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Decision-Making Using AI and Business Performance in Healthcare Organisations: A Gap Analysis of the Use of Business Analytics

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Abstract: *The use of Artificial Intelligence (AI) along with data driven technologies in health care is becoming increasingly significant in decision making, operations and organisational performance. This research will look at 5 different studies that have been chosen that focus on AI-supported hospital management, AI adoption, using data driven technology for decision making, operational efficiency and Business Analytics capabilities within Electronic Medical Records. The literature found shows that AI may improve information, analytical, operational and managerial functions. Business Analytics capabilities such as data aggregation, analysis and interpretation can also help with decision making. Though each study looked at different variables, contexts and outcomes meaning there is still some missing understanding. There was a gap in the research identified when looking at the relationships between AI Adoption, Business Analytics Capabilities, Decision-Making Effectiveness and Healthcare Organisational Performance. Previous studies have generally looked at each factor individually and there is little evidence to understand if Business Analytics Capabilities is a mediating variable that helps increase decision making effectiveness by increasing AI Adoption. A framework has been proposed that will link these 4 factors together. By addressing this gap it can give a better understanding of how AI can create value for organisations and help with improving healthcare management.*

Key Words: *Artificial Intelligence (AI), AI Adoption, Business Analytics Capabilities, Decision-Making Effectiveness, Healthcare Management, Organizational Performance, Data-Driven Decision-Making, Operational Efficiency, Healthcare Organizations.*

1. INTRODUCTION:

Artificial Intelligence (AI) and Business Analytics are becoming more important within healthcare. The large amount of information generated by healthcare organizations through their electronic medical records and hospital management systems can be used to improve performance, operation and decision making within healthcare. Using AI can help healthcare organizations make appropriate decisions by using the information. Business Analytics can also be used to transform the data into information. Using both AI and Business Analytics can improve decision making and operation, however it is important to ensure the AI capabilities are used correctly to create analysable data and make effective decisions.

Many researchers have looked at different areas of using AI to improve decision making within healthcare. Researchers have shown that AI can be used to create decision support systems within hospital administration. They have shown that there is a relationship between AI and hospital performance. They have also looked at the role of data in decision making within healthcare. They have shown that AI can help improve operation within healthcare and Business Analytics capabilities can help make effective decisions. However these studies do not have one theme and do not look at how AI

can improve Business Analytics capabilities, how Business Analytics capabilities can improve decision making effectiveness and whether effective decisions can improve healthcare organizational performance.
These issues are very important to close the research gap and provide theory and concepts to base further research around. This research gap has been analysed looking at 5 studies to show where the current research lacks. This will allow this study to help future research to understand how AI enabled Business Analytics capabilities can improve decision making effectiveness and organizational performance. This paper will look at the relationship between AI Adoption and Business Analytics Capabilities, how Business Analytics Capabilities can improve Decision-Making Effectiveness and how Decision-Making Effectiveness can improve Healthcare Organizational Performance.

2. CRITICAL REVIEW OF RESEARCH ARTICLES:

2.1 Article 1

2.1.1 Title

“Alves, Maurício, Joana Seringa, Tatiana Silvestre and Teresa Magalhães." "Use of Artificial Intelligence Tools in Supporting Decision-Making, in Hospital Management." (2024) BMC Health Services Research, volume 24(1282) 10.1186/s12913-024-11602-y.

2.1.2 Purpose

The aim of the study is to assess the current state of the art of decision-making in hospital management, explore the possible contribution of Artificial Intelligence, and identify hospital managers’ perceptions of using AI technology as a decision-support tool. The study also aims to determine the influencing factors and obstacles to implementing AI in hospital management decision-making processes.

2.1.3 Abstract

The research has explored the role of Artificial Intelligence (AI) in decision-making of hospital management. The qualitative and exploratory study has utilized a semi-structured interview method with 15 hospital managers from various departments and healthcare organizations as participants. The article revealed some barriers to the decision-making process in hospital management, including lack of communication, the issue of data silos, isolated decision-making, and inadequate information access.
The research has demonstrated the potential ability of AI to address such issues, increasing information access, analytical capacity, operational efficiency, and resource optimization in hospital management. The study has also identified the primary limitations and barriers to implementing AI-driven decision-making in hospital management, including data privacy, ethical issues, the lack of technical competence, organizational resistance to change, and the need for human expertise. Thus, the article has concluded with the consideration of the critical factors for the effective adoption of AI technology in various healthcare institutions. The keywords for this article are Artificial Intelligence, Hospital Management, Decision-Making, Healthcare Analytics, Data-Driven Decision-Making, Operational Efficiency, Resource Allocation, AI Adoption, and Data Privacy.

