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Role of Artificial Intelligence in Cost Reduction and Competitiveness Achievement

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Abstract. *The research addresses the role of artificial intelligence technologies in achieving cost reduction, achieving a sustainable competitive advantage, and improving the operational performance of companies, by analyzing how these technologies reduce costs. The research is based on a basic hypothesis that "artificial intelligence technologies contribute positively to reducing costs for economic units by improving the efficiency of using available resources, reducing waste, and improving technical innovations, which enhances the ability of the economic unit to compete and achieve a sustainable competitive advantage." The research recommends investing in artificial intelligence technologies, training employees to use them effectively, developing a clear strategy, adopting analytical models to measure the impact of artificial intelligence on performance and costs on a regular basis, and supporting research related to developing artificial intelligence applications to improve operational efficiency and enhance cooperation between universities and economic units to develop innovative solutions that achieve a sustainable competitive advantage. This research is an addition to the literature concerned with how economic units adopt artificial intelligence technologies and work to reduce their operating costs, and aims to provide a practical framework for economic units seeking to improve their financial performance by adopting the latest artificial intelligence technologies.*

Keywords *AI, Costs, Efficiency, Competitive*

1. INTRODUCTION

Today's economic units face significant challenges with accelerated changes in the business environment, requiring responsiveness and adaptation to these changes, understanding the impacts of the surroundings, and exploiting opportunities to ensure their survival and continuity in the market. These changes prompted economic units to introduce artificial intelligence (AI for short) into their strategies to ensure cost reductions, achieve the competitive advantages they seek, and reduce the imbalances that the technological business environment may cause. AI has become a necessary tool to gain sustainable competitive advantages, increase market share, and ensure the development of the performance and effectiveness of economic units.

Statement of Research

Although many economic units adopt different strategies in their work to reduce costs, they face challenges in their strategy to reduce costs and promote sustainable competitive advantage. The fundamental challenge lies in effectively combining the chosen strategy with its implementation capabilities, while simultaneously achieving tangible economic gains. Therefore, the main research problem is to determine the role of AI technologies in reducing

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costs, with the aim of achieving a sustainable competitive advantage through their use. Based on this problem, the following research questions have been posed:

a. Can economic units use AI technologies and involve them into their business strategies?
b. Can AI technologies reduce costs and achieve the sustainable competitive advantage of any economic unit?

Hypothesis

This paper hypothesizes that "AI technologies contribute positively to reducing costs for economic units by improving the efficient use of available resources, reducing loss, and improving technical innovations, which help economic units compete and achieve a sustainable competitive advantage."

Significance

This study is significant as it:

a. Provides insights into the role of AI technologies in business strategies by reducing costs through innovative and sustainable strategies.
b. Helps understand how AI technologies reduce costs.
c. Highlights the role of AI technologies in achieving sustainable competitive advantage.

Objectives

This study aims to:

a. Investigate how AI technologies improve efficiency and reduce costs in economic units.
b. Identify factors that help or hinder the role of AI technologies and understand how these technologies can reduce costs and enhance economic benefits.
c. Understand the role of AI technologies and how economic units can help enhance their business competitiveness.

Approach

An analytical-descriptive approach has been adopted in this study. The five-point Likert scale was utilized to measure subjects' responses, determining the actual demonstration of the study variables, and developing conclusions and recommendations.

Background of AI

As economic units transition into the smart age and the rise of the so-called fourth industrial revolution, driven by advanced information technology and social networks, artificial intelligence (AI) has supplanted traditional working methods. Over the past two decades, the business environment has witnessed tremendous developments in technology, technology use, and technology applications. Most business sectors, workers, and occupations have mirrored these developments. AI has been a major source to provide them

with the necessary information. Therefore, it has become necessary to acquire new skills and expertise enabling them to use these technological technologies to achieve the goals of economic units and society. The cognitive foundations of AI will be elaborated on below:

a. AI

Every human being is in a state of transformation, evolving to become a machine; it is true that the machine is evolving to become a human being. The French philosopher Valery Paul articulated this idea as early as the 19th century. This marked the inception of a genuine debate about the future of machines and their relationship with humans. This debate has been the first attempt to question the role of automated intelligence, also known as AI (Gamoura et al., 2018:1).

Artificial intelligence is used in many fields and businesses, making it one of the most important topics of our time. AI can be defined as the machine's ability to perform the cognitive functions of perception, learning, interaction, and reasoning. Experiments in AI enable machines to think like humans by developing complex systems (Al-Jaber, 2020; 17). AI is a subfield of computer science involving the creation of smart devices and software that work and interact like humans. Also, AI represents the ability of a computer-controlled digital computer or android to perform tasks commonly associated with smart objects (Estep et al., 2023:1).

b. Models and Levels of AI

There are several levels and models of AI, which are as follows (Szabadföldi, 2021: 158):

1) Narrow Artificial Intelligence (NAI): It is an AI phase where only machines can perform a set of precisely defined tasks. This is the only AI that exists right now. Most people interact with narrow AI, such as Google Assistant, Google Translate, Siri, Cortana, or Alexa, on a daily basis. All these artificial intelligences rely on natural language processing.
2) General Artificial Intelligence (GAI): A type of AI with human ability. However, this field is still in its infancy as the human brain serves as a generic model for creating intelligence.
3) Super Artificial Intelligence (SAI): Here, the machine has more highly intelligent knowledge capabilities than man. Super AI is expected to outperform humans in almost all fields, especially in scientific creativity, logic, and social skills.

c. AI Techniques

There are certain techniques pertaining to AI, each of which has its own components, co-interactions, and functions.

1) Automatic Learning

People often confuse automatic learning, a crucial component of AI, with AI itself. Automatic learning enhances learning through data, primarily focusing on the device's ability to continuously solve tasks using training data and algorithms. With regard to the modus operandi of automatic learning, the device or software can learn to perform certain tasks if it has previously obtained experience in the form of relevant data. Therefore, the machine's experience increases with this data and with each completed task. In other words, the machine learns (Weber, 2020:49).

2) Neural Network

It should be noted note that a neural network mimics the structure of the human brain as both a device and a software system. Typically, a neural network consists of numerous processors operating in parallel, arranged in numerous layers. These layers further subdivide into an input layer and substrates: the hidden layers, known as the first layer, mimic the human optic nerve and possess initial data. The subcategories incorporate the product of the previous layer, resulting in an AI system that undergoes a learning process from one layer to another. The output layer then displays the results of the AI system (Reisenhofer, 2021:9).

