

THE ROLE OF AI IN ACHIEVING SOME SDGs IN IRAQ

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Abstract

The stated relevance of the role of AI is especially notable in the context of the so-called Fourth Industrial Revolution, or Industry 4.0, marked by widespread processes of digitalization and large-scale application of artificial intelligence (AI). This suggests its ever-increasing importance as one of the key areas of global development and economic growth drivers. Innovation in various areas, driven by AI, is associated with improving the quality of human life. That is why the use of AI is not limited to purely economic motives and constantly seeks to achieve the SDGs. AI, with its learning, analysis, and decision-making capabilities, can enhance the performance of economic sectors or even elevate them to a higher level. Yet that will enable addressing some of the most paramount economic problems, such as hunger, poverty, and unemployment. In conclusion, attempts to expand the use of AI across the economy can help accelerate economic dynamics and promote a permanent upward trend in living standards for all and the realization of the SDGs for a sustainable world.

Keywords: *AI, Economics of AI, AI Techniques, Information Technology, Sustainable Development.*

INTRODUCTION

The four industrial revolutions began with the steam revolution at the end of the eighteenth century, then the electricity revolution in the nineteenth century, then the electronics revolution in the twentieth century, and Now a combination of technologies and AI, and the Internet revolution.

In the past, human interactions were the primary driver of international politics, but recently AI has played a prominent role in political life, and has become a major actor in the global economy, strategic planning, negotiation, strategic consulting, international wars on land, sea, and air, satellite commands, and drones.

AI has levels, generations, and Advantages, as well as disadvantages when used for illegal purposes and harmful to humanity. The distinction in this power lies with the state that is scientifically strong, politically and administratively strong, has security stability, has a rising economic growth, pioneer in making and employing AI.

That is, it can be said that AI has witnessed a qualitative leap in the field of technology, as there has been a shift from traditional methods of managing institutions, depending on their type of activity, to using the latest programs and advanced technologies with the aim of improving the level of performance of institutions and striving to develop them. In all fields, the economic field is the field that is most up to date with these developments.

The Importance

This research holds great value for the following reasons:

1. This work aims to develop methods for preserving human experience and transferring it to intelligent machines. This will allow this knowledge to continue to be used, and it can be easily accessed anytime and anywhere.
2. Research seeks to facilitate the use of advanced technologies by all members of society, not just specialists. This will democratize access to information and enable users to obtain accurate information more easily and efficiently.

The Problem

This research examines the potential economic shifts expected with the widespread adoption of AI across various sectors and the broader economy. While AI promises significant economic benefits, concerns about job displacement due to automation and the possibility of AI replacing human control are likely to emerge. This study places itself in the context of the Fourth Industrial Revolution, examining the intersection between AI and economic change.

The Hypothesis

Scientific progress, the spread of information and communications technology (ICT), and increased scientific cooperation are significantly accelerating human progress and contributing to the achievement of the SDGs.

The Aims

Highlighting the importance of AI in the contemporary world. Emphasize the need for greater focus on AI and its potential benefits. Explore how organizations can embrace technological advances to move beyond traditional management practices. Study the role of AI in promoting economic growth at the national and institutional levels.

THE METHODOLOGY

This study used a scientific research approach that combines inductive and deductive reasoning methods. The investigation began with an inductive process involving a comprehensive review of the existing economic literature on AI. Subsequently, the deductive approach was used to extract previously established theoretical insights related to the research topic. This joint approach aims to validate the following proposition: the economic impact of AI technologies on countries.

The Structure

To verify the research hypothesis and align it with its objectives, the research was divided into three distinct sections, followed by a concluding section that includes recommendations. The first section outlined the conceptual framework of AI. The second section explored the different stages involved in creating AI. Finally, the third section addressed the contributions of AI to achieving the SDGs.

SECTION 1

Conceptual Framework of AI

The spread of AI technologies has emerged as a critical strategic priority for many countries. This priority

stems from the clear positive impact of AI on economic performance at the micro and macro levels, which may contribute to achieving the SDGs. However, alongside these potential gains lie concerns, primarily regarding the impact of AI on employment and the potential for worsening income and wealth inequality, particularly to the advantage of developed countries at the forefront of AI development.

I. Concept of AI

The field of AI, although in its early stages of development, has the potential to significantly impact various aspects of human life. Traditionally, AI includes a wide range of technologies that enable computers to mimic human cognitive functions, such as decision-making. However, it is necessary to distinguish between the overall concept of AI and its specific sub-domains. One such subfield is machine learning, which uses the power of ever-expanding data sets for tasks that involve prediction (Al-Ratmi, 2012, p. 12).

Several definitions characterize the field of AI. One viewpoint defines AI as the ability to build computational models of a given domain, identify basic relationships between its elements, and thus generate appropriate responses to events and conditions within that domain (Abdel-Majeed, 2009, p. 14).

Another definition emphasizes AI as the science and engineering involved in creating intelligent machines. These machines are characterized by their use of sensors to perceive and analyze data (Stanford, 2020, p. 1). In simpler terms, AI can be understood as a scientific discipline that primarily aims to understand human cognitive processes and create machines that can emulate them. In other words, AI can be described as computer science principles and applications that seek to replicate and emulate various aspects of human intelligence (Al-Hadi, 2021, p. 42).

