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Professional Research Thesis

Titled

The impact of employing artificial intelligence on the efficiency of institutional performance in business administration organizations.

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SUMMARY

In light of the rapid technological advancements characterizing the digital age, Artificial Intelligence (AI) has emerged as one of the key factors influencing organizational performance in business management institutions. AI technologies have brought about a profound transformation in institutional work methods, contributing to improved efficiency in administrative and production processes, enhanced competitive capabilities, and support for strategic decision-making through advanced data analytics. Consequently, studying the impact of integrating such technologies into organizational performance has become essential to ensuring sustained excellence and innovation in the modern business environment.

Contemporary business management no longer relies solely on traditional managerial and organizational skills; rather, it now necessitates the effective utilization of intelligent technological developments that enhance institutional efficiency. AI enables the optimization of strategic planning, human resource management, and big data analytics, all of which positively influence the speed and quality of decision-making. Moreover, AI applications such as Machine Learning and Predictive Analytics play a crucial role in understanding operational patterns, identifying investment opportunities, and anticipating potential risks—thereby reinforcing organizational sustainability.

In addition, the adoption of AI in the business environment presents numerous opportunities to improve customer experience by developing intelligent decision-support systems, virtual assistants, and consumer

behavior analytics tools. AI also facilitates the automation of administrative and logistical processes, which leads to reduced operational costs and increased productivity. However, despite these benefits, reliance on AI is not without challenges. These include the need to upgrade digital infrastructure, address security and privacy concerns, and understand its implications on the labor market, particularly in terms of its effect on traditional employment opportunities.

Hence, the significance of this research on "The Impact of Artificial Intelligence Adoption on Organizational Performance Efficiency in Business Management Institutions" lies in its aim to provide an in-depth analysis of AI's role in enhancing organizational performance, while also highlighting the opportunities and challenges facing institutions in this regard. The study further seeks to offer recommendations grounded in applied studies and advanced theoretical frameworks to support decision-makers in strategically leveraging AI for optimal organizational effectiveness.

Accordingly, this study will analyze the relationship between AI and organizational performance efficiency by examining several key factors, such as the extent of AI adoption within institutions, its impact on productivity, the quality of managerial decisions, customer satisfaction, and organizational agility. The research will also shed light on the experiences of leading institutions in this field and utilize practical models to present a comprehensive vision of how to balance AI reliance with the development of human skills to ensure institutional sustainability.

In conclusion, this study represents an effort to enrich the scientific knowledge in the fields of business management and artificial intelligence

by presenting an integrated analytical framework that enables institutions to adopt effective strategies for utilizing intelligent technologies, thereby ensuring institutional excellence in an increasingly competitive and dynamic business environment.

The study Problem:

The world is currently witnessing an unprecedented technological revolution led by Artificial Intelligence (AI), which has become a key driver in the development of various sectors—foremost among them, business management. Organizations have increasingly recognized the importance of adopting AI to improve organizational performance and enhance their competitive advantage. AI contributes to raising operational efficiency, analyzing big data, and supporting strategic decision-making through accurate predictive models and advanced analytics. However, the impact of AI on organizational performance remains surrounded by several challenges, particularly regarding how to strike a balance between automation and human skills, and the extent to which these technologies effectively improve administrative, financial, and productive performance.

Although numerous studies have explored the importance of AI in the business environment, a research gap persists in the need for a deeper understanding of how AI deployment affects organizational performance efficiency from various dimensions—whether by accelerating administrative processes, improving customer experience, or enhancing innovation capacity and responsiveness to changes in the business

landscape. While some organizations that adopted AI reported significant improvements in productivity and reduced operational errors, others faced challenges related to implementation costs, human resource development, and concerns over privacy and information security.

In light of these challenges, there is a pressing need for an analytical scientific study that examines the impact of AI adoption on the efficiency of organizational performance in business management institutions. This includes evaluating the effectiveness of AI technologies in achieving organizational objectives and assessing the readiness of institutions to adapt to rapid digital transformations. Furthermore, the study should explore the barriers that may hinder the optimal use of AI and propose practical solutions that help maximize its benefits—ultimately ensuring enhanced organizational performance and contributing to sustainable development in the modern business world.