3) Expert Systems

Adopted in the 1980s, this AI program has gained experience to the point where it can replace human specialization in a specific area of decision-making. The structure of the expert systems includes the following components (Al-Jaber, 2020:24).

A: Knowledge base: It contains specialized knowledge about a particular area, making the person who possesses it a real expert in that field. Experts provide this knowledge, which is then entered into the knowledge base using the latest techniques for knowledge representation, among which are databases. (Ashehri, (2019:58).

B: The engine of reasoning: It is a cognitive process. The engine of reasoning's role is to process available and existing information from the work memory and knowledge base, in order to extract new information and data relevant

to the problem. This process is somewhat similar to humans' mechanism for processing information and reaching a final conclusion.

C: Interpretation annex: The interpretation facility provides a justified explanation of the results for some of the problems the expert systems address.

D: User Interface: Expert systems possess software that provides expert advice from multiple workstations to users. The expert system's software converses with the beneficiary in their native language and provides advice, which is a crucial aspect of the expert's communication with the user. The user can obtain information about the required interaction in two ways: either by selecting from a list of options displayed on the user interface, or by responding to specific questions in the system beforehand. This process makes it easier for the user to better access information. Additionally, this system can be supplied with data related to a field or knowledge issue, enabling it to recognize them and respond to any inquiries about them (Bouzaid, 2017:23).

d. Natural Language Processing

Natural Language Processing (NLP) is a computer-assisted analytical technique aimed at automatic analysis and understanding of human language, allowing scientists to easily extract useful ideas found in text datasets and avoid computational work (Kang et al., 2020:1).

NLP focuses on understanding unstructured data (from human sources). In other words, it serves as a communication tool for AI applications. Since the central problem of intelligence is the problem of communication, this technology facilitates communication between man and computers (Fisher et al., 2016:13).

NLP consists of two directions: understanding the natural language (Natural Language Understanding, or NLU) and natural language generation (NLG). The main task of NLU is to understand natural language (human language) by decrypting documents and extracting valuable information in return. NL produces text in natural languages that can be distinguished by our humans on providing structured data, texts, graphics, audio, and video. NLG is divided into three categories: text to text, such as translation and summary; text to another, such as images generated by text; and another to text, such as text generated by video (Kang et al., 2020:4).

NLP plays a crucial role in accounting by influencing customers who use online platforms like Twitter to express their opinions about companies or business scientists. This information, along with the emotions it evokes, can significantly impact the

purchasing behavior of other customers and the investment decisions of investors. Tweeters or commentators employ various mechanisms to influence their audience. For instance, investors increase their holdings to enhance the positive sentiment in tweets (Tang, 2018:5).

e. Importance of AI

AI systems are among the most important and widespread modern vocabulary in our current time in various fields. Therefore, they have been used in many fields, including humanities, educational fields, and modern technical practices. AI has also been employed to develop and enhance the performance of economic units by linking them to various duties. For instance, managing the performance of workers in economic units, bolstering management through effective decision-making, and assessing indicators through data analysis can yield outcomes that more accurately and realistically depict the actual performance of economic units, compared to traditional methods. AI fosters systems that showcase human intelligence, such as acquiring new knowledge or resolving problems for computer implementation (Al-Maqiti, 2021:13).

The importance of AI can be best demonstrated by the following practices (Shanaby, 2016:157-158):

1) AI plays an important role in many sensitive fields, such as assisting in disease diagnosis, prescribing medicines, legal and professional consulting, interactive education, and other fields.
2) Smart systems contribute to areas where decision-making is made; these systems have autonomy, precision, and objectivity. So, their decisions are far from wrong, biased, prejudiced, or even influenced by external interventions. AI is expected to contribute to maintaining the accumulated human experience by transferring it to smart machines. Additionally, the ability of AI to support the potential and efficiency of economic units demonstrates its business importance. Additionally, AI can enhance the potential and efficacy of a business, streamline its timely completion and integration, and identify the number of beneficiaries by developing associated tools and programs. Currently, many modern economic units rely on AI systems and software to showcase and demonstrate their services, replacing traditional employees. AI can increase the efficiency and effectiveness of the business, speed its implementation, raise its value, participate in the continuous development and follow-up of the business, and increase and enhance

the number of interactions with this business due to the continuous and continuous development of the related tools and software (Mousa & Bilal, 2019:43).

3) Moreover, AI applications contribute to solving most accounting and administrative problems, contributing to achieving and increasing information and reducing costs. Accordingly, AI can be utilized in many areas, including effectiveness, accuracy, clarity, timing, flexibility, and reliability. The basis for the application of AI and its success in economic units is integration and harmony as well as alignment of strategies, objectives, economic unit plans with strategies, plans, and AI goals.

f. AI Techniques as Cost Reducers

The relationship between AI and financial performance establishes a link between the technologies and programs that AI grants or develops for machines and computers, and the various processes performed at the level of financial performance in economic units. These processes involve the entry and processing of data, which are then transformed into information that benefits the user. The AI Revolution has led to a shift in the perception of financial performance, enhancing its accuracy through innovative solutions and the swift application of advanced software to generate financial returns and manage risks that align with those returns. Economic units can use AI not only for forecasting, but also for decision-making, managing returns, reducing costs, and many other financial matters at the unit level (Raqeeq, 2015:25).

AI technologies significantly contribute to cost reduction in various fields, as noted by Al-Aqoor (2022:25) and Erqal & Ibraheem (2023:47).

1) AI can automate many repetitive routine tasks. This in turn reduces the need for manpower and reduces human errors. One example is the use of accounting robots to record financial transactions and issue necessary reports.
2) Improve operational efficiency by analyzing activities and detecting activities that add value and that do not add value, such as costs based on activity.
3) AI technologies help analyze historical data and predict future costs significantly, improving financial planning and reducing waste.
4) AI can continuously monitor performance, analyze financial performance, rationalize costs, identify areas that can be improved, and reduce costs.
5) AI technologies help effectively allocate resources based on expected demand, increasing resource efficiency and reducing loss.