2.1.4 Assertion

The paper claims that AI may be implemented as an important decision-making support system in hospital management. AI was considered to provide timely information to managers, automate repetitive tasks, enable predictive analysis, and help in resource and managerial organization.
Meanwhile, the study highlights that AI should be used as an assistant to human decision-making processes. Managerial experience and knowledge, contextual and interpersonal factors, and ethical considerations, should be taken into account in healthcare decision-making.

2.1.5 Coverage

The paper includes an analysis of the current practices in the field, including the ways hospital managers use excel spreadsheets or business intelligence systems. The authors also identify the key issues connected with the topic, such as isolated information systems, a lack of access to data, varying levels of technical proficiency, communication barriers, and time spent on data entry and management.
The article also underlines the postulated outcomes of the technology application in the setting, including artificial intelligence’s role in predictive analytics, resource allocation, information management, operational management, and strategic analysis. Finally, the managers also raise such questions as organizational change, governance, rules, and regulations, workforce retraining, and the technology’s impact on the criticality of the human factor in healthcare management.

2.1.6 Conclusion

The study proves that AI has the capacity to improve decision-supportive systems in hospital management and create opportunities to make the process more efficient, accessible, and analytical. It can also help in shortening the time spent on data-related responsibilities by managers and enhance their analytical skills. Nevertheless, there is a need for

functional data infrastructure, technical expertise, training, and other factors for successful AI implementation. In general, the research suggests that AI use can be beneficial for hospital management but only as an addition to human expertise and not as a substitute.

2.1.7 Research Gap

The study provides extensive qualitative information on the perceptions, experiences, and expectations about AI-assisted decision-making of hospital managers. However, as the study is exploratory, being based on a qualitative analysis of the views of 15 managers, it cannot demonstrate how the use of AI impacts the actual decision-making processes and performance of the organization.

The study elaborates on the use of Business Intelligence as part of the current practices of management but does not operationalize Business Analytics capability as a mechanism by which AI adoption affects decision-making. Similarly, while the study discusses decision-making, it does not establish a link between decision-making and organizational performance.

Thus, there is a research opportunity to quantify the impact of AI adoption on Business Analytics capabilities and their subsequent effect on decision-making effectiveness and healthcare organizations' performance.

2.2 Article 2

2.2.1.Title

"Pham, Phuoc, Huilan Zhang, Wenlian Gao, Xiaowei Zhu.", "Determinants and Performance Outcomes of Artificial Intelligence Adoption: Evidence from U.S. Hospitals.", (2024), Journal of Business Research, Vol 172 (114402), 10.1016/j.jbusres.2023.114402.

2.2.2Purpose

The paper conducts a study to determine factors that influence hospitals in adopting Artificial Intelligence and the effects of such adoptions on performance. The paper will specifically examine whether hospitals that adopt AI improve their performance.

2.2.3 Abstract

The purpose of the paper is to investigate determinants of Artificial Intelligence (AI) adoption in the U.S. hospitals and analyze the effect of such technology on the studied organizations' performance. The data collected from the study include 1882 hospital-years, of which 941 are identified as AI-hospital years and 941 are non-AI-hospital years, which were used to analyze the impact of AI application on hospitals. The present research provides a detailed analysis of the effect of AI on the hospitals' performance based upon the information collected. It reports that the organizations which have higher market share tend to be more inclined to adopt AI technologies. The application of AI results in an increase in total outpatient revenue, total inpatient revenue, productivity, and occupancy rate, which means that the studied technology is beneficial for hospital performance. The data also include the analysis of the impact of endogeneity on the results of the study to ensure the accuracy of conclusions and the validity of their results. Thus, the information provided by the research is sufficient to prove the positive effect of AI on different aspects of hospital performance, which contributes to the efficiency of business analytics in the healthcare environment.

Keywords: Artificial Intelligence, AI Adoption, Hospital Management, Business Analytics, Organizational Performance, Healthcare Efficiency, Productivity, Financial Performance, Data-Driven Decision-Making.