The importance of studying:

The significance of this study stems from the urgent need to understand the profound and growing impact of Artificial Intelligence (AI) on the efficiency of organizational performance in business management institutions, especially in light of the rapid technological transformations occurring globally. AI has become a central element in enhancing organizational competitiveness by improving decision-making processes, developing business strategies, increasing productivity, and reducing operational errors. Therefore, examining this topic provides an opportunity to explore the effectiveness of these technologies in improving organizational performance and the extent to which institutions can leverage their potential to achieve growth and sustainability.

Furthermore, this study contributes to bridging the knowledge gap regarding the relationship between AI and organizational performance efficiency. It highlights the positive aspects that institutions can attain through AI adoption, as well as the challenges they may face during the digital transformation process. By offering a rigorous, scientifically grounded analysis, the study aims to guide decision-makers and

institutional leaders toward adopting effective strategies for utilizing AI in the most optimal ways.

The study gains particular importance amid the increasing reliance on big data and intelligent technologies in management and strategic planning processes. It clarifies how AI can be employed in data analysis and decision-making with greater speed and precision—ultimately enhancing performance efficiency and achieving sustainable competitive advantage. Additionally, the study provides institutions with a comprehensive perspective on how to adapt to digital transformations without compromising traditional job structures, by seeking ways to integrate AI with human skills rather than replacing them.

In this context, the study may serve as a valuable reference for researchers and professionals in the fields of business management and technology. It offers a scientific framework for understanding the multifaceted impacts of AI on organizations and proposes practical solutions to address potential challenges. By shedding light on the experiences of institutions that have successfully leveraged these technologies, the study helps extract lessons that can guide other companies toward making more informed decisions regarding the effective use of AI to achieve their organizational goals.

Objectives of the study:

- *Analyze the impact of Artificial Intelligence (AI) adoption on the efficiency of organizational performance in business management institutions.*
- *Identify the business areas that benefit most from the application of AI technologies.*
- *Measure the extent to which AI influences administrative decision-making processes.*
- *Explore the challenges faced by organizations when adopting AI technologies.*
- *Examine the relationship between AI and the achievement of a sustainable competitive advantage.*

Study hypotheses and questions:

Research Questions:

- *To what extent does the adoption of Artificial Intelligence (AI) affect the efficiency of organizational performance in business management institutions?*
- *How can AI contribute to improving administrative decision-making processes?*
- *Which organizational areas benefit the most from AI technologies?*
- *What challenges do institutions face when adopting AI in the workplace?*
- *How does AI impact customer experience and satisfaction with the services provided?*

Research Hypotheses:

- *There is a positive impact of AI adoption on the efficiency of organizational performance.*
- *AI contributes to improving the quality and speed of administrative decision-making within organizations.*
- *The adoption of AI enhances the competitive advantage of organizations in the business market.*
- *AI helps reduce operational costs and increase productivity within organizations.*
- *Organizations face both technical and human-related challenges when implementing AI systems.*

Study Approach:

The descriptive analytical approach was employed to examine the impact of Artificial Intelligence (AI) adoption on the efficiency of organizational performance in business management institutions.

The limits of the study:

Spatial boundaries: The Arab world.

Time limits:2025-2003

Study plan:

Chapter One: Theoretical Framework and Scientific Concepts

Section One: An Introduction to Understanding Artificial Intelligence

1. *The Nature of Artificial Intelligence and Human Intelligence*
2. *Methods of Artificial Intelligence*
3. *The Emergence and Development of Artificial Intelligence*
4. *Fields and Characteristics of Artificial Intelligence*

Section Two: The Nature of Business Administration

1. *The Concept and Importance of Management*
2. *Types and Fields of Management*
3. *The Relationship Between Management and Other Sciences*

Section Three: Applications of Artificial Intelligence in Organizations

1. *AI in Operations Management and Supply Chains*
2. *AI in Customer Service*
3. *AI in Decision-Making*

Chapter Two: The Impact of Artificial Intelligence on Organizational Performance

Section One: Positive Effects of AI Adoption

1. *Improving Productivity*
2. *Reducing Costs*
3. *Enhancing Competitive Advantage*

Section Two: Challenges Associated with AI Adoption

1. *Technological Challenges*
2. *Human and Ethical Challenges*

Chapter One: Theoretical Framework and Scientific Concepts

Section One: An Introduction to Understanding Artificial Intelligence

1-The Nature of Artificial Intelligence and Human Intelligence

Humans are uniquely characterized by possessing "intelligence," a mental capacity that plays a critical role in every aspect of life. The field of artificial intelligence (AI) is fundamentally concerned with automating human intelligence and analyzing its cognitive abilities. One of the primary motivations for studying AI is to gain a deeper understanding of the workings of the human mind—beyond the scope of disciplines like philosophy, psychology, or neuroanatomy, which also address aspects of the human intellect. AI, in contrast, strives not only to understand intelligence but also to recreate it in a mechanized form.