6) AI technologies help improve supply chain management and reduce costs associated with shipping and distribution by analyzing big data accurately.
7) AI can be used to train staff and develop their skills continuously, reducing the need for new recruitment and reducing training costs.
8) AI technologies help analyze customers' behavior and anticipate their future needs. This helps the economic unit better customize its offerings, avoid overproduction or shortages, and reduce costs.
9) AI technologies help predict possible equipment and machinery failures by analyzing operational and historical data. This helps in preventive maintenance before breakdowns occur, reducing emergency maintenance costs and increasing equipment life.
10) AI can monitor and analyze energy consumption in production processes. By using energy optimization techniques, the costs associated with excess energy consumption can be reduced and environmental efficiency achieved.

g. Automatic Learning

In terms of cost reduction, automatic learning applications enhance working efficiency by offering insights into how economic units operate, thereby improving work efficiency. Automatic learning can be used to learn office tasks and work more efficiently than human-based work, making it easy to retrieve information. Additionally, these applications streamline the recruitment process by automating the review of applicant information for those applying via the organization's website, facilitating the easy identification of suitable candidates. This increases efficiency, reduces the total downtime that can result from the absence of a skilled workforce, helps predict problems, and automatically solves them (Parry et al., 2020:13).

Automatic learning aids in the provision of information on productive resources and manufacturing methods, aiding in the determination of the cost of new products, as well as the analysis of product elements, functions, and the associated costs of required activities. Also, automatic learning helps use high-tech methods to measure activity costs. Additionally, automatic learning aids in cost reduction through self-improvement, a process where the machine adapts to itself, thereby enabling it to continuously improve itself. If the machine notices its inefficiency, it corrects and addresses these shortcomings. According to The Manufacturer's annual report, 92% of senior heads of manufacturing companies believe that automatic learning will help them increase productivity, reduce costs, improve the quality of work, reduce the deadline

for completion, reduce costs associated with product development, and reduce transfer costs by 20%, resulting in higher productivity in the workforce (Jeannie, 2012:64).

Additionally, automatic learning aids in the conversion of the fewest inputs into high-quality and efficient outputs, monitors any manipulation to prevent human errors, and completes tasks with minimal supervision and human intervention. Additionally, auto-learning management enables the system to make decisions based on factual information rather than mere predictions. These systems function flawlessly from the start due to machine learning. Product and operating shortcomings can be detected, production corrections made to increase efficiency, and additional costs incurred due to inefficiency are reduced (Al-Aqoor, 2022:44).

h. Expert Systems

Expert systems study and analyze raw material supply activities to predict the raw materials used and their cost. They design products to predict the cost of product design, introduce new ideas, design new production methods commensurate with the continuous development in production, and predict the company's competitive level compared to competitors. These systems also help to provide information on activities that add value to the product, harmonize administrative units to provide accurate data on costs, reduce waste, enhance the quality of products and services, and accelerate service delivery. Thus, these processes aid in reducing costs more effectively. Using expert systems in economic units reduces overall operational costs, helping to gain a competitive advantage in the market (Erqal & Ibraheem, 2023:26).

i. Neural Networks

Neural networks utilize feedback between inputs and outputs to forecast costs based on available data. The process begins with estimating the error and then returns to rectify it. Al-Aqoor (2022:17) maintained that neural networks, being a tool for cost measurement, can support estimate accounts. Also, Erqal & Ibraheem (2023:25) posited that neural networks can help calculate the cost of a product accurately and objectively by loading it with expendable resources creatively. This process makes a qualitative shift in cost measurement and presentation in non-traditional models that add economic value.

By applying automation methods such as decision-making, problem-solving, learning, and achieving processes that require human intelligence in terms of cognition, thinking, and action, neural networks can reduce operating costs in sectors by 15-20%. In the area of productivity, neural networks are expected to make a significant

development by strengthening workers' capabilities, improving work efficiency, reducing error, and reducing risk levels. These procedures help reduce costs. Additionally, neural networks assist in addressing fluctuations in the production volume of finished products without distortion, allowing for accurate cost allocation and providing accurate information to the cost reduction service (Erqal & Ibraheem, 2023:12).

j. Concept and Significance of Sustainable Competitive Advantage:

Competitive advantage serves as the foundation for economic units' performance, and it is uncommon for an economic unit to outperform its competitors at all levels and in all areas. Therefore, competitive advantage is key to the success of economic units.

Previous studies have defined competitive advantage as the economic unit's ability to accomplish any distinct or different activities from its competitors. According to Al-Salmeen (2001:104), a competitive advantage refers to a skill, technical capability, or unique resource that enables the economic unit to generate greater value and benefits for customers compared to competitors.

Also, competitive advantage can be described as an economic unit's ability to formulate and apply strategies that put it in a better position than units operating in the same activity. These results are achieved through better utilization of technical, material, financial, organizational, capacity, competencies, knowledge, and other potential of the economic unit. Hence, achieving these results is linked to two fundamental dimensions: the customer's perceived value and the economic unit's ability to achieve excellence (Abu Bakr, 2004:13).

Also, competitive advantage can be identified as the means by which an economic unit can penetrate markets for competitive position by providing the best products and services in the right quantity and quality and at the right time (Khaira, 2015:34).

Similarly, Sustainable Competitive Advantage (SCA) is an element that outweighs economic units in exploiting their sources of power and pursuing innovative strategies to add value to their products that are not accessible to competitors. In the same vein, Hitt et al. (2000:5) noted that SCA occurs when the economic unit develops a strategy that competitors do not implement at the same time. Also, Mursi (2003:21) stated that SCA has a strong relationship with competitive strategy because it is one of its components. Consequently, three primary components determine the competitive strategy.

1) Competitive method: It involves product strategy, location strategy, pricing strategy, etc.
2) Competitiveness cell: It includes the choice of competition field, markets, and competitors.
3) Competition basis: It includes assets and skills available at the economic unit. The assets you possess, such as your brand name, brand loyalty, competitive location, etc., and the skills you excel in, such as advertising and efficient manufacturing, set you apart from your competitors.

Likewise, some studies reported that the concept of sustainability encompasses all actions taken by an economic unit to prevent competitors from replicating or replacing its unique strategic strengths and capabilities using other resources (Business School, 2023).

