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FACTORS INFLUENCING AI IMPLEMENTATION DECISION IN INDIAN HEALTHCARE INDUSTRY: A QUALITATIVE INQUIRY

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Abstract. Recently, Artificial Intelligence has started showing up in the realm of health care innovations with researchers exploring its potential for healthcare organisations. Since healthcare possess industry specific features, the context and challenges of exploring AI adoption in healthcare is different than other industries. This study intends to conduct grounded theory to review the strategic, cultural, environmental and operational factors towards adoption of AI technology in Indian hospitals. The study uses purposive sampling to conduct semi-structured in-depth interviews of the decision makers of various healthcare organizations across the country. The present study would contribute to the existing literature on the impact of disruptive technology on healthcare as it would be a comprehensive study assessing the determinants of adoption in hospitals.

Keywords: Artificial Intelligence, Healthcare, Disruptive Technology

Introduction

Artificial intelligence (AI), the defining technology of 21st century, with its learning, reasoning and adaptation capabilities, has transformed industries worldwide [1]. Academic literature in AI domain has explored technology adoption across sectors like agriculture [2], architecture, engineering and construction [3], energy [4], smart cities [5], communications [6] and manufacturing [7]. Recently, AI has started capturing attention in the realm of health care innovations [8]. This is supported by an Accenture report, 2017 estimating a CAGR of 40 per cent in AI health market through 2021. Another study by [9] reckon AI health market will grow ten times during 2020-25.

Since healthcare possess industry specific features [10,11], the context and challenges of exploring AI adoption in healthcare is markedly different than other industries [12]. While assessing the technology adoption challenges in healthcare sector, [13] found issues pertaining to management, technology, security and legal aspects. Organisational planning and inter departmental integration [14], quality of patients' care [15], management support [16] and an assessment of financial and economic benefits [17] have been identified as few of the other challenges in AI adoption in healthcare.

Recent studies have examined the transformational impact of using AI technology in healthcare industry. AI technology has immense potential for healthcare organisations- improving service quality [18], efficiency and productivity [19]; effective resource management [20]; accelerating health responses [21]; automating clinical documentation and upgrading medical records management [22]; improving communication and coordination among users [23]; reducing errors [24] and costs [25]. At the country level, this would improve public health surveillance [26] and encourage targeted research and development. For a developing and world's second most populous country, India, currently undergoing a demographic, economic and epidemiological transition and imposing an increased pressure on existing healthcare infrastructure, such outcomes are much awaited.

Although extant literature highlights the positive impact of AI technology on healthcare, its benefits in Indian context are yet to be capitalized. Existing studies have focused on other segments of healthcare like

diagnostics, telemedicine, medical insurance, pharmaceuticals and medical equipment. To the best of our knowledge, there is no systematic study exploring the impact of AI applications on hospitals from an administrator's glance. While studying healthcare centres, though few studies have focused on the existing challenges and barriers to implementation, limited attention has been given to discuss the factors affecting the decision to adopt AI technology. The current study adopts a multi-dimensional approach towards adoption of AI technology in Indian hospitals.

Literature Review

Artificial intelligence (AI) is gradually changing business functions in various sectors particularly, healthcare [27]. In line with recent technological innovations, the role of Artificial intelligence (AI) and its incorporation with various applications such as IoT [28], robots [29], data mining [30] are discussed in various studies. According to [31], several empirical studies have been written on the role of AI in the last two decades in sectors such as IT, financial services, healthcare, etc. These studies focused mainly on the drivers for the AI adoption largely economic and technical drivers [32,33]. According to [34], an increase in productivity and innovation are the potential drivers of AI adoption. Similarly, [35] mentioned about the efficiency of AI enables a system in reducing costs related to human errors, equipment, and taking the decision and making accurate predictions at various points.