2.2.4 Assertion

The paper claims that the use of AI will lead to improved performance of hospitals in terms of both operational and financial outcomes. The results suggest that hospitals are not equally likely to adopt AI; moreover, their market position plays an important role in such decisions.

Furthermore, the article claims that performance benefits linked to the adoption of AI should be examined more carefully since hospitals which decide to work with AI technologies are not randomly distributed; thus, there is a need to account for endogeneity issues when discussing causal relationships between AI adoption and overall performance outcomes of hospitals.

2.2.5 Coverage

The research explores two main topics related to the adoption and performance of artificial intelligence (AI). The article analyzes the factors that determine AI adoption and the effects of AI usage on the hospitals' performance. The study utilizes the data collected from the United States hospitals in order to observe the correlation between AI adoption and such variables as total outpatient revenue, total inpatient revenue, productivity, and occupancy. The research incorporates the Organizational Information Processing Theory in its analysis of AI adoption determinants. Additionally, the article addresses the methodological issue of endogeneity in the context of causal relationship between the adoption of technology and hospital performance.

2.2.6 Conclusion

The study concluded that adopting artificial intelligence (AI) has a positive impact on hospitals' financial and operational performance. The research revealed that hospitals that have a higher market share tend to be more inclined to adopt AI. Furthermore, the hospitals that decided to implement AI technology could benefit from using it to improve their performance in several areas.

The study also concluded that when evaluating the relationship between adopting AI and hospitals' performance, one needs to consider the potential endogeneity problem. In general, the research provided evidence that implementing AI could have a positive impact on the performance of hospitals, as well as identifying organizational characteristics that are associated with the decision to adopt AI.

2.2.7 Research Gap

The study establishes a link between the adoption of AI and hospital performance. However, the study mainly focuses on the mechanism that directly connects the adoption to performance. The study does not explore the mediating processes that adoption initiates and through which performance is realized. Specifically, the study does not establish if Business Analytics capabilities moderate the utilization of information generated by AI or if the adoption of AI improves decision-making effectiveness before overall organizational performance is affected.

The study can be extended by exploring the mediation mechanism that constructs the relationship between AI adoption and performance. An example of such an analysis is examining the relationship as follows: AI adoption → Business Analytics capabilities → Decision-making effectiveness → Healthcare organizational performance. This way, the study can elaborate on how AI adoption improves performance in detail rather than establishing a direct relationship between the two concepts.

2.3 Article 3

2.3.1 Title

"Basile, Luigi Jesus, Nunzia Carbonara, Umberto Panniello, and Roberta Pellegrino." "The Exploitation of Data to Support Decision-Making in Healthcare: A Systematic Literature Review and Future Research Directions." (2025), Management Review Quarterly, Vol 76(2), 1073–1105, 10.1007/s11301-024-00482-5.

2.3.2 Purpose

The purpose of this study is to examine the nature of the exploitation of data for the decision-making process in healthcare organizations, which are influenced by risk and uncertainty. The study will focus on three healthcare organizational areas, including structure, process, and outcome. Besides, this study will highlight the research and practice gaps and provide recommendations for future research.

2.3.3 Abstract

The presented study evaluates the role of data in supporting the decision-making process in healthcare. Information technologies enable managers to make the most advantageous choices and reduce risks, which is especially important in the healthcare sphere due to the high risks involved. The authors analyze the collected literature data to assess the connection between decision-making and such variables as healthcare, medical data, and risk management. The researchers applied the PRISMA framework to conduct the study. The articles found in Scopus, Web of Science, and PubMed databases were screened and subjected to inclusion-exclusion criteria. As a result, 152 articles were included in the final analysis. The findings indicate that data utilization for supporting the decision-making process is common in the healthcare sphere. Nevertheless, the interrelations between the analyzed variables were poorly studied. The researchers conclude by identifying gaps in the existing research and providing propositions for further studies in the field.

Keywords: Healthcare Management, Data Analytics, Decision-Making, Risk Management, Systematic Literature Review, PRISMA, Data-Driven Decision-Making, Healthcare Organizations, Research Gaps.

2.3.4 Assertion

The paper claims that the growing amount of healthcare data can create opportunities for improving decision-making in circumstances where organizations face risks and threats. The information environment can help decision-makers to shape their approaches, manage situations, and resolve issues.