SCA refers to an economic unit's ability to maintain its current competitive advantage by developing new strategies that competitors cannot easily emulate or imitate in the long term, thereby contributing to its superior and continuous performance.

k. Importance of Competitive Advantage

The fact that an economic unit must base its strategies on competitive advantages unavailable to competitors for long periods highlights the importance of SCA in determining the availability of key elements of success vis-à-vis competitors. Also, an economic unit should avoid strategies whose success requires unavailable strengths. Therefore, economic unit strategies can only succeed if they are commensurate with their internal potential. Assessing these possibilities realistically is crucial to align their strategies with their actual potential, as they rely on understanding their strengths and weaknesses to function within their boundaries (Awadh, 2000:135).

Hill and Jones (2001:122) posited that an economic unit gains a complete advantage when its profit rate exceeds the industry average, and it achieves a sustainable competitive advantage (SCA) when it can sustain its profit rate over a sustained period. Lynch (2003:152) asserted that the true advantage lies in the inability of competitors to replicate the benefits, which is why economic units must deeply instill the complete advantage in their resources, skills, and culture.

The competitive advantage is highly significant in that an economic unit adopts a superior style of work that outperforms similar ones in the market by providing a greater value to the customer. Therefore, companies consistently strive to satisfy their

customers as their primary goal. Therefore, an economic unit's purpose is to retain customers and earn their permanent loyalty, which serves as an attraction for acquiring new customers (Tabidy, 2012:23).23).

The importance of competitive advantage is demonstrated by the following (Bilaly, 2007:22):

1) It gives economic units qualitative, quantitative, and preferential superiority over competitors, thus enabling them to achieve high performance results.
2) It keeps economic units superior in performance or value of what they offer to customers both.
3) It positively impacts the perceptions of customers and the rest of the economic unit, motivating them to continue and develop the transaction.
4) Being continuous and renewable, SCA enables economic units to pursue long-term development and progress.
5) Being based on the resources, capacity, and merit of the economic unit, SCA therefore gives dynamic to the internal processes of economic units.

l. Sources of SCA

With the growing competition between economic units for leadership, which recognizes only superior and distinct economic units and the challenges posed by the dynamic environment in the speed of change in business, maintaining a competitive advantage is difficult to achieve unless you realize the true and continuing source of competitive advantage for as long as possible (Breesh, 2005:67). SCA sources can be identified as follows:

1) Internal Sources: The economic unit's ability to possess, build, or purchase resources that are not available to other competitors, such as innovation and creativity, plays a significant role in creating a competitive advantage. Here, creativity extends beyond service development to encompass strategy, business style, technology, and the creation of new benefits (Blounass & Amina, 2010:8).

   Wheelen & Hunger (2006:133) and Burnett (1984: 60) indicated that it is possible to categorize the internal environment into three main aspects that can enable economic units to gain SCA: organizational structure, dominant organizational culture, and resources and potential. These aspects are detailed as follows:

2) Organizational structure: it represents a set of organizational relationships, businesses, and functions arranged according to administrative levels, i.e., it

defines responsibilities and powers and regulates them so that collective efforts are directed towards achieving the objectives of economic unity. The organization's organizational structure is a variable factor, changing based on the requirements of the strategy, i.e., it follows the strategy, and when there is a mismatch between them, the organizational structure must be changed to be more aligned with the strategy. Any change in the strategy leads to a similar change in the structure.

3) Organizational culture: The set of common beliefs, expectations, and values that constitute the overall norms of acceptable and unacceptable behavior within the economic unit. Organizational culture follows the strategy. It must be ensured that the prevailing organizational culture is not inconsistent with the new strategies to be formulated, and work to bring about change in them if necessary to become more compatible with the requirements of the strategy to be adopted.
4) Available resources: It is a key premise of successful management that strategic managers' attention should be focused on creating a balance between strategic plans and resources available for their implementation. The available resources encompass a variety of financial, human, and technological resources, as well as various administrative systems, management information systems, and research and development potential within the economic unit.
5) External sources: Changing customers' needs or technological, economic, or legal changes that may create a competitive advantage for some economic units as a result of their rapid reaction to changes, For instance, the economic unit that swiftly introduces modern and necessary technology into the market gains a competitive edge by promptly responding to technological advancements and market requirements. Therefore, the economic unit's ability to respond quickly to external variables is crucial. This ability is dependent on the economic unit's flexibility, its ability to analyze information and anticipate changes, and the presence of an initial information system (Plunas and Amina, 2010:8).

The external environment of an economic unit encompasses an infinite number of external variables that interact with its operations and either support or hinder it, collectively serving as a source of sustainable competitive advantage. The following is a brief illustration of these variables (Ben Habtoor, 145:2007):

6) Economic variables: They encompass the state's overall economic framework, which includes the type of economic regulation, private and public ownership, as well as fiscal policies.

7) Political variables: They include the degree of political stability, the extent of government intervention in business fields, and their impact on the performance of economic units.
8) Social variables: They involve the traditions, values, and ethical frameworks of individuals in society, the role of women in society, and a high level of education.
9) Technological variables: They are concerned with both changes in the technical environment and modern changes in technology, such as increased reliance on automated computers.

The impact of these variables on economic unit performance necessitates continuous collection, organization, and analysis of integrated data on external environment variables, including their type, collection method, and acquisition (from internal or external sources). It seeks to identify the opportunities and threats it encounters, leveraging the circumstances of a particular period to carry out its tasks and accomplish its goals. Threats are potential events that, if they occur, will cause a risk or adverse impact on economic unity (Daft, 2003: 71).

Mechanisms to Develop and Promote SCA

Adopting a competitive advantage involves outperforming competitors in one or more strategic performance areas, such as cost, flexibility, or creativity. In a globalizing world, as competition intensifies and new entrants expand with innovative methods and products, no competitive advantage can endure without constant development. This is only possible if the economic unit can maintain the competitive advantage over time (Nasruddin and Zain, 2008:14).

Achieving a competitive advantage nowadays is not an opportunity in itself. As threatening as it may be, the economic unit that achieves this excellence becomes the focus of all competitors, who strive to achieve or surpass this excellence through various means and methods. Hence, an economic unit needs to work continuously to improve, renew, and develop its advantages. A super successful economic unit is the one that is able to discover, recognize, and assess the original and real source of SCA. Economic units often create new competitive advantages by identifying and implementing continuous improvements and technological advancements. Additionally, economic units employ marketing strategies and production processes that involve research and development, as well as the enhancement of creativity and people's skills (Bresch, 2005:112).

