ARTIFICIAL INTELLEGENCE AND ITS NEED IN HEALTHCARE

by

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Abstract

Artificial intelligence (AI) has bombarded many of the global industries with promises to improve day-to-day operations, while augmenting decision-making and providing simplistic solutions. The healthcare industry has begun to observe the uptick in AI as well, with challenges of quality, costs, and access historically actualized; leaving healthcare leaders with decisions to make about adopting AI into their facilities. With the dynamic provisions that AI is driving in industry, there is still not a holistic adoption due to many fears and unknowns. A pulse into the minds of healthcare leaders is needed to understand the relationship between AI and healthcare.

Key words: Artificial intelligence, AI, quality, access, costs, healthcare

Dedication

To my family, this research paper is sincerely dedicated to you all. Words cannot express how much inspiration and support that I have received. To my wife Erika, who continues to demonstrate an unwavering belief and support in me—you are truly the love of my life. My Dad and Mom, dedicating this to you both whom I strive to continue to make proud every day. And lastly, my children, you are the best children a father could ever dream of. I could not have done anything without you all. Much love!

Acknowledgments

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Section 1: Foundation of the Study

There are challenges in every industry. Healthcare is not exempt—especially when the industry maintains a massive gross domestic product. Healthcare providers are challenged with many dilemmas, more specifically, efficiency issues that decrease quality of care, increased access times, and rising costs. These issues drive healthcare leadership teams to find solutions and within these challenging times of a worldwide pandemic, healthcare providers are subject to healthcare risks without impacting the goals of improving healthcare—as a whole. Artificial intelligence (AI) has encroached into the healthcare industry and healthcare facilities are exploring ways to incorporate AI into their facilities. However, there are many reasons that healthcare facilities do not deploy AI into their practices. Underlining the need to utilize AI in healthcare is critical to offset the efficiency challenges that healthcare providers experience. Furthermore, demonstrating the impact the AI offers to healthcare facilities can solve many of the healthcare dilemmas—mainly efficiency.

Needing to dive deeper into the reasons behind the lack of adoption into healthcare, research was conducted to peak into the healthcare leaders' mind within Texas and tease out their perspectives around AI and healthcare. With the conglomerate of leaders that were interviewed, there were many themes that were observed. Three segments of the Texas healthcare system were targeted: Academic, Trauma, and Rural hospitals. These segments provided a highly valued viewpoint into AI and healthcare. Furthermore, there were others within the Texas healthcare market that completed a survey to deliver their assessment as well. The healthcare leaders spoke about their experiences, or lack thereof, around utilization and/or understanding of AI in healthcare; providing a clearer appreciation as to how is AI viewed within healthcare and why it is not holistically adopted within the industry.

Background of the Problem

Healthcare and its challenges are remarked upon by Kissick (1994) referenced the "iron triangle"—where the three central dilemmas (i.e., cost, quality, and access) are acknowledged. Kissick (1994) explained that these three components possess equal values and represent identical priorities and an expansion of any of the dilemmas comprise one or both components. In an ideal healthcare world, there would be equal balance between these components; although tensions exist by increasing costs, lack of access, and lowering quality (Niles, 2015). Neill (2013) remarked on the efficacy of AI in early detection of cancers, heart disease, and defects, providing predictive models for alerting physicians, stratifying risks, and hospital stays. Considering AI and machine learning (ML) outcomes, the effective assistance of diagnosis and treatment suggestions; especially in the potential stroke patients—where time and patient management is central to a patient's long-standing medical outcomes, AI and ML's ability to predict, diagnose, and treat improves the quality of care (Jiang et al., 2017). Whereas Jha (2016) and Topol (2016) discussed AI and its capabilities in radiology to screen the population faster and lower cost. Furthermore, Vermeulen et al. (2009) validated the usage of AI in the patient scheduling space (i.e., where bottlenecking can occur, increasing access times) by optimizing solutions and properly allocating urgent and non-emergent patients; demonstrating an improvement in efficiency in access. Lastly, with the existence of medical errors due to cognitive factors, healthcare costs are rising (malpractice, diagnostic repeats/redundancy, etc.). AI can reduce disparities and discrepancies that are observed in healthcare and augment service lines such as radiology and cardiology, where early cardiac detection can reduce extended hospital admissions and length of stays (Dilsizian & Siegel, 2014). The utilization of AI has proven to

lead in the improvement in efficiency within healthcare and AI has impacted healthcare within the quality, access, and cost spaces; offering the opportunity for stakeholders to observe value.

Problem Statement

The general problem to be addressed is the failure of utilizing artificial intelligence (AI) and its impact leading to the lack of efficiency in the healthcare system. According to Noorbakhsh-Sabet et al. (2019) the implementation of AI in healthcare can transform the delivery of healthcare by providing a better, more defined clinical decision support system. While literature supports the needs of implementing AI to deliver a transformative delivery of healthcare to the consumers and providers, there is still a holistic failure to adopt AI. The many buckets where efficiency concerns exist are observed by higher healthcare cost, increased patient access times, and reduced quality of care. There are attempts to improve healthcare, utilizing AI in these buckets as observed within electronic healthcare records (EHR) and other data-capturing components where efficiency issues and inaccuracies exist. However, there are facilities that do not support AI and its utilization within the healthcare industry. Davenport and Kalakota (2019) remarked that consumer engagement is one of the major hurdles that facilities are experiencing, in terms of the utilization of AI as they may not identify the impact nor appreciate the value that AI delivers; ultimately leading to a lack of adoption within healthcare facilities. As efficiency concerns loom within the industry, specifically concerning the dilemmas surrounding cost, quality, and access, a solution is needed. The specific problem to be addressed is the potential failure to adopt and utilize AI resulting in the lack of efficiency within Texas healthcare facilities.

Research Questions

The improvement of healthcare and the utilization of AI is critical in solving the problem statement—especially in regions where AI is not deployed. Wahl et al. (2018) discussed some of the issues that are observed in poor, lower socioeconomical regions. When AI is deployed, the delivery of healthcare is appreciated, especially where face-to-face encounters cannot take place. Understanding the impact of AI and the localities of utilizations versus where AI is will provide clarity regarding the need for AI in healthcare and its environment. Identifying facilities in Texas where AI is being deployed and utilized, while understanding the role that AI has delivered to the facility and how the impact on stakeholders will provide an experiential lens; demonstrating the impact the AI will afford to healthcare. Multiple stakeholders offered their experience with AI and how it has altered their decision-making in the cost and delivery spectrums of healthcare.

Research Question 1 (RQ1): How do healthcare facilities fail to utilize AI?

Research Question 2 (RQ2): How can AI impact efficiency in the healthcare industry?

Research Question 3 (RQ3): How has AI improved healthcare in comparison to departments that have not utilized AI?

Research Question 4 (RQ4): What role does AI play in improving the delivery of healthcare?

Purpose Statement

The purpose of this qualitative multiple case study using flexible design was to expound on the impact of AI within Texas healthcare facilities and describe the failure of utilizing AI, outcomes resulting in the facilities where AI is not utilized and the impact that AI has upon the decision makers within healthcare. Key decision makers within the Texas healthcare facilities are faced with efficiency challenges: cost, quality, and access. These challenges were explored

through a comprehensive study that will reveal the impact that AI delivers to Texas healthcare facilities.

Nature of the Study

Discussion of Research Paradigms

The research paradigm is positivism, as this paradigm offers the opportunity to create new knowledge within research. Positivism provides a scientific approach to research and an empirical, cause-and-effect oriented approach that is used in fields such as health sciences (Creswell & Poth, 2016). Furthermore, utilizing multiple perspectives from participants afford qualitative data collection (i.e., results, conclusions, and questions). Considering the positivism paradigm for synthesizing the healthcare industries' perspective regarding AI provides the framework to appreciate the need of AI within healthcare, studying observations and facts that uncover and validate the role of AI in healthcare. Moreover, investigating and verifying locations within healthcare that have observed efficiency issues when AI has not been deployed, compared to settings that data authenticates the need to adopt AI.

Cohen et al. (2011) articulated that science provides the clearest possible ideal of knowledge, implying that the positivism paradigm observed a phenomenon and appreciate a definitive view through analysis and data collection. In relation to the study of AI, the participants experienced the utilization and results of AI were extrapolated, affording clarity for the topic. Moreover, the collection of data from the cases offered a definitive view of the results from the utilization of AI within the respective facilities. Scott and Usher (2011) agreed that to guarantee an accurate representation, a set of methodological rules can provide an objective sense of reality, also, a factual representation of a phenomena. Furthermore, this approach affords further guidance towards revealing the validity of the research questions by creating

reality of the phenomena and its effect on the healthcare stakeholders. The epistemological position is galvanized by factual data from experiential data collection efforts to appreciate the narrative of AI and its need in healthcare.

Other research paradigms have been researched to determine the correct fit regarding AI and its need in healthcare. The postpositivist paradigm views evidence as imperfect and unsound, furthermore while the postpositivist paradigm targets the truth, influencers such as human groups can shape knowledge and beliefs (Robson & McCartan, 2016). Within the critical theory paradigm, Robson and McCartan (2016) communicated that theories and criticisms guide the researcher's judgements providing an attempt to understand and facilitate action. Lastly, the constructivism paradigm reveals that the researcher is develops subjective meanings of experiences leading to a complexity of views (Creswell & Poth, 2016). This could lead to the researcher developing a theory rather than base their research outcome on a fact.

Discussion of Design

This study was conducted with a flexible design using qualitative methods specifically, a multiple case study design was used. The case study afforded the opportunity for an in-depth evaluation utilizing analysis of specified communities where AI is used. Utilizing a qualitative methodology provided an incorporative practice that makes the world visible by employing field notes, interviews, conversations, recordings, and memos, delivering a sense of representations of the world (Denzin & Lincoln, 2011). Furthermore, Creswell and Poth (2016) agreed that there are multiple methods to gather information: interviews, observations, and documents rather than relying on a single source of data. Guiding the research, the qualitative methodology provides opportunities to present a contextualized view of the account then due to the problem and its need to be explored, the researcher can leverage the power of relationship with the participants to

deliver clarity through experiences (Creswell & Poth, 2016). As the view of AI and its need in

healthcare increase, leveraging a bevy of personalized experiences created a strong sense of

realism. This was performed through the researcher and the participants. Additionally, granular

data points (i.e., experiences) offered the ability to understand and address gaps to assist in

explaining the problem and presenting a clear worldview. Creswell and Creswell (2018)

validated this approach by vocalizing the usage of learning from multiple participants from an

exploratory lens. Moreover, the approach created a comprehensive coverage of the field of study

through the participation of those who have experienced the phenomena (Robson & McCartan,

2016).

Other qualitative approaches were presented, such as a narrative, phenomenological,

grounded theory, and ethnographic research; however, when examining these approaches, they

would not have provided the opportunity to obtain granular responses. The narrative research

strives when collecting stories from individuals who can share a life story. The story approach

can be appreciated through a biographical form or an autoethnography where there are multiple

layers of a personal story (Creswell & Poth, 2016). Attempting to gather the rich data needed to

demonstrate the centrality of AI and healthcare, this approach would not be a good fit due to the

challenges of the narrative approach which can solely focus on an individual's life. Additionally,

the phenomenological research approach would have had a similar approach, however, focused

on lived experiences from several individuals who shared a similar experience or phenomenon.

Emphasizing on a phenomenon, through multiple persons can be resourceful due to the

collection of data that is needed.

However, the captured data can come from a variety of sources such as poems,

documents, and observations (Creswell & Poth, 2016). Identifying a population that has a shared

experience presented a large sample size and any attempt to glean useful data can be difficult for this specific topic. The grounded theory research design moved to present and/or generate a theory. This approach did not fit within the healthcare space as any theoretical approach would need to be tested on samples and individuals. Lastly, the ethnographic research examines the behaviors, values, and beliefs of a group who have shared in similar process (Creswell & Poth, 2016). Driven by the culture of a group, the researcher investigated the social aspects of any group and looked to explain the patterns through the gathering of data. Healthcare and AI did find its role and could be examined to understand its effect on the healthcare culture; however, the researcher would need extensive time to observe and capture the depth of the healthcare culture; communicating the response to AI in the healthcare field.

Discussion of Method

From a flexible design perspective, there were qualities that needed to be observed such as: multiple qualitative data collection; framing the study with assumptions and views from multiple realities; the researcher understood relationships; analyzing data from multiple levels of abstractions; Lastly, demonstrated a clear and engaging experience to provide a sense of realism and belief (Robson & McCartan, 2016). Furthermore, the researcher demonstrated certain skills to extrapolate data—ensuring that there is a firm grasp on what is being researched. Demonstrating question asking and good listening skills, adaptiveness, and flexibility, grasp of the issues and lack of bias are needed to be effective when carrying out a quality flexible design research (Robson & McCartan, 2016). Exhibiting these skills regarding the problem statement, provided the opportunity to deliver a clear, realistic understanding towards the problem; additionally, a bevy of experiential data points from multiple facilities framed a strong sense of realism.

Other designs were considered for the research such as fixed and mixed methods; however, they were not believed to be best suited for this research. Robson and McCartan (2016) communicated that fixed designs are theory-based and can be considered risky due to the inability to capture individual behaviors. Furthermore, there was need for the researcher to remain detached and/or distant from the research to remove potential influences that the researcher may deliver. In terms of design approach, there was a need to remain close to the research to understand the impact of AI and the healthcare stakeholder's perspective; particularly, those who have experienced AI and its impact and the stakeholders who have elected not to utilize AI. A fixed approach did not permit this type of interaction, nor will a theory-driven approach be deemed acceptable. Regarding mixed methods and the quantitative-qualitative design, there were benefits that cannot understated.

Discussion of Triangulation

Triangulation would create validity in findings, neutralizing limitations, the ability the vividly illustrate data utilizing qualitative data to illustrate quantitative findings, and explaining findings when unusual findings emerge (Robson & McCartan, 2016). However, the complexities of the mixed methods raised concerns, hence the direction of utilizing flexible design. Robson and McCartan (2016) communicated that there could be a lack of integration of findings, possibly producing a disjointed and unfocused research approach; furthermore, timing concerns exist with the quantitative research being completed before the qualitative side is performed. Lastly, when using the mixed methods design, a pragmatic approach was observed and if the approach is poorly executed, the outcomes of the research will be severely impacted (Robson & McCartan, 2016).

Summary of the Nature of the Study

Utilizing the multiple case study design, the communities within the healthcare industry that leveraged AI in their practice was in focus, providing a rich understanding of the need of AI in healthcare where AI can be researched, described, and analyzed. Creswell and Poth (2016) vocalized the hallmark of a good case study is to present an in-depth understanding of the case, furthermore, the need to have a clearly identifiable case that the researcher seeks to focus upon— through the collection of multiple resources (Creswell & Poth, 2016). Examining AI and its need in healthcare from a multiple case design provided a clear and tangible investigation of the problem of why there are issues when AI is not deployed can assist with a more in-depth understanding of the need of AI in the healthcare industry. Yin (2017) communicated that there must a clear methodological path and within the case study approach, researching and understanding the descriptive information will provide a revelatory nature (Yin, 2017). Additionally, Robson and McCartan (2016) communicated a guidance for synthesizing multiple sources of evidence. Needing a strategy, the researcher understood that an empirical investigation of a phenomenon, utilizing multiple methods of data collection for evidence was critical (Robson & McCartan, 2016).

The need to utilize multiple facilities will provide granular outlook of the efficacy of AI in the various facilities. Yin (2017) mentioned the opportunities to demonstrate concrete cases when utilizing multiple cases. Additionally, having more data points to afford, more specificity, concluding with discoveries and clarity through the research question. Thus, validating the need for AI in healthcare. This approach ensured that validity is projected and observed, emphasizing triangulation. Furthermore, the multiple case study approach engaged multiple healthcare stakeholders to impact the research and present multiple perspectives that focus on a collection

of data points regarding the phenomenon of AI within the healthcare industry. This provided

consistency and multiple sources where commonalities exist such as stakeholder's role,

interactions, and decision-making capabilities.

Conceptual / Theoretical Framework

Researching the impact that AI offers to the healthcare industry, a relationship of

elements needs to be performed. Healthcare and its challenges are remarked upon by William

Kissick (1994) and the "iron triangle"—where the three central dilemmas (cost, quality, and

access) are acknowledged. Kissick (1994) explained that these three dilemmas possess equal

values and represent identical priorities and an expansion of any of the dilemmas comprise one

or both of the other two. In an ideal healthcare world, there would be equal balance between

these components; although challenged by increased costs, lack of access, and lowering quality

(Niles, 2015). Identifying the concepts (e.g., cost, quality, and access) and demonstrating the

relationship that theories, actors, and variables engage in can be appreciated in the diagram.

Utilizing AI will lead to improvement in efficiency within healthcare. AI has impacted

healthcare within the quality, access, and cost spaces where stakeholders can observe value. The

components of healthcare can be facilitated by the outlined theories, actors, and variables,

comprehensively directing towards the desired outcomes which is improved efficiency.

Figure 1

If AI impacts concepts, why is it not utilized?
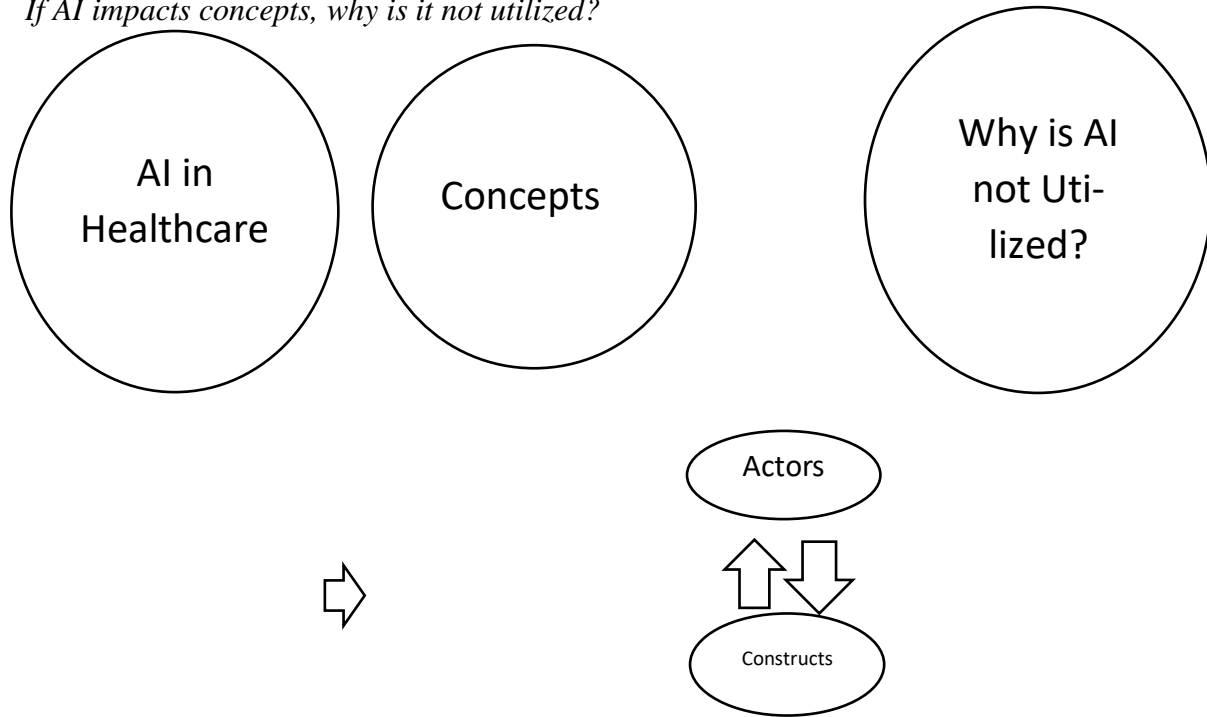
Concepts

Improved Quality. Neill (2013) remarked on the efficacy of AI in early detection of cancers, heart disease, and defects, providing predictive models for alerting physicians, stratifying risks, and hospital stays. Additionally, personalized treatments, appropriate recommendations of diagnostic testing, monitoring patient community health and safety, and discovering new medical knowledge directly impacts the quality of healthcare; when AI is leveraged (Neill, 2013). Considering AI and ML outcomes, the effective assistance of diagnosis and treatment suggestions; especially in the potential stroke patients where time and patient management is central to a patient's long-standing medical outcomes, AI and ML's ability to predict, diagnose, and treat improves the quality of care (Jiang et al., 2017).

Decreased Access. Jha (2016) discussed AI and its capabilities in radiology to screen the population faster and lower cost. Furthermore, Vermeulen et al. (2009) validated the usage of AI in the patient scheduling space (i.e., where bottlenecking can occur, increasing access times) by optimizing solutions and properly allocating urgent and non-emergent patients; demonstrating an improvement in efficiency in access.

Reduced Cost. With the existence of medical errors due to cognitive factors, healthcare costs are rising (e.g., malpractice, diagnostic repeats/redundancy, etc.). AI can reduce disparities and discrepancies that are observed in healthcare and augment service lines such as radiology and cardiology where early cardiac detection can reduce extended hospital admissions and length of stays (Dilsizian & Siegel, 2014).

Actors

Research Hospitals. These facilities provided rich data collection opportunities due the innovated approaches with new technologies. Many of these hospitals leverage AI throughout many service lines and have had experiences within healthcare with and without the utilization of AI. The facility's stakeholders were able to share their challenges when AI was present versus its absence, presenting a value from an access, quality, and cost perspective. By utilizing research and academic hospitals, a clear path was crafted for others to emulate those who have not leveraged AI in their facilities.

Hospital Leaders. The decision-makers were able to offer experiential data and vocalized their approach to leveraging AI, changing their ability to make decisions. Furthermore, leadership provided clarity with improving efficiency when AI in utilized. The facility's leadership also provided valuable insights to their leadership approaches and styles where AI impacted offering a unique perspective to their leadership styles and changes as AI was

introduced within their facilities. Hospital leaders grant an opportunity to capitalize on their

engagement with hospital personnel, other stakeholders, and patients.

Constructs

Profits. The revenue that AI can generate into the healthcare facilities varies from

facility-to-facility. Some facilities observed a tremendous amount of revenue due to patient

experience and referrals, while some may not experience the same amount revenue. Some

facilities who have the means to invest in AI communicated the return on investment, providing

foundational data for justifying the investment. However, the variance from the facilities, in

terms of profits, maybe not be an apples-to-apples comparison due to the dynamics of healthcare

provision (e.g., types of surgeries, exams, etc.).

Leadership Style. Many of the stakeholders that are tenured may not lead with the same

leadership style. This created variability when collecting the data from the stakeholders—as age

and time in position may create the variance. The variance of leadership style within the hospital

leaders were gleaned from the received data to reveal the impact of AI and how the leadership

style is affected.

Summary of the Research Framework

Overall, the relationship between the actors and constructs were central to the outcomes

of understanding why AI is not utilized. With artificial intelligence, healthcare has demonstrated

the ability to impact the concepts, leading towards improved efficiency. However, adoption has

not been widely accepted, while healthcare is still observing access concerns, decreased

provision of quality, and increased cost. These concerns are at the top of many of the healthcare

stakeholders and the need to tease out the "why" AI is not adopted is significant to driving the

transformation of healthcare through the lens of AI, impacting the bevy of stakeholders, and offering a premium, holistic approach in the delivery and consumption of healthcare.

Assumptions, Limitations, Delimitations

There were key factors that needed to be considered when attempting to understand the impact of AI on healthcare. Stakeholders and their subjectivity presented and/or absolved assumptions within the study. Furthermore, limitations were present due to the scope of the region in which information will be gleaned from and the sample size of the subjects and the newness of AI into the industry. Lastly, delimitations will be discussed. Delimitations will be noted due to the stakeholders that will be targeted when delivering and presenting surveys. These factors created weaknesses within the study and need to be noted, deduced, and factored in when comprehending AI and its need in healthcare.

Assumptions

The participants of the case study were provided questions that will uncover the needs of AI in healthcare. It was assumed that the participants will be unbiased and answer the questions with honesty; furthermore, the answers will be without motives that could potentially cloud the outcomes of the questionnaires. Leedy and Ormrod (2016) communicated that assumptions will be present in the study, as the research problem could not exist without them. Furthermore, the need for each subject to be honest without feeling influenced when completing the survey is central to ensure that their responses are subjective and clear. In order to mitigate the risk of biased and dishonest answers, the surveys and interviews were direct and granular permitting a directed outcome. Additionally, should be assuaged by notifying the subjects in person about the importance of the surveys and interviews in addition to how they will drive more adoption throughout the healthcare industry.

As a researcher for this study, the assumption was that many feel that AI will greatly diminish the role of the stakeholders in the industry. Sun and Medaglia (2019) commented on challenges of AI within the public healthcare sector by mentioning the potential impacts on jobs and how the workforce fears of replacement, bringing in increased threat of unemployment to the healthcare staff. Many direct healthcare providers feel the pressure of replacement, as AI solves for some of the manpower concerns that healthcare leaders are experiencing. Furthermore,

Another assumption is trust. It was assumed that healthcare stakeholders are aware of how AI has entered healthcare, but simply do not trust AI. La Rosa (2022) remarked about the trust factor as AI grows into the healthcare industry. As the focus on technology and the presented efficiency solutions, healthcare stakeholders are examining how AI will impact human-human interactions, more specifically, doctor-patient relationships. The entire stakeholder gamut may feel that AI and its involvement in healthcare will create a trust issue between them.