Conversely, the researcher defines AI as the ability of machines and computers to perform specific tasks that mimic those performed by humans, and to display human-like behaviour while learning, understanding, and integrating information.

II. Types of Ai

AI has advanced to the point that it can design computer programs that mimic human cognitive abilities (Abdel-Wahab et al., 2017; Razuki and Falta, 2020). This development has facilitated the automation of tasks that traditionally required human intervention, especially those involving logical thinking, understanding, sensory perception (hearing, speaking), and coordinated motor skills. The burgeoning field of AI has given rise to a range of methodologies, which can be broadly categorized into three main types.

1. The most primitive form of AI is known as weak narrow AI. In this model, AI systems are precisely programmed to perform specific functions within a well-defined environment. Their behaviour is essentially a predetermined response to a particular set of stimuli.
2. Strong or general AI represents a more advanced level of intelligence capabilities. AI systems at this level gain the ability to collect and analyze information and extract experiences from different situations. This accumulated stock of knowledge enables these systems to make independent and autonomous decisions.
3. Super AI, which is still under development, aspires to achieve a level of intelligence comparable to that of humans. Research in this area explores two main paths: (1) understanding human intellectual and emotional processes that influence behaviour, and (2) developing a “theory of mind” model, which enables AI to express its internal state and predict emotions and situations. Humanity, and interact with humans on a deeper level.

III. Benefits of AI

AI is an emerging technology. It is relatively new in human resources management, but it provides many benefits. AI will become more efficient and effective for human resources management in the future. The benefits of AI can be summarized as follows (Tambe et al., 2019, 22-23):

1. Reducing the suffering of administrative employees in the organization.
2. Helping the institutions appoint the best employees.
3. Can be used to acquire new talents.
4. Useful in determining the employee retention rate in the workplace.
5. Finding out the reason for employees' dissatisfaction in their current workplace.
6. A human resources chatbot can be used to respond to inquiries automatically.
7. Reducing the chance of error and maintains workflow.
8. Providing a future of endless possibilities and opportunities for employees.
9. Increasing employee engagement.
10. Helping human resources know which employees need training and in which field based on analysis of existing data.
11. Reducing the biases of human resources decision-making in the organization.
12. Reducing human error.
13. Managing recurring jobs.
14. Providing digital assistance.
15. Improving the candidate experience.
16. Reducing human participation.

IV. The Impact of AI: A Two-Sided Coin

This section addresses the multifaceted nature of AI, a defining technology of the Fourth Industrial Revolution. The pervasive impact of AI across military, industrial, economic, technical, medical, educational, and service fields has reshaped human life. (Twomey, 2018; Bharadwaj, 2017)

Advantages of AI:

1. AI promotes progress in economic, social, and human development.
2. AI holds great promise for improving the quality and accessibility of healthcare.
3. AI streamlines development processes and deploys advances quickly.
4. AI contributes to reducing the costs of production, service provision, transportation, and communications.
5. AI promotes sustainable development across various dimensions.
6. AI reduces time spent on tasks and work.
7. AI facilitates the global dissemination of human development achievements.
8. AI offers opportunities for convenient and cost-effective transportation solutions.
9. AI has powerful capabilities of analysis, inference, and synthesis, offering transformative potential.

Disadvantages of AI:

1. AI may lead to large companies dominating industrial production, marginalizing small companies.
2. AI-driven automation and rapid technological progress may significantly increase unemployment, particularly affecting medium- and low-skilled workers.
3. AI has the potential to exacerbate inequality, widening the gap between the rich and the poor.
4. AI represents unprecedented challenges for human societies:
 - a. AI requires a comprehensive overhaul of economic structures.
 - b. Achieving the goals of the Fourth Industrial Revolution through AI requires advanced economic, social, and political structures to ensure comprehensive and sustainable development.
 - c. AI-based social manipulation may lead to unintended consequences regarding cultural and social values.

SECTION 2

A Historical Overview of AI

The pursuit of AI has a rich history dating back to the mid-20th century. In 1950, after the end of World War II, Claude Shannon, a leading figure in the field of information theory, began research on applying AI to the complex game of chess, a popular test of intelligence. This work was developed by researchers McCarthy and Minsky in 1963, representing an important early step in using computers to develop AI.

The subsequent period, extending from the mid-1960s to the mid-1970s can be described as a phase of “knowledge representation.” During this period, Marvin Minsky introduced the concept of frames as a means of representing information and the world, while Winograd developed a system capable of understanding English sentences.

AI entered the third stage of its development in the 1970s. This era witnessed the emergence of various technologies covering a wide range of applications. These developments led to the transfer of a large portion of human intelligence to computer programs, marking an era often referred to as the golden age of AI (Kazim, n.d., pp. 6-8).

I. Historical development of AI

The conceptual foundations of AI can be traced back to the mid-twentieth century. In the early twentieth century, the pioneering French philosopher Paul Valery presciently addressed the future of machines and their possible coexistence with humanity. He famously pointed out that every human being is essentially a machine, implying that as AI technology advances, it may replace human intelligence.