According to Jaber (1990:185) and Bruno & Daniel (2001:22), the most important of today's economic units is the competitive pressure, which requires building a competitive

strategy that enables it to survive, considering that competitive advantage is the driving force that influences a customer's behavior to deal with economic unity and no other competitors. Thus, a given economic unit should be dynamic in nature, depending on the environmental environment's need for change and renewal and the result of competitive escalation in the delivery of new, better, and distinct to achieve an SCA through the following:

a. Continuously developing new research to access good new products and upgrading existing products at lower cost and with more modern and permanent technology.
b. Continuously seeking and improving production methods by rationalizing the use of resources (achieving efficiency before creativity) and optimizing the potential of information technology, including electronic marketing, which enables it to gain a lasting and continuous competitive advantage.
c. Building an information base to maximize the unit's information on markets, customers, and competitors.
d. Embracing customers, responding quickly to their needs, and involving customers in decisions permanently.
e. Constantly searching for new sources of excellence as well as developing the methods of dealing with markets and customers.
f. Providing services or business brands.
g. Understanding the customer before competitors and planning to win over many customers in the future.
h. Investing in marketing activity.
i. Maintaining the overall appearance of the economic unit.
j. Continuously reviewing the challenges to the marketing of the economic unit's services.

Dimensions of SCA:

After examining some of the concepts of SCA, which were indicated by their content dimensions, it is important to highlight these dimensions through the contributions of researchers who have approached SCA and the aforementioned dimensions from various perspectives.

I. Core capabilities: It means the economic unit's ability to build a core value embodied in skills and capabilities shared by its various lines of production or business and thus attributes its distinct capabilities to achieving SCAs in the sector in which it operates (Hamel & Prahalad, 1990: 79).

Core capabilities are specific organizational skills and perceived advantages geared toward achieving the highest levels of customer satisfaction compared to competitors.

Productive resources, which include a complex package of skills and technology contributions, collective learning, implicit knowledge, and the phenomenon of contributing to the competitive advantage of economic units through regulatory processes that ensure superior coordination in functional activities, are among the most critical capabilities (Wanga et al, 2004:253).

A resource is essential if it possesses a range of characteristics and qualities, including the following (Barnay, 2003:145).

a. It is of a competitive value to the economic unit.
b. It is scarce, i.e., other competitors cannot get the same resource.
c. It can't be imitated by competitors, or the costs of imitating it are high.
d. The economic unit has the organizational and administrative capacity to optimize the resource's utilization through renewed regulatory forms.

II: Creative culture: It is a set of values and beliefs that motivate individuals to generate new ideas and devise effective methods for implementing or enhancing existing ones. Therefore, a culture of creativity is a prerequisite for it (Al-Shaby, 2011:2). The process of transforming into a creative culture that leads to a competitive advantage will be influenced by people's ability to cooperate in service delivery, marketing, and manufacturing. Consequently, the presence of the organizational culture, which rival economic units cannot duplicate or mimic, facilitates the development of SCA (Panico, 2004:2).

III: Information technology: Technology can be defined as all knowledge, products, processes, tools, methods of work, and systems used in the creation of goods and services. In this sense, it refers to how things operate or the practical application of knowledge in the field of work (Al-Ghaliby and Idris, 2007:540). Information technology is a term encompassing all the science, educational tools, and unspecified resources associated with computers, equipment, and other parts attached thereto (Lardner et al., 2001:32). Information technology plays a crucial role in successfully implementing new strategies, enabling economic units to target new customers or those overlooked by competitors, and contribute to the development of a value chain that unlocks a customer's creative value (Anderson & Markides, 2006:4). Marketers have begun to feel the impact of marketing information technology in the last decade of the last century and the current century. Economic units looking to achieve SCA. Economic units seeking a sustainable competitive advantage must establish a work program, employ structured methods, and invest in high-end skills that enable them to access a unique or homogeneous blend of essential market.

Over time, information technology transforms from a mere driving force to a well-established infrastructure or technology culture. This transformation ultimately leads to the development of significant technology-based decisions that are challenging for competitors to replicate, as they are not readily available for purchase (Abu Ghneim, 2007:99).

IV: Strategic Resilience: One theory that attaches importance to strategic flexibility is that an economic unit that can survive is one that is better adapted to the environment. However, the most flexible economic units are those that are better adapted to the environment, particularly if it is variable and uncertain (Url, 2022:89).

Additionally, the performance of an economic unit is closely associated with its flexibility, and some view it as a composite resource that combines a multitude of resources and competencies to enable strategic choices. These options synthesize the effects of flexible harmonization of tenure and the use of flexible resources. Resource flexibility is greater when used in the largest number of uses. Additionally, minimizing the expense and duration of transitioning between uses is crucial. The flexible economic unit transforms the industry by mitigating uncertainty, as it is the sole entity capable of competing with other competitors (Al-Dulaimy, 2009:99).

Strategic resilience is crucial for economic units as it ensures the flexible utilization of resources, reorganizes processes, and showcases dynamic abilities. These abilities enable them to gain a competitive edge in challenging markets, fostering an environment of economic unity that allows them to enhance their situation, utilize, and assimilate new information (Zhou & Wu, 2010:551). According to Al-Dhmoor (2008:33), strategic resilience refers to the organization's capacity to adapt to changing environmental conditions, necessitating education. In the same vein, Al-Lahiby (2009:108) stated that strategic resilience indicates the business' ability to adapt to accelerated changes in the competitive environment. strategic resilience is measured by the level of speed and how a business responds to competitive threats or opportunities in appropriate strategic areas modestly with environmental forces". Moreover, the goal of strategic resilience is to examine the intricate relationships between various environmental factors. Strategic resilience is a multidimensional concept that requires a lot of strategic actions and tools to secure an efficient level of prediction, analysis, follow-up and control of competitive environmental variables. Of these tools is the competitive intelligence tools, which is key to modifying and adapting strategies, plans, programs, structures, and overall business policies.

AI Technologies as SCA Supporters:

Automatic Learning

Automatic learning supports SCA by acting as a decision-maker in specific situations and anticipating future needs. It mimics human behavior in problem analysis and rapid search for solutions, selecting the best alternative when conflicting or competing with possible solutions, eliminating unreasonable solutions, and solving big data problems that support SCA (Al-Aqoor, 2022:34).