The authors highlight that having access to great amounts of data is not enough for supporting the effective choice of an organization. There is a need to learn how to understand the interplay between data, decision-making, and risk management processes.

2.3.5 Coverage

The review includes the articles dedicated to the use of data for healthcare decision-making under risk and uncertainty. The authors grouped the papers according to health care organizational structure, process, and outcome, and risk management phases.

The study involves both quantitative and qualitative research since it is based on the systematic review of the literature. The papers that were excluded included the ones focused on the development and testing of the algorithms instead of the use of data for organizational decision-making.

2.3.6 Conclusion

The authors conclude that data is increasingly utilized to facilitate healthcare decision-making, particularly during instances of risk and uncertainty. Nevertheless, the existing literature does not offer a comprehensive comprehension of the interconnection between data, decision-making, and risk.

The study recommends that the gaps identified might inform future research on the aforementioned issues of data utilization to support decision-makers in the healthcare sector. The authors propose that the framework established in the review could serve as a springboard for researchers to expand their investigations into the relationship between data utilization, decision-making, and risk.

2.3.7 Research Gap

The paper identifies a research gap in understanding the interrelationships between data, decision-making, and the risk management component in healthcare organizations. Although the literature review highlights that data are used as a basis for decision-making, there is a deficiency in research on this matter.

In relation to the proposed research, the source does not concentrate on developing and empirically testing a model linking AI adoption, Business Analytics capabilities, decision-making effectiveness, and organizational performance but focuses on a broader concept of decision-making and risk management.

Therefore, the further research can build on the findings of the article by exploring how these factors affect each other to build a successful healthcare organization.

2.4 Article 4

2.4.1 Title

"Rakesh kumar, Ajay Singh, Ahmed Subahi Ahmed Kassar, Mohammed Ismail Humaida, Sudhanshu Joshi, and Manu Sharma.","Impact of an Artificial Intelligence-Driven Operational Management System on Operational Efficiency in Health Care Organization in Saudi Arabia: A Mediating Role of Staff Attitude.", (2025), Frontiers in Public Health , Vol 13 (1558644),10.3389/fpubh.2025.1558644.

2.4.2 Purpose

The paper aims to assess the effect of the AI-based operational management system (OMS) on the healthcare organizations' efficiency in the context of Saudi Arabia. The paper also tries to establish if staff attitudes act as a mediator between the implementation of an AI-based OMS and its efficiency in the selected healthcare organizations. The Theory of Planned Behavior is used to evaluate the perception of healthcare professionals about the use of AI-based operational systems.

2.4.3 Abstract

The paper focuses on the relationship between operational efficiency and the application of artificial intelligence (AI) operational management systems in healthcare facilities in Saudi Arabia. The research method used in the paper is a quantitative cross-sectional survey design conducted among 287 healthcare workers in various hospitals. The samples were collected using a survey questionnaire, and the data analysis was done using Partial Least Stratified Structural Equation Modeling (PLS-SEM). The paper's results indicate that AI operational management systems have a positive influence on process performance while also having an intervening effect on staff attitudes towards these systems. Overall, the study shows the need to consider both factors in order to achieve better performance in the healthcare sector. The keywords that could be associated with this study are AI, operational efficiency, healthcare, staff attitude, AI operational management system, and PLS-SEM.

2.4.4 Assertion

The paper claims that implementing AI-based operational management systems can improve healthcare operations' efficiency. Such systems can make processes more unified, data more accurate, and activities more informed.

The authors add that attitudes of employees towards AI are important for its efficient implementation. Optimistic attitudes on the job can amplify the benefits of using such technology; thus, the factor should be considered by hospitals and other health care facilities.

2.4.5 Coverage

The paper focuses on healthcare organizations operating in the Kingdom of Saudi Arabia. It investigates the correlation between three key elements related to operations management, namely AI-based operational management systems, staff attitudes, and operational efficiency. In this regard, the paper focuses on healthcare professionals' perceptions of the impact of AI-based OMS on operational efficiency as opposed to the purely technical assessment of such systems.

In terms of methodology, the paper employs a quantitative cross-sectional design. The study utilizes the PLS-SEM technique to test the theoretical model. Specifically, the study explores four theoretical models, namely the direct effect of AI-based OMS on operational efficiency, effect of such systems on staff attitudes, the effect of the latter on operational efficiency, and the mediating effect of staff attitudes.