A second reason for the growing interest in AI lies in the practical benefits it offers in various areas of our increasingly digital lives. Although the future remains uncertain in detail, it is evident that the integration of computer technologies with human-like intelligence will have a profound and far-reaching impact on our daily lives and the evolution of modern civilization.

AI also presents one of the most intriguing puzzles of our time: how can a relatively small brain—whether biological or electronic—perceive, reason, predict, and interact with a world vastly more complex than itself? What path can lead us to build such an intelligent "brain" with its intricate capabilities? While the question is undoubtedly complex, unlike the pursuit

of faster-than-light travel, the science of AI is built upon solid and feasible foundations. In fact, all one needs to do is look into a mirror to see a living model of an intelligent system.

1.1.1 Definition of Artificial Intelligence

The term intelligence typically encompasses a range of mental abilities, including analytical thinking, planning, problem solving, rapid mental simulation, abstract reasoning, idea coordination, language acquisition, and the capacity to learn quickly. While popular understanding tends to associate intelligence with memory capacity, psychology treats intelligence as a distinct behavioral trait, separate from creativity, character, wisdom, or even memory retention.

Artificial Intelligence (AI) *is a subfield of computer science focused on enabling machines to perform tasks that would normally require human intelligence—such as learning, reasoning, and decision-making. Among the widely accepted definitions is one provided by the Arab Encyclopedia for Computers and the Internet, which defines AI as:*

"A branch of modern computer science aimed at simulating human cognitive processes, allowing computers to solve problems and make decisions in a structured and logical manner similar to human thinking."

These processes include:

- ***Learning****: acquiring knowledge and rules for using that knowledge.*
- ***Reasoning****: applying acquired rules to reach approximate or exact conclusions.*

- ***Self-correction****: the ability to autonomously refine processes and outputs.*

*In essence, **Artificial Intelligence** is the science of automating intelligent behavior, and its development requires three fundamental components:*

- *A **data system** to represent knowledge and information;*
- ***Algorithms** to guide how this information is processed;*
- *A **programming language** to implement both the data structures and algorithms.*

Thus, AI is a modern discipline within computer science that seeks to develop advanced systems capable of mimicking—albeit within limits—some of the intellectual processes attributed to human intelligence. Importantly, AI does not aim to replicate or rival the divine complexity of the human brain, but rather to understand complex cognitive operations such as thinking, and translate them into computational processes that can enhance machines' problem-solving capabilities.

1.1.2 Human Intelligence

God Almighty says in the Holy Qur'an:

"And among His signs is that He shows you the lightning, [causing] fear and aspiration, and sends down rain from the sky by which He brings to life the earth after its death. Indeed in that are signs for a people who use reason."
(Surah Ar-Rum, 30:24)

And also:

"Indeed, in the creation of the heavens and the earth and the alternation of the night and the day are signs for those of understanding." (Surah Al-Imran, 3:190)

These noble verses highlight the profound importance of mental processes—first, as a distinguishing feature of humankind from other creatures; and second, as a distinguishing feature between individuals themselves. Intelligence stands among the most critical mental activities performed by the human mind, yet it remains one of the most difficult to define precisely:
Is it the ability to deduce?
The capacity to acquire and apply knowledge?
Or is it the ability to comprehend, conceptualize, and influence the physical world?

