on addressing this discrepancy. Enhancing an efficient, productive, and patient-centered healthcare system relies on educating administrators and medical professionals about the applications of artificial intelligence.

Healthcare providers in Malaysia may have difficulties in resource allocation and the shift to AI-powered systems, especially in smaller healthcare facilities. Meticulous planning, strategic resource allocation, and prospective collaborations with AI vendors can alleviate these issues and facilitate a successful transition to AI-driven healthcare. The integration of AI in talent acquisition can enhance the efficiency and effectiveness of hiring processes (Md. Aftab Uddin, 2021).

The project would encompass the formulation and assessment of Adoption Strategies specifically designed for private hospitals in Melaka, Malaysia. This includes the development of training programs, pilot initiatives, and change management strategies to ensure a seamless and efficient integration of AI technologies.

This case study aims to deliver a detailed and thorough assessment of the preparedness for AI implementation in private medical hospitals in Melaka, Malaysia. By tackling complex problem statements related to infrastructure, clinical knowledge, regulatory compliance, and implementation strategies, it aims to provide significant insights into the emerging environment of AI in Malaysian healthcare.

LITERATURE REVIEW

Artificial intelligence (AI) is widely acknowledged as a pivotal technology for the future. The study indicates that artificial intelligence (AI) holds considerable potential for small and medium-sized firms (SMEs) in several sectors. The domains of logistics, procurement, and purchasing exhibit the most potential for the application of artificial intelligence technologies.

Nonetheless, there exists a considerable need for cloud-based AI services owing to the restricted access to expertise and data within small and medium-sized organizations (SMEs) to autonomously develop AI solutions (Ulrich & Frank, 2021). The application of artificial intelligence (AI) in healthcare systems has the potential to significantly transform the sector. There exists much interest over the application of AI in medical practice (Saw & Ng, 2022). Artificial intelligence (AI) has emerged as a disruptive technology with significant potential in the healthcare sector.

Attitude (A)

Attitude is a fundamental determinant of technology acceptance, since both positive and negative emotions influence perceptions of outcome quality, the ability to exhibit those outcomes, and the ease of technology use (Kacmar et al., 2009). The implementation of AI-enabled technologies in hospitals relies on trust (Lupton, 2018). However, individuals lacking familiarity with digital technology, especially AI, would encounter significant challenges in trusting an AI system. Attitude is consistently the predictor of behavioral intention and serves as the psychological metric to indicate favorable or unfavorable dispositions.

Individuals typically engage in particular actions based on their attitudes toward the behavior (Kharde & Madan, 2018). Consequently, individuals will adopt AI when they have favorable attitudes towards the technology. Previous research by Kharde and Madan (2018) identified a substantial correlation between attitude and behavioral intention. All of these endeavors are privately acquired to cultivate their own convictions. A positive belief significantly influences technology adoption.

Patient Engagement and Experience

Jelovac (2022) demonstrated that consumer involvement and experience are pivotal factors in technology adoption across diverse industries, identifying a correlation between technological adoption and affective commitment, as well as consumer citizenship behavior, which has the potential to enhance the retail sector and other industries.

Patient engagement in the medical treatment process is crucial for accurate disease diagnosis and the assurance of patient safety. Moreover, patients perceive their active participation in dialogues with healthcare professionals as a valuable and gratifying experience for their own advantage (Kolovos et al., 2016). Despite patients' limited familiarity with AI or AI-assisted medical systems, they are more likely to participate in the treatment process if educated through mainstream media or their healthcare provider regarding the potential advantages, including expedited and precise diagnoses, diminished medical errors, and lowered healthcare expenses.

Active patient involvement in the medical treatment process, encompassing collaborative decision-making and self-management, is essential for improving patient satisfaction and overall treatment results. Research underscores the significance of involving patients as collaborators in their care, integrating them into decision-making processes, and enabling them to manage their health effectively (Moroz et al., 2023). Boulding et al. (2011) discovered that patients who perceive a positive experience in their treatment involvement positively influence treatment outcomes and patient safety. Significant patient engagement can synchronize development with patient requirements, mitigate patient apprehensions about AI advancement, and cultivate lasting collaborative connections between healthcare providers and patients (Samira Adus et al., 2023).

Variable Measurement

To fulfill the research objectives of this study, a qualitative research approach (Lak et al., 2020) was employed, emphasizing the subjective views and experiences of interviewees to assess the readiness for Artificial Intelligence (A.I) adoption in private hospitals in Melaka, Malaysia. Qualitative research aims to comprehend the importance of human experiences and behaviors.

D. Turner et al. (2021) assert that qualitative researchers do not seek to test quantifiable hypotheses; rather, they concentrate on investigating particular occurrences defined by confusing research issues and intricate realities. In this domain, numerous concepts and theories are potentially validated on a provisional basis.

Maxwell (2008) asserts that qualitative research functions within the realm of meaning, attitudes, aspirations, and values, necessitating an exploration of profound manifestations of connections, interactions, and experiences that resist straightforward quantification and transformation into operational variables. Consequently, qualitative research focuses on attaining a deep comprehension and examination of the complexities of social relationships. Researchers analyze the gathered data from multiple perspectives to reveal possible answers for a complicated phenomenon, frequently following theoretically informed methodologies. Consequently, the qualitative research methodology is suitable for this study, as the researcher's interpretation of participants' experiences and viewpoints is crucial for providing insights on enhancing AI adoption in private hospitals.