Lastly, the assumption that data protection and safeguarding the data was a real threat. When delivering the surveys to stakeholders, one can assume that they will begin to think about their IT department and its ability to handle AI, possibly repelling the idea of AI in their respective facilities. Dash et al. (2019) mentioned the challenges of AI adoption, in lieu of healthcare and its massive data. One of the primary challenges is storage, and while many have directed their attention toward cloud-based storage capabilities, security concerns exist. Accuracy of the data is centrally important for AI adoption as well. Any discrepancies in healthcare data will provide in accuracies and lack of quality. Hackings, security breaches, and phishing attacks are primary threats to data security and a priority for health care organizations.

The concerns of privacy were expressed when communicating the adoption of AI into healthcare facilities.

Limitations

The research of AI and its need in healthcare is subject to limitations. While AI is not relatively new to everyone, it is a fairly new introduction to the healthcare industry, possibly creating a lack of previous research on the topic. Adopted within the last few years into the healthcare industry, AI may not be well represented. The need to invest, understand the return on investment, and healthcare facility's ability to invest may contribute to the lack of utilization of AI. Furthermore, many of the potential subjects may not be able to determine the possible impacts that AI could have on their facilities.

Additionally, lack of subject's experience present limitations; rendering an inability to synthesize the impact on decision making by hospital leadership. Where inefficiencies are present, hospital leaders take a holistic view of where improvements in quality, access times, and cost can take place. Experientially, hospital stakeholders make these decisions based on metrics, however, if there is not a sufficient number of metrics, leaders may not be able to provide quantitative value and objective answers to the relative inquiries.

Acknowledging the limited exposure to AI within a respected region, there was an effort to engage with a variety of facilities that have adopted or elected not to adopt. AI and healthcare are moving closer to marriage due to the many impacts that AI has demonstrated. However, opposition is still present within many regions and these impacts may or may not have been observed by all facilities. Hoping to mitigate the limitation by identifying the correct and willing facilities to participate was a significant challenge, yet one that was attempted.

Delimitations

Healthcare stakeholders hold a variety of leadership positions. When examining the

central subjects, it is important that the boundaries are well described. Hospital leadership, more

centrally, healthcare providers and managers are in scope. Their objective responses created clear

and descriptive outcomes that provided superlative opportunities for the industry to appreciate;

being close to the consumers (patients) and understanding the impacts that AI affords the

efficiency dilemmas in healthcare. The stakeholders deal with the day-to-day operations,

provision of healthcare, and making critical decisions, valuing the adoption of AI into their

facilities. A firsthand assessment of AI is one that needs to be appreciated, holistically;

contrarywise, other stakeholders may only observe the outcomes that are monetarily driven (i.e.,

chief financial officer). The stakeholders that reside outside of the provision of healthcare were

not surveyed due to their outlook; meaning they may induce risk being biased.

Significance of the Study

In healthcare there are manifold issues, specifically in quality of care, rising cost, and

access times. Kissick (1994) unpacked these dilemmas (i.e., quality, cost, and access) and further

communicated the equivocal tensions they present to healthcare consumers, payers, and

providers. The introduction of AI into the healthcare industry has impacted these dilemmas by

increasing quality and reducing access times, however, cost is still affected. Two reasons need

further exploration: return on investment (ROI) and AI's impact on hospital leadership. As AI

continues to explode into the industry, there is a lack of research that communicates the impact

that AI has in the healthcare field.

Reduction in Gaps in Literature

AI has demonstrated the ability to improve the quality of healthcare to the consumer by utilizing the large amounts of data that is produced throughout the industry. The data were applied in various capacities and challenge the way that way healthcare providers manage the consumer's healthcare. The technologies can assist with early detections of cancers, while guiding researchers through clinical trials (Davenport & Kalakota, 2019). Researching and communicating AI and its efficacy can drive future adoptions offerings to provide a holistic improvement of quality of healthcare.

Additionally, AI impacts within the access space. Pre-COVID, hospitals were seeing large patient volumes and remote access issues. Within the facilities where large patient volumes were observed, leadership struggled with the large amount of healthcare data and needed assistance on how to manage the data. Healthcare information technology (HIT) provides cost efficient opportunities to handle massive amounts of data, while improving outcomes. AI and ML can deliver algorithms to provide data management to healthcare managers, improving access and better resource utilization (Nelson & Staggers, 2018). Within radiology, AI can provide guidance on predicting potential technology failures; affording leadership with the opportunity to schedule downtimes for service without affecting patient care. Moreover—as seen within the COVID pandemic, healthcare providers are utilizing remote access, creating improvement opportunities for patients within remote communities.

The knowledge that this research provides will prove to drive the adoption—by communicating the return on investment, enhancement of quality of healthcare, and improvement of access times. Furthermore, connecting with various healthcare leaders will offer insights on how AI has affected their approach to leadership theories and managerial styles. The

impact of AI needs to be vocalized to galvanize adoption, leading to an improved provision of

healthcare, better access times, and potentially lowering healthcare costs.

Implications for Biblical Integration

From a biblical perspective, conducting business undertakes an approach that can provide

glory to God. The Christian business manager can look to God for connecting their work to

God's work. Keller and Alsdorf (2012) communicated that a calling to one's work is similar to

one's calling to ministry. As a minister is called and equipped to build up the Body of Christ, so

is one who is called to a secular position equipped to perform the duties, exemplifying God's

empowerment within the leadership position (Keller & Alsdorf, 2012). When conducting

business, the Christian leader is to understand the purpose of their work in the world, conducting

themselves in accordance with that purpose (Keller & Alsdorf, 2012). Within healthcare, the

opportunity to present artificial intelligence in a Christian leader's facility can provide an

improvement of efficiency; most importantly, offer premium provision of healthcare to the

consumer, without an increase of cost nor access times. The conduct of the leader is synthesized

by Keller, when he mentions that one must view their work—as God purposed Adam to view

work as a service (Keller & Alsdorf, 2012). When one views work through the lens that God

view work in, the leader's ability and talents create the greatest opportunity to provide service to

the consumers and needs.

Looking throughout the book of Genesis, God did not make a chair, car, nor a boat. He

provided Adam with the elements and talents to be successful in the garden. Adam was to "work

it and take care of it" (Gen 2:15 NIV); arming Adam to perform the work. God provided the

talents to Adam, and he was to view work in the same capacity that God view His work as a

service. In healthcare, God has positioned leaders, and these leaders are to accept His view and

provide the platform for others to emulate. Artificial Intelligence has encroached into the healthcare industry, now it is time for the Christian leaders to value the impact of AI and carry on the view of God's work within healthcare.

Benefit to Business Practice and Relationship to Cognate

Understanding and appreciating the adoption of AI into the healthcare industry directly impacts many of the healthcare stakeholders. First and foremost, the consumer will appreciate AI's integration due to the ability to extend access, reduce exam times, potentially provide a healthier community, and improve quality of care. Secondarily, the providers will feel the impact as AI provides the opportunity to increase efficiency, deliver standardization, and afford augmented healthcare provision. Lastly, healthcare leaders will appreciate the return on investment as initial cost will be observed; however, the long-term cost savings will be appreciated.

From a business practice perspective, leadership will appreciate the advantages of AI in their facilities, transforming the traditional practices of healthcare to a more post-modern, premium in quality, and advanced technological approach to healthcare. AI and its need in healthcare is a central to alleviate the tensions between high healthcare cost, lowering provision of quality, and increased access (i.e., longer waiting periods). Understanding the impacts of AI in healthcare facilities provide a framework for decision-makers to utilize and modify the stakeholder's position by unveiling cost-cutting opportunities and enhance quality. The research can assist the healthcare leader's ability to engage with others within the industry and share best practices; assisting the entire industry and affording the occasion to standardize across borders. The augmentation of AI within healthcare is driving quality by setting the stage for healthier communities, faster diagnosis, lowering costs, and reaching areas where healthcare is not easily

accessible in lower economical communities. The developments are observed and studied by the

stakeholders and shared; however, there are many who have their reservations about the adoption

of AI in their community. By disclosing the enhancements in efficiency, the research can aid the

healthcare leaders to modify their decision-making capabilities and drive quality in the provision

of healthcare.

Summary of Significance of the Study

There is a critical need for understanding AI and its need in the healthcare industry.

Rising cost, concerns with access, and diminishing quality of patient care provide anxieties for

the entire scope of stakeholders. The "iron triangle" discusses the dilemmas that stakeholders

encounter, and healthcare leaders are constantly evaluating solutions to ease these dilemmas.

Gaps exist within the industry due to the variance within healthcare from a location, costs, and

experience perspective as some locations do not have the finances to invest in AI, while

leadership does not have experience using AI and its applications, and certain facilities do not

fully appreciate the impact that AI delivers. From a biblical perspective, AI can augment

leadership's ability to perform the work that God places in their hands. And lastly, the benefits

that stakeholder's can value are the improvement of quality care, lowering costs, and delivering a

healthier community.

A Review of the Professional and Academic Literature

Within healthcare, efficiency is critical. Whether it is quality, cost, or access efficiencies,

stakeholders look to develop and execute on strategic plans that will improve on these dilemmas.

These dilemmas can be challenged within the implementation of AI. Moreover, healthcare

leaders can appreciate the ability to lower costs, improve quality of care, and decrease access

times within their respected markets. The importance of researching the literature offers a clear

picture of how AI can impact where AI is deployed versus not adopted, additionally, the role that AI will play in decision-making and healthcare's future. Although AI has encroached within the industry, there are facilities where AI is not adopted, highly valued, nor understood.

The literature review will focus on synthesizing peer-reviewed and scholarly resources— leading towards understanding why AI is not universally adopted, improvements in efficiencies, decision-making, and the role of AI in the healthcare industries. Furthermore, the literature review will glean from articles that expose what AI is not utilized within healthcare, as factors exist such as replacement of staff, trust issues, implementation and maintenance of policies and regulations, and lastly, accountability concerns. Moreover, efficiency will be examined within the review, as the exposure of AI and its impact within healthcare centers on how more efficient the provision of healthcare is noted for the consumers, providers, and leaders. Lastly, AI delivers premium outcomes when implemented. Within the review, outcomes such as predicting admissions, wearable devices that provide data to providers, decreasing costs, and decreasing access times were discussed.

Healthcare and Why AI is not Utilized

There are many factors that are driving the failure to adopt AI within healthcare. Stakeholders, throughout the industry, operate within different localities, meaning that healthcare facilities' mission differ from location to location. In addition to the location variance, healthcare leaders are cost prohibitive. Attempting to understand the cost versus revenue are normal day-to-day operations that stakeholders manage and determining if AI and its' associated cost will provide a positive return on investment (ROI) are examined. Furthermore, facilities are attempting to identify the need of AI and its place within their respected mission. AI is attempting to dynamically transform the provision of healthcare to the consumers. However,

some facilities may take the traditional approach, which is in the mindset of "the way we have always do it." Some of the concerns with the adoption of AI, outside of location, cost, and needs are the fears that AI will supplement staff. While many stakeholders are keeping their eyes on the government and regulatory bodies. Lastly, as payers' role within healthcare are appreciated, stakeholders are monitoring how payers are reimbursing for the adoption.

Lysaght et al. (2019) dove into the depth of impact that AI offers in the decision-making segment of healthcare. Disclosing the transforming capabilities and the role that AI plays, Lysaght et al. (2019) discussed the clinical decision support system (CDSS) and how AI is utilized to improve outcomes. Some of the major concerns regarding AI-assisted CDSS was accountability and transparency. With multiple stakeholders existing within healthcare, the decision-making process resides within the provider segment, and with AI-assisted CDSS— concerns arise surrounding accountability, especially when the decisions are highly complex. Understanding the ethical and legal responsibility that provides have, AI has demonstrated, through algorithms, the ability to assist with decision making. However, if patients are harmed when AI-assisted technology is used, scrutiny is valid. This creates accountability concerns as to the ability to potentially override the AI-assisted CDSS, especially when AI is providing recommendations for decisions and diagnosis. The decisions that AI offers need to be validated to ensure that the predictive analysis that is provided is not overlooked. While AI may provide more face-to-face time between stakeholders, there are still concerns over the ability to influence decisions and provide the much-needed accurate information that human engagement has historically provided.

Secondarily, the risks of exacerbating some of the risks between communities or groups within healthcare are observed. Meaning, the existence of various groups (e.g., ethnicity, age,

socio-economic backgrounds, etc.) create groupings that the CDSS recognizes and have

historically led to the perception of discrimination. With the adoption of AI, these groups may

feel more apt to profiling and marginalization. Furthermore, the conflict between providers and

AI is blurred. The roles and responsibilities of providers to provide care, while documenting

patient information in the electronic health record (EHR). However, scenarios exist where dual

roles are observed with providers performing both patient care and behaving like a researcher;

ensuring the highest quality of healthcare data are inputted within the EHR. This can take the

provider away from qualitative patient care, disrupting their primary focus.

Lysaght et al. (201) addressed many other concerns, specifically, professional integrity

where providers look to AI and its ability to augment their clinical decision-making. However,

the drivers of AI and its implementation need to ensure that AI and its end-users are educated to

make certain the awareness of over-reliance and complacency. Additionally, considerations must

be investigated to ensure that prejudices and discriminatory harms are not observed as outcomes

are valued. The development of AI-assisted CDSS and communication between the developers

and implementers needs to be transparent and closely monitored to prevent any burdens.

Additional criticism was discussed by Amann et al. (2020) regarding the inability to

explain the benefits and relevance of AI. With healthcare costs' rising, AI can be seen as a

potential solution, as the CDSS assist providers in the diagnosing and treatment decisions. AI-

based technology has demonstrated the ability to outperform human capabilities in some

respects, however, the inability to explain AI and its abilities has created a sense of hesitancy,

impeding its adoption across the industry.

Carter et al. (2020) revealed that while clinicians can logically explain the reasoning

behind their own decisions, AI is argued to need the ability to explain how diagnosis, prognosis,

and healthcare management decisions are made. Furthermore, while AI is fundamentally fueled by data, biases will be reinforced, meaning that certain groups (e.g., gender, ethnicity, and the disadvantaged) will continue to be under-recognized. Although there are developers that have plans to launch bias-detected programs, the concerns are experienced. Moreover, transferability is discussed as Carter et al. (2020) explained that AI algorithms demonstrate the tendency to fail when transferred. Although trained in a specific setting, AI requires detail testing and evaluation to ensure the strength of training the data, maintaining its efficacy. In terms of data, Carter et al. (2020) dove into the concern of validating, training, and ownership of the data to safeguard the protection of the massive amount of data used in the developing of AI-based technologies. Furthermore, ownership and accountability need to be addressed due to the potential of harm or leakage of data, leaving the consumers vulnerable.

Regarding the potential for displacement of staff as adoption of AI within the industry, the lack of responsibility can be alarming. Carter et al. (2020) drove the concern by vocalizing the moral and professional responsibilities that human healthcare providers maintain, while AI may create a lack of trust and a sense of consumer resistance, losing the support of implementation. While there are benefits to the adoption of AI, implementing and explaining the investment of AI can be overwhelming and sometimes uninspiring.

Topol (2019) remarked on the challenges and limitations of AI where some of the results have been observed as erroneous, regarding cancer detections. This potentially creates a harmful approach to patients and opens the door for medical malpractice. Explainability and the "black box" are oftentimes alluded to within the scope of the utilization of nontransparent algorithms and the unexplained. Adding to the bias concerns, AI lacks the inclusion of minority datasets, hence exacerbating the human biases' concerns that are already in place within the industry.

Another overriding concern is the fear and threat of hacking and piracy of healthcare data. Topol

(2019) mentioned the potential risk of overdosing of medicines and/or overstimulating

defibrillators due to the potential hacking of AI and its algorithm. Furthermore, the security

issues that need to be addressed need governmental and legislative involvement to deter the

threat of advancing AI in the industry.

Sun and Medaglia (2019) commented on challenges of AI within the public healthcare

sector by mentioning the potential impacts on jobs and how the workforce fears of replacement,

bringing in increased threat of unemployment to the healthcare staff. Furthermore, as AI enters

into the public healthcare sector, social and ethical issues are focused, as privacy and regulatory

issues are in constant view; additionally, the need for education on how AI is useful in

Healthcare is needed. Sun and Medaglia (2019) stated that as promising as AI can be to the

health care industry, there are challenges such as data collection, social challenges (i.e., the

misunderstanding of the capabilities of AI technologies and the data needed to appease potential

bias), and the consumers' attitude toward clinician-patient relationships. The economic

challenges of adopting AI are presented when many stakeholders believe that AI adoption may

be costly, while ethical challenge exists due to trust, liability four critical decision making, and

the potential unethical use of data sharing.

Sun and Medaglia (2019) also mentioned the political, legal, policy-related areas that

have been highlighted by the entire stakeholder group in health care. On a macro-level, national

security threats from AI developers and protection of sensitive data have the health care

stakeholders concerned. Moreover, regulation affords uncertainty and exacerbates the worries of

monitoring and utilization of AI across the healthcare industry. On a micro-level, health care

facilities are uncertain of performance leading to a lack of strategic planning for AI development,

management, and the misunderstanding of how AI is augmenting healthcare without the fear of job displacement.

      One of the major dilemmas that Sun and Medaglia (2019) discussed is who owns the data. Tensions may arise regarding data integration and how the clinician-AI developer collaboration coexist and streamline data from facility to facility. These tensions and challenges are highly relevant to the stakeholders. The amount of data needed to create accurate training of AI-based technologies needed to be protected and government policies and regulations are consistently reviewed to ensure that these databases are protected. Technological challenges exist as well, as Sun and Medaglia (2019) vocalized the difficulties that AI systems may have from a transparency standpoint. The lack of transparency is called the "black box," meaning that end-users do not have the ability to understand why a diagnosis, or a decision is made. The lack of transparency concerning the performance of AI is a major concern for healthcare stakeholders and of the concerns that stakeholders have vocalized with the logical challenges up here to be central. Additionally, Fogel and Kvedar (2018) remarked on the uncomfortable situation that clinicians and patients communicate concerning AI in healthcare due to the inability to explain how AI technology can generate predictions. Also, the concerns of whether AI can outperform clinicians in simple tasks and create an unpleasant work environment within healthcare.

      Adadi and Berrada (2018) discussed the explain ability concerns of AI by mentioning four reasons work that AI needs to solve for to present a better understanding and trust. The need to explain the justification for why decisions are made, whereas the need to explain the preventative concerns due to unexpected vulnerabilities and flaws needs to be understood and controlled. Also discussed is the need to explain the continuous improvement within AI, regarding ongoing iterations and interactions between human and machine. Lastly, needing to

explain how information is gathered and knowledge gained, as AI based decisions provide

opportunities to predict, gain new insights, and lend to the credibility of the adoption into the

health care industry. Explainability is central as every decision that an AI system affords, a

variety of outcomes may be noted; hence, needing explanations. The considerable resources that

are needed to develop AI and ML are significant and need to be validated to ensure accuracy of

data and training to prevent potential errors that may harm patient care.

There are many concerns about the adoption of AI in healthcare. Esmaeilzadeh (2020)

remarked on the concerns that AI presents due to the lack of transparency and safety and the

technology space. Furthermore, anxiety may be observed in the case of potential IT systems

malfunctions and the dependency of AI to deliver quality love care 2 the consumers. Another

concern within IT segments are hackers. Since AI utilizes a massive amount of data, there are

potential errors and on traceable attacks that can endanger patient safety and potentially death or

injuries. Furthermore, the concerns are exacerbated if data produces inaccurate predictions,

incorrect diagnosis, or erroneous treatment plans. Another concern resides and the

communication segment. Esmaeilzadeh (2020) mentioned that the utilization of AI may cause

communication concerns between the consumers, stakeholders, and AI technologies.

The interaction between patient and clinician central to the quality of the delivery of

healthcare, and as AI encroach is into healthcare, some stakeholders are fearful that the

relationship may not be symbiotic. Esmaeilzadeh (2020) mentioned that while AI may improve

health care, conversations between clinicians and their patients may decrease the quality up

healthcare. Ethical concerns are also observed within the adoption of AI, more specifically in the

ability to trust judgment, understand discrimination, and dilemmas concerning liability. Trust is

central in healthcare. Patients may not trust the predictive and diagnostic abilities, and this has

been a central factor in an adoption of AI. The lack of transparency, as Esmaeilzadeh (2020)

mentioned directly impacts patient trust, increasing create are risks and the adoption of AI in

healthcare. Another concern is privacy, specifically in the confidentiality of electronic health

records. Data breaches galvanize the risks of AI adoption due to the need of sharing personal

health information and governance is needed to ensure the protection of health information.

Esmaeilzadeh (2020) further commented on AI and the potential of exhibiting gender or

racial bias, as data sets may not accurately represent population, increasing the opportunities for

social discrimination, profiling, and mistrust. The healthcare communities are concerned that AI

technology demonstrates flawed practices buy an accurate decision involving certain patient

populations. Regulatory concerns are obvious. As AI systems need accountability and

responsibility, governance to ensure performance and clinician involvement is needed to drive

policies and guidelines. Additionally, due to the intelligence of AI systems, requirements in

safety guidelines need to be rolled out and regularly monitored to maintain the impact and

validity of AI-based devices. More challenges are discussed by Esmaeilzadeh (2020), as there

are perceived liability concerns. In situations where AI based devices offer wrong

recommendations, responsibility and liability concerns are present. Lastly, risks are realized as

the lack of ambiguity about safety and the opacity to explain the effectiveness of AI are noted.

The inability to explain, "the black box," lowers the stakeholders' willingness to adopt and

utilize AI.

Kelly et al. (2019) discussed the exciting promise that AI delivers to healthcare, however

challenges add limitations that offer hesitation when adopting AI into the health care industry.

First, Kelly et al. (2019) mentioned the potential up data shortcomings that may present in

accuracies, reducing clinical efficacy. Electronic health records (EHR) AI algorithms require

retraining to ensure improvements in performance over time. Furthermore, data that are localized

in electronic health records needs to demonstrate reliability in order to prevent bad decision-

making capabilities. Overcoming these issues requires training data to improve clinical

performance and accurate outcomes. Kelly et al. (2019) also mentioned the need to achieve

reliable generalizability, meaning different sites have different equipment such as EHR systems

and coding definitions, leading to inaccurate models that cannot overcome the variation.

Furthermore, discriminatory bias is observed as the downside of AI systems disproportionately

impacts certain racial, gender, and socioeconomic communities generating concern for patients

and certain service lines. Algorithms are susceptible to external manipulation and attacks, while

difficulties exist in providing data for AI to utilize within each facility. There are many benefits

of adopting AI into health care, but one of the loudest voices speak to the inability to explain

decision making. Known as explainability, there are governments that mandate the "right to

explain" for AI-enabled technologies. Additionally, if "black box" technologies are used in

healthcare, they need to explain why decisions and judgments are made. Lastly, Kelly et al.

(2019) remarked that that ever-evolving relationship between clinicians and AI tools need to

improve, removing the concerns of adoption up AI in healthcare.

La Rosa (2022) remarked about the trust factor as AI grows into the healthcare industry.

As the focus on technology and the presented efficiency solutions, healthcare stakeholders are

examining how AI will impact human-human interactions, more specifically, doctor-patient

relationships. With the potential to reshape healthcare, AI can demonstrate the ability to improve

and support medical decisions, functions, and improve efficiency; however, AI has not presented

the ability to support in a familial capacity. Within healthcare trust is critical. Trust needs

reliability, understanding (behavioral), and knowledge. Demonstrating these components within

healthcare offers a nature of trust that develops into relationships. The medical role of a doctor, regarding healthcare, allows vulnerability and trust. The consumer entrusts the doctor with a set of expectations that is grounded by experiences and understanding patient values and beliefs.

La Rosa (2022) dove deeper into the importance of trust within healthcare by unpacking the doctor-patient relationship and the potential threats that AI presents when introduced to healthcare. Understanding patient values, beliefs, and social capabilities are appreciated by the consumers, moreover, the human interactions and experience are highly valued and with AI, there is a potential negative impact towards this relationship. Furthermore, patient's trust may be lost if there is a perception that AI is potentially augmenting the decision-making component of healthcare. La Rosa (202) additionally remarked on the regulatory and policy concerns. With the introduction of AI into the healthcare ecosystem, there is a need to ensure that AI is involved with a similar set of regulatory and policies that are already implemented in the industry.

Lee and Yoon (2021) mentioned the role and mistrust that AI presents when adopted in healthcare. Experiences are highly valued within healthcare and human experience is investigated against the perception of technological experience, providing insights to potential mistrust if AI is utilized delivering patient care. Specifically, in terms of ethnicity, some distrust exists in certain racial communities where perceived discrimination is in view. This mistrust exists and the inception of AI does not solve but maintains the level of mistrust in the healthcare industry.

Although there is enthusiasm surrounding the adoption of AI, Richardson et al. (2021) mentioned that patients want assurances about the safety of AI in healthcare. Expressing caution due to AI being an emerging technology, patients are looking to clinicians to behave as safeguards and as Richardson et al. (2021) communicated that the stakeholders need to be the

final say over treatment plans and maintaining responsibility for patient care. As cases vary,

patients view their situation as unique and look to the clinician authenticity and relatability.

Furthermore, healthcare consumers have preferred autonomy and choice regarding the utilization

of AI in their specific healthcare. Richardson et al. (2021) also spoke about the concerns voiced

by patience and the potential rise of health care costs and insurance coverages. Other concerns

that have been communicated by the patients surround the integrity of data. Electronic health

records, privacy and accuracy of data, and the concern of biases in healthcare are communicated

when interviewing the stake holders, and Richardson et al. (2021) mentioned the accuracy of

data in electronic health record was not accurate enough to be reliable, mitigating medical errors.

Lastly, new AI technologies might reveal risks if a mass database failure takes place.