Expert Systems

Expert systems assist in supporting SCA by designing programmed decision-making systems that can solve problems at a level of performance comparable to or surpassing that of human experts. These systems can utilize quantitative and metadata data, as well as access results from incomplete or uncertain data (Samer, 2020: 22). Using information stored in databases helps develop solutions to different problems and provide appropriate ideas and solutions. Expert systems not only facilitate task completion but also replicate human expert performance, free from emotional or personal biases. This is due to the fact that expert systems possess a higher capacity for problem-solving than human experts, particularly in situations of uncertainty (Al-Tarawneh, 2022:18). Expert systems provide accurate and fair measures of products, provide more credible and objective information in the analysis of quality deviation, help design a balance for product development, and operate a regulatory system that includes corrective procedures for deviations in production (Arqal, 2023:25).

Neural Networks

In the field of SCA support, some writers argue that neural networks have influenced competitive advantage by conducting different operational processes. These developments have led to a diversity of products. Additionally, neural networks enable management to comprehend the interconnectedness of resources and provide information at the operational, tactical, and strategic levels (Omar, 2023:18). Additionally, neural networks assist in establishing pre-existing benchmarks for product quality and diversity, thereby promoting differentiation within the SCA system.

Analysis

To reduce costs and achieve SCA, analysis requires a research sample that identifies the most important uses and working mechanisms of AI applications. Generally, the sample can reflect and reflect research on other samples, namely, economic units in general. Therefore, the Kufa Cement Plant in Najaf, Kufa District, was selected. Below is an overview of the unit in question and the motives that led to its selection.

Kufa Cement Plant: A Historical Profile

The State Company for Southern Cement was established pursuant to Ministerial Order No. 2963 in 1995 by F.L.S. AS, a Denmark-based company. The plant represents a Southern Cooperative of the State Company having begun its operations in 1995 with a capital of IQD 871500000. In 1999, the company's capital was raised to IQD 1,471,500,000. The company's center is located in Najaf/ Kufa district. This plant is a productive economic unit as it is self-financed and fully owned by the state. Furthermore, the plant maintains financial and administrative autonomy and maintains a connection with Iraq's Ministry of Industry and Minerals. The plant works at a steady pace toward building strong foundations, securing the most important strategic industries, and meeting the market needs of cement for construction, reconstruction, and infrastructure. The plant has 4 1,500-ton line power production lines, or 6,000 tons, as a daily production of the total four lines of this plant. Also, the plant is equipped with global technology to produce 2 million tons per year. After plans were made to develop production by the State Company for Iraqi Cement and its southern cement collaborators, the product was improved, and the production of cement of its various types was increased, ordinary and resistant, to assist the public and private sector in providing foreign currencies spent on importing cement. The plant is a strong revenue source to support Iraq's industry. Also, it is one of the successful economic pillars in Iraq, and the reason is the availability of all raw materials. During 2018-2015, plans were drawn up by the State Company for Iraqi Cement and its Southern Cement collaborators to ascend production capacities, improve production, and access energy that ensures the supply of cement at competitive market prices. Production reached 1,450,000 tons of production of cement of various types, ordinary and resistant. Accordingly, the plant aims to achieve the following:

a. Supervising the investment applications of the plant with the aim of promoting production and operation, increasing the efficiency of performance according to scientific methods, and ensuring that the ownership of these plants, after being invested and achieving basic design capacities, is again to the state.
b. Strengthening national income by providing the national product that meets the qualitative standards, standards, and Iraqi standards provided in Iraqi markets and providing the economic interest of tens of billions of dinars annually.
c. Effectively contributing to all social, environmental, and medical fields that create the company's self-presence in various sustainability-achieving aspects.

d. Establishing clear and formulated production and marketing policies according to a competitive environment to address all imported products that have recently acquired markets.
e. Helping to build managerial and technical cadres at international levels by embracing investments in various fields, promoting human development, and believing that human resources are renewable and creative capital.

Statistical Description of Variables

This study utilized questionnaire forms from the relevant economic unit to gather data and draw conclusions. These forms were distributed to the managers, department heads, as well as employees working in finance, marketing, quality, and production sections. Eighty forms were distributed, and 72 forms were retrieved for use and analysis. The distributed forms contained three main items graded according to the 5-point Likert scale. The most important tools used in the implementation of the practical study will be identified by collecting data from the company's employees represented by the respondents to the questionnaire forms distributed to them. Excel has been used to collect data on questionnaire forms. The data collected in these forms were then converted to SPSS software to find frequencies as follows:

First, the use of duplicates and percentages to describe the demographic characteristics of respondents to the questionnaire.

Second: The questionnaire consists of two main sections. The first contains the personal information of these respondents (sex, age, and qualification). The second, comprising 39 statements, is set to elaborate on the role of AI technologies in reducing costs and achieving SCA.

To reply to the statements in the second section mentioned above, the 5-point Likert scale was used so that respondents can agree to each statement according to the following table:

Table 1. Five-point Likert scale

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

The value (1) is given to answers with strongly disagree, the value (2) is given to answers with disagree, the value (3) is given to answers with neutral, the value (4) is given to answers with agree, and the value (5) is given to answers with strongly agree. The mean is determined by calculating the range (5-1 = 4), dividing it by the largest value in the scale

to obtain the length of the cell (4/5 = 0.8), and then adding this value to the lowest value in the scale, which is (1), in order to determine the minimum limit of this cell. This process results in the length of the cells, which is displayed in the following table:

Table 2. agreement levels on questionnaire statements

More than 4.20	**3.40 to 4.19**	**2.60 to 3.39**	**1.80 to 2.59**	**Less than 1.80**	**Mean**
Strongly agree	Agree	Neutral	Strongly	Strongly disagree	**Agreement**
Very high	High	Medium	Very poor	Poor	**Assessment**

Reliability

The reliability of the questionnaire statements has been verified using Cronbach's Alpha. Reliability means that a tool is free of errors caused by misunderstandings of statements or the reliance of subjects or respondents on random answers that do not accurately reflect the item to be measured. These irregularities make the tool give different results if it is reapplied. Furthermore, Cronbach's alpha has been used in this paper to measure the internal consistency of the questionnaire items. The value of alpha varies between 0 and 1. The acceptable statistical value for the alpha coefficient is 0.5 or higher to maintain the tool's reliability. Hence, the alpha coefficient has been accounted for in the other enabling and indicative procedures of the questionnaire.