Avoiding deep philosophical discussions, intelligence may be defined as encompassing all the above and more. Broadly, it includes all mental functions such as creativity, innovation, control of motor functions, sensory perception, and emotions. Within the scope of AI research and computational modeling, however, intelligence can be understood more narrowly as the human capacity to conceptualize, analyze properties, and draw inferences—essentially, to create a ***mental model*** *of a specific domain, identify its elements, derive relationships among them, and produce appropriate reactions to various events or scenarios.*

To illustrate this, imagine two people attending a football match together. One of them is well-versed in the game's rules, team strategies, player identities, and the impact of the result on the league standings. The other is completely unfamiliar with football. After the game, if both are asked to

comment on what they saw, the first would likely offer a structured and insightful analysis of team performance, tactical errors, and player decisions. In contrast, the second would probably describe the event in simplistic terms, as a group of 22 players chasing a ball without grasping the deeper purpose or context.

This disparity arises because the first individual has an internalized mental model of the game—one that enables them to retrieve relevant information and interpret events meaningfully. The second person, lacking this model, cannot offer such an analysis. However, if the second individual continues to watch more games, they may gradually develop their own model of the game, and eventually become capable of offering a more informed evaluation. The first individual, in turn, can refine and expand their model as the sport evolves.

Such mental models are not only built through experience and reasoning, but they are also subject to continuous development and adaptation. One of their greatest benefits is that they help the individual identify relevant variables and simplify the complex dynamics of real-world situations. For instance, in assessing a patient's heart condition, a physician's mental model focuses on vital indicators—such as blood pressure, blood sugar, and cholesterol levels—while disregarding irrelevant details like the patient's favorite food or car color. Thus, mental models help streamline problem-solving by narrowing attention to what truly matters.

3- The Difference Between Artificial Intelligence and Human Intelligence

Artificial Intelligence:

Artificial intelligence can be defined for computers as the ability to

represent computational models of a specific field of life, determine the basic relationships between its elements, and then generate reactions that correspond to the events and situations of this field. Therefore, artificial intelligence is primarily related to representing a computational model of a specific field, followed by its retrieval and development. Secondly, it is concerned with comparing this model with the events and situations in the field to derive useful conclusions.

The difference between the definitions of artificial intelligence and human intelligence can be observed in the following points:

1. ***The ability to create the model:***
   Humans are capable of inventing and creating mental models, whereas the computational model in artificial intelligence is a representation of a model previously created in the human mind.
2. ***Types of conclusions:***
   Humans can use various types of mental processes such as innovation, creativity, and reasoning. On the other hand, artificial intelligence is limited to conclusions based on axioms and well-established rules that are programmed into the system.

2. Methods of Artificial Intelligence

The origin of artificial intelligence (AI) is based on pure and theoretical research that studies methods of representing models in computer memory (Model Representation), search and matching methods between their elements (Search & Match Methods), goal reduction, and performing various types of reasoning (Reasoning), such as logical reasoning (Logic), analogy-based reasoning (Analogy), or inductive reasoning (Induction). Below are some of the most important methods:

1. Rule-Based Method

Using rules that govern a specific field is one of the key methods for representing models. For example, if the field of research involves types of fruit, a rule might be written as follows: "If the plant is a fruit and its color is red, it is most likely an apple." This rule consists of two parts:

- ***Premise:*** *"If the plant is a fruit and its color is red."*
- ***Action:*** *"Then it is most likely an apple."*

By using a large number of such rules about a specific topic, an implicit model is created that stores facts about the subject and can be used to deal with events and derive conclusions. This type of representation is common due to its ease of application, but it is considered a simple representation that often fails to represent all types of models or derive all types of known conclusions.

2. Semantic Networks Method

*The **Semantic Networks** method is another common way of representing models. It involves creating a network of relationships between elements in the model.*

3. Frame Representation Method

*The **Frame Representation** method is a common approach that can be considered a special type of **Semantic Network** representation. This method involves organizing information into frames that represent concepts and their attributes, much like the structure of human knowledge.*

4. Computer Vision Method

*The **Computer Vision** method involves converting an electronic image, composed of black or white pixels, into connected lines and edges to form an image. The properties of the resulting image are then compared with models previously stored in the system. For example, the image of an airplane can be recognized by its wings and tail, an airport can be identified by its runways, and a mosque can be recognized by its minaret.*

The difficulty in computer vision lies in the variation of images due to differences in lighting and the shadows cast on parts of the object. Computer vision has numerous applications in areas like missile guidance, aircraft navigation, satellite work, espionage, and, of course, robotic arms.