As implementation of AI in healthcare is more prominent, Ye et al. (2019) examined the

relationship, roles, and engagement of AI in the healthcare space, more specifically some of the

key issues regarding implementation of AI-based technology. High-performance medicine: the

convergence of human and artificial intelligence. Ye et al. (2019) communicated the data sharing

concern, data would need to be shared across multiple facilities, need for anonymization, and

informed consent to transfer data from institution to institution. This creates the need for health

care reforms and government intervention to promote data sharing. The maintenance of the data

sharing would need clinician collaboration because AI driven technology may be cultural-

specific and not be effective to certain populations. Furthermore, the transparency of data and AI

algorithms creates a concern due to the need of accuracy when diagnosing and predicting. Within

the concern of transparency, lies the "black box approach" where AI is opaque in explaining how

decisions are made. A dilemma exists, as Ye et al. (2019) communicated that if there is an

enforcement of transparency and interpreting ability their result may be in the decrease of

accuracy and predictive performance. Also of concern is that AI and its technologies have the

potential to reinforce discriminatory practices based on gender, ethnicities, and other features.

Patient safety is communicated, and the lack of accountability where errors might exist,

and the lack of responsibility is observed (Ye et al., 2019). A critical component for

implementation is data standardization. What data exist in standardized formats, AI technology

needs to translate the data into a common format, Creating complex cities of healthcare data,

more specifically in the massive volumes of patient information. For optimal performance of AI

technology, there will need to be maintenance, governance, monitoring, and training. This could

lead to a financial concern when implementation is examined. Ye et al. (2019) communicated

that business incentives historically I have played central roles in implementing technologies,

however as AI based technologies are entering into the healthcare industry, there are unknowns

of the financial impacts. Lastly AI and its implementation needs constant policy and regulatory

assessments. The FDA and other regulating entities are constantly examining and determining

the safety of AI-based technologies. Ye et al. (2019) vocalized the future of AI in healthcare and

the need of healthcare stakeholders to be actively involved, educated, and collaborative and the

efforts to implement AI in healthcare.

Jiang et al. (2017) vocalized that there has been some apprehension about AI and its place

in healthcare, mainly surrounding the potential replacement of human physicians in the future,

however, AI will be deployed to assist physicians in providing better clinical outcomes.

Meanwhile, Davenport and Kalakota (2019) communicated that many of the components of AI

clearly demonstrate the ability to outperform physicians at early detection of cancers. Some

believe that AI replaces humans in more General Medical process domains. Davenport and

Kalakota (2019) also mentioned that the use of AI in healthcare creates hesitation due to some of

the implications on the health care workforce, more specifically, substantial displacement of the workforce and leading the industry into automation. Some fear that AI will take over health care in the next 10 to 20 years, which will limit jobs and reduce direct patient contact. One of the segments in healthcare that feels most threatened is radiology. Speech recognition AI models impact the identifying of potential findings (e.g., nodule detection, brain hemorrhages, etc.).

Mesko et al. (2018) described the potential looming issues in healthcare such as doctor shortages, burnout of clinicians, and the increased demand have chronic care. Additionally with the expected increase of chronic illnesses, combined with the lack of access to care—crisis, regarding the lack of medical professionals and lowering quality of care has surfaced. AI is being viewed as an opportunity to fill these gaps and Mesko et al. (2018) mentioned that AI has a clear view of performing tasks, simulating human like capabilities in healthcare and performing simple tasks. In radiology, AI-enabled assistance can analyze images and detect potential medical issues. Regarding pharmaceutical research, AI-driven supercomputers may reduce potential outbreaks. While regulatory agencies would need to oversee future developments, there are steps being taken to examine the outlook of AI and its adoption into healthcare. AI-technology can improve access to care, combined with medical professionals and their tools, making better decisions, reducing medical errors, in providing improved treatment outcomes. These costs and improvements in healthcare have created the potential for outdating 50% of jobs in 20 years. While the improvement of quality of care is observed, some stakeholders fear that AI will probably replace them.

In terms of regulations, Jiang et al. (2017) remarked that some of the challenges where AI experiences exist are in the regulations and data exchange segment. From the regulation's standpoint, obstacles exist due to the need to prove efficacy, safety, and standards. On the data

exchange side, there is not a current incentive for sharing data, creating an issue, as AI needs to

be trained with a refreshment of data. Additionally, Rajkomar (2020) articulated that the urban

need of high-quality data sets to be successfully trained tool provide accurate assessments of

predictions. When large amounts of data are present, the accuracy of ML models is improved.

Rajkomar (2020) remarked that the strength of ML is contingent on the trained data.

Additionally, this creates vulnerabilities due to some of the inabilities to find historical data.

Regarding AI and its adoption into the healthcare industry, clinicians and the consumers need to

understand limitations and how to protect the large amount of data that are used in today's AI

environment.

Davenport and Kalakota (2019) communicated that many have found difficulties of AI

and its work within the health care industry. This is due to medical regulation and health care

insurance. Ethically, health care decisions have almost exclusively been made by humans

throughout history and the utilization of AI and smart machines may raise ethical issues in

accountability, transparency, and privacy. Acknowledging that mistakes may happen by AI

systems, there may be difficulty with accountability and incidents in which patients receive

medical information from AI systems may create a lack of empathy from the healthcare industry.

It is important that health care facilities as well as government and regulatory bodies limit

negative implications due to the alignment of quality of health care and the cost association. The

greatest challenge of AI exists in the adoption due to the approval of regulators, payors, in

potential updates within the field. These challenges create adoption issues, as a result AI may not

experience a holistic adoption within health care for years.

Gerke et al. (2020) appended to the challenges by remarking about the inform consent

perspective. Question arises, ethically, if AI and informed consent can clinically coexist and how

physicians are to educate and/or notify if AI is being used. This is a key challenge as physicians are aware of how/when AI is utilized in the interpretation, diagnosis, or treatment recommendations; moreover, if shortcomings exist potentially creating during the consent process. Additionally, safety is a concern as Gerke et al. (2020) remarked that the shortcomings of AI in the clinical setting are observed and how erroneous and unsafe treatment recommendations in the Oncology setting fueling the dilemmas of how AI utilizes the abundance of healthcare data. Safety is another concern, when discussing AI in healthcare. Some of the concerns regarding safety have come to light within the cancer treatment segment of health care. Errors and unsafe treatment recommendations have presented a negative light, in terms of AI and its efficacy.

Stakeholders are evaluating the reliability and validity of AI and its developers to determine if accurate results are observed. Secondarily, patient confidence and safety have created some hesitation due to the ever-increasing cyber security risk. Furthermore, this has led to false diagnosis and rendered ineffective treatment plans that jeopardize the consumers' safety. This may be a result of the failure to collect data from minority populations as AI algorithms were predominantly trained on Caucasian patients. Additionally, data privacy concerns are detected. The successful integration of AI into clinical practice needs trust, regarding processing data and privacy concerns are noticed. With the value of healthcare data in the billions, some facilities are hesitant to allow AI to operate within this segment. Questions arise involving the collection and protection of healthcare data, including doctor-patient relationships, insurance jobs, and personal relationships. That affords concerns to health care facilities, which could lead to the withdrawing of data within AI, which could ultimately doom AI in healthcare.

Gurkaynak et al. (2016) unpacked some concerns about regulating and adopting AI. The inability to explain liability for damages if AI causes harm, creates a difficult situation. Regulatory oversight and government intervention is needed when considering AI as there is an outbreak of fear that AI will overtake human capabilities altogether. Harvey and Gowda (2020) remarked on how the FDA assessors the risk, benefit, and ended intended use of AI in a clinical setting. Some of the difficulties for products using AI are observed when AI is continually learning. This risk is significant in healthcare, specifically in an imaging department, as radiology was one of the first to adopt these technologies. AI-based tools have been identified for the interpretation of diagnostic imaging. However, AI is used to augment the providers and diagnosing imaging. The spread of AI within the imaging department has raised fears with staffing concerns and compensations. These AI-based tools have created significant efficiency improvements, however there are liability concerns as regulatory issues exist. The FDA needs to constantly promote new regulations with a great amount of specificity within health care to ensure that data security and privacy are appreciated, preventing the opportunity of a cyber-attack. As AI grows but then the health care market, the FDA has a significant role in ensuring that AI software and AI-based tools are regulated.

Dash et al. (2019) mentioned the challenges of AI adoption, in lieu of healthcare and its massive data. One of the primary challenges is storage, and while many have directed their attention toward cloud-based storage capabilities, security concerns exist. Accuracy of the data is centrally important for AI adoption as well. Any discrepancies in healthcare data will provide in accuracies and lack of quality. Hackings, security breaches, and phishing attacks are our primary threat to data security and a priority for health care organizations. The concerns of privacy are expressed when communicating the adoption of AI into healthcare facilities.

Holzinger et al. (2019) communicated that AI and its encroachment into medicine is a great challenge. Although there is a strong motivation to adopt AI in healthcare and an observed demand due to the opportunity that AI could enhance trust in medical facilities; health care providers need to understand how missing and erroneous data can impact medical decisions—posing threats to health care. Although the ability to trust AI is up-and-coming, there is a need for high level ML and human computer interaction; constantly monitored ensuring clear explanations and accuracy. As noted by Holzinger et al. (2019), health care providers need to understand and retrace AI's decision processes. This will impart confidence within the safety, security, and privacy segments where many concerns exist. Additionally, supervised learning is very expensive, as AI needs supervised learning to ensure credibility and trust. As AI ventures into the healthcare industry, some express concerns on how AI will support medical decisions and/or make these decisions by itself.

Howard (2019) revealed that there are future important issues regarding AI and occupational safety. Healthcare professionals need to develop a stronger comprehension of AI and its effects within health care. AI and its emerging tools can be transformational to the consumers; however, these tools need to be reviewed. With AI and ML, data are needed. Datasets are prepared in an environment where supervision is appreciated. AI applications create uncompromised benefits; however, with the large amounts of flowing data comes concerns around privacy dilemmas, potential performance challenges, and the consumer depersonalization, meaning the consumer feels a lack of personalized health care. AI-based tools are being leveraged in the decision support systems (DSS). This segment of the healthcare industry observes large amounts of data. The DSS is central in improving risk assessments and management strategies, and questions arise regarding AI and DSS due to the risk that AI may

take over the human capability, and its potential decisions that may lead to the consumer injury

or fatality.

Howard (2019) dove deeper into the interaction of health care providers and AI regarding

potential negative consequences. The reliability of AI technologies is valued, however in

complex human-machine interactions, liability concerns are questioned, for example, serious

injuries or fatalities. As AI-enabled applications enter the healthcare industry reviews of their

benefit and risk should be tasked. This proactive approach full allows healthcare professionals to

determine the risks-benefits possibilities, potentially quenching any concerns over consumer

safety and the overall health of the health care community.

Longoni et al. (2019) expressed that while AI is revolutionizing healthcare, there are

stakeholders who are not as open to adoption. This reluctance can be directionally focused on the

inability for AI to adapt to uniqueness or flexibility. The inability to adjust has the stakeholder's,

mainly the consumer's attention as the consumer feels that AI might not have the humanistic

sense that a human physician would. Called the "uniqueness neglect," Longoni et al. (2019)

communicated that consumers resistance is observed via the impression that AI cannot exhibit

the characteristics of human medical provider, leading to the potential lack of monetization value

that AI is attempting to deliver. Plainly stated, the consumer is not willing to pay for the

healthcare if AI is involved, as opposed to human performance. Personalized care is of premium

value to the consumer and while AI delivers tremendous potential across the healthcare industry,

many stakeholders still communicate the pressures of AI and its inability to account for

uniqueness.

Park et al. (2020) unpacked many of the concerns for AI adoption in healthcare. The

massive amount of healthcare data needed to drive efficacious results is needed and Park et al.

(2020) mentioned that serious security concerns are felt throughout the healthcare industry.

Privacy concerns are the central issue and while many countries acknowledge the concern, there

are any systematic resolutions. Agencies, such as the FDA, are constantly approving and

monitoring new AI software and technologies. And although many of the AI-driven technologies

exist, there are many safety and liability challenges. Mismanagement towards a potential group

is oftentimes a concern leading to discrimination or healthcare mismanagement. Furthermore,

from a liability standpoint, AI-based technology might impact physician's judgement resulting in

medical accidents. These liability concerns have provided guidance by healthcare facilities to

draft policies that strengthen monitoring the safety of AI-based technologies and awareness

toward medical stakeholders (e.g., providers, consumers, etc.) to mitigate the risk of medical

accidents. The concern of performance degradation is feared by the healthcare community

leading to continuous monitoring of AI and human interaction. The awareness of AI and

healthcare, policies and procedural updates, security concerns, and improvements need to be

addressed soon for the holistic adoption of AI into the healthcare industry.

Tang et al. (2018) expressed additional challenges regarding the amount of data AI needs,

the cost to adopt and deploy AI-based tools, and the length of time it takes to become useful

within healthcare. Protecting patient data is a looming obstacle in healthcare, and AI needs data

to be fully appreciated. Benchmarking erroneous data can create inaccuracies in the performance

of AI. To combat this potential concern, regulating updates and calibration on data is needed.

Moreover, institutions must ensure that these massive data sets are secure- by integrating data-

protection policies and cybersecurity management. Working groups need to be evaluated to

ensure mandates are drafted, monitored, and adhered to. Additionally, for AI to be fully adopted

in healthcare, Tang et al. (2018) revealed the importance of AI and its integration into the reading stations (PACS).

Many stakeholders are having difficult times in defining clinical problems, in terms of implementing AI. Wahl et al. (2018) communicated the lack of trust between the clinical experts and how AI is to be integrated. With the need of large amounts of data, the challenges to obtain the data sets are observed, permitting a lack of accuracy in detecting and providing treatment. Furthermore, in lower income communities, hand-written healthcare records still exist combined with the localized language. The time consumption concerns, the accuracy of data, and the lack of a strong EMR limit the impact of AI within these regions. Whereas in the high-income regions, the focus of privacy, data security, informed consent, and data ownership are observed. Additionally, many experts express that AI applications can exacerbate ethnic and gender inequalities in both settings; however, more of an obvious concern in the lower income localities.

Tang et al. (2018) observed on the role of governance and AI, specifically to policy and regulatory issues. With the rapid advancements of AI into the global market, urgency on officials to ensure proper recommendations are in place; more specific with the threats that many stakeholders are communicating regarding the adoption of AI into their specific industry. The feeling of replacing human staffing is a central concern for stakeholders and the need to governance to enforce policies and regulations are in view.

Park et al. (2019) communicated that besides the potential benefits that AI deliver to health care, challenges exist such as complex organizational changes and long-term social consequences. Other challenges include social technical changes impact on patient physician communication anxieties about staff and their role in medicine. Furthermore, some in the healthcare field sense that AI might minimize human engagement; potentially lowering the

quality of health care. Park et al. (2019) also mentioned the tensions between the stakeholders and the invisibility of AI. These tensions are recognized by the trust factor, as the invisibility of AI may demonstrate a lack of transparency and accountability. Many stakeholders question the collaborative approach in healthcare, meaning patients and/or providers working together with AI and its risk of shifting the normalcy of healthcare practices.

Sandeep Kumar and Satya Jayadev (2020) mentioned more regulatory concerns as the lines of responsibilities are not clear in terms of medical errors and liability determinations. Furthermore, the "black box" problem is observed where the data needs to be closely monitored and scrutinized to maintain significant responsibility over AI and its utilization. Sandeep Kumar and Satya Jayadev (2020) communicated and adds to the concerns of bias towards specific communities by recognizing potentially inappropriate data sampling and training of AI algorithms. Additionally, sharing data with AI developers is concerning due to the lack of requested insights by AI developers regarding clinicians and patient representatives. Clinicians have communicated doubt regarding the methods of developers, as they have not been involved in the design and testing of AI applications, where providers can present simple user-interface designs and integration with electronic health records.

Yu et al. (2018) recognized many of the dynamic opportunities for AI to revolutionize healthcare, challenges exist due to the reliance of the massive amounts of data needed to properly represent the population. Training the data to ensure reliability and improve performance requires clinician supervision leading to potential cost concerns. From the patient value perspective, the needs to master the data, ensuring proper data validation and classification is required by both the AI developer and clinicians. Furthermore, regarding electronic health records and privacy, concerns are mentioned with AI cloud-based technologies. Many

stakeholders express the need to secure and promote security infrastructures to protect data

sharing. From the social viewpoint, the healthcare industry expects quality of care to be

increased, while reducing clinician fatigue and medical errors some anticipate more workload for

physicians for at-risk patients. Additionally, AI has created some skeptics regarding adding more

work for clinicians as an attempt to balance and trust AI in the diagnosis space.

The FDA plays a central role in the implementation of AI and Yu et al. (2018)

commented that the FDA is observing an influx of so many AI technologies and the need to

ensure the direct impact of AI is safe and effective. Also, legal concerns are discussed as liability

needs to be properly aligned. As the standard of care and the implantation of AI is detected, roles

and tasks need to be continuously monitored and updated. And while AI looks to drive cost

down, insurance companies need to decide how reimbursements will look and if AI is reducing

cost, will quality suffer. Lasty, the stakeholder's expectations are that AI will free up clinicians

to perform more complex tasks, instilling fear that AI could replace staff, reshaping the

healthcare workforce and reimbursements.

Reddy et al. (2019) added to the challenges that are present when considering AI and

healthcare by remarking that, although AI provides a promising outlook, there is a regulation and

responsibility concern within the industry. While governmental involvement is seen across the

world, there are the needs to ensure that governments formulate strategies to outline the

utilization of AI and how AI will be funded and/or reimbursed. Additionally, responsibility

needs to be identified as the liability concerns are evident. Defining and clarifying how liability

will be identified is critical in the provision of healthcare. There needs to be constant

consultation between clinicians and AI developers. Another concern discussed is the "black box"

problem. Reddy et al. (2019) spoke to the concern by discussing how clinicians need to stay

close to the decision-making and ML segment of AI, ensuring that clinicians are leading the

responsibility segment of AI. Another noted challenge is the data sharing that AI and healthcare

need to manage. The AI developers need to involve healthcare stakeholders, patient

representatives, and policy leaders to ensure the protection of the massive amounts of data. And

lastly, Reddy et al. (2019) remarked to the trust concern but more importantly the clinical side

where clinicians are slow adopters due to trusting AI-technology and how it integrates into

healthcare and decisions.

Esmaeilzadeh (2020) mentioned, while there are risks in prediction and recommendation,

opportunities for AI directed at medical diagnosis and treatment plans are noted, but with higher

speeds and accuracy. AI has demonstrated the ability to diagnose cancers more efficiently,

provide imaging diagnosis, offer patient management, predict behavioral patterns, and afford

patient treatment planning. Also noted is the implementation of AI-devices and how they

improve the decision-making process.

Schönberger (2019) added to the concerns of AI in healthcare beginning with the biased

training data and how AI relies on data and the concerns of flawed training data. Particularly

when discussing variables such as race, age or gender, AI and the trained data has not

demonstrated a reliable translation, creating disparity. Schönberger (2019) also mentioned the

issue of opacity AI and how the "black box" concern is realized by the health care industry;

Meaning stakeholders are unable to understand the intelligibility of AI systems. With the

massive amounts of data needed for AI technology, in accuracies, creating error rates and

misrepresentations are observed. Specifically, as Schönberger (2019) mentioned highly accurate

data has provided dynamic and premium outcomes in regard to high-risk pneumonia patients.

Contrariwise, inaccurate data has created biases towards racial groups and potential erroneous

outcomes. in terms of fairness and discrimination, Schönberger (2019) communicated that there are cases where major health inequalities are observed, increased healthcare costs, and concerning events such as mental health and gender identity serve as barriers when attempting to gather accurate data.

Fairness has created a challenging decision-making issue due to the biases in healthcare data and its difficulties to properly classifying the data into the proper classifications. Schönberger (2019) dove into the legal aspect of discrimination and AI by commenting on the dynamic potential of discrimination when AI is used within healthcare. furthermore, concerns around AI intelligibility may galvanize the disadvantages of minorities, in doing so, healthcare stakeholders are not able to determine the decision-making process of AI, exposing flaws and health care outcomes. While research is taking place, AI and its deployment into healthcare needs to be monitored to ensure that decisions and predictions go without bias.

In respect to autonomy, Schönberger (2019) commented on the intelligibility concern and how AI is empowered to make choices. Traditionally, from the ethical perspective, privacy is discussed as the consumers and stakeholders' confidentiality of data is cherished. But how will the consumers handle the transfer of health care data throughout the industry, and how are access rights being monitored to ensure privacy is premium. The moral responsibility, accountability, and liability challenges that Schönberger (2019) dove into are concerning, as the consumers worries of accountability and liability are heavily focused. From the accountability perspective, the ability to explain an action needs to be identified to ensure accountability. Schönberger (2019) commented on holding AI systems accountable and their developers to explain why decisions are made, keeping humans in the loop. Furthermore, upholding more responsibility and accountability is centered to provide confidence from patients in health care. The concerns

regarding who is in control of the decision-making process provide significant hesitancy to the

adoption of AI. Schönberger (2019) spoke to the behavior of technology and how AI can

represent moral responsibility, ethical behavior, consciousness, and intentionality. Transparency

Is a significant component of health care and how will AI systems reveal reasoning or the ability

to explain in the face of the request of transparency. As human decision making requires

explanations, this does not translate well to AI.

Schönberger (2019) vocalized the liability issues regarding the current state of health care

with the existence of breach of duty and causality. With the introduction to AI-technology and

the assumed potential of erroneous predictions, there is a systemwide concern for not only

causation but the potential of breach of duty of care. Schönberger (2019) conveyed that AI

technology and its potential for causation and breach of duty, directives and national

implementations are to be in place to provide a safety net for product liability. These directives

and implementations might not exonerate facilities in the case where AI-technology is the cause

of potential liable outcome and acknowledging these doubts discussions realized where an AI-

technology based product may be accused of negligence.

The Efficiency Impact that AI has Demonstrated in Healthcare

There are current challenges that the healthcare industry observes, specifically located

within the cost, quality, and access segments. Healthcare stakeholders currently analyze these

specific segments, as they directly impact the consumers, which are patients and AI has the

potential to augment the provision of health care by increasing quality, holistically reducing cost,

and decreasing access.

Leadership plays an integral part in the adoption of AI. Many health care leaders are

attempting to understand how AI can be effectively implemented, furthermore, increase

efficiency within health care. health care leaders are navigating through challenges that are created by rising health care costs, potentially outdated technologies, increase access times, which can result a less than healthy population, frustrated providers, and potentially facility closures. From a consumer standpoint, AI can be a saving grace by reaching out to the rural communities where access is an issue. Furthermore, AI and its technology what is crime can't administrate faster exam times, early detection from cancers, improve quality of care, and afford a potentially healthier population. With the encroachment of AI into the healthcare industry, decision makers are left with determining their return on investment makes sense for their local facilities and how AI will impact the quality of provision of care to the consumers. Additionally, healthcare leaders and decision makers are evaluating how AI will be rolled out within each facility, due to the skeptics that fear that AI will replace the human workforce.

Noorbakhsh-Sabet et al. (2019) commented on the implementation of AI in healthcare can transform the delivery of healthcare by providing a better, more defined clinical decision support system. AI and EHR are improving healthcare by predicting sepsis in patients, congestive health failure, and ophthalmological conditions. ML has encroached into the domains of pharmaceuticals. Noorbakhsh-Sabet et al. (2019) connected drug discoveries, side effects, and the cost of drug development to the utilization of ML. Clinical trials are and AI/ML are collaborated, permitting the ability to replace humans and animals in the clinical trials, while still appreciating valuable outcomes. The opportunities for AI/ML to improve healthcare go without challenges. Data privacy is oftentimes communicated, trust between AI and stakeholders is observed, and the fear that AI/ML will eventually replace the human components of healthcare are silently communicated.

Jiang et al. (2017) stated that AI can provide suggestions to physicians; alerting them about potential stroke patients and assist with stroke management, improving efficiency and accuracy. Wahl et al. (2018) mentioned the cost savings that AI would deliver to healthcare; furthermore, the observed benefits of synergizing AI and mHealth in resource poor settings, enhancing digital health in these communities. This would provide immediate impacts due to the expansion of access. These efforts are fueling opportunities to improve healthcare in resource-challenged communities. Mobile phones, cloud computing, and other wireless technologies are providing openings for patients to obtain healthcare when face-to-face opportunities are difficult. Improving immunization coverage is one of the gleaned outcomes of wireless technologies. AI needs data and AI can leverage the knowledge of current market conditions, using the data to provide insights and afford support to physicians. Furthermore, this support may enable a human expert, in some conditions where one is not readily available, determining and predicting outcomes. Slowing disease progression, using EMR to support clinical decision making, providing cancer treatment recommendations, and offer treatment advice are observed when AI is present. As poorly resourced countries develop, AI and healthcare could identify potential outbreaks; offering insights to governing agencies the ability to monitor and investigate potential progressions of the epidemic.

Hamet and Tremblay (2017) discussed how AI impact healthcare when utilized within medical records. AI improves organizational performance by capturing data, sharing, applying, in managing the critical information within health care records to provide real time decisions. Furthermore, Hamet and Tremblay (2017) communicated AI utilization within electronic medical or healthcare records are essential for early cancer detection and targeted prevention, with the aim to increase clinical value and lower health care costs. Additionally, capturing real

time data can promote transformational improvements for physicians and consumers. With AI's introduction into healthcare, specifically in healthcare records, nick celebration identifying certain key metrics such as family history or chronic disease, can improve patient care.

