

Everyone's Smart University

College of Management

Master of Management



The Effect of Artificial Intelligence on the Quality of Decision Making In the Train Sector in Saudi Arabia

**أثر الذكاء الاصطناعي على جودة اتخاذ القرار في قطاع القطارات في
المملكة العربية السعودية**

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Introduction

The movement of people and goods between different regions is made easier thanks to Saudi Arabia's Train Industry, which is an essential part of the nation's transportation infrastructure (Alotaibi et al., 2022). Making wise decisions is essential in this industry for ensuring operational effectiveness, safety, and client satisfaction. With the rapid development of artificial intelligence (AI) technologies, AI can be used to improve decision-making in the Train Industry (Brahimi, 2019). This research proposal aims to investigate the impact of AI on the standard of decision-making in Saudi Arabia's Train Industry to identify the potential advantages and difficulties of its implementation.

Study Problem

There are particular difficulties and restrictions associated with the use of AI in Saudi Arabia's Train Industry (Silva, 2015). Comprehensive research on how AI technologies affect decision-making in this industry is lacking in the available literature (Brahimi, 2019). Understanding how AI can enhance decision-making and address the particular difficulties faced by the Saudi Arabian Train Industry depends on closing this gap.

Study Significance

For various reasons, the study is essential. First, it will add to the knowledge of using AI in decision-making in the Train Industry, particularly in Saudi Arabia. Second, it will offer insights into the potential advantages that AI could bring to decision-making processes, such as increased precision, effectiveness, and resource allocation. Finally, the results of this study will help policymakers, business leaders, and stakeholders in the Train Industry understand the benefits and difficulties of adopting AI, allowing

them to make wise choices to improve operational performance and service quality.

Objectives of the Study

- To assess the current state of decision-making in the Train Sector in Saudi Arabia.
- To examine the impact of AI on decision-making processes within the Train Sector.
- To identify the benefits, challenges, and limitations of AI integration in decision-making within the Train Sector in Saudi Arabia.

Study Questions

- What is the existing decision-making process in the Train Sector in Saudi Arabia?
- How does integrating AI technologies influence decision-making within the Train Sector?
- What are the main benefits, challenges, and limitations of using AI in Train Sector decision-making?

Literature Review

Overview of AI in Decision Making

With applications in many different industries, including decision-making, artificial intelligence (AI) has emerged as a technology redefining many fields (Gil et al., 2020). Machine learning, data analytics, and predictive modeling are some techniques that fall under the artificial intelligence (AI) umbrella and allow systems to learn from data and take independent actions. The potential of AI to increase decision-making accuracy, efficiency, and results has been shown in previous studies by Smith et al. (2018); Chen et al., 2020).

AI in the Transportation Industry

The transportation sector has embraced AI technologies to improve operations and service quality (Abduljabbar et al., 2019). AI has been used in the Train Industry for several purposes, including predictive maintenance, route optimization, and demand forecasting. These programs have shown promise in enhancing operational effectiveness, decreasing delays, and lowering costs (Wu et al., 2021)

Decision-Making in the Train Sector

Complex processes influenced by safety regulations, operational limitations, and customer demands are used in the Train Industry to make decisions. Several issues, such as resource allocation, scheduling, and risk management, have been highlighted in previous studies that have examined decision-making practices in the Train Industry (Alsaedi, 2023). However, the use of AI in decision making within this context is hardly ever addressed in research.

AI Integration in the Train Sector

Numerous potential advantages could result from using AI technologies in decision-making in the railroad industry. Real-time analysis of massive datasets by AI enables more precise predictions and better decision-making (Hassan, 2020). Maximizing resource allocation and scheduling can increase operational efficiency, resulting in lower costs and more dependable service. AI can also help with decision-making focused on the customer's needs, allowing services to be tailored to specific preferences and raising general satisfaction (Flammini et al., 2020). Data quality,

privacy, and ethical issues must all be addressed for AI to integrate into decision-making successfully.

Gaps and Limitations in the Literature

There is still a need for research mainly centered on the Saudi Arabian context, even though existing studies have examined AI in decision-making within the transportation industry, including applications in the Train Sector. Understanding the effects of AI on decision-making processes and the particular difficulties decision-makers in this situation face has received scant attention. By examining how AI influences decision-making in the Saudi Arabian Train Industry, this research aims to close this gap.

Theoretical Framework

Decision-Making Theories

Understanding the cognitive processes and variables influencing decision outcomes is based on theoretical decision-making perspectives (Edwards, 1954). Decision-making theories like rational decision-making, bounded rationality, and intuitive decision-making provide insights into how decisions are made in the railroad industry (Gigerenzer & Gaissmaier, 2015). These theories can be modified to look at how integrating AI technologies affects the decisions and results of those decisions.

AI Decision-Making Models

The research can be directed by using specific AI decision-making frameworks and models. With the help of feedback and rewards, for instance, reinforcement learning algorithms can help AI systems learn the best possible decision-making approaches (Phillips-Wren, 2012). In complex decision-making scenarios, other models, like decision trees or neural

networks, can help recognize patterns and relationships (Wilson & Van Der Velden, 2022). These models can be modified or created especially for the Saudi Arabian Train Industry to study the effects of AI integration on decision-making efficiency.

Technology Acceptance and Adoption Theories

Several factors affect how AI technologies are accepted and used in decision-making. The Technology Acceptance Model (TAM) or other pertinent theories, such as the Unified Theory of Acceptance and Use of Technology (UTAUT), can offer a theoretical lens to comprehend decision-makers' attitudes, intentions, and behaviors towards AI adoption within the Train Sector (Taherdoost, 2018). These theories highlight elements like perceived utility, usability, and organizational context that affect how well AI technologies are accepted and integrated.

Research Methods and Methodology

This study will use a mixed-methods approach; surveys given to decision-making stakeholders in the Train Industry, such as management and operational staff, will be used to gather quantitative data. The data will be statistically and thematically analyzed to gain meaningful insights and reach conclusions.

Study Tools

The study will use a survey questionnaire to gather quantitative data from decision-making stakeholders in the rail industry. The questionnaire aims to collect data on respondents' perceptions of the adoption of AI, the effectiveness of their decision-making, and their overall satisfaction levels.

Fields of Study

The research will focus on the following fields within the Train Sector in Saudi Arabia:

- Decision-making processes
- AI implementation and integration
- Operational performance
- Resource allocation
- Customer satisfaction

Proposed Time Plan

The research will be conducted over 10 weeks; the proposed timeline is as follows:

Week 1-3: Choosing the titles and proposal design

Week 3-5: Data collection, writing, and submitting the proposal

Week 5-7: Report writing and drafting research findings

Week 8-10: Finalizing the research report

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