*One of the most famous systems that use computer vision in the industrial field is the **Onsight system**, currently used at General Motors in Canada. This system allows a robotic arm to sort engine casts as they pass on a*

conveyor belt under a specific lighting condition. After analyzing the light, the arm selects the casts that do not meet the required specifications.

Using more than one robotic arm in a confined space presents significant technical challenges due to the risk of collisions between the arms. Additionally, coordinating their efforts in a collaborative task is difficult because each arm's actions need to be tracked, along with the work completed by the other arms. Until recently, robotic arms were generally used independently, with each arm performing a separate task. However, using more than one arm to complete a complex task requires new and sophisticated automated systems that create an overall movement plan and logically determine the steps each arm must take. These systems need to incorporate artificial intelligence and its methods to create computational models of the environment, store movement rules, and define the necessary motion foundations. Despite some advancements, such as the ***STRIPS system*** *enabling robotic arms to perform autonomous movements, most of these systems are still in the research and development phase.*

5. Natural Language Processing (NLP)

This method aims to understand natural languages to allow computers to directly receive commands in the same language, thus enabling them to converse with humans by answering specific questions. NLP encompasses the following areas:

- ***Speech:*** *Providing computers with the ability to understand human speech by receiving sounds, reassembling them, recognizing them, and then responding appropriately.*
- ***Vision:*** *Equipping computers with optical sensors that enable them to recognize people or shapes in their environment.*

- ***Robotics:*** *This involves electro-mechanical machines that receive commands from a computer, which directs them to perform specific tasks. In this area, artificial intelligence enables robots to move, understand their surroundings, and respond to various external factors.*
- ***Learning:*** *The most significant form of learning in this context is* ***automated reinforcement learning****, which seeks to utilize the computational power of computers in educational and training fields.*

Conclusion:

At the conclusion of this study, it is clear that artificial intelligence plays a vital role in the development of business management organizations in the era of digital transformation. The integration of AI technologies opens new horizons for efficiency and innovation, enhancing the ability of organizations to adapt to the constantly changing market demands.

This study explored the importance of intelligent data analysis and how AI can contribute to the development of decision-making processes within administrative organizations. It also examined the impact of smart technology on the efficiency of daily operations and the improvement of organizational performance.

Through examining the effect of machine learning and AI on performance enhancement, it became evident that AI is not just a data analysis tool, but a strategic partner that can be effectively integrated into business structures.

It is also important to emphasize the need to focus on training and preparing administrative staff to fully benefit from AI applications. This focus strengthens organizations' ability to control and direct technology towards improving performance and achieving strategic goals.

In conclusion, the role of AI emerges as a key driver for continuous development and improvement in business management organizations. Adopting sustainable strategies for the use of smart technology greatly contributes to enhancing organizations' ability to adapt to rapid transformations and achieve success in a volatile business environment.

Results:

- *Artificial intelligence plays a fundamental role in the development of business management organizations by enhancing operational efficiency and decision-making processes.*
- *AI helps increase employee productivity and reduce costs by automating certain administrative and operational tasks.*
- *AI enables business managers to make more accurate and timely decisions based on the processing of large data sets and predictions.*
- *AI solutions open new avenues for interacting with customers and managing customer relationships more effectively.*
- *There is a clear connection between the application of AI and supporting the mechanisms of digital transformation.*

Recommendations:

- ***Enhancing Training and Development:*** *It is recommended to strengthen training and development programs for administrative staff to enhance their understanding of artificial intelligence technologies and how to use them effectively in daily operations.*
- ***Effective Integration of Technologies:*** *Strategies should be developed to effectively integrate artificial intelligence technologies into business structures, with a focus on providing a robust infrastructure that supports AI applications.*
- ***Improving Data Security:*** *Additional measures should be taken to improve data security and protect it from cyber threats, which contributes to building trust among customers and partners.*
- ***Encouraging Innovation:*** *Creating an environment that supports innovation within the organization using AI technologies is encouraged, motivating administrative teams to experiment with new solutions.*
- ***Developing Marketing Strategies:*** *It is advised to analyze and use AI technologies to understand market needs and develop effective marketing strategies.*
- ***Continuous Improvement:*** *The importance of continuous improvement in utilizing AI technologies should be recognized, with continuous*

updates to systems and processes to ensure effectiveness and seamless integration.

The reviewer:

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