Additionally, Hamet and Tremblay (2017) provided more information surrounding AI and physical objects, such as medical devices. The future of health care has many promising approaches, but none more interesting than the utilization of robots as helpers. AI and physical objects, such as robots, can be used in surgery to assist surgeons, communicate with, and teach autistic children, and assist the elderly population with cognitive declines or any limited mobility concerns. AI is appreciated by both consumer and provider, when synergized with physical components such as robots, in areas where rehabilitation is needed. Please novel applications of AI and the physical object create a unique interaction specifically when monitoring guided delivery of drugs to target organs. An AI ecosystem can shape personalized health care in the future, as the impacts can improve health care and the behavioral segment, wellness segment and provide personal interactions. Be unprecedented amount of data combined with AI and its processing capabilities will be warm increasingly valuable to the consumers. However, ethical issues arise and need to be resolved before AI and robots will be accepted within today's medical environment. Additionally, another apprehension within the health care industry is that AI will become so sophisticated that it will surpass and take over our human capabilities creating ethical concerns.

Bullock (2019) discussed how AI can reduce many of the administrative waste out of the healthcare mix by reducing the time it takes for information to be transported from one physician to another. Typically, faxes are used by physicians to communicate healthcare data, however, AI can augment the process of this communication and quantifiably eliminate millions of hours of

administrative work in healthcare. Furthermore, scheduling patients within facilities can create

administrative burnout. AI and ML can help solve many of the tensions that administrators use

by providing AI software that can identify high-crisis patients, who are at risk, alerting

physicians and prioritizing scheduling follow-up appointments. The challenges of chasing

referrals and ensuring healthcare data are accurate can be laborious for administrators. Applying

AI can assist physicians and administrators by mitigating burnout and work overload,

furthermore, providing more value to the patients as clinicians can primarily focused on patient

care.

     Neill (2013) remarked on the efficacy of AI in early detection of cancers, heart disease,

and defects, providing predictive models for alerting physicians, stratifying risks, and hospital

stays. Furthermore, the ability to predict, detect, and monitor massive amounts of data that could

identify and understand threats to communities and their safety are in development. The potential

of AI to vastly improve healthcare needs healthcare data. These datasets can be used to detect

patterns that greatly influence outcomes. Neill (2013) discussed that AI can observe variations in

healthcare, significantly impacting healthcare provision to certain groups; furthermore, the future

of AI is prophesized to deliver dynamic outcomes such as: personalized treatments with minimal

side effects, recommending diagnostic testing, and monitoring health of communities.

Considering AI and ML outcomes, the effective assistance of diagnosis and treatment

suggestions; especially in the potential stroke patients where time and patient management is

central to a patient's long-standing medical outcomes, AI and ML's ability to predict, diagnose,

and treat improves the quality of care (Jiang et al., 2017).

     Vermeulen et al. (2009) validated the usage of AI in the patient scheduling space (e.g.,

where bottlenecking can occur—increasing access times) by optimizing solutions and properly

allocating urgent and non-emergent patients; demonstrating an improvement in efficiency in access. Hamet and Tremblay (2017) mentioned that the utilization of AI can gather the abundance of healthcare data, while offering solutions in a quick, accurate manner, increasing effectiveness and quality to the consumers. Additionally, personalized treatments, appropriate recommendations of diagnostic testing, monitoring patient community health and safety, and discovering new medical knowledge directly impacts the quality of healthcare when AI is leveraged (Neill, 2013).

Carter et al. (2020) promoted the efficacy of AI in healthcare by demonstrating its impact within the patient care segment, moreover, within breast imaging. Minimization of repeats, and early and accurate detection is central to outcome of the morbidity and mortality of cancer. Carter et al. (2020) discussed that deep learning algorithms offer improvement in detection and diagnosing, while cost effectiveness can be observed as an additional outcome of AI-based technology.

Davenport and Kalakota (2019) added that within precision medicine, were predicting treatments are central, AI provides the potential for early detection; Where on Oncology oriented imaging is utilized furthermore, AI is increasingly used for Speech recognition to assist in outcomes where difficult interpretations exist. Many within the industry feel that AI is technically capable of taking on cancer treatments. Rajkomar (2020) enhanced the decision-making capabilities that AI delivers to AI by remarking on how ML is able to identify admitted patients and their transfer risk. Taking in the data from electronic health records, ML can demonstrate the ability to learn which medication best fits a certain population, furthermore, understand prescribing habits of clinicians. These efforts empower healthcare facilities to lower costs. Rajkomar (2020) mentioned how the bundle of AI and electronic health records assists

with decision-making by providing suggestions in cases where misdiagnosis could exist and where providers may demonstrate uncertainty.

A Look at the Outcomes of AI in Healthcare

AI has demonstrated the ability to improve efficiency within health care. The consumer side of the stakeholders' value faster exam times, decreased access times, and an overall better quality of care. However, there are departments that have not identified the overall impact of AI and its respected department. This could create a dilemma within a facility where AI is deployed in one department and not deployed in another department. Departments such as radiology have been identified as departments where AI has made tremendous progress. The improvement of healthcare within radiology and other ancillary departments are observed by both the consumer and provider.

Topol (2019) summarized the need for efficiency in healthcare and how AI can transform the industry by producing key predictive solutions and outcomes. Predicting readmissions, utilizing electronic health records and the massive data, AI provides enhanced predictive accuracy utilizing algorithms. Moreover, AI is used in microsurgeries, AI-powered wearables (i.e., where algorithms can assist communities remotely), and increasing efficiencies in the cost, quality, and access segments of healthcare. Topol (2019) discussed the wearable technologies and how watches and phones are able to monitor and deliver exams for medical purposes such as skin lesions and rashes, headaches and migraines, infections, and retinal diseases. The ability to assess glucose levels, afford clinical analysis to predict glycemic responses to certain foods and coach individualized diets for diabetic patients. Noteworthy is the ability of AI to understand and reconstruct neural circuits. Topol (2019) communicated that AI has the ability to the human's brain grid cells, providing insights to how body movements regarding speed and direction.

Tang et al. (2018) discussed the improvement of quality of care that AI delivers within healthcare by assisting and impacting radiologist in the diagnosing disease. The power of AI and ML is clearly appreciated within the radiology service line. The data that flows throughout healthcare has afforded ML to improve workflow by automatically detecting lung nodules. Furthermore, AI is being leveraged in other segments of the radiology department due to the ability to detect patient behavior patterns; identifying patients that are prone to miss scheduled appointments. Furthermore, AI is enabling programs that can create a report card for radiologists based on their practice patterns.

AI unloads a vast number of opportunities to improve healthcare. Tang et al. (2018) mentioned from a clinical workflow standpoint, there are scenarios that AI may operate. Triage-wise, AI can augment healthcare with screening patients and determining the priority of exams to read by the radiologist. Secondarily, with the utilization of AI, radiologists can be replaced in some spaces, if AI can prove to be more accurate, faster, reproducible, and easier to obtain. In some cases, AI demonstrates the ability to dive deeper into the clinical side by determining liver volumes and possible liver transplant candidates. Although screening software to automatically detect nodules existed, AI provides the ability to improve detection capabilities; furthermore, AI can drive quantitative improvements by predicting outcomes such as cancer-mortality rates. With AI and its improvement in clinical detection of brain hemorrhages, image quality and technical protocols conformity will be appreciated. This creates opportunities to drastically improve workflow. These new functionalities will need an interoperability framework that features a broad range of vendors, hardware, and software support, while providing considerations for privacy of data.

Rajkomar (2020) discussed the improvement within health care aided by AI that have improved the efficiency within clinical workflow and allow clinicians to spend more time with their patients. Furthermore, with limited access to emergency departments, patients may be able to utilize AI-driven devices prior to their arrival; convincing the triage system. Moreover, the opportunities to increase comfort and reduce health care costs are observed when patients that may need hospitalization, could assist with remote monitoring.

Reddy et al. (2019) reviewed the roles that AI plays within healthcare in healthcare administration, clinical decision support, patient monitoring, and interventions. In the administration segment, Reddy et al. (2019) spoke to infrastructure of information technology and the integration of AI; more specifically, the promising outlook of AI and its augmentation of the healthcare industry and the stakeholders. Improvements can be observed throughout the industry. Lessing the administrative demands on clinicians, freeing providers up to be more effective by reducing routine tasks, placing accurate data in front of providers in a timelier manner, decreasing access times via machine-learning scheduling opportunities, and predicting lengths of hospital stays. On the clinical decision support side, Reddy et al. (2019) remarked to the abilities that AI potentially delivers by reducing medical errors, providing healthcare providers with personalizing treatment decisions, and in some cases potentially predicting and diagnosing. These outcomes are more evident in the radiology and pathology services, where AI assists radiologists and pathologists in protocoling and reducing errors; possibly matching the performance of healthcare providers. Jiang et al. (2017) also communicated that AI can help in reducing medical errors.

Patient monitoring is noting an unprecedented value of AI. Electronic health records, mobile devices, and AI have synergized to provide opportunities to monitor patients' vital signs,

more specifically, sleep patterns, respiratory and cardiac analysis, and blood pressures affording

greater quality of care for communicating to patients that need follow-up appointments and

medication information. Healthcare interventions and the opportunity to reduce access, provide

faster and less expensive treatments, and offer robotics support where gaps may exist,

particularly in the elderly population. Lastly, the future opportunities are noted when Reddy et al.

(2019) communicated that AI is examined to potentially predict outcomes, accelerate drug

development, and substantially reduce the overall cost of healthcare. Furthermore, the

opportunities to create an AI-virtualized environment is possible, where AI and technology can

potentially perform routine procedures.

Jha and Topol (2016) discussed AI and its capabilities in radiology to screen the

population faster and lower cost. Radiologists have always leverage machines, when dictating

radiographs. With AI and ML, deep learning has arrived at radiology. Deep learning (DL) has

transformed imaging in the eyes of radiology this transformation has taken place in modalities

such as computed tomography and MRI, where anatomy is displayed with greater detail, making

diagnosis simpler in creating opportunities for radiologist and their interpretation improvements.

The radiologist views an abundance of radiographs daily, demonstrated tendencies of fatigue

when searching for anomalies. Yet, with the assistance of AI, ML, and deep learning imaging,

radiologists should feel hey cognitive ease. AI and DL can augment radiology by detecting and

characterizing long nodules, providing management opportunities. This has created efficiency

improvements within health care.

Pathologists have embraced the same benefits within their segment as AI has automated

simple tasks that will allow pathologists to focus on the more complex tasks. AI can predict the

grade end stage of cancers, in some instances, better than pathologists, and in some cases with

better accuracy. Radiologists and pathologists have been fundamentally similar, and AI has created efficiency improvements in the diagnosis of cancers and could assist health care providers with managing individuals and populations. This efficiency improvement can provide populations to be screened faster with less cost, potentially mitigating false-negative results. The scale of improvement, that AI presents, will result in premium quality to health care and unite health care providers with AI, augmenting health care and transforming the industry into a unified discipline that will drastically improve patient health care.

AI can reduce disparities and discrepancies that are observed in healthcare and augment service lines such as radiology and cardiology—where early cardiac detection can reduce extended hospital admissions and length of stays (Dilsizian & Siegel, 2014). Tang et al. (2018) supported the need for utilizing AI as it will aid in workflow optimization and automated detection of brain hemorrhages, additionally, providing conformity to provide standardization of quality in radiology departments. Miller and Brown (2018) agreed that AI has the ability to detect carcinomas and differentiate between malignant and benign, furthermore improved diagnostic accuracy for tumor detection. Support for AI also notes the opportunities to detect diabatic retinopathy and macular edema improving diabetic care and outcomes. Also in the cardiology service line, heart failure has the potential to be predicted with more accuracy than other assessments.

Jiang et al. (2017) mentioned that AI plays a central part in healthcare, more specifically in diagnosis, early detection, treatment in service lines such as: cardiology, oncology, and neurology, furthermore, AI can be trained to assist, screen, diagnose, and assign treatment guidance to patients. In terms of cost, AI has offered cost reduction opportunities within early

detection of strokes and the timeliness of patients receiving treatment. This has motivated the

deployment of AI where stroke management and centers exist.

Jiang et al. (2017) spoke to the fueling and active discussions of AI and potential

replacements of human physicians in the future. As AI presents the assistance two health care

providers to make better clinical decisions, AI techniques can unlock abilities to drive premium

healthcare opportunities to the consumer. AI-based tools and ML techniques are increasingly

powerful when discussing cancers, neurology, and cardiology. There are AI systems that assist in

diagnosing cancers, GI tools daft can restore movements in quadriplegics, and AI systems to

detect heart disease. These three areas are there the three leading causes of death. Creating a

great opportunity for early detection to be achieved and improve healthcare throughout. ML

algorithms and deep learning Kim assist in the prevention and treatment for stroke, as well as

predict outcomes and prognosis evaluation. AI and healthcare can substantially improve disease

diagnosis and treatments.

Jiang et al. (2017) mentioned that hurdles exist specifically in regulations and lack of

standards to assess safety and advocacy. The guidance from the FDA can be considered loosely

and need to provide real-world justification, besides clinical trials, when assessing the

operational characteristics of AI systems. Furthermore, data exchange is in view, as initial

training is continuous and the abundance of healthcare data that flows in and out needs to be

protected. Players have shifted from rewarding the volumes of treatment to successful outcomes.

Insurance companies are reimbursing medication and treatment procedures by its efficient

outcomes. With reimbursements driving health care, health care facilities along with other health

care stakeholders have greater incentives to gather and exchange data; and adopt AI to increase

the effective outcomes of health care.

Yu et al. (2018) commented on the positive outcomes that AI provides to healthcare mentioning the successful integration in the ancillary service lines, more specifically radiology, ophthalmology, dermatology, and pathology. The clinical workflow, diagnosis, and treatment plans are domains where AI has delivered tremendous value. Radiology has observed an increase in requests for computer-aided detection (CAD) due to the ability for AI to utilize deep-learning techniques to detect and diagnose lung nodules, breast masses and tuberculosis. Dermatology, in terms of diagnosis skin lesions, utilizes AI neural networks to outperform the average dermatologist and improves accessibility of lesion screening. Ophthalmology has observed dynamic outcomes as well. Yu et al. (2018) described that deep learning can extract new information from previous data, playing a central role in identifying causes of blindness, while in pathology, AI can augment healthcare by detecting cancers.

Furthermore, Topol (2019) discussed the attention that AI is receiving from ancillary services as well, mentioning that radiology is utilizing deep neural networks (DNN) to assist in medical imaging. AI is driving premium results in evaluating strokes, aging in bone films, cancers, and cardiac imaging. Furthermore, AI is working faster and has demonstrated the ability to interpret scans 150 times faster than clinicians. Within radiology, AI provides a reproducible opportunity to obtain high levels of accuracies and clinical outcomes. Topol (2019) mentioned while pathology has not adopted AI as fast as radiology, the ability to improve accuracy and the speed of interpretation is observed, creating faster workflows and turnarounds to patients. Dermatology has observed an improvement of performance when using deep neural networks when comparing AI to dermatologist. Deep learning extends in the ophthalmology service as the ability to perform and interpret optical disorders are noticed with similar efficacy as ophthalmologist. Other service lines such as cardiology, gastroenterology, and mental health

witness additional value when implementing deep neural networks, providing diagnosis and suggestive medications.

Sensmeier (2017) remarked on the benefits of AI and its ability to transform healthcare delivery, while improving patient safety. As medical errors exist in healthcare, AI can reduce the number of medical errors, Miller and Brown (2018) mentioned that AI can contribute two more accurate diagnoses, predict patient outcomes, reduce costs, and offer personalized treatment plans. Personalized treatment plans can drastically improve health care today and in the future. AI in combination with EHR can demonstrate its power to provide tailormade treatment plans; radically transforming healthcare. Furthermore, Miller and Brown (2018) commented on the predictive analysis that AI delivers to healthcare to assist in identifying and analyzing disease patterns, suggesting optimal treatments, understanding hospitalizations and re admittance—while improving patient safety. Clinical decision support is a tool within the EHR system that clinicians utilize to enhance decision-making. Miller and Brown (2018) spoke to the synergies of AI and that clinical decision support two deliver alerts in life threatening abnormalities, drastically reducing the number of medical errors and diagnosis, and enable providers to make better decisions in certain areas. AI delivers the opportunity to augment providers to improve the quality of care and Miller and Brown (2018) vocalized the ability to create efficiency improvements as AI assists clinicians, reduces burnout, improving quality, Anne enhancing patient outcomes.

The Role of AI in the Future of Healthcare

AI plays a central role in improving the delivery of health care to the consumers. The impacts of AI are already felt in larger academic facilities and high-volume hospitals. The ability that AI delivers to any facility are highly valued by the stakeholders. Understanding the impacts

of AI are critical to the overall acceptance of its adoption, improving patients experience,

creating a healthier community, ultimately reducing healthcare costs. Davenport and Kalakota

(2019) stated that AI will play an important role in the future of healthcare, especially as

development of AI is increased and credibility is observed due to the early impacts of providing

early diagnosis and treatment recommendations. Acknowledging the rapid advancements of AI,

radiology and pathology will experience the greatest impacts but then health care. Davenport and

Kalakota (2019) added that AI has seen its place but then many industries and is encroaching

into healthcare. The technologies that AI delivers have the potential to transform patient care,

quality of care, and cost.

Dash et al. (2019) inputted the future opportunity for using AI-enabled mobile devices.

and the impact of using these devices to improve healthcare by accelerating communication

between patients and clinicians. AI-based applications provide direct access to two real time

status of the body, improving wellness planning, encouraging healthier lifestyles; affording

patients to become their own advocates in healthcare. Clinical decision making, using electronic

health records, can lower costs, provide better access and management, and afford insights prior

to scheduled exams. In healthcare, AI has found its niche and the decision-making process in

service lines such as radiology, pathology, and cardiology. Furthermore, strategies are being

refined to assist in the generation of documentation prior to clinical visits. Additionally, AI uses

healthcare data to assist clinicians to make better clinical decisions. In radiology, AI-enabled

software is being integrated into the Picture Archiving and Communication System (PACS) To

enhance diagnostic capabilities.

Fogel and Kvedar (2018) provided a glimpse into the future regarding AI-enabled

technology, specifically to the ability of detecting skin cancer using mobile devices, reducing

access times in clinical settings. When evaluating diabetic patients, AI can screen for diabetic

retinopathy with increased speed and accuracy to provide early detection and treatment plans,

improving eye health. Fogel and Kvedar (2018) also mentioned the potential of AI-enabled

technologies that will perform simple tasks, enabling clinicians and healthcare staff to focus on

the more complex procedures.

During the pandemic, there is a need to monitor and control the spread of COVID.

Vaishya et al. (2023) spoke to the impact that AI technology has within healthcare, moreover, the

ability to identify high-risk patients, possibly predict mortality risk, and present suggestions

regarding infection control. Early detection provides quicker notifications allowing AI to respond

by effectively monitoring and predicting the potential spread. Furthermore, AI allows healthcare

officials to understand clusters and predict reappearances. In imaging, CT and MRI, along with

the utilization of AI can diagnose symptomatic patients quickly, while AI assists healthcare

officials to identify regions of vulnerability. Additionally, Vaishya et al. (2023) discussed the

ability for AI to project cases and mortality, analyze data and design drug development, reduce

workload on healthcare workers, and lastly help future virus prevention efforts.

Data collection and AI offers strategies in the fight against epidemics. Chang (2020)

discussed how AI and technology are combining to develop cases in the case of future pandemic

breakouts. Taking in data across healthcare, AI has the potential to effectively anticipate and

offer containment strategies and Chang (2020) mentioned that AI-trained models are utilized to

manage healthcare. The synergies between AI and healthcare also have the potential to design

new medication for potential future breakouts. In agreement, Wang et al. (2021) joined in by

communicating that AI and healthcare can enhance the diagnosis and detection of COVID. More

specifically, the utilization of AI can assist clinicians in triaging patients with COVID and facilitate the discovery of new treatment drugs.

Discovered Themes

When examining the existing literature, there were themes that arose. Healthcare needs help and AI appears to solve some of the challenges that currently exist within the healthcare industry. Access, quality, and cost are some of the key dilemmas that healthcare stakeholders are faced with, impacting the consumers of healthcare. The ease of providing healthcare to the consumers will tremendously impact the gamut of stakeholders. However, the problem exist as AI and healthcare are not in full cadence with each other. Many of the themes observed within the literature were around the positive impact that AI has already delivered and the trust of AI within the industry.

The excitement was apparent. Positive outcomes are already appreciated by healthcare leaders from early detection of cancers to improving access concerns, managing patient volumes in times of potential staff shortages to assisting clinical decision-makers. One of the key points surrounded AI and its assistance with reducing time for patients within the healthcare systems. Whether it means faster throughputs in radiology or physician-to-physician interaction, AI is impacting the efficacy of healthcare by reaching diagnosis earlier, notifying decision makers, and reducing time for clinical leaders to obtain critical healthcare information.

Another clear theme was the apprehension that healthcare leaders have vocalized within the literature. With the vast amounts of healthcare data that is needed, segments of healthcare are wary of the security risks. Breaches and inaccurate data sets posed challenges for healthcare leaders, as inaccurate data sets could lead to negative healthcare outcomes, while security breaches would create tremendous negative outputs that would cascade into other areas.

Moreover, the accountability concerns were discussed. With AI assisting with diagnosing and assisting with healthcare decision-making, biases are observed. The inability to ensure that biases are incorporated within data sets has challenged AI and its validity in decision-making towards ethnicities. Additionally, the inability to explain why decisions are made by AI, who owns that data that is needed to train and supervise the data, what happens if AI fails were all themes that the literature presented.

Summary of the Literature Review

An evaluation of the literature demonstrates the need for AI in healthcare, furthermore, the impact of AI when adopted and utilized. The role that AI plays can lead to improvements in healthcare dilemmas such as cost, access, delivery, and quality of healthcare. Healthcare stakeholders can appreciate the outcomes that AI delivers—additionally, the stakeholder's assessment of the criticality of AI in healthcare. Factors that need to be considered such as cost (e.g., investment), need (e.g., clinics versus large hospitals), the unawares of the holistic impact of AI need to be discussed, revealing some of the reasons why AI is not universally adopted. However, AI has a place in the healthcare industry, moreover, in every healthcare facility; leading to an improvement in the challenges that healthcare facilities routinely encounter.

Transition and Summary of Section 1

Healthcare stakeholders have the opportunity to deliver quality of care, without compromising access times or increasing cost. AI places tools into the stakeholder's possession that can impact provision of care, especially within the efficiency space, revolutionizing healthcare holistically. Creating opportunities to enhance quality of care, improve access by reaching out to rural communities, and faster diagnoses are observed when AI is utilized, providing efficacy and efficiency. Additionally, stakeholders look to find ways to motivate

providers leading to superior care, while ensuring consumers that their facilities have up-to-date

technologies. Moreover, AI can provide the prospects to minimize medical errors. The synergies

of AI and ML can organize healthcare data, predict no-shows, and assist physician healthcare

management, offering innovative openings for efficiency solutions. These solutions drive

investment opportunities with healthcare providers and technologies, while affording different

leadership perspectives for healthcare stakeholders.

      The opportunities to improve healthcare were extrapolated by healthcare leadership

through surveys; collecting data from Texas healthcare facilities who have leveraged AI and

providers who had not utilized AI in their facilities. Their responses assisted with understanding

how AI is impacting their respected facilities, pertaining to quality, access, and cost efficiencies

that healthcare stakeholder's encounter. Furthermore, the review of literature affords an

exhaustive approach to understand what impacts have already been appreciated within the

industry. The synergies of both leadership surveys and the exhaustive literature review will drive

the need for AI within the healthcare industry, moreover, the impacts on leadership.

Section 2: The Project

Artificial intelligence, also known as AI, has encroached many industries, delivering a range of impact points when utilized. The healthcare industry is no different. Stakeholders have observed AI driving positive outcomes that are still transforming the industry to assist providers and the consumers. However, there are still facilities failing to utilize AI and there is a need to examine reasons healthcare stakeholders are not adopting AI into their respective healthcare facilities.

Purpose Statement

The purpose of this qualitative multiple case study using flexible design was to expound on the impact of AI within Texas healthcare facilities and describe the failure of utilizing AI, outcomes resulting in the facilities where AI is not utilized, and the impact that AI has upon the decision makers within healthcare. Key decision-makers within the Texas healthcare facilities are faced with efficiency challenges, more specifically within the cost, quality, and access segments. These challenges were exhaustively explored through a comprehensive study that revealed the impact that AI has on Texas healthcare facilities.

Role of the Researcher

The role of the researcher was significant within this scope of study, as there was the need for a deeper understanding of uncovering the lack of adoption and/or utilization of AI within healthcare. Acknowledging the abundance of published literature regarding the impact of AI in healthcare, the researcher assumed that the stakeholders were not aware of the breadth of impact across the facilities that are outlined in the purpose statement. This created a clear and concise research, removing assumptions that the stakeholders, including the researcher already possessed. The researcher delivered research questions to key decision-makers within the Texas

healthcare industry and selected facilities that were high-volume, academic, and critical access facilities. This delivered a greater outlook across the spectrum of healthcare facilities, as there were variables within each facility that must be considered. The overall expected outcome provided an in-depth analysis from various locations and obtained their perspective on AI and reasons why it might or might not be adopted.

The need to utilize bracketing was central to this qualitative study. Tufford and Newman (2012) discussed the importance of bracketing and how bracketing can drive profound results, while mitigating emotional interference that could promote tensions within the study. Removing personal bias from both researcher and healthcare stakeholders was critical and to perform the researcher assumed a position of objectivity. Delivering a clear approach to healthcare decision-makers and why AI is or is not utilized needed to be teased out by the researcher. Furthermore, a rigorous discussion needed to be had between the stakeholders and the researcher to ensure that there are not any presumed, subjective conceptions regarding the subject of AI. Organizing the rollout of questions to stakeholders that lack presumptions was key, while ensuring that clarity is delivered when surveying stakeholders. Those steps helped absolve the threat of subjective results that could dampen the research and its outcomes.