2.4.6 Conclusion

The study suggests that AI-enabled systems have a positive impact on operational management systems in different healthcare sectors. The research also proves that AI can improve staff attitudes toward working in the organization and show that improved attitudes lead to higher levels of operational efficiency.

The mediation analysis conducted by the researchers proves that changes in employee attitudes partially explain the relationship between AI-based OMS and operational efficiency. The authors conclude that healthcare leaders must pay attention to technology and employees' perceptions when implementing AI-based systems.

2.4.7 Research Gap

The study provides quantitative evidence which associates operational management systems driven by artificial intelligence to operational effectiveness, while also identifying staff attitude as a mediating determinant. However, the model explored primarily focuses on operational effectiveness and employee attitudes, and does not assess the role of Business Analytics capabilities in the relationship between AI and performance.

The study does not specifically test if AI-supported analytics improve the effectiveness of managerial decision-making prior to demonstrating organizational performance outcomes. The mechanism by which AI-generated data and analytical capabilities are transformed into effective managerial decisions is insufficiently examined.

This presents an opportunity for further research to be done which could explore whether Business Analytics capabilities and decision-making effectiveness provide additional explanatory mechanisms between AI adoption and broader healthcare organizational performance.

2.5 Article 5

2.5.1 Title

"Liew, Ewilly Jie Ying, Andrei O. J. Kwok, Sharon G. M. Koh, Shairil R. Ruslan, M. Shahnaz Hasan, and Yeh Han Poh.","" Examining Doctors' Business Analytics Capabilities in using the Electronic Medical Record System for Decision- Making Effectiveness in Intensive Care Units: Impact of the COVID-19 Pandemic", (2025), PLOS ONE, Vol 20(7) (e0317954),10.1371/journal.pone.0317954.

2.5.2 Purpose

The paper aims to investigate how doctors' perception of EMR influences their Business Analytic Competencies and how these competencies impact their decision-making process in Intensive Care Units. The study also attempts to explore if these processes experienced any changes during the COVID-19 pandemic.

2.5.3 Abstract

The present study analyzes the role of Business Analytics capabilities within Electronic Medical Record (EMR) systems to improve healthcare decision-making. The focus was placed on three core competencies, which are data aggregation, data analysis, and interpretation. Data were collected from 130 physicians employed at public tertiary hospitals in Malaysia. The obtained results were analyzed using Partial Least Squares Structural Equation Modeling.

The results of the research demonstrate that physicians' EMR-related perceptions affect their Business Analytics capabilities. Moreover, the capability of data analysis plays a significant role in the process of decision-making during the COVID-19 pandemic. The study also confirms the tendency for healthcare professionals to rely more on technologies related to EMR systems during the pandemic and the critical role of analytics in modern healthcare management.

Keywords: Business Analytics, Electronic Medical Records, Healthcare Decision-Making, Data Analysis, Artificial Intelligence, COVID-19, Healthcare Management, Decision-Making Effectiveness.

2.5.4 Assertion

The paper claims that for effective use of EMR systems healthcare professionals need to have adequate Business Analytics competencies. Having access to an electronic healthcare system is not enough – doctors need to know how to engage with it, analyze and understand healthcare data. The research also notes the importance of technology perceptions in shaping these competencies, as positive EMR perceptions may lead to increased use of analytics and more effective decision-making.

2.5.5 Coverage

The study addresses doctors' utilization of EMR systems, technology perceptions, Business Analytics capabilities, and decision-making effectiveness in the context of intensive care units. Business Analytics capabilities include data aggregation, data analysis, and data interpretation.

The study focuses on doctors working in public tertiary hospitals in Malaysia and explores doctors' experiences before and during the COVID-19 pandemic. The study applies PLS-SEM to investigate technology perceptions, Business Analytics capabilities, and decision-making effectiveness.

2.5.6 Conclusion

The study concluded that the COVID-19 pandemic emphasized the importance of EMR and Business Analytics capabilities for healthcare decision-making. Physicians became more reliant on digital tools and understood the importance of analytical capabilities in navigating through health data.

In particular, data analysis was found to be significantly associated with decision-making effectiveness during the pandemic. The study recommends that healthcare organizations focus more on analytical capabilities and invest in digital healthcare solutions to get the most out of their data.