Sample and Data

Comprehending the reasoning for candidate selection, the complexities of semi-structured interviews, and the impact of varied backgrounds is essential for effective interview processes (Quayle et al., 2023). This qualitative study includes three participants: a management-level individual, a nurse, and a consulting physician. The backgrounds of both the interviewer and interviewee significantly influence the dynamics of qualitative research interviews, affecting the depth and quality of the information obtained (Roulston, 2023). The chosen physician is the hospital's resident cardiologist, a specialist with comprehensive education, notably in artificial intelligence applications and selection. The selected nurse is a staff nurse with eight years of expertise in overseeing daily patient care and is instrumental in the integration of AI. The CEO, tasked with formulating policies and systems, was appointed at the management level. Researchers must evaluate sample criteria and ethical review processes

when selecting individuals for interviews to ensure the validity and reliability of the obtained data (Peters & Halcomb, 2015).

A Zoom interview with the consulting physician was held on May 11, 2024, concentrating on the research subject. An in-person interview with management occurred on May 15, 2024, followed by a final face-to-face interview with a nurse on May 16, 2024. Audio recordings and field notes were documented during each discussion. This individual relationship with all three participants facilitated a thorough examination and intricate insights.

The inclusion of these three individuals, with distinct job scopes, locations, data gathering methods, experiences, and educational backgrounds, offered a comprehensive and diversified variety of perspectives for the study.

RESULTS AND DISCUSSIONS

The integration of artificial intelligence (AI) in private hospitals signifies a substantial advancement in healthcare innovation. This transition presents several obstacles. This study examines the challenges and intricacies that private hospitals face in incorporating AI technologies into their operations. Interviews with participants revealed several characteristics that highlight the problems encountered by private hospitals about adoption from the viewpoints of management, physicians, and nurses. Figure 4.6 delineated the factors recognized as obstacles in the use of AI.

The infrastructure preparedness for AI implementation in private hospitals includes critical elements such as sophisticated computational resources, resilient data management systems, high-speed network connectivity, and rigorous cybersecurity measures. These features collectively constitute the foundation that underpins the deployment and integration of AI applications within clinical and administrative operations. In the interview session with three participants, five critical variables were identified that affect the status of IT infrastructure in private hospitals: data, digital transformation initiatives, robust storage security, IT systems, and management.

A notable positive correlation exists between the attitude towards AI adoption and its deployment in private hospitals in Melaka. A substantial positive correlation exists between Patient Engagement and Experience about AI deployment in the private hospital in Melaka.

Through the interview sessions with three participants, we found 75 references pertinent to the three research objectives. Three themes were discovered from the investigation, along with 25 codes to evaluate the preparedness for AI deployment in the private hospitals of Melaka. The implementation of AI in private hospitals has numerous advantages, including increased diagnostic precision, higher operational efficiency, and improved patient experience.

Adopting AI technology places private hospitals at the vanguard of medical innovation, guaranteeing the delivery of superior treatment in a progressively competitive healthcare environment. The introduction of AI in hospitals encounters numerous barriers; comprehending these obstacles is essential for formulating effective strategies that use AI's promise while minimizing risks and assuring successful integration in private healthcare environments. Ensuring the preparedness of IT infrastructure is essential for the successful use of AI in private hospitals. By investing in and enhancing these essential components, private hospitals may leverage the transformative capabilities of AI to better patient care, improve operational efficiency, and maintain competitiveness in the fast-developing healthcare environment.

CONCLUSIONS

This study seeks to assess the preparedness and implementation of AI in private hospitals in Melaka, Malaysia, concentrating on the prospective advantages and applications of AI in healthcare. The study used a qualitative methodology to identify principal hurdles and obstacles to AI adoption, while evaluating the existing infrastructure, technical proficiency, and data management capabilities within these hospitals.

The Technology Acceptance Model (TAM) proposed by Davis in 1989 provided the underlying framework for

this study. A conceptual model was developed to analyze the influence of attitude, regulatory compliance, data security, physician and staff acceptability, and patient involvement and experience on the effective use of AI in private hospitals. Thus, the fundamental rationale of these associations suggests that if technology is regarded as user-friendly and significantly advantageous, it will enhance the user's propensity to engage with the technology (Baroni et al., 2022).

Investing in employee training is essential for the seamless integration and acceptance of AI technologies. Implementing extensive training programs will enable workers to proficiently employ AI tools in their daily tasks. Furthermore, partnering with AI companies helps enhance integration and provide continuous assistance. Vendors may offer essential expertise and resources to assist hospitals in effectively integrating AI systems into their current infrastructure, hence optimizing the advantages of AI adoption.

Furthermore, the costs related to training represent a vital investment in enhancing the skills and knowledge of individuals. To successfully integrate AI into healthcare procedures, it is imperative that the staff acquire both the expertise to utilize these technologies effectively and the capability to maintain them. This entails structured training programs that impart crucial skills and knowledge, incurring costs for instructional materials, instructor remuneration, and potentially the use of simulation environments to augment practical learning experiences.

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