Overall, the researcher needed to understand the criticality of their role and the importance of removing bias from the researcher. The expected outcome of the researcher produced additional information that literature and stakeholders can appreciate. Additionally, the points that are produced from the research will help drive the overall adoption of AI into the healthcare industry, promoting efficiency opportunities across the stakeholders. Lastly, the need to utilize bracketing within the research approach was vital to mitigate potential preconceptions

that stakeholders may possess. Driving out preconceptions and biases promoted a thorough, much needed outcome towards AI and its impact on healthcare.

Research Methodology

This study was conducted with a flexible design using qualitative methods specifically, a multiple case study design was used. The case study afforded the opportunity for an in-depth evaluation, utilizing analysis of specified communities where AI is used. Utilizing a qualitative methodology provides an incorporative practice that makes the world visible by employing field notes, interviews, conversations, recordings, and memos, delivering a sense of representations of the world (Denzin & Lincoln, 2011). Furthermore, Creswell and Poth (2016) agreed that there are multiple methods to gather information: interviews, observations, and documents rather than rely on a single source of data. Guiding the research, the qualitative methodology provided opportunities to present a contextualized view of the account, then due to the problem and its need to be explored, the researcher leveraged the power of relationship with the participants to deliver clarity through experiences (Creswell & Poth, 2016). As the view of AI and its need in healthcare increase, leveraging a bevy of personalized experiences created a strong sense of realism. This was performed through the researcher and the participants. Additionally, granular data points (experiences) offered the ability to understand and address gaps to assist in explaining the problem and presenting a clear worldview. Creswell and Creswell (2018) validated this approach by vocalizing the usage of learning from multiple participants from an exploratory lens. Moreover, the approach created a comprehensive coverage of the field of study through the participation of those who have experienced the phenomena (Robson & McCartan, 2016).

From a flexible design perspective, there were qualities that need to be observed such as: multiple qualitative data collection; framing the study with assumptions and views from multiple realities; the researcher needed to understand relationships; analyzing data from multiple levels of abstractions; lastly, demonstrating a clear and engaging experience, providing a sense of realism and belief (Robson & McCartan, 2016). Furthermore, the researcher demonstrated certain skills to extrapolate data ensuring that there is a firm grasp on what is being researched. Demonstrating question asking and good listening skills, adaptiveness, and flexibility, grasp of the issues and lack of bias were needed to be effective when carrying out a quality flexible design research (Robson & McCartan, 2016). Exhibiting these skills regarding the problem statement, provided the opportunity to deliver a clear, realistic understanding towards the problem. Additionally, a bevy of experiential data points from multiple facilities framed a strong sense of realism.

Other designs were considered for the research such as fixed and mixed methods; however, they were not believed to be best suited for this research. Robson and McCartan (2016) communicated that fixed designs are theory-based and can be considered risky due to the inability to capture individual behaviors. Furthermore, there is need for the researcher to remain detached and/or distant from the research to remove potential influences that the researcher may deliver. In terms of design approach, there was a need to remain close to the research to understand the impact of AI and the healthcare stakeholder's perspective; particularly, those who have experienced AI and its impact and the stakeholders who have elected not to utilize AI. A fixed approach will not permit this type of interaction, nor will a theory-driven approach be deemed acceptable. Regarding mixed methods and the quantitative-qualitative design, there are benefits that cannot be understated. Triangulation would create validity in findings, neutralizing

limitations, the ability to vividly illustrate data, utilizing qualitative data to illustrate quantitative findings and explaining findings when unusual findings emerge (Robson & McCartan, 2016). However, the complexities of the mixed methods raised concerns, hence the direction of utilizing flexible design. Robson and McCartan (2016) communicated that there could be a lack of integration of findings, possibly producing a disjointed and unfocused research approach; furthermore, timing concerns existed with the quantitative research being completed before the qualitative side is performed. Lastly, when using the mixed methods design, a pragmatic approach is observed and if the approach is poorly executed, the outcomes of the research will be severely impacted (Robson & McCartan, 2016).

Other qualitative approaches were presented, such as a narrative, phenomenological, grounded theory, and ethnographic research, however, when examining these approaches, they would not have provided the opportunity to obtain granular responses. The narrative research strives when collecting stories from individuals who can share a life story. The story approach can be appreciated through a biographical form or an autoethnography where there are multiple layers of a personal story (Creswell & Poth, 2016). If the researcher could achieve in gathering the rich data needed to demonstrate the centrality of AI and healthcare, this approach would sill observe challenges as the narrative approach solely centers on an individual's life, making this approach an unideal fit. Additionally, the phenomenological research approach utilizes a similar approach, however, focuses on lived experiences from several individuals who shared a similar experience or phenomenon.

Emphasizing on a phenomenon through multiple persons can be resourceful due to the collection of data that is needed. However, the captured data can come from a variety of sources such as poems, documents, and observations (Creswell & Poth, 2016). Identifying a population

that has a shared experience could present an extremely large sample size and any attempt to glean useful data can be difficult for this specific topic. The grounded theory research design moves to present and/or generate a theory. This approach does not fit within the healthcare space as any theoretical approach would need to be tested on samples and individuals. Lastly, the ethnographic research examines the behaviors, values, and beliefs of a group who have shared in similar process (Creswell & Poth, 2016). Driven by the culture of a group, the researcher investigates the social aspects of any particular group and look to explain the patterns through the gathering of data. Healthcare and AI does find its role and could be examined to understand its effect on the healthcare culture; however, the researcher would need extensive time to observe and capture the depth of the healthcare culture; communicating the response to AI in the healthcare field.

Utilizing the multiple case study design, the communities within the healthcare industry that leverage AI into their practice will be in focus; providing a rich understanding of the need of AI in healthcare where AI can be researched, described, and analyzed. Creswell and Poth (2016) vocalized the hallmark of a good case study is to present an in-depth understanding of the case, furthermore, the need to have a clearly identifiable case that the researcher sought to focus upon through the collection of multiple resources (Creswell & Poth, 2016). Examining AI and its need in healthcare from a multiple case design provided a clear and tangible investigation of the problem of why there are issues when AI are not deployed can assist with a more in-depth understanding of the need of AI in the healthcare industry. Yin (2017) communicated that there must be a clear methodological path within the case study approach. This is enabled by obtaining and understanding information to provide a revelatory outcome.

Additionally, Robson and McCartan (2016) communicated a guidance for synthesizing multiple sources of evidence. Needing a strategy, that is, undertaking an empirical investigation of a phenomenon, utilizing multiple methods of data collection for evidence (Robson & McCartan, 2016). The need to utilize multiple facilities provided a granular outlook of the efficacy of AI in the various facilities. Yin (2017) mentioned the opportunities to demonstrate concrete cases when utilizing multiple cases; additionally, having more data points to afford more specificity, concluding with discoveries and clarity through the research question (Yin, 2017), thus, validating the need for AI in healthcare. This approach ensured that validity is projected and observed, emphasizing triangulation. Furthermore, the multiple case study approach engaged multiple healthcare stakeholders to impact the research and present multiple perspectives that focus on a collection of data points regarding the phenomenon of AI within the healthcare industry. This provided consistency and multiple sources where commonalities exist such as stakeholder's role, interactions, and decision-making capabilities.

When considering the appropriateness of the research design and method, the need to consider that the need to ensure a rich delivery of information is expected. There is a need to examine the stakeholders and their perspective of AI. Acknowledging the impact of AI through existing literature is expected to be observed, however, investigating the "why" AI is not adopted needed to be gleaned out of the research. There were multiple opportunities to receive data points and obtain descriptive information that the healthcare industry can appreciate, but the need to select the correct research design and methodology needed to be examined and deployed.

Participants

Participants for the study were from academic and research hospitals, as well as healthcare leaders within the hospitals of Texas (i.e., rural, trauma). These stakeholders were

able to communicate the "why" AI has or has not been adopted, furthermore, offered valuable

information that provided premium insights to how healthcare leaders think about AI and its

offering within the healthcare segment. There was a need to discuss, with more granularity, these

stakeholders that were being leveraged and labeled as the population, additionally, going in-

depth on the sampling--its methodology, frame, and why the sample and its size are appropriate

and lastly, gaining access to the population.

Population and Sampling

The composition of the population that were sampled derived from healthcare facilities

within the South Texas region. Healthcare leaders from academic and research facilities provided

rich data collection opportunities due to their proximity and access to Artificial Intelligence.

With many of these facilities leveraging AI, these facilities and healthcare leaders were able to

outline some of their experiences, challenges, and the impact of AI. Moreover, there were

occasions where healthcare stakeholders were able to vocalize valuable information that offered

insights to their multiple experiences where AI was not leveraged versus localities where they

were employed, and AI currently exists. Furthermore, critical access hospitals and their

healthcare leaders were within the scope of the population as they delivered potential challenges

of adoption.

Table 1

Participants who were Surveyed

Location	Healthcare Leaders
South Texas	21
Total	21

Table 2

Participants who were Interviewed

Location	Healthcare Providers	Healthcare Managers
Academic	3	3
Trauma	1	5
Rural	0	4
Total	4	12

Discussion of Population

These facilities and their respected stakeholders provided a large number of understandings of AI and its need within healthcare, due to the variety of their respected missions of their healthcare facilities. The sample size needed to be large enough and within the healthcare facilities within South Texas, there was enough to ensure that the sample size was attained. There were many trauma facilities, along with academic and research hospitals and lastly, numerable critical access hospital existing within the rural areas of South Texas to glean from.

Discussion of Sampling

According to Creswell and Poth (2016), the preferred sampling method for a case study is purposive, which allows for maximum variation to represent holistic representation of various samples. The sites that are being discussed are various and the need to collect detailed information from each site is central to the outcome of the research. Maximum variation strategies provide the ability to document diverse variations where samples derive, moreover, where the sites have particular characteristics (Creswell & Poth, 2016). Gleaning the data from

various sites within the South Texas region proposed a potential variety of data, meaning some

of the sites have differences in their missions and budgets. This means that there needed to be a

grounded method to identify where common themes exist.

As for the sample frame, healthcare facilities and their respected healthcare leaders—

where the dilemmas of access, quality, and cost are observed. Additionally, these healthcare

facilities where leaders have experienced the need and/or observed the impact of AI is critical to

understanding AI and its need within healthcare. These sources came from various localities

within the South Texas region. Some were trauma facilities, where access and cost are

heightened, whereas some were academic and research facilities in which quality are more in

focus. However, subjectively the more interesting facilities were the critical access hospitals due

to the constraints of funding and needing to create access points within the healthcare systems.

In terms of the sample and its size, questions were asked to a proposed 100 facilities and

their leaders. These questions will not lead the leaders to an answer but be plain and simple to

tease out honest and critical data. Furthermore, the size of 100 should create enough

opportunities to ensure that validity and give enough of a sample size to offer a comparison of

the healthcare industry. These facilities and their responses will assist with reaching saturation,

meaning the 100 samples should reveal redundancy. Gaining access to these facilities might be a

challenge given the time and scope of the project, however, the researcher is currently employed

within the healthcare industry and there are opportunities to reach out and connect with

contemporaries within the field to assist with gaining access to the healthcare leaders within

South Texas.

Data Collection and Organization

When collecting data, there were many considerations. Factors such as gender, ethnicity, and preference were considered, and when obtaining data for understanding AI and healthcare, the healthcare stakeholders provided similar factors that were reflected upon. Creswell and Poth (2018) mentioned that locating the correct types of stakeholders surveyed, obtaining permission, collecting the data, and validating that the outcomes are not biased are critical to the data collection planning process. Ensuring that the correct instruments were used when collecting the data, moreover, organizing the data was central to understanding the problem and providing additional data as to AI and its need in healthcare.

Data Collection Plan

There are important steps in the data collection plan. Identifying the correct locations was one of the most important. In order to obtain vital information, the plan included face-to-face interviews, surveys were sent out to a variety of locations, and follow-up interviews. The sites that were interviewed included trauma facilities, academic hospitals, centers of excellence, critical access facilities, and rural (community) hospitals. Furthermore, within the facilities, stakeholders who provide healthcare and decision makers were interviewed and most importantly informed why they were selected. And lastly, one of the central considerations were facilities where AI is utilized and hospitals where AI is not utilized. The reason to spread out these interviews and surveys is to understand where AI is impacting healthcare and to understand why AI is not utilized. These procedures were central to obtaining the much-needed data. Furthermore, Yin (2017) commented that there will be a need to create a clear schedule, including specific time periods and understanding the availabilities of the subjects being interviewed. The more organized the interviewer is the more efficient (from planning for

potential changes) the research will be. Additionally, as this a case study, Yin (2017) remarked that there will be an accumulation of plentiful documents from the selected sites, lending to the need of an organized approach that entails emailing and properly storing documents, while creating PDF hard copies, when electronic versions are not available.

Creswell and Poth (2018) provided more guidance with data organization by remarking that the development of protocols when collecting data is critical and that the researcher should be aware of certain field issues, meaning having inadequate data from the sites. These two important staples provided dynamic guidance within the data collection scope of the research. First, the development of protocols aided within the capturing and recoding planning of this segment. Lending to the protocols, a descriptive plan directed the surveys and interview towards leaders within the industry, while teasing out their understanding of the phenomenon of AI, was vital to the collection of data. Moreover, there was a need to anticipate the possibility of field issues. The need to obtain premium data was critical to the research and while specific sites were identified, the questions were specific to driving the outputs of why AI is or is not adopted within the healthcare industry.

The research questions assisted with extraction of valuable data that, in turn, were collected, organized, and stored. Emailed questions provided swifter responses and, in the case, where a need for follow-up, face-to-face activities were scheduled and acted upon with the stakeholders and members of the research. Additionally, there were cases where new questions needed to be asked, the researcher ensured that those responses are widely spread throughout the interview process. These follow-up actions provided granular outcomes to ensure that every segment of the research is being captured and the research questions are understood and answered.

Instruments

There were a few avenues to select from when collecting the data. Instruments such as surveys and interview guides were used to capture relevant information within the research. Capturing the information needed for the research led to a few follow-ups, however, the in-depth questions on both of the interview guides and surveys that were drafted ensured a granular outcome in terms of responses. Within the appendices, copies of both the interview guide and surveys is observed and were referenced. Robson and McCartan (2016) commented on the commonality of surveys but also how they may take up time, effort, and challenges carrying them out. However, within a smaller sample size, electronic surveys are the best approach to ensuring that the questionnaires are delivered. The captures of central information were obtained through the surveys, especially with follow-ups, leveraging the manifold connections with the healthcare industry.

Within Appendix A, there is the interview guide. The questions guided the participants and allowed answers, while uncovering dynamic revelations. Within the research, there were a few questions that need to be answered. One of which is to discover why there is a failure to adopt AI in healthcare. The interview guide addressed the interviewee's experiences and concerns regarding AI, providing critical data for the researcher to understand why there is a failure to adopt AI. Furthermore, there was a need to understand the impact of AI within healthcare to justify the need within the industry. The fifth question within the interview guide aided in uncovering the impact, where AI is adopted and utilized. Lastly, there was a need to uncover the thoughts of the interviewee. The second question assisted the researcher with comprehending the interviewee and their exposure to AI. Some of the interviewees added more

color to their responses, then led to an additional follow-up, and provided more insights as to why there are some facilities that leverage AI and others that do not.

When evaluating the surveys, they were sent out through the contacts within the South Texas healthcare industry. This survey, found in Appendix B, offered a simplistic approach to understanding AI and healthcare. The questions were specific in nature and concise, not taking much thought and time offering a greater opportunity to gather a larger sample size. The survey questions offered an opportunity to add more color and potential answers to the research question asking about the role that AI would have in healthcare (see question #4 in Appendix B). The survey questions and the research questions correlated and provided more depth to the research paper, furthermore, the answers from the survey provided additional follow-up opportunities and led to a few more in-person interviews. Utilizing Survey Monkey as the instrument (tool) to deliver the surveys ensured that participants that were located throughout regions that could not be reached, without breaching the current scope of South Texas. This route was used and found to be reliable providing an easy method to capture results. Additionally, from a validity standpoint, the tool afforded a deep saturation of samples with enough to observe reliability as well.

When considering the data that was captured through interviews and surveys, there was a huge appreciation of provided sample to observe a wider perspective of healthcare leaders. There were many sites using AI, offering many opportunities to utilize the data that already exists. The researcher gathered, examined, and determined that these data points were relative to the research questions within the research. Much of the data that were collected were deemed pertinent and were posited within the research, analyzed along with the other data were collected.

Data Organization Plan

The approach to organizing data was simple. There was a need to separate both interview and survey data. The survey data were easy to collect and organize since it was captured via email, moreover as Creswell and Poth (2018) remarked that this type of data allows more time to review, connect with the hard-to-reach groups, and determine if there is a need any follow-ups. When fully captured, the survey data will be organized and separated from the interviews. The interviews were organized and labeled for the researcher to ensure that all of the participants are categorized by location (i.e., trauma hospital, academic facility) and role (e.g., end user, healthcare executive, etc.). Yin (2017) mentioned the advantage of creating a database where categorizing the data into fields helps the researcher with storing, organizing, and retrieval of the collected data. The expected data were observed in the forms of interviews and surveys; additionally, was critical to organize the data properly as there were numerous sites and roles. From sites (trauma to rural), to mission-driven (academic to research), and to the stakeholders (new to tenured) data were gathered, and the various instruments used to capture that data were organized in such a manner that it made it easier to schedule follow-ups.

Separating the interviews into categories (role and location) were vital to understanding why AI is not widely adopted across healthcare and not in a specific sector of the industry. There was a central need to understand where AI is adopted and chosen not to be adopted, also why AI was not elected to be adopted and who is making these decisions. That is why, with organizing the data collection, there was a need to understand, label, and remark "where" and "who" was interviewed and surveyed driving a holistic picture of the South Texas healthcare system and how AI was viewed within the region.

Summary of Data Collection and Organization

When considering the need to have an organized plan to collect data and subsequently organized the collect data, the research needed to take steps in having a solid game plan. With the variety of facilities, participants, and localities, there was a large amount of data to be collected. To ensure that the data were identified and utilized within the research, the researcher needed to label both the surveys and interviews. These tools (e.g., interviews and surveys) were the net of which all of the data were captured. Furthermore, the data were analyzed to ensure reliability and with a large sample size, there will be enough to ensure validity. These tools were used to capture data in-person and via the internet (e.g., email, etc.), and provided the ability to reach rural facilities, trauma hospitals, and academic locations where AI is or is not adopted and utilized. When the data were captured and organized, the researcher was able to analyze—affording well-rounded research.

Data Analysis

After organizing the data, there was a need for continued analysis. Reading over the data, taking notes from what has been captured, classifying the data, assessing interpretations, and discussing how to represent and visualize the data were the next steps of the research. Those next steps assisted the researcher with the process of conducting the research in an organized manner, removing possible rework and waste. Lastly, the data were placed in software to assist the researcher when time savings and offer opportunities to retrieve, link data, and share data.

Emergent Ideas

According to Creswell and Poth (2018), there was a need for the researcher to immerse themselves into the details of the data and identify phrases, ideas, and central concepts that foam up to the top of the interviews and surveys. After granularly examining the data, taking detailed

notes on the captured data determined larger thoughts that the subjects have communicated. It was vital for the researcher to jot these thoughts and document these concepts in a systematic approach which uncovered trends in the data that lent to a more developed research output. Highlighted by the researcher, these memos provided substantial opportunities to appreciate the content offered by the subjects, subsequently, affording the occasion to categorize them into potential themes. Corbin and Strauss (2008) also communicated that after analyzing the data, emerging patterns will be observed, and it is vital to scribe (memo) to move the analysis forward.

Coding Themes

The next step is describing and classifying codes into themes. Creswell and Poth (2018) communicated that this is where researchers develop granular descriptions, apply codes, build themes, and offer explanations of what has been identified. There was a need to make sense of what has been uncovered through the research, additionally made sense of the data, the researcher gathered the data and categorized the findings into codes. These categorized findings were assigned a label/code, leading the researcher to code the findings by descriptive themes. The coding procedure afforded a relationship visualization and when examining the locations and stakeholders of the study, there was a simple, efficient way to investigate the information in a detailed approach. Lastly, coding themes aided the researcher with making sense of the data collected from the interviews and surveys.

Interpretations

In the development, assessment of interpretations offered a critical view of learning what the data represents. The existing data lent to more questions or follow-ups. However, the researcher needed to locate patterns, summarize, and determine if there are surprises with the findings (Creswell & Poth, 2018). Patton (2014) commented on the need to utilize careful

judgments regarding what are meaningful patterns and themes. This was extremely critical to the research, ensuring that proper interpretations were being sought after. The formation of the interpretations resulted in the examination of the data within the interviews and surveys and were evaluated with granularity. After careful gleaning of the interviews and surveys, the researcher examined outcomes and compared them with existing literature. There was a need to be creative when examining the interviews, as themes emerged and coding took place, prompting the researcher to evaluate patterns and judgements, before developing an interpretation. Lastly, the iterative process needed to be considered in the case there are challenges with the interpretations and existing literature (Creswell & Poth, 2018).

Data Representation

Representing is the final phase of what Creswell and Poth (2018) communicated as the data analysis spiral. A visualization of the data in a text or figurative form to help established a visual appreciation of the packaged data (Creswell & Poth, 2018). Searching through the data and deciding how to visualize the data was important, and obtaining feedback from contemporaries within the field of research was appreciated, aiding the researcher to select the way to represent the data so that it is easily digested. Displaying the data assisted with verifying conclusions, validating the collected data, and ensured that there was not a need for revisions.

There were a variety of ways to represent the data. When examining the need for AI and its impact in healthcare, this phenomenon (AI) needed a general template as these are personal experiences were teased out of the subjects. The need to scribe the statements from the surveys and interviews, then group them, assisted the researcher by providing a foundation of the discussed experiences and potentially eliminating redundancy. Additionally, reflecting on the

experiences provided substance to drive an exhaustive representation of the phenomenon of AI within healthcare.

Analysis of Triangulation

To ensure the credibility and validity of the research, the was a need to triangulate the data. Within the interview process, there was the need for specificity regarding the description of the questions and alignment of the outcomes with other data sources such as existing literature, contemporaries, and surveys from other locations. In qualitative research, the researcher needed to clarify the subjects and their respected biases and determine if there is a rapport with researcher and subjects, enabling rich data outcomes. Lastly, having peer reviews kept the researcher honest, while the researcher devoted time and openness to sound feedback provided by the peers (Creswell & Poth, 2018). In the quantitative approach, the need to understand triangulation was critical as well. With the quantitative approach, the data captured within the initial research (interviews/surveys) needed to be validated and to do so, the research needed to allow for feedback from other peers within the field of study and other sources. The measured outcomes within the quantitative approach would have demonstrated weaknesses if triangulation was not observed, likewise, the qualitative approach needed triangulation. Within the specificity of qualitative research, the other data sources and peers provided validity and reliability for the AI and healthcare.

Summary of Data Analysis

Overall, there were multitude of steps discussed with Creswell and Poth's (2018) data analysis spiral. Gleaning over the data that was collected, taking notes with fine detail, then classifying the data from codes to themes, and synthesizing interpretations out of the data presented great opportunities to understand the interviews and surveys from the research.

Furthermore, the validation of data by utilizing triangulation and verifying the research outputs with peers within the industry, looking for feedback, and other potential data sources was vital. Attempting to understand the impact of AI within healthcare, stakeholder, various locations, and facility's mission provided detail-rich data and utilizing the data analysis spiral to capture and analyze the data to strengthen the research that is needed within the industry.

Reliability and Validity

When interviewing the participants of the research, there were many potential questions that arose. The challenges that arose within the survey and interviews were observed, as there were fears that many of the participants would be biased; leading the researcher to spend additional time within the field to understand the impact of the phenomenon and to observe the findings that emerged from the facilities. Reliability and validity are vital to the outcomes of research and needed to be addressed by the researcher to validate the findings and remove any unstable data.

Reliability

Reliability needs detail, furthermore, the detail needs to be stable and agreed upon by multiple coders (Creswell & Poth, 2018). The need for trustworthiness is valued within the research, and as the researcher, there were important measures taken to fend off concerns of credibility, transferability, dependability, and confirmability. Triangulation was observed when using the multiple case study approach, as engaging multiple stakeholders directly impacted the research and drove multiple lenses of how AI is impacting healthcare. From the credibility perspective, the stakeholders that were the subjects are healthcare leaders who lent strong insights to the current ongoings within the industry; moreover, from the researcher's lens, biases were removed by ensuring that valid, fully described data was acquired. These stakeholders

included providers and decision-makers within various facilities, offering a premium opportunity for triangulation. Having multiple facilities, while leveraging both surveys and interviews will additionally promote triangulation. Creswell and Poth (2018) mentioned that when the findings are transferable between the subjects and researcher, thick descriptions were critical to ensure confirmability and dependability.

Furthermore, as Robson and McCartan (2018) communicated that participant bias and error, along with observer error and bias needed to be cautioned. The perspectives of the subjects were extremely critical; however, bias and error needed to be in researcher's thoughts when interviewing and delivering the surveys. Moreover, as the researcher was dynamically infused within the market, bias and error needed to be cautioned by the observer as well. In order to mitigate these threats, direct instructions were delivered and adhered to by both the subjects and researcher. In doing so, the multitude of perspectives provided reliability. Additionally, transferability was addressed by the outputs of the interviews in their respective localities.

The interviewed stakeholders provided deep, detailed descriptions of the phenomenon of AI within the facility and removed the researcher's biases. This also answers the confirmability lens due to the neutrality of where the data are collected. The researcher did not interfere with the outputs of the participants, nor did the researcher attempt to cripple the results by adding preferences to the interview. Lastly, dependability was addressed by identifying locations where AI is utilized versus where AI is not adopted. This afforded consistency throughout the research; furthermore, validated by the surveys, and interviews, synergized the outputs of data towards the research.