Demographics of the Sample

The tables below show the statistical percentages of the study sample represented by the subjects or respondents based on the demographic variables (sex, age, and qualification).

Sex

Table (3) below displays that males are approximately (64%) of the total sample, while females are approximately (36%) of the total sample.

Table 3. Sex statistics

Description	**No.**	**Percentage %**
Males	46	63.9
Females	26	36.1
Total	**72**	**100**

Age

Table (4) below indicates that 20.8% of the total subjects is younger than 25 years old, 30.6% is between 25 and 35 years old, 29.2% is between 35 and 45 years old, and 19.4% is older than 45 years old.

Table 4. Age statistics

Description	No.	Percentage %
younger than 25 years	15	20.8
between 25 and 35 years	22	30.6
between 35 and 45 years	21	29.2
older than 45 years	14	19.4
Total	**72**	**100**

Qualification

Table (5) below demonstrates that (43.1%) of the subjects hold Bachelor's, (20.8%) of the subjects hold Master's, (11.1%) of the subjects hold PhDs, and (25%) of the subjects hold other diplomas or degrees.

Table 5. Qualification statistics

Description	No.	Percentage %
Bachelor's	31	43.1
Master's	15	20.8
PhDs	8	11.1
Other diplomas or degrees	18	25
Total	**72**	**100**

Tool

To answer study questions and hypotheses, a questionnaire consisting of two variables, the first is on AI techniques, and the second is on the SCA, has been designed.

Testing the Reliability of the Questionnaire

Reliability means that the questionnaire is stable and not inconsistent with itself. Reapplying the questionnaire to the same sample yields the same result. For that purpose, the reliability of the questionnaire has been measured using Cronbach's alpha coefficient.

Cronbach's Alpha

To measure the extent of reliability of the study tool (questionnaire), Cronbach's alpha formula was used to verify the reliability of the designed questionnaire on the 72-questionnaire sample. Table (6) below details the reliability levels of the questionnaire.

Table 6. Reliability coefficients of the study scale following Cronbach's Alpha

Variable	No. of questions	Cronbach's Alpha
Aspect 1: AI techniques	27	0.929
First dimension: Automatic learning	10	0.819
Second Dimension: Expert systems	9	0.844
Third dimension: Neural networks	8	0.792
Aspect 2: SCA	12	0.785
Total	**39**	**0.945**

Table (6) above shows that the values of the generic reliability coefficient for the study aspects are high. These values amounted to 0.945 for the 39-item questionnaire. Reliability coefficient values for the first aspect amounted to 0.929, while those for the second aspect amounted to 0.758. These frequencies indicate that the questionnaire is highly reliable. Hence, it can be relied upon in the practical analysis of the data according to Nunnally & Bernstein's model, which adopted (0.7) as a minimum constant (Nunnally & Bernstein, 1994).

This section presents the statistical results derived from the answers to the study's hypotheses. These hypotheses aim to find out the effect of AI techniques (automatic learning, expert systems, and neural networks) on SCA.

1.Testing of the Variability Inflation Coefficient (VIF) and Tolerance Index (Tolerance)

To verify the linear interrelationship between independent variables, indices of variability inflation coefficient (VIF) and tolerance index (tolerance) were used. Variance index values are assumed to be smaller than (10), and tolerance index values are greater than (0.1). The results are set in the table below:

Table 7. Test results of VIF and Tolerance Index

Variables	VIF	Tolerance
First dimension: Automatic learning	3.655	0.274
Second Dimension: Expert systems	3.213	0.311
Third dimension: Neural networks	3.271	0.306

The table above shows that all VIF values are below 10 and Tolerance index values are greater than 0.1. These frequencies indicate that there is no problem in the linear interrelationship among independent variables.

Hypotheses Testing

The findings of the main hypothesis test, which states, "There is a significant relationship between AI techniques (automatic learning, expert systems, and neural networks) and SCA.".

The correlation between independent variables (AI techniques) and their related aspects (automatic learning, expert systems, and neural networks) and SCA was tested, as shown in the table below:

Table 9. Test results of correlation between independent variables and dependent variable

Variables	SCA
First dimension: Automatic learning	.676**
Second Dimension: Expert systems	.597**
Third dimension: Neural networks	.547**

**Statistically significant at (0.01)

*Statistically significant at (0.05)

The above table shows that the correlation coefficient between independent variables (AI techniques), their related dimensions (automatic learning, expert systems, and neural networks), and the SCA variable is statistically significant at 0.01. This indicates a strong and inverse relationship between independent variables and dependent variables.

- The findings of hypotheses test (There is a significant effect of AI techniques (automatic learning, expert systems, and neural networks) on SCA.

To test hypotheses, multiple linear regression was used to determine the effect of independent variables (automatic learning, expert systems, and neural networks) on the dependent variant (SCA).

Table 10. Results of multiple linear regression

Variables	B	T	Sig.
Constant Limit	1.935	5.472	0.000
Automatic learning	0.453	3.426	0.001
Expert systems	0.126	1.095	0.027
Neural networks	0.249	2.342	0.038
F-statistic	19.803	Probability value	0.000
R-squared	0.466	Adjusted R-squared	0.443
Durbin-Watson		1.850	

The table above, which displays the results of the statistical analysis, confirms the statistical significant of the tool. The value (Sig.) of the F-statistic was less than 0.05 and was recorded as 0.000. This demonstrates that the model is valid and that its results are reliable. The Durbin-Watson statistic amounted to 1.850, which is greater than R-squared, which is 47%. This explains the absence of self-association and the occurrence of false regressions. The R-squared value of 0.466 indicates that the independent variables have an interpretive power of 47% when compared to the dependent variable. The adjusted R-squared value was 0.443, which means that independent variables affect the dependent variable by 44%. The remaining 56% are due to non-model factors including test accuracy-related random errors, the accuracy of measurement units, and others.

Interpretation Results of the First Hypothesis

The results of the statistical analysis show that the Sig. of the independent variable AI techniques (automatic learning) is less than (0.05), amounting to (0.001). This indicates that there is a significant effect of AI techniques (automatic learning) on cost reduction and the achievement of SCA.

Interpretation Results of the Second Hypothesis

The results of the statistical analysis show that the Sig. of the independent variable AI techniques (expert systems) is less than (0.05), amounting to (0.027). This indicates that there is a significant effect of AI techniques (expert systems) on cost reduction and the achievement of SCA.