2.5.7 Research Gap

The study establishes a relationship between Business Analytics capabilities and decision-making effectiveness, but its focus is mainly on individual doctors using EMR systems in intensive care units.

This study does not consider AI adoption as a factor contributing to the emergence of Business Analytics capabilities. The study does not go as far as organizational-level outcome variables such as healthcare organizational performance.

Thus, future studies could further explore whether AI adoption enhances Business Analytics capabilities, whether enhanced Business Analytics capabilities promote decision-making effectiveness, and finally, whether improved decision-making effectiveness contributes to achieving organizational performance in healthcare organizations.

3. GAP ANALYSIS:

By analysing the 5 studies, it can be seen that the use of artificial intelligence, business analytics and data driven technologies/systems are becoming more popular to help manage and improve healthcare. The studies looked at the impact of using artificial intelligence, effectiveness of decision making, performance and how data is used. It also showed how business analytics capabilities can help improve decision making. However, the studies mainly focused on the individual aspects rather than combining them.

The first study looked at how AI can be used as a decision support tool within healthcare management. The study looked at how AI can benefit hospital managers but did not look at how much AI can impact hospital performance. The second study shows how adopting AI can lead to increased performance, however the study only looked on how AI can be used to increase performance.

The third study recognised the importance of using data to make decisions but also found that there was no understanding of how data can impact decision making and risk management. It did show areas that could be further researched but did not look at how adopting AI can lead to business analytics capabilities, therefore impacting decision making and organisational performance. The fourth study showed how using AI to manage operations can improve performance. It also showed how employee attitudes were a significant predictor of this link. However it did not look at how business analytics capabilities and decision making effectiveness can act as a mediator.

Finally, the fifth study showed how business analytics capabilities such as data analysis can improve decision making effectiveness of doctors using the electronic medical records. However, it only focused on individual (doctors) and organisational level (ICU). It did not look at how business analytics capabilities can be impacted by adopting AI, nor did it look at how decision making effectiveness can act as a predictor.

Overall, the research gap identified from the literature review was that there was little research looking at how AI Adoption can impact Business Analytics Capabilities which can then impact Decision Making Effectiveness and Healthcare Organisational Performance. There is little empirical research looking at how AI Adoption can impact Business Analytics Capabilities and how this can impact decision making effectiveness and organisational performance. This research can help identify the relationship that:

AI Adoption → Business Analytics Capabilities → Decision Making Effectiveness → Healthcare Organisational Performance

This would be useful for healthcare organisations to know how much AI, analytics and improved decision making can impact their performance. It will provide them with useful insights as to what they should focus on to gain benefits from analytics technologies.

4. CONCLUSION:

The five studies identified indicate that AI technologies, data analytics and digital health technologies are likely to have an increased role in healthcare decisions and management. Evidence was provided to show how they can be used in many ways to help in decision making, information processing, management and operations to achieve positive

outcomes. However this depends upon the data available, level of data analytics, technical skills, knowledge, willingness and infrastructure within the organisation.

Each article highlights how AI can be used as a decision making tool within hospitals (study 1). There was quantitative evidence to show how using AI can influence hospital performance (study 2). The article also shows how data analytics are becoming increasingly important in decision making, however there is more to understand about how decision making can be influenced by data analytics (article 3). Evidence was provided to show how having an operations management system based on AI can influence employee attitudes and operations (study 4). The fifth article shows how Business Analytics capabilities can be relevant in improving decision making effectiveness.

Whilst there is evidence to suggest how AI and data analytics can influence healthcare, each article focuses on different parts of the research problem. There is not much evidence within the literature to understand how using AI technologies, Business Analytics capabilities can lead to improvements in decision making effectiveness. There was not enough explanation as to how Business Analytics capabilities can act as a mediator between AI information and management decision making and how improved decision making will lead to improvements in organisational performance.

The main gap in the research would be the lack of empirical research to understand how AI and data analytics can lead to improvements in decision making effectiveness when adopted by healthcare organisations. This study can help to understand how AI can influence decision making by looking at how AI can create value via improvements in analytics and decision making. The study can also provide implications to give healthcare managers insight into how they can gain the skills and capabilities to make the most of AI and Business Analytics technologies.

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