Although, these studies confirmed that AI brings revolution, but, many challenges lie ahead too [36,37]. To this end, few significant studies advanced their work by elaborating on the barriers of AI mainly technical and social aspects of implementation [38,39]. [40] confirmed that the availability of expertise human assistance and extensive infrastructure support are few main barriers due to the excessive cost associated with it. Another important barrier that is largely discussed is the serious social implications of AI adoption in the healthcare sector [41,42,43]. [44] confirmed that lack of knowledge, trust, and ignorance of stakeholders are a few main social barriers to the adoption. Also, increased job insecurity among doctors or nurses is largely discussed in this domain [45].

Another important social barrier is the emotional dependence of patients on hospitals staffs that are missing in non-human caregivers [46,47,48]. According to [49], the biggest challenge to the healthcare sector is the social acceptance of AI and robotics models among the staff and patients. Accuracy and effective monitoring of disease assessment by robots and AI models are few other social challenges discussed in previous studies [51]. Also, the privacy of data and health safety issues were stressed in a few significant healthcare studies [52]. Most importantly, behavioral change challenges have been emphasized in most of the studies [54].

There is a lack of reviews outside of the technical and social barriers in the literature [55]. Studies largely focused on technical aspects/barriers of the adoption [57]. But, pieces of evidence are available where the

effectiveness of new technologies have been challenged due to cultural biases and environmental issues despite their technical benefits are established [58,59]. Recently, [60] used discussed various organizational, managerial, operational, strategic aspects for the successful implementation of AI in the healthcare sector.

Based on the findings of a systematic literature review done by [61], there is a need to increase the understanding of strategic, cultural, political, environmental implications and challenges when selecting AI and other disruptive technologies for the healthcare sector. Technical, cost, and social barriers are given high significance in the academic literature [62]. But, a few studies also indicated the impact of AI on management and environment by including variables like job insecurity, safety, errors, trust and dependence [63,64]. Taking in a clue, the present study is a pioneer in its attempt to suggest a comprehensive model by including strategic, cultural, environmental, and operational challenges to the AI adoption in hospitals.

Research Method

In order to have first-hand understanding of the challenges, possibilities and expectations of the various stakeholders regarding the introduction of AI in their organization, we intend to conduct grounded theory by conducting semi-structured in-depth interviews of the decision makers of various healthcare organizations across the country. The interviews will be audio recorded or video recorded. The recorded interviews will

be converted into transcripts (textual data). We intend to use NVivo software to analyze the data in order to generate primary codes followed by axial coding which further leads to themes which helps us create a thematic model.

In addition, we also intend to carry out an “external audit” in which a separate coding is done by an external subject matter expert (SME) to verify that findings of the study are impartial and free from the bias and prejudice of the researchers. To achieve that we will conduct inter-rater reliability test and mention the kappa coefficient which offers the degree of commonality between the study scholars’ codes and themes and that of the codes and themes of the external SME. The findings of the study are then discussed and elaborated further by the existing literature.

Probable Outcomes

A thorough review of strategic, cultural, environmental and operational factors would contribute in identifying the factors influencing the decision to adopt AI technology in Indian hospitals. Strategic factors like the level of competition between players in industry and an overview of cost components in respective healthcare centre along with an understanding of leader’s education and level of exposure would contribute in developing this understanding. Other dimensions like a scanning of external environment in terms of government support, human resource availability and the level of technological advancement coupled with operational factors like addressing interoperability and scalability challenges and reviewing customer support would help in addressing the research questions. Further, the efficacy of AI technology in hospitals in

terms of data standardization and integration in clinical workflows, patient safety, cyber security and return on capital employed would create a ground work for implementing AI in hospitals.

Probable Implications

The present study offers few implications. First, the study helps to identify crucial factors for the successful implementation of AI in hospitals. Project managers and administrators in the health domain should review these contexts while using AI for their administrative and medical purpose. Hospital management should understand the role and significant of AI to fulfil the missing of the firm and gain competitive edge in the society. The study is beneficial as it assesses hospital administrators' views about AI technology and their preparation for the adoption in the long run. The study also indicates drivers and barriers of AI adoption in hospitals. Understanding of these variables is crucial from management perspective as AI adoption considered as a capital expenditure which involves huge cost and commitment by the stakeholders.

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