Validity

Creswell and Poth (2018) dove deep into validation of research by remarking that the researcher's role needs to undertake the challenge of fact-checking the data. Additionally, Robson and McCartan (2018) mentioned the threats to internal validity as history, testing, instrumentation, regression, mortality, maturation, selection, selection by maturation interaction, ambiguity, compensatory equalization, and compensatory rivalry. Strategies were in place to ensure that these threats were absolved. Specifically, dealing with each of these individually created the ability to defuse these threats as they arise. In doing so, internal validity was appreciated.

The researcher gathered the collaborative amount of data, documented the data, and triangulated the data to validate. Triangulation was observed and when the need to neutralize potential challenges with validity, the sources from the multiple case studies was used along with the variety of sources to compare within the region. These data points from the across the region provided a substantial amount sample to establish credibility and accuracy as there was enough within the sample size to validate emerging, consistent themes when discussing AI within healthcare.

Bracketing

Tufford and Newman (2012) mentioned that bracketing can deliver profound outcomes, while promoting tensions within the research. Creswell and Poth (2018) described bracketing as the need for the researcher to set aside their experiences, providing a clear perspective towards the researched topic. It was imperative to drive a clear approach to the healthcare providers and decision-makers as to why AI is or is not adopted within healthcare, without any biases from the investigator. Additionally, with the removal of subjectivity, the researcher was successful to

understand why AI has not been holistically adopted utilizing the end-users where AI has been

incorporated, ultimately aiding in the research by delivering objective-based answers. Bracketing

assisted as the researcher removed their personal understandings of the phenomenon of AI in the

healthcare industry. Furthermore, the subjects being interviewed needed to be honest and

presented some understanding of what AI is and how it is used in other industries. The answers

were thick and free from subjectivity, as personal bias could have created cloudy outcomes. A

defined rollout of the interviews removed any presumptions, as the surveys were simple, and the

interviews were direct, eliminating the threat of toxicity from personal biases. These interviews

and surveys were organized and prefaced with assurance that bracketing is in focus.

Summary of Reliability and Validity

Regarding validity and reliability, both were in scope of the targeted rollout of the

interviews and surveys. In order to break down those threats of validity, triangulation needed to

be demonstrated. The number of samples, the neutrality of selected stakeholders, and variety of

sites provided an ease of trepidation when discuss validity. Interviewing selected sites within

South Texas activated multiple perspectives about the phenomenon of AI and its impact within

healthcare. Furthermore, the surveys assisted with a simplified rollout that led to concise

responses throughout the regions which delivered easy to plot data points and gave additional

perspective regarding the stakeholders' experience with AI. Additionally, from the reliability

perspective, the data were easily observed and valued due to answering the credibility,

transferability, dependability, and confirmability prospects. Having a multitude of sites and

stakeholders, reliability was achieved, furthermore, these sites created a saturation of samples

that delivered tremendous opportunities, delivering dynamic outcomes within the research.

Summary of Section 2 and Transition

For the research to deliver a stronger understanding of the why AI has or has not been adopted within the healthcare industry, there was a thought out, planned, and executed strategy. Unpacking the role of the researcher was critical, as the researcher needed to be biased from the research. Any biases could have toxified the research, ultimately demising the conclusions of the surveys and interviews. Having a direct purpose statement promoted guidance and a roadmap for the research, furthermore, discussing and understanding the methodology of the research afforded a dynamic opportunity for a successful outcome. The participants were thoughtfully identified, specifically the healthcare stakeholders within the South Texas healthcare facilities, to offer a bevy of samples in both surveys and interviews. The samples were collected, organized, analyzed, and examined to ensure that reliability and validity were observed. In summary, the usage of existing literature and newly delivered samples from research assisted in understanding how healthcare stakeholders regard AI and augmented the need for AI within the healthcare adoption.

Section 3: Application to Professional Practice and Implications for Change

Overview of the Study

AI is not novel to the world; however, it is the healthcare industry. AI has demonstrated the ability to enhance quality of providing healthcare and improve accessibility to care. There have been numerous occasions where AI has proven itself to drive positive outcomes that literature has validated. From early detection of cancer and heart disease to improving access times in radiology, AI had presented an opportunity to solve the challenges of cost, access, and quality. So, the question is, why is AI not holistically adopted within healthcare, especially if AI is mounting strong evidence generation in healthcare.

Needing to dive deeper into the reasons behind the lack of adoption into healthcare, research was conducted to peak into the healthcare leaders' mind within Texas and tease out their perspectives around AI and healthcare. With the conglomerate of leaders that were interviewed, there were many themes that were observed. Three segments of the Texas healthcare system were targeted: Academic, Trauma, and Rural hospitals. These segments provided a highly valued viewpoint into AI and healthcare. Furthermore, there were others within the Texas healthcare market that completed a survey to deliver their assessment as well. The healthcare leaders spoke about their experiences, or lack thereof, around utilization and/or understanding of AI in healthcare.

Some of the themes that were derived from the research were engagement or education, excitement, and anxiety. The main driver was centered around the lack of education or the need for engagement. By combining the two themes into one, the need of education, there was an overwhelming cry for more education within the healthcare industry. From provider/patient relationships to the questions where healthcare facilities have experienced troubles with AI.

Healthcare leaders have requested more information about AI. Other themes aligned assisted with answering the research questions that were posed at the beginning of the research. Additionally, many of the healthcare stakeholders' responses aligned with existing literature to provide analogous views across the entire healthcare system. Excitement was observed within literature due to AI driving highly qualitative outcomes in access and quality. The leaders, who have had experience with AI, spoke about similar outputs within their facilities. From radiology to cardiology, AI is delivering dynamic solutions within the efficiency space, standardization of care, and improving access to healthcare.

Presentation of Findings

Regarding AI and its need in healthcare, the ecosystem of healthcare stakeholders and their respective voices need to be appreciated. With the focus of solving for access, cost, and quality, these decision-makers consistently examine opportunities to deliver premium care to patients. With AI encroaching into the deluge of industries, it was a matter of time before the healthcare industry would be impacted. However, there still has not been a full adoption of AI into the healthcare industry. Needing to dive into the "why," research has been conducted with various leaders throughout the south Texas healthcare market to understand their thoughts on why there has not been a holistic adoption and utilization of AI within their respective facilities. This deep dive of research, both by conducting surveys and interviews, will tease out their reasons and synergize their responses to obtain an unparalleled perspective towards the failure to adopt and utilize AI within the healthcare facilities.

Themes Discovered

Surveys

When conducting surveys with 21 participants regarding AI and its need in healthcare, there were a few commonalities that were observed. Although these subjects vary in terms of experiences, job title, and location, there was the ability to glean an abundance of data that adds value from the perspectives of healthcare leaders. A few emerging themes were pulled from the data and will be discussed.

Communication. Participants mentioned the need for communication. While there were five subjects that vocalized that they are very familiar with AI within the healthcare industry, the majority (11) were somewhat familiar with AI; whereas the remaining five participants communicated that they were not familiar at all with AI within healthcare. To dive deeper into the communication theme, the majority of subjects (11) have utilized AI in healthcare; while the entire group mentioning that they believe that AI can improve efficiency within the healthcare industry.

Willingness. Moreover, 15 of the 21 contributors conveyed that AI should be adopted by the entire healthcare industry. This highlights the willingness theme of the surveys and to deliver more value to the willingness component is that 20 of the 21 subjects would leverage AI in their facilities if they had the opportunity. Lastly, 47% of the participants have not experienced the utilization of AI within their facility, however, 95% (20 out of 21) of the entire surveyed participants would leverage AI.

Interviews

When conducting interviews with sixteen healthcare leaders within various roles and locations, there were a few themes that were discovered. Of the interview participants, four are

leaders located in rural/community facilities (P7, P8, P9, and P10), six participants are employed in the academic hospitals (P1, P2, P3, P4, P5, and P6), and six healthcare leaders work within trauma facilities (P11, P12, P13, P14, P15, and P16). The scope of participants are all healthcare leaders, with various experiences. Although the subjects vary in role, location, and experience, a few similar themes emerged.

Need for Education. The entire assembly of surveyed participants mentioned the need for communication. Feeling left out due to the lack of communication and/or education, the participants from the rural facilities mentioned that they feel left behind, but also mentioned that cost might be one of the central reasons. This segment was vocal about the interest within the leadership space but is aware that providers might not be as interested. The trauma contributors explained their interest, however, the potential lack of clarity of reimbursements, trusts/accountability, and the need for more education are the causes for the lack of adoption. Whereas the leaders within the academic facilities communicated that they received a deluge of educational opportunities, leading to AI adoption. These contributors mentioned their specific outcomes but would love to hear more testimonies from others. With communication mentioned amongst eighty-eight percent of the participants (14 out of 16), it is clear that this theme is a must for the surveyed contributors.

Excitement. The academic and trauma contributors touched on this portion of the interview. More specifically, there were four providers (P1, P2, P6, and P16) who vocalized their current utilization and potentially holistic adoption of AI into their care pathway. These segments are the prominent AI users, and their responses indicate their excitement about the results that AI is currently delivering. Other leaders also communicated their excitement by talking about how much the healthcare industry is forecasting the utilization of AI in future years. Although, other

leaders within rural facilities candidly expressed interest, there were some fears on how the consumers of healthcare will feel if/when AI is incorporated. Within these surveys, there was a strong sense of enthusiasm within almost all of participants voices when responding to the questions.

Anxiety. Contrarywise, there were some anxiety concerns. All of the contributors spoke about trusting AI and utilization within their respective facilities and how it might not be entirely accepted in healthcare. This was more evident within the rural leaders. Two of the rural leaders (P9 and P10) mentioned that their facilities and consumers could experience some pain points, one way or another, which led to further questions. Most of the discussions with these two subjects were around the patient satisfaction segment of healthcare and how the patient's experience might be impacted. More specifically, one of the rural leaders (P8) communicated that many of the providers were more tenured and might not leverage AI even if it meant potential improvements in their facility. This was briefly touched upon by one of the leaders within the trauma facility (P13) as well; however, it was mentioned that it has not prevented the facility from utilizing AI in some of their departments.

Interpretation of Themes

The most common theme amongst the surveys and interviews was communication or the need for education. With the majority of the subjects being located in facilities where AI can be utilized, the health care leaders communicated the importance of improving efficiency within their facilities. Furthermore, the majority openly discussed the need to obtain more education around AI, even though those that are currently leveraging AI demonstrated excitement around its potential. Contrarywise, the rural healthcare leaders were direct. All of the interviewed respondents identified the need for more education, not only to them as providers, but to the

healthcare consumers. Acknowledging that there are avenues where educative opportunities exist, the rural subjects remarked that there is still a deluge of ambiguity. Two of the rural contributors (P9 and P10) mentioned the fear of scaring off some of the consumers due to lack of education; with one (P10) mentioning that the facility has a more elderly ecosystem and wanting a sense of traditional medicine.

This was more difficult to unpack in the surveys, as the questions were more direct but what could be understood is that many of the stakeholders are currently leveraging some form of AI, but still lack familiarity. The entire group of surveyed respondents all verified their belief that AI can improve efficiency, however, only five of the respondents acknowledged that they were very familiar with AI. Additionally, with the majority mentioning that they would utilize AI in their facilities, there were four of the respondents that opposed the idea of a holistic adoption of AI within the healthcare industry.

Secondarily, excitement was teased out of all of the interviews. Acknowledging that efficiency looms at the top of the stakeholders' minds, excitement was evident through their voices as they spoke about the potential of AI. The trauma and academic facility stakeholders all communicated the need to improve access and with access prioritized, all twelve of the participants demonstrated a positive outlook of AI and its impact towards access. This same group were the most educated, but the majority (seven out of 12) did comment on the need to ensure more education to drive more anticipation. During the interviews, the rural facility leaders did express excitement as well. Three out of the four (P7, P8, and P9) expressed a sense of excitement about the future and what their healthcare systems might look like if they were the central decision-makers. Of the four providers, the cardiology pathway appears to benefit the most from AI. One of the respondents (P16) spoke about the quality of care that AI will deliver,

while improving decision-making capabilities. The other three providers (P1, P2, and P6) conveyed their excitement around AI and its assisting with diagnoses. These stakeholders seemed to fall on common ground, in terms of the exciting impact that AI is and will be delivering to healthcare.

Another theme that was gleaned from the interviews was anxiety. Out of the sixteen surveyed respondents, all of the respondents vocalized some sense of anxiety or concerns around trust. More prominent within the rural facility leadership, as concerns were vocalized about a potential-wholly adopted AI-driven healthcare system. Three out of the four leaders in this segment pointed to the consumers' experience and satisfaction. More granularly, it was communicated that the age of the population and provider tenure being the key driver to the angst. One of the rural leaders (P10) mentioned IT concerns with healthcare data but needed more education to absolve this trepidation. Although there are some leaders that are more familiar with AI than others, one of the rural leaders (P8) communicated that many of the providers were more tenured and might not leverage AI even if it meant potential improvements in their facility. This was briefly touched upon by one of the leaders (P15) within the trauma facility as well; however, it was mentioned that it has not prevented the facility from utilizing AI in some of their departments. Another central component to the trust segment was centered around potential failures and responsibility. These concerns were found mainly in the trauma and academic segment. Centered around who will take blame if AI is completely relied upon, along with the possibility of providers leaning on AI too much due to provider burnout within this busy segment, creating the prospects of missed diagnosis.

Two of the last discussion points within this theme surrounded upon reimbursements and replacement concerns. Two providers (P1 and P16) were open around the payers currently not

offering reimbursements for AI and its users, more specifically, reimbursements for those who leverage AI versus the facilities that do not. Lastly, with the consideration of staff shortages, two of the respondents vocalized some anxiety around staff being potentially replaced due to the growth of AI and its ability to streamline productivity. One leader (P3) directly pointed to the fact the AI can impact their staff by reducing the amount of workflow; mentioning that, while it is a plus, some of the staff may be concerned that their jobs might be in jeopardy.

Representation and Visualization of the Data

With the communicated and interpreted themes that have been vocalized, there were some interesting outputs that will be presented. Having a well-rounded mix of healthcare leaders, various roles and locations, it must be presented and visualized. These outputs (themes) were easily extracted from the survey guides. These respondents in each location were able to provide rich data to assist with understanding their perspectives on AI and healthcare.

The Need for Education

Within the academic segment of the interviews, there was a common agreement amongst stakeholders proclaiming more education/communication around AI. The academic segment (P1, P2, P3, P4, P5, and P6) holds various levels within management. Furthermore, four of the six respondents communicated that they were familiar with AI and although it was common among of the surveyed participants to have read about AI, there was still a mutual understanding for more education.

The leading physicians all mentioned the potential of AI within their facilities, with one specifically, label as P2, mentioning the need for more feedback from the industry:

Although AI presents a very exciting outlook in healthcare there needs to be more

feedback from end users where AI has not done so well. There are still too many

questions and educating providers will go a long way towards adoption.

Statements like this reveal the desire to obtain more education even when excitement towards the

future has been communicated. Moreover, another participant, labeled as P5, mentioned their

excitement around the potential of positively driving the quality of healthcare. This anticipation

was somewhat stifled by their statement regarding education: "I cannot wait to see the full

potential of AI in healthcare. However, I need to see other facilities, their utilization, and hear

their stories before raising my hand to commit."

These particular respondents within the academic community appeared excited about what the

future holds in regard to AI and its utilization within healthcare; however, there appears to be a

common need for more education. Furthermore, other interviewees communicated a very similar

need for education, with a provider (P1) stating:

Super excited about the future. This is great. Delivering quality outcomes, possibly

reducing hospital stays, early detections in cancer and cardiovascular will assist us with

creating a healthier community in the near term. The only question that I have is that

there are still some blurred lines in other departments outside of radiology.

When hearing what the mid-level managers had to say, it is clear that they are in agreement with

the providers with one of the managers (P6) communicating: "While I love what AI is doing in

my department, there are some questions from my staff that need to be answered. Would love to

connect with others to hear how much more AI can assist my staff."

Within the rural facilities, the majority of the stakeholders mentioned their main reasons

for a lack of adoption of AI, which is the need for more education. Three out of the four

interviewees highlighted the need for education, more specifically, pointing to lack of education

as their main area of not promoting AI to others within their respective areas. One of the

supervisors (P8) stated:

> There is little news on where AI has not done so well. This gives me some fear, as I hear
>
> many promote AI but what happens when AI does not perform so well. Also, where is the
>
> feedback from others in communities like ours.

Speaking with the rural community's leadership, it is apparent that there was a desire for more

education. All of the rural leaders found that AI is interesting and see the potential, but within the

rural communities they communities' relationships can be intimate. One of the subjects (P7)

went further with their response by remarking:

> Our provider and patient relationship are a tight-knit relationship, and it will take some
>
> time to get used to AI and the role that it will play in our facility. Maybe a seminar would
>
> help, where AI users can deliver educational seminars or something of that nature to help
>
> our facility and patients to become more familiar with AI.

When speaking with the rural leaders, they made it clear that they have read about AI via

journals and articles. Two of the four mentioned that their utilization of AI is minimal but are

excited to leverage AI on a larger scale. All expressed their understanding of AI and how it

impacts healthcare but the two stakeholders who have not leveraged AI in their facility

mentioned their interest and how AI will be used in their facilities. One of the key stakeholders

(P10), who have not utilized AI, communicated:

> I am so interested in AI. I have heard from peers that AI improved the quality of care and
>
> patient satisfaction, but that was in another facility in a larger city. Where is the

<u>information about AI being used in smaller hospitals? Everywhere (that) I have read</u>

<u>about AI being used is within larger hospitals.</u>

It was clear that the utilization within the rural facilities was much lower than the others that

were interviewed. The questions that were asked help to appreciate the mindset of the rural

facility stakeholders, furthermore, their exposure to AI. Lastly, all of the stakeholders within the

rural facilities expressed excitement but all vocalized a similar sentiment of need communication

for peers and/or experts.

The last group of participants were those who reside within trauma facilities. There was a

total of six participants with various roles ranging from one physician, two upper-level

managers, two mid-level leaders, and one supervisor. Among the stakeholders, three of them

emphasized the need or lack of education, as a result of why AI is not accepted or fully utilized.

One of respondents (P11), who is currently leveraging AI within their facility, commented:

I love what AI is doing. The potential for AI to improve our healthcare system is clearer

by the day, seeing AI with my own eyes, the patient satisfaction, along with AI operating

in the background have given me more confidence with AI. Yet, there still needs more

information around the job security component and the provider's fear of AI threatening

future career prospects.

The others that remarked on education were clear with the need but mentioned that their

exposure to AI has had positive patient impacts, in terms of satisfaction. The overall group of

leaders within the trauma segment expressed excitement, except for one, who mentioned their

wariness because of patient acceptance. This leader (P13) vocalized:

Seems like a lot. AI has a place in our facility and while providers are excited, I am a

little wary as AI might create a super competitive market, where facilities who use AI

might replace facilities where AI is not used. This competitive market might lead to access concerns.

Out of all of the trauma facility leaders, three out of six mentioned a lack or need of education/information as a reason for a lack of holistic adoption of AI in their healthcare facilities. All agreed that AI will improve healthcare by granting opportunities for enhancing clinical decision making, expanding access, improving quality of care, and improving patient outcomes. Yet, one of the mid-level leaders (P12) stated:

We will eventually need more training. With AI being so impressive, many of the staff are so excited. We are seeing improvements in access and quality, but our patients do not know that we are using it. Sometimes I want to ask my teammates if they are telling their patients that they are using it. Should we or let them find out?

Within the surveys, there were some gleanings as well. Among the twenty-one surveyed, seventy-two percent expressed that were somewhat or not familiar with AI and its role in healthcare. More interesting, 57% of the participants have experience utilizing AI in healthcare. This would indicate that there are users that are using AI but still need further information/education due to lack of familiarity with AI. Lastly, demonstrated within the surveys were 95% of the subjects that mentioned if they had the opportunity, would leverage AI in healthcare.

When evaluating the surveys, a few outputs were observed. There was a total of 21 participants and when asked about their familiarity with AI and healthcare, 24% of the respondents mentioned that they are not familiar with AI in healthcare. To demonstrate more insight, 28% of the respondents remarked that they do not believe that AI should be adopted by the entire healthcare industry. Pinning these two results together indicates that education will

provide more perspective and insight that should move the needle on a holistic adoption of AI into healthcare.

Excitement

Another recognized pull through from the interviews was the excitement around AI. This was observed by the comments made throughout the interview process. Many of the stakeholders communicated their thoughts on AI but went on to reveal the impact that AI is having in the healthcare segment. Although the need for education and/or more information was more present in the comments, excitement still loomed large within the interviews.

Of the 16 interviews, 11 presented their exciting comments around the impact that AI has brought to their respective facilities. Within the academic space, there were commonalities around the excitement that AI is offering. One of the physicians (P1) mentioned:

> This is huge. What AI has already done within my department, has brought tremendous opportunities to bring quick patient turnarounds and AI is opening doors within radiology and cardiology. More patients are being seen, more quality of care is also seen as an outcome, along with more consistency among the end users. Standardization of care is already seen.

The exciting comments were delivered by all of the stakeholders that were interviewed. Terms such as "game-changer," "super-exciting," and "augmentation of clinicians" were used by these healthcare leaders. Another leader (P3) commented:

> Seeing AI in action brings so much excitement into the future of healthcare. There is so much potential for improving healthcare and AI's potential impact in healthcare will be appreciated by all. Improving efficiency is always top-of-mind and AI is showing us that there is a pathway to help our patients sooner and with more quality. Areas from patient

management to assisting with misdiagnosis to early detection are areas where I feel the most interest.

Anxiety

Lasty, outlined within the interviews was the issue of trust. All of the participants mentioned trust as a concern for adopting AI into their facilities. This was clearer within the rural segment, where two of the four specifically called out trust as a factor. One of the leaders (P9) mentioned:

There will always be concerns about AI in healthcare. Will it replace my staffing? How will my patient community accept AI's position within healthcare. Will AI become more dependent? These are the questions that are running through my mind right now. Also, cost is a concern. How are we to be reimbursed? What does the total cost of investing in AI look like and will we see a return on the investment?

This was also observed, more clearly, in one of the other rural leaders. The leaders were adamant about the entire facility's position about AI with one leader (P8) stating:

We have a more tenured group of providers. They are old-school, not much into changing their ways. AI appears to threaten them, and it appears they might not have a strong sense to use AI, if offered—even it means that it could improve efficiency. This could threaten the traditional way of delivering healthcare.

Although mentioned by all of the leaders within the academic, rural, and trauma facility leaders, there is still a sense that the rural facility leaders are the most expressive. The trauma and academic leaders made small comments such as: "failures," "accountability," and "security," but did not dive deeper. Most of the stakeholders brought back the fact that more information could help, but not within the two rural leaders as they were the most vocal.

As for the surveys, there was complete agreement among the surveyed respondents that AI can improve efficiency. However, not all of the respondents believe that AI should be holistically adopted, although 95% of the participants remarked that they would leverage AI in healthcare if they had the opportunity. This comes off of the heels of the question on the survey that asked the participants if they had experience utilizing AI with 53 of the subjects having utilized AI in healthcare. Lastly, only 24 subjects vocalized that they are not familiar with AI in healthcare. This can be appreciated below:

Figure 2

AI in Healthcare
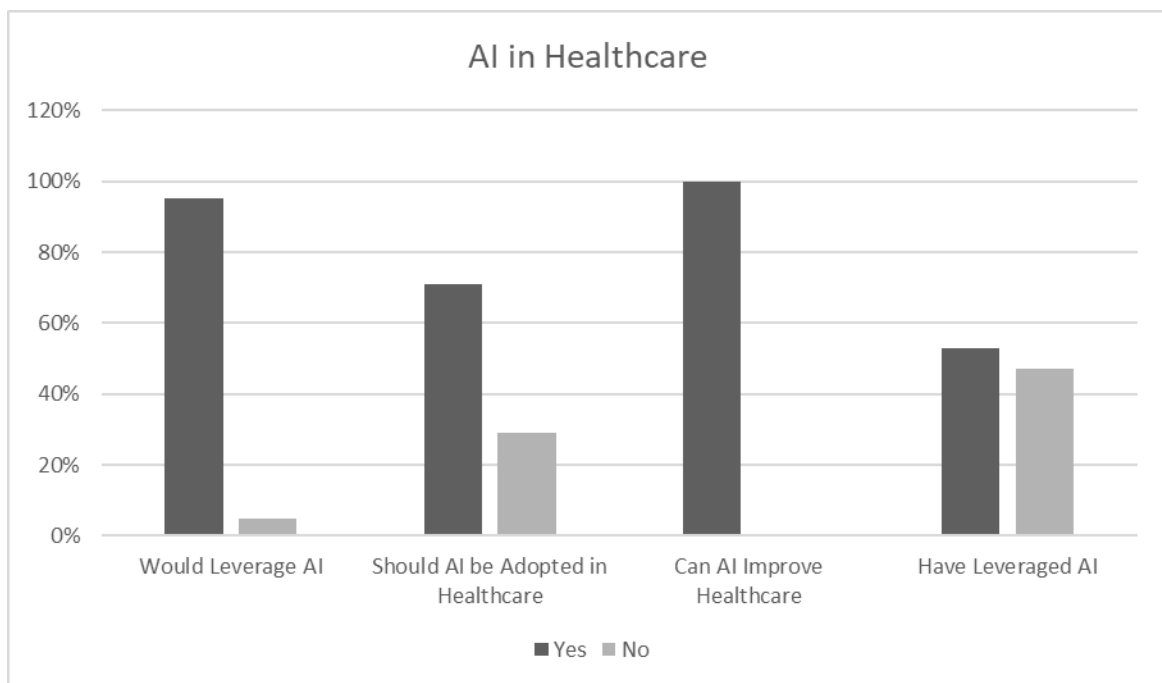
Figure 3

AI in Healthcare and Familiarity
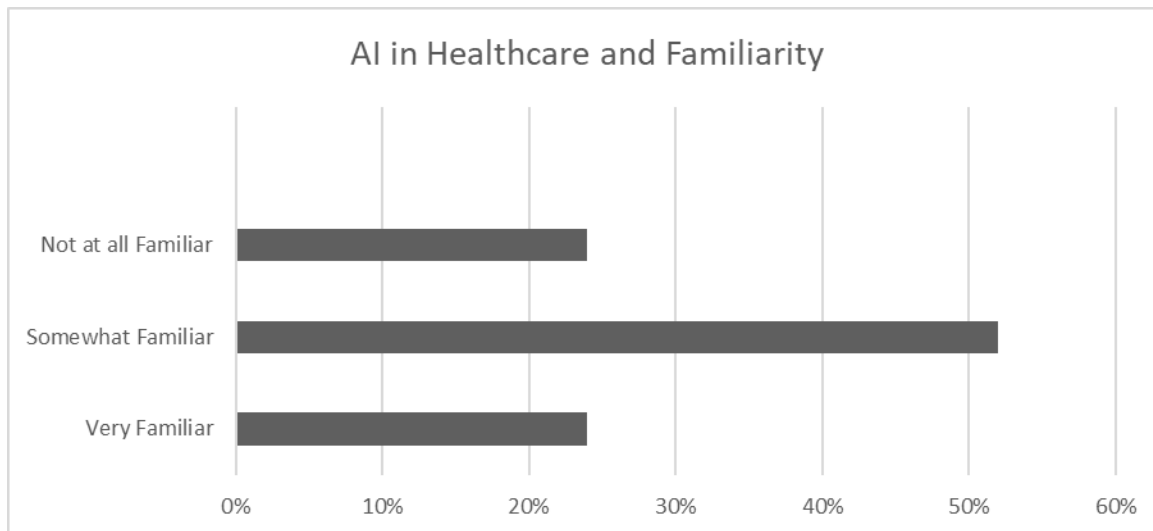
Relationship of the Findings

The Research Questions

When reflecting on the findings, there is a linkage between the findings and the research questions. The research questions need to be addressed to deliver a comprehensible solution to the problem. Understanding that not all healthcare facilities within Texas are currently leveraging AI, a small glimpse into Texas healthcare leaders deliver a candid perspective of why AI is still not being utilized within healthcare. The research questions are as follows:

RQ1: How do healthcare facilities fail to utilize AI?