Interpretation Results of the Third Hypothesis

The results of the statistical analysis show that the Sig. of the independent variable AI techniques (neural networks) is less than (0.05), amounting to (0.038). This indicates that there is a significant effect of AI techniques (neural networks) on cost reduction and the achievement of SCA.

As for the multiple linear regression equation, it can be represented as follows:

$$\boldsymbol{Y = 1.935 + 0.453X1 + 0.126X2 - 0.049X3}$$

Where $\boldsymbol{Y}$ is the competitive advantage

$\boldsymbol{x1}$ is the automatic learning

$\boldsymbol{x2}$ is the expert systems

$\boldsymbol{x3}$ is the neural network

2. CONCLUSIONS

a. AI technologies reduce operational costs by improving processes, managing resources efficiently, and reducing the need for manual labor in recurrent routine tasks, thereby reducing expenditures.

b. AI technologies provide a clear and in-depth view of the data. This vision enhances the ability to make faster and more accurate strategic decisions. Thus, economic units can customize products and services to better meet customers' needs in order to achieve SCA.

c. AI technologies improve quality, reduce production errors using automatic learning and computer vision techniques, and enhance interaction with customers through smart support systems.

d. The application of AI requires significant initial investments in technology and training.

3. RECOMMENDATIONS

a. It is essential that the government provide incentives for AI-based economic units and strengthen legal and regulatory frameworks that ensure the use of AI security, improve efficiency, and reduce costs.

b. There should be investment in AI technologies, employees should be trained to use it effectively, a clear strategy should be developed, and analytical models to measure AI's impact on performance and costs periodically should be applied.

c. Research on developing AI applications to improve operational efficiency should be supported, collaboration between universities and economic units should be promoted, and SCA-enhancing solutions should be developed.

d. AI techniques can be incorporated into educational curricula to develop the skills of the next generation, and training programs can be provided for specialists in technical and administrative fields in order to adopt technology efficiently.

REFERENCES

Abu Bakr, M. (2004). *Human resources: An introduction to achieve competitive advantage.* Cairo: Al-Jamiaa Press.

Al-Aqoor, S.M. (2022). *Effect of AI on cost reduction in Jordanian industrial companies listed on Amman stock exchange*. Unpublished Master's Thesis, World Islamic Science and Education University, Jordan.

Al-Jaber, G.M. (2020). *Impact of AI on the efficiency of accounting systems in Jordanian banks*. Master's Thesis, Middle East University, Jordan.

Al-Maqiti, S.A.H. (2021). *The Reality of Employing Artificial Intelligence and Its Relationship to the Quality of Performance of Jordanian Universities from the Faculty's Perspectives*. Master's Thesis, Middle East University, Jordan.

Ashehri, R. (2019). Governance of artificial intelligence in KSA: Neom as model. *International Journal of Advanced Studies,* **46**-80**.**

Bilaly, A. (2007). *Competitive advantage in economic businesses between private resources and external environment: A case study of Algeria's telecommunication enterprises.* PhD Dissertation, Algiers University, Algeria.

Bouzaid, A. (2017). *Role of expert systems in the quality of higher administration decision-making in the Palestinian Ministry of Health*. Master's Thesis, Al-Aqsa University, Palestine.

Business School (2023). University of Central Florida. *www.bus.ucf.edu*

Erqal, M. & Ibraheem, A.M. (2023). Accounting of resource use and its role in cost management: A survey. *Arab Journal of Human and Social Studies*, 33(1).

Estep, C., Griffith, E.E., & MacKenzie, N.L. (2023). How do financial executives respond to the use of artificial intelligence in financial reporting and auditing? *Review of Accounting Studies*, 1-34.

Fisher, I.E., Garnsey, M.R., & Hughes, M.E. (2016). Natural language processing in accounting, auditing, and finance: A synthesis of the literature with a roadmap for future research. *Intelligent Systems in Accounting, Finance, and Management*, 23(3), 157-214.

Gamoura, S.C., Bay, M., & Kerrouche, H. (2018). AI between reality and hope. A technical field study. *The International Conference on Artificial Intelligence: A Challenge to Laws?* Hasiba Bouali University, Algeria, November, 2018.

Jeannie, F. (2012). Exploring boundaries: Optimizing individual class boundaries for binary classification problem. *Proceedings of the 14th annual conference on Genetic and evolutionary computation.*

Kang, Y., Cai, Z., Tan, C.W., Huang, Q., & Liu, H. (2020). Natural language processing (NLP) in management research: A literature review. *Journal of Management Analytics*, 7(2), 139-172.

Khaira, T. (2015). *Role of artificial intelligence in the achievement of sustainable competitive advantage: A case study of Mobilis telecom in Ain Defla*. Master's Thesis, Djilali Bounaama University, Algeria.

Mousa, A. & Bilal, A.H. (2019). *AI: A revolution in modern technologies*. Kitab Inc.

Nunnally, J.C. & Bernstein, I.H. (1994) The assessment of reliability. *Psychometric Theory*, 3, 248-292.

Parry, J., Palaz, D., Clarke, G., Lecomte, P., Mead, R., Berger, M., & Hofer, G. (2020). Analysis of Deep Learning Architectures for Cross-Corpus Speech Emotion Recognition. *Interspeech 2020.*

Raqeeq, A. (2015). *Using AI applications in the management of corporate activities: A case study of selected economic institutions*. Master's Thesis, Algeria.

Reisenhofer, C. (2021). *Die Anwendung von künstlicher Intelligenz bei unternehmensbezogenen Entscheidungen*. Master's Thesis, Graz University, Austria.

Shanaby, S. (2016). Implementation of railway transport development in Algeria using smart transport systems as an AI technique. *Journal of Accounting and Finance Studies*, 7(1)

Szabadföldi, I. (2021). Artificial intelligence in military application: Opportunities and challenges. *Land Forces Academy Review*, 26(2), 157-165.

Tang, V.W. (2018). Wisdom of crowds: Cross-sectional variation in the informativeness of

third-party-generated product information on Twitter. *Journal of Accounting Research*, 56(3), 989-1034.

Url, L.M. (2022). *Forecasting mit künstlicher intelligenz*. Graz University, Austria.

Weber, F. (2020). *Künstliche intelligenz für business analytics*. Springer Fachmieden Wiesbaden.