RQ2: How can AI impact efficiency in the healthcare industry?

RQ3: How has AI improved healthcare in comparison to departments that have not utilized AI?

RQ4: What role does AI play in improving the delivery of healthcare?

When examining the relationship between the findings and Research Question 1, healthcare facilities need more information/education. Many of interviewed and surveyed

participants revealed that, although they are using AI in their facility, they still need more

information. These leaders were clear about the improvements in efficiency and excited about

the potential AI will deliver to healthcare. Contrarywise, the healthcare leaders that are not

leveraging AI in the hospitals vocalized trust issues, especially within the rural segment of the

hospitals. There were a few gleanings around reimbursement and potential staffing replacement;

however, one of the main themes centered on education and/or more information. These leaders

agreed that there is a need for more information around the improvements, accountability, and

noted shortcomings of AI in healthcare.

Another reason pertaining to the Research Question 1 and the failure for healthcare

facilities utilizing AI is the trust issue. Healthcare leaders were clear that there were some trust

issues around dependability and accountability. These were some of the direct discussions within

the interviews. The respondents answered questions surrounding the lack of AI in healthcare and

while some were direct, others were apprehensive; specifically, in the rural communities. The

rural leaders were staunch about AI and its possibilities of disrupting the provider-patient

relationship. Furthermore, an area of concern where trust issues were teased out was about the

tenure of physicians. Fearing that the more traditional, tenured physician would not be open to

leveraging AI and performing healthcare in their traditional way the lack of utilization would not

be observed. This is due to the physician and trust.

Another component of the trust issues centered on reimbursements and potential

replacement of staffing. Some of the concerns within facilities where AI is currently being

leveraged spoke about how there are some fears within the end-users that AI could ultimately

replace the more tenured end-user as AI is responsible for delivering a more simplistic approach

to delivering of healthcare. Additionally, and in terms of reimbursements, there were a few

rumblings around the payers of healthcare and will there be a change towards who/how reimbursements will be levied toward the AI-utilized healthcare facilities versus the non-users. These potential tensions are creating some adoptions concerns and answering the question on how healthcare facilities fail at utilizing AI.

Examining Research Question 2, it is evident that the academic and trauma segments of the interviewed observed a tremendous amount of impact. These leaders mentioned that AI is already demonstrating critical improvements in their facilities by addressing access issues, improving quality of care, enhancing patient satisfaction and management, augmenting clinical decision-making, and positively impacting patient outcomes. The academic segment was unanimous regarding what can be appreciated in their departments where AI is utilized. More specifically around patient management, and early detection opportunities. It is evident that the segment that invested in AI has begun to appreciate the improvements in efficiency. Most notably within the cardiology and radiology departments where AI is being utilized, there has been a tremendous impact on improving access concerns by faster patient throughput and streamlining workflow, assisting providers with technologies without a loss of quality.

By driving improved efficiency outcomes, AI appears to be challenging the "iron triangle" in some departments. In MRI, where backlogs are headaches due to long exam times, one of the department leaders spoke heavily on AI and how they are seeing shorter exam times without loss of image quality. This is why there was so much excitement within the academic space. Access times are shortened due to shorter exam times, increased patient satisfaction is appreciated, radiologists are happy as there is not a loss of image quality, and now more patients can be scanned. These are some of the challenges that healthcare leaders are faced with, and AI is delivering premium results in efficiency.

When addressing Research Question 3, there is a distinction in the outputs of answers. The facilities where AI is currently leveraged, the stakeholders have expressed the improvements within their delivery of care. Whereas within the rural segment, the stakeholders have not observed a sense of improvement. This is obvious when speaking with one of the rural leaders and it was mentioned that they would love to use AI and would see the immediate benefits, however, the staff and community might present fear as AI might create a ripple between the patient-doctor relationship. Furthermore, too many questions still need to be addressed around reimbursements, trust, and accountability. When examining the leaders that are leveraging AI, the only concerns that were communicated were around trusting AI. Although the concern for trust exists, the leaders revealed the positive impact that AI is currently having within their facilities. Many of the deliverables was around how AI has improved clinical decisions, patient management and satisfaction, improved access concerns, and enhancing quality of care to patients.

The last question, Research Question 4, was around identifying the role that AI plays in improving the delivery of care. When interviewing the leaders in the trauma and academic segments, an obvious answer about how AI is improving healthcare was directed towards improving the quality of care. With efficiency at the top of their minds, delivering quality towards patients was mentioned by 68% of those interviewed. More specifically, improving quality with respect to clinical decision-making and patient outcomes were mentioned alongside quality. The leaders that are currently leveraging AI have already observed an uptick in patient satisfaction and access improvements. Radiology is leading the way, in terms of adoption. AI is assisting radiologists and technologists with streamlining workflow; standardizing patient care and impact radiologist with AI models that assist with interpretations. Mentioned within the

radiology segment was the role that AI is playing and assisting both technologists and radiologists with imaging.

For the radiologists, AI is assisting with early detection and capturing small lesions. While for the technologists, a simplistic approach to delivering the imaging to the patients was discussed. In the emergency department, AI's role is patient throughput as well and the leaders point to improving quality of care in the busiest of departments. Moving patients through the department and sending them towards the proper departments is critical to obtaining more access. AI is opening more opportunities with access as physicians are able to allow AI to assist with clinical decisions and help with patient management.

The Conceptual Framework

Acknowledging the concerns around access, quality, and cost, AI has a place within healthcare where impacts are being appreciated by hospitals and its stakeholders. Referred to as concepts (i.e., access, quality, and cost), the dilemmas are in constant view; moreover, stakeholders are challenged with additional challenges such as financial pressures and staff shortages. When interviewing the stakeholders and unpacking the surveys, it is evident that AI has a dynamic opportunity within healthcare to improve upon the concepts.

From the surveys' perspective, there was an overwhelming agreement that if the leaders had the opportunity to leverage AI, the respondents would. Coupled with the interviews, where the majority of the respondents delivered their thoughts on how they felt AI would improve healthcare, excitement for the future in healthcare augmented by AI is evident. With published articles referring to AI and how it is impacting the concepts, facilities and their leaders are examining how and if AI fits within their facilities. Excitement was a major theme found within the interviews. Leaders used terms such as "exciting times," "super exciting," and "game-

changing," to describe AI and its place within healthcare; whether AI is being used in their facilities or having read about AI in published articles. The leaders where AI is being utilized also communicated how AI is improving quality of care, positive patient outcomes by early detections and patient management, and expanding access. Although cost was not specifically addressed by most, reimbursements were teased out in a few leaders' interviews, specifically around length of stays due to appropriate detection.

Improving efficiency is top of mind of healthcare leaders. Improving access, enhancing quality, and reducing cost are a conversation that leaders have within healthcare. Within the trauma segment, healthcare leaders are focused on improving quality of care, while within the academic facilities, leadership communicated their desire to augment clinical decision-making and improve patient outcomes. Additionally, rural community leaders vocalized their need to drive premium quality of care and patient satisfaction. When interviewing the leaders who are currently leveraging AI, it is clear that their experience in achieving quality of care, enhanced clinical decision-making, improving early detection, and increasing efficiency was observed. Moreover, the majority of the leaders were clearly excited about what the future of healthcare would look like when AI is more holistically integrated into the industry. This was very clear within the trauma segment of the interviews, as throughput is premium.

The patient journey, from department to department, is under constant examination. In terms of improvement and with some of the challenges that these healthcare leaders are faced with, AI has demonstrated tremendous value with assisting with the patient journey. This translates to patient satisfaction. Less time within departments such as radiology means that patients are moving through the facilities, while AI is operating behind the scenes and augmenting clinical decisions.

The desire to improve quality of care was also vocalized within the academic space of the interviews. Academic healthcare leaders were consistent with articulating their experiences utilizing AI with excitement. The entire scope of stakeholders within the academic segment are positively impacted. The leaders were almost unanimous on how AI is able to modify their ability to increase throughput when AI was used in comparison to departments where AI is not utilized. Furthermore, the leadership styles were enhanced due to AI's ability to assist with improving patient outcomes, specifically in radiology where AI is used to assist technologist with large patient volumes and reduce some of the manual steps that the technologist used to encounter.

One of the radiologists that were interviewed pointed directly to AI as the ability to see more patients directly impacting access times. This created a shift in the entire department's ability to schedule across their system. The department leaders can then modify how scheduling patients are performed due to the augmentation of care, via AI. The collaboration between cardiology and radiology is enhanced due to AI and the leaders within these departments appreciate the overall impact that AI is delivering; affording more time to areas where AI is not present.

Contrarywise, one of the major themes that all leaders exuded was the need for more education or communication. Within the academic space, the leaders were extremely pleased with AI and its impact, however, anxieties from: accountability, staff worries (e.g., replacement), and becoming too dependent on AI were teased out of the interviews. The need for more education was also a common theme within trauma hospitals. Although leaders demonstrated excitement within the improvements of throughput, access, and quality, there were still questions around too many AI companies and the competitiveness it might create within the community,

reimbursements, and trusting AI and who is responsible if AI fails is someway. The most

obvious segment, where the need for more education and communication exists, was in the rural

communities. The rural leaders were consistent with trusting AI, their patient's experience with

AI, and understanding where AI has failed and what are the next steps if AI fails. Much of the

worries centered on acceptance from the entire gamut of stakeholders; mainly the provider-

patient relationship.

Regarding the profitability component of the research, many of the leaders within the

academic segment directly spoke about how AI is improving quality of care. One leader, who is

a leader of radiology and cardiology departments, was clear on how AI is creating a more

simplistic approach of transitioning patients from one department to another. Specifically, when

dealing with large patient volumes and access concerns, the leader was clear with calling AI a

"game-changer" due to AI's ability to streamline decision-making, improving access concerns,

and assisting radiologist with diagnosing. Thus, creating an assumed profitability and cost-saving

offering due to early detection and shortening hospital stays, providing direct care to patients in

need, reducing waste, and performing more patients via improved workflow enhancements.

The Literature

Within literature, there were many instances where AI demonstrated tremendous impact

on improving access concerns, delivering premium quality of patient care, and decreasing cost;

without directly affecting the other dilemmas (noted by William Kissick's "Iron Triangle").

Regarding Kissick's (1994) "iron triangle," the challenges of cost, quality and access are

observed, with these challenges being equal, one cannot impact one without creating tension on

another. These challenges that healthcare has historically faced are noted and the industry has not

observed solutions toward efficiency without adversely impacting the challenges. When access is

improved, it comes with a cost of either reducing quality or increasing cost. As is so with the

other noted dilemmas (e.g., cost and quality). This quandary has stifled many of the healthcare

leaders. After interviews and surveys, the research has aligned itself with many similarities and

revealed some differences.

Many of the respondents (P1, P4, P5, P6, P12, P15, and P16) communicated an

improvement in the quality of healthcare that their facilities are providing. In terms of quality,

the existing literature points out that AI has delivered tremendous outcomes in quality of care. As

mentioned by Neill (2013) on the efficacy of AI in early detection of cancers, heart disease, and

defects, the respondents communicated on AI and its ability to augment the provision of

healthcare within cardiology and radiology by alerting physicians, assisting with clinical decision

making, ultimately diminishing hospital admits and reducing stays. From early detection,

augmentation of clinical decision-making, and expediting patients through their healthcare

journey the leaders commented on how AI is impacting their facilities when leveraged.

The respondent labeled, P16, completely agrees with this segment of literature.

Furthermore, P3 concurs with Jiang et al. (2017) as they validate that AI can provide suggestions

to physicians, alerting them about potential stroke patients, and assist with stroke management,

improving efficiency and accuracy observed and much appreciated improvement in quality of

care was commonly mentioned throughout the interviews. More specifically within the academic

and trauma facilities, where throughput is needed without the loss of quality. In times where staff

shortages are realized, efficiency is central to healthcare leaders. They need more staffing in

order to handle the large patient volumes. When the main points that are teased out of the

interviews, mentioning "AI is super exciting due to its ability to assist providers and improve

care" and "quality of care is so important, AI lends to helping providers in the busiest of environments with diagnostic suggestions and patient management."

Leadership spoke about access concerns and AI is assisting department backlogs. P3, P9, P14, and P16 align with the literature, as leaders mentioned that departments such as radiology are faced with backlog issues. Historically long exam times—associated with rising patient volumes have led to weeklong backlogs, frustrating providers and patients. However, the facilities that are leveraging AI within their radiology departments are appreciating a relief from the extended backlogs. AI is shortening exam times, allowing for more patients to image throughout the schedule and as one radiologist mentioned, "we are able to modify our schedules by using AI without comprising image quality." P9 and P14 harmonize with Topol (2016) as it was mentioned that AI delivered improvements in radiology towards screening the population faster and lowering overall costs. Furthermore, Dilsizian and Siegel (2014) provided perspective within the radiology and cardiology departments where AI can provide cardiac detection which can directly reduce extended hospital admissions and length of stays. The providers (P1, P2, P6, and P16) within the research pointed to these departments where AI has demonstrated the more premium value, in terms of reducing access times, delivering quality and standardization, and increased patient satisfaction. These improvements allow for better access, without adversely impacting quality, which was a challenge that the "iron triangle" pointed to.

Surprisingly, cost was not directly mentioned. It could be assumed that AI in radiology comes with a cost, yet the return-on-investment (i.e., scanning more patients and/or more patient referrals) provides an offset with a dynamic breakeven. However, that is assumed. Same can be assumed in terms of decreasing repeated exams, reducing waste, and assisting with early detection (e.g., cancers, strokes, and cardiac) creating cost savings by reducing hospital stays.

Alignment within literature around the anxieties, reimbursement, medical errors, privacy concerns, and accountability regarding potential failures needs to be discussed. Mentioned by two of the interviewed participants (P1 and P16), reimbursement concerns were of interest and the participants both mentioned that more education on this might help. The other concern was around accountability. Questions such as "where has AI not done so well?" and "what happens when providers depend on AI, and it fails"—came up within the interviews (P6 and P14). This was mentioned by Carter et al. (2020) as the concern around moral and professional responsibilities that human healthcare providers maintain, while AI may create a lack of trust and a sense of consumer resistance. Participants labeled as P5, P9, P11, and P14 cited trust, more specifically towards resistance.

Kelly et al. (2019) mentioned, while AI delivers promising and exciting news to healthcare, there are challenges due to limitations that may arise, leading to hesitation when adopting AI into the health care industry. This is due to the potential inaccuracies in data and possible outcomes that might lead to misdiagnosis and unacceptable decision-making capabilities also mentioned by P14. La Rosa (2022) also remarks about the trust factor as AI with the focus on technology and the presented efficiency solutions, healthcare stakeholders are examining how AI will impact human-human interactions, more specifically, doctor-patient relationships. The rural respondents (P8, P9, and 10) were vocal on the patient-provider relationship and how AI might impact this intimate rapport.

Furthermore, the lack of feedback from related facilities is concerning, as there have not been publications where AI has failed, and the facilities have observed a serious event. This was pointed out by P6. With regard to medical errors, although not directly vocalized, it could be directly engulfed into the accountability space. As mentioned by a bevy of respondents (P2, P9,

P13, P14, and P15), in the case AI does not perform its job where/who does blame fall.

Davenport and Kalakota (2019) communicated that many have found difficulties of AI and its

work within the health care industry. Ethically, health care decisions have almost exclusively

been made by humans throughout history and the utilization of AI and smart machines may raise

ethical issues in accountability, transparency, and privacy. Acknowledging that mistakes may

happen by AI systems, there may be difficulty with accountability and incidents in which

patients receive medical information from AI systems may create a lack of empathy from the

healthcare industry.

A missing theme was around data security or privacy concerns. With the vast amount of

data needed to provide dynamic outputs for the AI algorithms, a worry around data and the

healthcare information technology space was assumed. The stakeholders did not appear

concerned about integration or the potential threats to privacy. Albeit one leader within the rural

segment (P10), this was not mentioned, creating a misalignment with literature. Dash et al.

(2019) mentioned the challenges of AI adoption, in lieu of healthcare and its massive data. One

of the primary challenges is storage, and while many have directed their attention toward cloud-

based storage capabilities, security concerns exist. Hackings, security breaches, and phishing

attacks are a primary threat to data security and a priority for health care organizations.

The concerns of privacy are expressed when communicating the adoption of AI into

healthcare facilities. Park et al. (2020) validated this theme by communicating on many of the

concerns for AI adoption in healthcare. Most notably, the massive amount of healthcare data

needed to drive efficacious results is needed and the serious security concerns that the healthcare

industry might feel. One of the rural leaders (P10) touched on this topic but it was not a chief

concern. Privacy concerns are the central issue and while many countries acknowledge the concern, there are any systematic resolutions.

One concern that literature pointed out that was not an overwhelming point by the surveyed participants was around replacement. Mentioned once by an academic leader (P3), literature appears to have a more-sensitive perspective. Jiang et al. (2017) vocalized there has been some apprehension about AI and its place in healthcare, mainly around the potential replacement of human physicians in the future. Meanwhile, Davenport and Kalakota (2019) communicated that many of the components of AI clearly demonstrate the ability to outperform physicians at early detection of cancers. Some believe that AI replaces humans in some of the general medicinal practices.

Davenport and Kalakota (2019) also mentioned that the use of AI in healthcare creates hesitation due to some of the implications on the health care workforce, more specifically, substantial displacement of the workforce and leading the industry into automation. Some fear that AI will take over health care in the next 10 to 20 years, which will limit jobs and reduce direct patient contact. This harmonizes with P1's response. Mesko et al. (2018) mentioned that AI has a clear view of performing tasks, simulating human like capabilities in healthcare and performing simple tasks. P1, P2, and P16 spoke in regard to radiology and how AI-enabled assistance can analyze images and detect potential medical issues.

AI-technology can improve access to care, combined with medical professionals and their tools, making better decisions, reducing medical errors, in providing improved treatment outcomes. These costs and W while the improvement of quality of care is observed, some stakeholders fear that AI will probably replace them.

The Problem

After examining the findings of the research, the problem around the lack of adoption and utilization of AI resulting in the lack of efficiency is verifiable. The surveys and interviews delivered a bevy of rich results as to why the healthcare stakeholders are impressed with the potential and current utilization of AI. Additionally, teasing valuable information out of data disclosed why there are concerns about AI and what is one of the central reasons there has not been a holistic adoption of AI into the healthcare industry.

From the survey's perspective, the respondents mentioned an overwhelming absolute answer to their desire to leverage AI, if the opportunity existed. Additionally, all of the respondents vocalized that they believe that AI will improve efficiency within the industry. However, in terms of familiarity, there were still some of the participants mentioned that they were not familiar with AI. The problem identified within the surveys revealed that everyone is interested and believes that AI can positively influence the efficiency space of healthcare, whether they have/are utilizing AI or not, although the lack of familiarity proves that there is a further need to educate the healthcare communities.

This was galvanized within the interviews. The interviews demonstrated an abundance of excitement, from those that are experiencing improvements due to leveraging AI, to those participants who see the potential that AI is going to deliver, although their facility has not adopted AI. Even though excitement was teased out of the majority of the interviews, there were still many concerns. These concerns ranged from reimbursement, accountability, to trusting AI within the healthcare community. All of the concerns can be absolved by education or providing more information around AI and how it is impacting the healthcare industry.

Of the themes that arose from the interviews, the most obvious that would assist the problem statement would be the need for more education or information. Healthcare and its stakeholders are faced with solving efficiency challenges and the overarching understanding of AI and how AI can impact healthcare is clear and obvious. However, there is still more that the stakeholders need. When asking the question "why do you feel that healthcare facilities are not leveraging AI?" most of the participants mentioned the need for more information or a lack of education. Streamlining information into the academic, trauma, and more importantly rural facilities will support the push for a holistic approach. There is already a positive impact from AI on the healthcare industry, but the community is in need of more guidance.

The utilization of AI has delivered tremendous value within the efficiency space but yet stakeholders look to future and how much more and where can the stakeholders appreciate these improvements. The need for more engagement via education/information is needed. Especially within the rural facilities. These stakeholders only received information regarding AI from peers and some publications. However, this is only for the providers and leadership teams. The request from half of the rural leaders were around educating how the provider-patient relationships. Hoping not to disrupt that relationship, which is vital within the rural community, one of the subjects mentioned the possibility of AI seminars to launch familiarity if AI within healthcare.

With the existing literature and feedback given from the participants, it is clear that AI has encroached into healthcare. The influence and impact AI is having on healthcare has also stimulated the request for more AI into additional care areas. The most common care areas where AI has proved its value were within cardiology and radiology. Where access is of concern, AI has been utilized to improve access by shortening exam time and creating more open time slots within departmental schedules; ultimately improving efficiency.

Also, improving the quality of care. Stakeholders' constant theme was the desire to improve the quality of care. The challenges that stakeholders are constantly faced with are access, quality, and cost. AI has proved that it can solve these without directly impacting others. When speaking with the stakeholders that are leveraging AI, it is clear that AI is delivering solutions in these key areas without directly impacting the others. However, there is still a need for more information.

The stakeholder's communication around education and more information was well heard. One stakeholder mentioned that if their providers would receive more information about AI, they would open to leveraging it, if available. Additionally, mentioned was possibly launching seminars or press releases to the entire facility stakeholder community driving more information to patients and providers alike. The rural leadership community expressed the need for more education and information around potential failures and similar locations where AI is being leveraged. The need for more education and information is real to this certain group.

Overall, AI and its need in healthcare is real. When unpacking the data that was provided by surveys and interviews, it is clear that the healthcare community is excited and desiring AI. The community leaders throughout the research clearly wanted more information, for different reasons. From trusting to lack of accountability, these concerns may have slowed down the holistic adoption of AI. The most common theme from the data surrounded the need for more information or education.

Summary of Findings

To summarize, the need to improve efficiency is an obvious need within the healthcare system. AI can promote this improvement. There is enough literature within the grasp of healthcare leaders to assist with tackling these efficiency problems. Yet, there still voices that

have some apprehension about is AI. The existing literature promotes the value of AI within

healthcare, additionally, its ability to augment providers and deliver improvements across the

healthcare industry.

   When evaluating the findings from the research, the prominent themes that emerged were

need the for more education/information, excitement, and anxiety. Interviewing multiple leaders,

in various leadership roles, and from various facility types there was the ability to gather rich

data points. The deluge of data that was provided by the surveys also provided a glimpse into

what healthcare leaders think about AI. These perspectives offered dynamic offerings into AI, its

need, and why AI is or is not being utilized within the healthcare industry.

   The findings presented data as to how each of the research segments (i.e., trauma,

academic, and rural) within Texas view AI. Within the academic space, excitement around what

is happening within their departments, in terms of quality of care, patient satisfaction, improved

clinical decision-making and early detection, and lastly enhanced efficiency was noted. Within

the trauma facilities, improved access, premium quality of patient care, ease of use for

users/providers, and improved patient outcomes were observed. And lastly, within the rural

facility, patient satisfaction and access; however, this segment was most notably absent from the

adoption of AI.

   With regards to anxieties, some of the most concerning findings were around

accountability, the lack of feedback from end-users, and reimbursements. All of the respondents

vocalized some sort of worry or trust issues when discussing the possibility of a holistic adoption

of AI and why the industry has not/is not utilizing AI. Most notably, the rural facility leaders. As

they appeared worried about the patient-providers' relationship and how some providers will not

break away from their normal routines to utilize AI, even if adopted within their respective

facility.

However, the most notable theme captured within the interviews was around the need for

more information/education. All of the segments mentioned that, although excitement is evident,

there is still a need for more education and/or information regarding AI. Specifically, within the

academic and trauma facilities, where AI is currently most utilized, the leaders remarked that

quality of care is observed but would like to see more education to assist with further adoption.

The most common areas where AI is being utilized is within the radiology and cardiology

departments and these stakeholders are appreciating the uptick in patient throughput, leading to

improved access without a loss of quality of care to the patients. The academic segment also

commented on the dynamic opportunities to decrease access, enhance/augment patient care, and

streamline efficiency. Whereas the trauma segment's leaders agreed on the potential of AI to

drive premium access to more patients, improve clinical decision-making, and enhance quality of

patient care. Although these segments bubbled with excitement, they request more

information/education in terms of reimbursement, accountability, and areas where AI has not

lived up to expectations. Lastly, within the rural facility, leadership vocalized the need for

education within both the patient and providers segments of their facilities to help with the

adoption, mentioning the possibility to disrupt the relationships between the providers and

consumers.

The surveys that were extended to subjects also mentioned a unanimous desire to

leverage AI, if there was a possibility. In chorus with those results, there was an overwhelming

agreement that all believed that AI could improve efficiency as well. Taking note of the fact that

there was large number of respondents that remarked that they were familiar with or somewhat

familiar with AI, there were still a decent number of respondents that are not leveraging or

familiar with AI within the healthcare industry. This delivers a unique spin on how leaders feel

about AI. They are excited and believe in the impact on efficiency that AI could provide; without

utilizing nor having great understanding of AI. They could drive the need for more education and

engagement.

Many of these findings were anticipated, however, there were a few omissions pertaining

to the cost and potential replacement questions that were found within literature. The more

education/information that is being delivered to the industry is answering the questions,

bemusing anxieties, and offering a clearer path towards adoption. With the findings and

utilization of AI in healthcare it is clear that AI is here to stay with an assist from current AI

users' testimonies, society meetings, publications and articles, and peer-to-peer interactions.

Application to Professional Practice

AI has introduced itself into many industries. AI has proven to assist in efficiency

improvements, provide augmentation, and create dynamic opportunities for repeatable outcomes.

With AI being introduced into the healthcare industry, there are analogous opportunities for the

healthcare stakeholders to appreciate. The healthcare industry has historically been challenged

with increasing healthcare costs, reduced quality or lack of standardized patient care, and

decreased access to healthcare. Since AI has encroached into the industry, healthcare has

observed improvements in these specific challenges. With the notable improvements, one is left

to wonder why there has not been a holistic adoption of AI into the industry, as there are many

who still have reservations about AI and healthcare.

Hence the need to research, offering a perspective into the healthcare industry

stakeholders and their respective lens of AI. The research that was conducted included interviews

and surveys that pulsed the Texas healthcare system. The leaders that were interviewed are in positions to appreciate the utilization of AI, provide a clear picture of how AI is impacting their facilities, and offer their perspective of why there is a lack of holistic adoption of AI into the healthcare industry.

Improving General Business Practice

AI within healthcare is driving highly productive outcomes within healthcare. Augmenting clinical decision-making, early detection opportunities within cardiac and cancer pathways, and improving access to healthcare are appreciated by the entire healthcare stakeholder map. Existing literature has validated the value that AI delivers to the healthcare industry, demonstrating a dynamic opportunity to improve on the dilemmas healthcare leaders are faced with. That said, there are challenges with adoption of AI into the entire industry. Although excitement is observed, there is an outcry for more education and engagement.

The dilemmas of cost, quality, and access are in constant view of healthcare leaders. With the encroachment of AI into the industry, these dilemmas are now being challenged and improving the efficiency of how healthcare is being provided; without impacting the other dilemmas. When surveying and interviewing healthcare decision-makers about AI, the excitement of actual and potential was observed. Healthcare leaders are willing to utilize AI, acknowledging the impact that AI could have within their facilities. With long exams times, deduced or lack of standardized quality of care, and rising cost, healthcare needs improvement.

One of the most popular themes that was teased out of the research centered around excitement. Healthcare leaders communicated the results of AI and their facilities; more specifically, the impact of AI regarding improving access times without loss of quality. In the radiology departments, access times can be an issue. Backlogs can mount up over weeks,

meaning that patients are waiting to be imaged, properly diagnosed, and when results are issued, directed to the proper treatment plans. These backlogs are due to long exams times in MRI and Computed Tomography. In the past, the only way to improve on long exam times was to reduce image quality; however, AI is playing a central factor in improving the speed of these exams, without loss of image quality.

Healthcare leaders are appreciating the drastic improvement that AI is delivering, leading to faster patient throughput, earlier detection in cancers and cardiac events. Moreover, healthcare facilities are not faced with patients, who might be waiting for weeks to have an exam performed, leaving their facilities to identify substitutionary facilities and possible changes in their healthcare pathway. Healthcare leaders are communicating quicker patient turnaround times in both radiology and cardiology, faster throughput and moving the patients to the correct service line in trauma hospitals, and standardization of quality of care. While the cost component has not been observed as it may be too early to quantify, earlier detection of cancers, identifying cardiac or stroke events, and improving access times will impact the overall cost structure of healthcare. With these findings, healthcare leaders can now focus on improving other critical areas within their facilities; having mindshare freed up due to the impact of AI.

The education/engagement component of AI is also a critical factor in the adoption of AI into the industry. Healthcare leaders vocalized a sense of anxiety due to the newness of AI and healthcare. Education by AI third parties that provide early detection modules in stroke, cardiovascular, and oncology care pathways will propel future adoption, however, engagement from the current users of AI will have more of an impact due to the sharing best practices and dynamic impacts that other healthcare facilities are experiencing.

The rural facilities have the most to obtain from the education or engagement of AI users. These are facilities where the staff are stretched out, having more responsibilities, potentially leading to staff burnout. AI has demonstrated the ability to augment healthcare by assisting with driving patient and staff satisfaction, moreover, improving the quality of care due to augmenting healthcare staff with day-to-day activities. Healthcare leaders within the rural communities mentioned that their smaller communities need more education and engagement due to the lack of familiarity, not only for their patients but providers as well.

The utilization of AI within healthcare is exciting for the entire healthcare stakeholder community. Creating an ecosystem where patients, staff, and healthcare leaders are observing dynamic opportunities to improve healthcare was once a dream, not with AI, a reality. The improvement of healthcare, in a business sense, is one where the leaders are investigating, determining the return on investment and the impact of patient and staff satisfaction. Improving efficiency by shortening exam times, enhancing quality of care, and improving access times are outcomes that AI is providing to healthcare leaders; giving time back to staff, possibly shortening length of hospital stays, and reducing cost.

Potential Application Strategies

The research provided to drive holistic adoption of AI into healthcare facilities is paramount to the industry. There are a few avenues that can be leveraged to push the research and its outputs throughout the industry. The participants have mentioned the need for more education and engagement from both AI end-users and possibly third-party AI companies. Promulgating the request throughout the network of facilities that are leveraging AI and engaging with companies that are providing AI are central to disclosing of the findings of the research.

The facilities that need more education and engagement are in central focus. The disclosure of the findings of the research will stimulate these facilities to attract more internal support towards adoption of AI into their facilities. This could be done by pushing the research to the third-party companies that are currently rolling out AI into the healthcare industry. Currently, there is a deluge of companies that have marketed themselves as AI leaders in the healthcare industry. They focus on utilizing AI to healthcare providers with early cancer detection models, identification of stroke, improving exam times, leveraging data to promote a triaged system of healthcare that escalates the patient in a potentially more serious need, and capturing early cardiovascular disease.

Influencing these companies to branch out into the rural or critical access facilities through the research is a channel that can be used. With the outcry of education, these companies will need to be alerted about the research that was conducted. In the background, there will be a strategy to leverage social media connections such as LinkedIn to connect with AI companies to reveal the outcomes of the research. This should stimulate the companies to strategize the wheelhouse of potential facilities that need engagement.

Furthermore, the leaders of the facilities that participated will be given the heads-up that the research has concluded. Staying close with the participants and plan so that they would initiate the engagement after reading the existing literature, the outcomes of the research, and possible connections to others within the region is another strategy that will be in focus. This would help them connect the dots with end-users and AI companies at larger expos, creating opportunities for best practice sharing and bridging connections. Acknowledging that the majority of leaders vocalized the need for more education/engagement, while mentioning that

they would leverage AI if it was available within the facility would offer a strong internal influence within their respective facility.

Additionally, the synergies of both the facilities where AI is not utilized, facilities where AI is utilized, and AI companies can build plans to ensure an outreach throughout their respective markets. The only pitfall of this model is the competitive landscape of the healthcare industry. To combat this pitfall, AI companies will need to present testimonies of AI end-users about how AI has driven efficiency solutions that all facilities can benefit from.

Lastly, larger expos where the large companies can present market updates are another avenue that can be exercised. Typically, healthcare leaders travel to these society meetings to hear what is the latest and greatest within the healthcare market. The opportunity to utilize the AI companies' presentations and connecting AI companies with healthcare leaders materializes to future discussions and lend to facility presentations at the C-suite level. Gaining the buy-in from the procurement component of the healthcare industry is vital to the entire adoption of AI, and securing internal stock from the other leaders to drive future growth opportunities where AI can assist is central to the strategy.

Summary of Application to Professional Practice

Overall, the research that was conducted has a bevy of opportunities to drive holistic adoption and capture the momentum of AI adoption into healthcare. The existing literature combined with the research will propel the interest of AI by the healthcare leaders. Recognizing the need and revealing the solutions that others within the healthcare industry are experiencing around AI are pivotal and the research brings this out. There is a need for more engagement and education towards an excited industry, who is constantly looking for solutions towards cost control, access challenges, and standardizing quality of care towards patients. AI has and is

demonstrating strong validities within healthcare and proponents are beginning to be more

candid about the impact it is creating. From early detection, father patient throughput, improving

access times without loss of quality, reduction of cost by shortening hospital stays, and

standardizing quality of care, AI is gaining momentum in the healthcare industry. All it needs is

more education and engagement.

Recommendation for Further Study

        Although the research has provided more information around AI and its need in

healthcare, there are additional areas that can be investigated. There is the cost component. AI is

driving dynamic solutions in healthcare, but in order to drive more attraction, there needs to be

quantitative study. AI is reducing hospital stays, but what does add up to. The need to further

understand the cost savings of reducing lengths of hospital stays should be researched. As AI

grows into the healthcare industry, early cardiovascular event detection or implementation of

proper cardiology care pathways provide opportunities to transit patients into the proper exams.

Furthermore, presentations are driving recommendations to provide streamlined guidance to

patients that present with specific symptoms. Utilizing AI and the opportunities to direct patients

to the proper examinations might demonstrate the speed and efficiency needed to augment

decision-making, while reducing costs. Researching these potential cost-savings should fuel

further interests as the opportunity to reduce costs, recommend the proper examinations, and

augment decisions will be actualized.

        Another area where research could be appreciated will be in the staffing component.

Healthcare suffered a loss of staffing when the COVID pandemic hit. Hospital staffing resigned,

due to various reasons, leaving healthcare leaders with high patient volumes and minimal

staffing. More specifically, healthcare staffing has been challenged by the threats of contracting

COVID or mandates by the healthcare facilities. With staffing challenges and high patient volumes, staff burnout is being observed and with that could come a loss of quality of patient care. AI has demonstrated the ability to augment patient care by streamlining workflows, reducing the minutia of steps that would normally take time, and assisting with diagnosis. Researching this area would be extremely beneficial to understanding how AI is assisting with the potential of overwhelming workloads on the healthcare providers; ultimately, impacting access, cost, and quality of care.

Reflections

After examining the outputs of the interviews and surveys, reflections have been actualized. AI is driving a tremendous number of impacts throughout the healthcare industry, and as a former healthcare provider, these improvements are game-changing. Reflections around how healthcare was provided and the tireless times of steps a healthcare provider would encounter to deliver care to patients were meticulous and laborious. Furthermore, within the healthcare management space, there were an abundance of times where patient satisfaction was not at a premium level. Additionally, healthcare staff were burned out, patients complained about access times, medical errors were observed, and the thought of rising cost were alarming to the entire healthcare ecosystem. AI is in the process of being the remedy to some of current issues and as there is reflection about AI and healthcare, one could not imagine how healthcare is not all-in, regarding the adoption of AI.

Personal and Professional Growth

The growth aspect of this topic is noteworthy. Observing the energy and curiosity of healthcare leaders to solve challenges is appreciative, while the stakeholders' desire to implement AI solutions is a positive. These opportunities to provide solutions is admirable, as

there is a strong suite of healthcare leaders who are looking to be transformative, in terms of healthcare delivery, trimming access, and driving qualitative results in care. Reflecting on these interviews and surveying the overall healthcare leadership's passion for healthcare, offers a substantial amount of growth, both personal and professional.

From a personal perspective, examining the healthcare leaders' aspirations to deliver improvements to healthcare is surreal. Healthcare providers can, at times, want to perform their duties, albeit at times, cut corners to get to the end-results. Moreover, and from an experiential perspective, some providers were in healthcare just to pay the bills, leaving any altruistic beliefs out of the provision of care. This has led to unfair delivery of care in the past. Not to say that this was the norm, but it was observed and was iniquitous to the patients.

To see the healthcare leaders' posture in aspiring for a better healthcare environment is truly a breathtaking change. More specifically, healthcare leaders were so passionate about healthcare and how AI could alter the delivery care provided a satisfying growth opportunity. When researching AI and its need within healthcare, there were learnings about easily the healthcare leaders' mindshare was obtained by AI, moreover, the ability to listen to facilities' testimonials where AI being utilized within their facilities. These occasions afforded the ability to peek into the variety of leaders; lenses regarding healthcare, its challenges, and how AI is driving solutions.

Lastly, one of the growth opportunities is around how healthcare stakeholders viewed the industry and today's challenges. These challenges and the expertise at which healthcare leaders view them are premium. The amount of time that healthcare leaders spend thinking about solving healthcare access issues, costs, and quality are more central today than in the past.

From a professional perspective, growth was observed as well. The business lens of healthcare spouts from improving healthcare, while reimbursement costs are being cut, healthcare staff in minimized, and the on-going pandemic. Within the interview process, there were many gleanings around how AI will dramatically improve healthcare. This excitement was noted as one of the central themes within the research. However, the momentum of excitement was apparent due to the existing literature and market utilization of AI.

As a former healthcare leader, there were challenges that one had no control over, such as cost constraints, healthcare staffing, and rising patient volumes. These challenges led to high staff turnover and burnout, lack of standardization of care, and a disgruntled consumer community. When hearing the leaders communicate the impact that AI, in synergy with existing literature, staff, quality and standardization of care, and the healthcare community will share excitement around the inclusiveness of AI and its results in improving access, quality, and costs. One can now appreciate how today's healthcare leaders are curious about AI, its potential impacts within their respective facilities, and the providers' satisfaction.

Biblical Perspective

When paralleling the healthcare industry to the Christian worldview, there are many interconnected missions. Starting with Keller and Alsdorf (2012) communicated God's perspective and the alignment of the Christian leader. Acknowledging that work is designed by God, work is foundational to our makeup. God viewed work and was pleased, resting after the sixth day (Gen 2:1-3 New International Version). He created mankind and inserted mankind as a regent. As God's regents, the lens in which one should view work should be analogous to the lens that God uses. The design of work was inaugurated within the Garden—then God communicates to Adam to means to appreciate what God has called us to "work it and take care

of it" (Genesis 2:15 New International Version). Adam became an integral part of God's design; understanding that work is a way to serve God with meaning and purpose.

As servants to God within the workplace, we are given the opportunity to demonstrate the talents and gifts that God has provided. Keller and Alsdorf (2012) mentioned that God's regents are positioned to honor and serve God by demonstrating love and servitude towards neighbors and workplace. Without losing sight within the workplace, God's servants have meaning and purpose to perform their respective ministry and, in this segment, delivering healthcare. The leader's responsibility is to be credible and conduct themselves with a moral and ethical code that exemplifies God. Some of the challenges that the leader might face stem from the need to understand the root analysis of the issues, especially within healthcare, where providing care to those in need is warranted. During the collection of data and designing a research strategy, the need to produce, compute, and interpret the findings revealed talents, not just in the outputs and/or reflections, but witnessing the healthcare leaders desire to prove that their talents are appreciated and furthermore, aligns with the characteristics of God in the workplace.

As God's servants and leaders within the business field, the Christian leader can honor God with humility, love, and fruits of the Holy Spirit (Galatians 5:22-23 New International Version). Impacting the business by placing God first, arranges the business to be fruitful; affording the opportunity for God to receive all of glory. Additionally, the Apostle Paul states, "As a prisoner for the Lord, then, I urge you to live a life worthy of the calling you have received" (Ephesians 4:1 New International Version). God's calling healthcare professionals to illustrate the virtues in which God has bestowed upon them. Viewing this scripture with a professional ministry perspective, Snodgrass (2018) communicated that there is a calling is for all Christians and Christian healthcare leaders to align in accordance with what God has done.

Furthermore, Keller and Alsdorf (2012) communicated that Christians should be aware that are purpose within the workforce is not to choose our jobs and conduct our work to fulfill ourselves, but to understand that our calling is God empowering us and to appreciate the assigned work as a service.

The Golden Rule in the Bible, "So in everything, do to others what you would have them do to you" provides the beginning of how healthcare providers should consider the consumers in healthcare (Matthew 7:12 New International Version). William Kissick discussed the "Iron Triangle" in *Medical Dilemmas*. Kissick (1994) mentioned that the golden rule in healthcare should be that everyone deserves the finest healthcare attainable, while vocalizing that there are three pillars of the triangle: cost, access, and quality. Treating others in the capacity in which the provider would want to be treated affords a quality-approach towards delivering premium healthcare.

The Apostle James vocalizes, "my dear brothers and sisters, take note of this: Everyone should be quick to listen, slow to speak and slow to become angry," (James 1:19 New International Version) and healthcare providers should be ones with an ear to hear; exerting patience within healthcare. AI is delivering dynamic results to solve long-standing challenges, and after acknowledging the impact of AI, healthcare leaders should align themselves with the wisdom that the Apostle James imparts.

As this Bible verse is discuss by many commentaries (e.g., Christian differences) it is clear that the Word of God is directing us to be "quick to listen." Watchman Nee (1988) discussed the ability to hear and listen, remarking that there are three distinct avenues to effective listening. Listening to what was said, listening to what was interpreted, and listening to what was not said. During this time of education and exposure to the positive impact of AI, the

stakeholders within healthcare must engage with the consumers. Listening is critical as

Christians and as leaders in the healthcare space, and there should be a commingling effort with

others to enhance healthcare on every level.

Summary of Reflections

Upon reviewing the findings, how the findings are applicable to professional practice,

examining the recommendations for further studies, and reflecting on the research there are many

opportunities to drive additional energy into the adoption of AI into the healthcare industry.

There are tremendous channels to leverage within the healthcare stakeholder map, along with the

deluge of opportunities to galvanize the adoption of AI within healthcare. Of the many themes

that were teased out of the surveys and interviews, the need for engagement/education stood out

the most. The potential to apply the muscle of driving engagement into the healthcare industry,

the opportunities to appreciate adoption can be actualized.

Summary of Section 3

Of note, there are still a bevy of channels that can be utilized to drive further studies, such

as healthcare connections and social media. These channels are currently being leveraged,

however, with further stimulation, the offerings to push the industry can be appreciated. After

unpacking the respondents' interviews/surveys, the alignment with responses and literature has

similarities. With the challenges of access, quality, and cost healthcare leaders are still

scrambling to identify solutions where healthcare can be improved. There are additional

learnings from the research as well such as professional and personal growth.

As healthcare leaders observed and appreciate the impact of AI within their facilities, it is

evident that there will be more adoption, moreover, into the business practice, appreciating the

opportunities to solve for the challenges around rising costs, decreased healthcare access, and

diminished quality. The personal observation, upon reflection, is clear. As a healthcare provider,

AI is transforming healthcare across multiple stakeholders affording the lessons of growth,

energizing the desire to engage, and share best practices across the stakeholder map. Witnessing

the excitement for change, reading the existing literature, and aligning the outcomes of the

research into themes offers growth on a personal level.

Additionally, the biblical perspective is transparent as well with the dynamic opportunity

to reveal God's glory in these segments. Professionally, God has revealed that the healthcare

leaders have talents that were given to them by God, providing premium offerings of healthcare

to the His people. Being God's regents within their facilities, the occasion in providing quality

healthcare by possibly leveraging AI as a potential solution to the challenges outlined by

Kissick's "Iron Triangle.," becomes more real, giving glory to God.

Understanding the impacts of AI within healthcare and how AI is driving uncompromised

results, the growth component is actualized. This is due to the opportunities to create a healthcare

ecosystem where costs, quality, and access is drastically enhanced. The augmentation of

healthcare and the stakeholders contributes a new wave of premium healthcare when the

healthcare leaders observe the transformative bearing of AI. The drive to improve healthcare is

central to the research, as there was not an antagonistic view in any of the subjects/participants.

To summarize, God's hands are observed throughout the research process, outputs of the

research, and future research of AI in healthcare.

Summary and Study Conclusions

AI and its buzz throughout the healthcare industry is real. This has been the case for the

last decade. AI and its introduction into the healthcare industry is demonstrating impacts

throughout departments and leaving healthcare stakeholders with decisions on adoption AI,

potentially transforming healthcare facilities throughout. With the abundance of existing literature and known positive outcomes, AI appears to set itself up towards solving many of the dilemmas that healthcare leaders constantly face on a daily basis.

Acknowledging that AI has inserted itself as a positive force within healthcare questions have arisen as to "why" AI is not holistically adopted within healthcare. AI is opening doors towards simplifying decision-making, improving access concerns, augmenting quality of care, expediting patients throughout facilities and their care, and demonstrating the opportunities to drive costs down by early cancer and cardiac detections and assisting with shorten healthcare staffing.

The need to understand "why" healthcare is not completely on board with adopting AI into the industry presses more research towards understand the pause that healthcare leaders might have when considering AI. The research that took place within South Texas was aimed to understand healthcare leaders' perspective on how impactful AI is when utilized, why AI is not leveraged, and understanding the overall view of AI and its alignment with the healthcare industry. Questions were asked throughout various healthcare leaders within a few segments of facilities. From academic to rural facilities, perspective is critical from a deluge of leaders to appreciate AI and its place in the industry.

Within the research, it was apparent that many healthcare leaders still feel like they are in the dark regarding AI. Engagement is critical throughout the entire stakeholder map to assist within the drive of adoption; helping to mitigate the hesitations that stakeholders have. These trepidations stem from trusting AI to accountability and education/engagement was communicated as an appropriate solution to ease the concerns. Healthcare leaders are constantly evaluating how to improve healthcare. Within the research, many of the respondents agreed that

AI can improve their facilities, however, too many questions exist. Willingness and excitement were other themes that were communicated due to the efficiency solutions that AI presents within the quality, access, and costs segments.

To conclude, AI has a place within healthcare. AI and its involvement have offered premium efficiency solutions for those who have leveraged it. As stakeholders evaluate daily challenges with access, quality, and costs, AI has historically provided solutions in detecting cardiac events and cancers, streamlining decision-making, augmenting quality of care, assisting with improving access concerns, and improving the patient journey. Teasing out why healthcare leaders are hesitant on adopting AI was the target of the research, acknowledging that there are a bevy of existing literature and experiences. Healthcare leaders communicated that they are fairly familiar and excited about AI and healthcare, additionally, willing to utilize AI if they were given the opportunity. While the majority of the participants agree that AI can improve efficiency, there are still looming issues that healthcare leaders recognize.

The outputs from the research reveal that healthcare leaders need more education and engagement to quiet some of the trust issues that healthcare leaders vocalized. From patient-provider engagement concerns, accountability if AI does not live up to its expectations, potential job replacement, and lack of feedback from where AI has failed, healthcare leaders are still concerned about what a healthcare industry looks like with holistic AI adoption. That is why it is important to blast the industry with education from those facilities where AI has been successful, utilize channel to educate the consumers who are trepid towards AI, engage with healthcare facility leadership team to edify the overall impact of AI, more vendor-led seminars at the provider-patient level, and propose more return-on-investment tools. These education and engagement opportunities will assist with energizing and driving AI adoption throughout the

industry; ultimately, enhancing quality of care, cutting overall costs, and addressing access

concerns.

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Appendix A: Interview Guide

1. What is your experience with artificial intelligence (AI) as it relates to healthcare?

2. Have you ever read about AI and healthcare?

    a. What are your thoughts?

    b. What are your thoughts on AI and the potential of AI improving healthcare delivery?

3. Why do you feel that healthcare facilities are not leveraging AI?

4. Do you have trepidations about AI and healthcare?

    a. If so, why do these anxieties exist?

5. If utilized, how has AI impacted your healthcare facility?

Appendix B: Survey

1. How familiar are you with AI and healthcare?

    a. Very familiar

    b. Somewhat familiar

    c. Not at all familiar

2. Have you experienced utilizing AI in healthcare?

    a. Yes

    b. No

3. If you had the opportunity, would you leverage AI in healthcare?

    a. Yes

    b. No

4. Do you believe that AI can improve efficiency in healthcare?

    a. Yes

    b. No

5. Do you believe that AI should be adopted by the entire healthcare industry?

    a. Yes

    b. No