The term “AI” first appeared in 1965 at a prominent computer conference held in the United States. This conference served as a global platform to showcase research progress in the field of AI. The 1950s saw a boom in AI research, culminating in Japan's ambitious fifth-generation computer project launched in the late 1980s. This project represents a major leap forward in this field. The 1990s saw another major advance with the widespread adoption of the Internet and mobile phones. These technologies have revolutionized data storage and retrieval capabilities through advances in computing, which in turn has led to further advances in AI.

In conclusion, the current AI revolution, often referred to as the Fourth Industrial Revolution, is built on the foundation of three previous industrial revolutions. The First Industrial Revolution (1760-1840) was driven by the invention of the steam engine. The second, spanning the late 19th and early 20th centuries, was electrically powered. The Third Industrial Revolution, which began in the 1960s, was marked by the emergence of digital computing, mainframe computers, personal computers, and the Internet. These developments ultimately paved the way for groundbreaking current-day applications in AI, biotechnology, 3D printing, social media, and the digital world in general (Al-Samarrai and Al-Sharida, 2020, p. 18).

II. Characteristics of AI

AI refers to the ability of machines to mimic human abilities to learn, understand, perceive, and perform tasks. This section explores these characteristics, drawing on Rashid (2023, pp. 303-304).

1. AI excels at generating solutions – whether specific solutions to individual problems or general solutions that apply to a group of similar problems.
2. AI uses reasoning methods similar to those used by humans to solve problems.
3. AI goes beyond pre-defined performance and speed limits when dealing with hypotheses.
4. The development of AI follows established scientific methodologies, not random chance.
5. AI requires the representation of vast amounts of domain-specific knowledge.
6. AI aspires to replicate human thought processes and thinking styles.
7. AI aims to capture the human experience and preserve it for future use.
8. AI can handle non-numeric symbolic data through logical analysis and comparison techniques.
9. AI can generate new ideas and enhance creativity.
10. AI can reduce dependence on human experts in specific fields.

At its core, AI exhibits similar human problem-solving capabilities, including finding solutions to existing problems. Performing cognitive processes such as perception, thinking, acquiring, storing, and applying knowledge. Adapting to new situations and developments. Show creativity. Perceiving and understanding visual information. Providing the information necessary to make informed decisions.

III. The Importance of AI in Development

AI stands as the cornerstone of contemporary scientific progress resulting from the modern technological revolution. Its increasing importance in recent years stems from the far-reaching applications it offers across many vital sectors and areas within human societies. AI technologies have revolutionized the economic landscape, driving progress towards achieving the SDGs – most notably SDG 7 (Affordable and Clean Energy), SDG 13 (Climate Action), SDG 14 (Life below Water), and SDG 15 (Life Below Water).), and Goal 15 (Life under Water). On the ground). The healthcare sector has also witnessed a significant positive impact of AI, due to its ability to diagnose epidemics and facilitate the treatment of chronic diseases. Likewise, the role of AI in generating clean and environmentally friendly energy sources cannot be underestimated, which directly contributes to reducing environmental pollution within the energy sector.

As Hussein and Lafta (2019) aptly summarize, the importance of AI in development goes beyond individual organizations, extending its impact to the state level (p. 5). Here is a breakdown of the main benefits it offers:

1. AI works to protect organizations, ensuring the continuity and expansion of their operations in a way that enhances adaptation to evolving market requirements.
2. It enables organizations to comprehensively understand potential threats, and enable proactive strategies to confront them. This includes analyzing future risks and implementing preventive measures by allocating the necessary resources.
3. AI facilitates superior exploitation and identification of profitable opportunities.
4. Provides access to accurate information, which is critical for making informed and timely strategic decisions.
5. AI represents a challenge not in providing information, but in ensuring rapid access to it and enabling organizations to take advantage of its potential.
6. Economic intelligence implanted through AI enhances a knowledge base that gives organizations a competitive advantage in achieving desired results.
7. The availability of economic information, facilitated by AI, enables organizations to effectively participate in agreements and treaties with other countries, ultimately moving them towards achieving their economic development goals.
8. AI contributes to formulating preventive and proactive strategies through a proactive, intelligence-based approach. It promotes the development of knowledge and the ability to anticipate future scenarios, serving as the first line of defence.
9. AI technology acts as a catalyst for generating innovative ideas.
10. AI enhances well-being in all aspects of the social sector by paving the way for economic prosperity. This is achieved by identifying new markets, creating more efficient logistics services, and at the same time improving the quality of goods and services provided.

IV. Objectives of AI

The field of AI is primarily concerned with understanding the essence of human intelligence. This is achieved by creating computational programs that can simulate intelligent human behaviour. Given the rapid advances in AI, it is essential to understand its capabilities and goals. Al-Hadi (2018, 3) suggests the following goals for AI:

1. To effectively store, analyze, and retrieve knowledge, along with the associated methodological rules. AI aspires to achieve this with high accuracy and speed.
2. Acquiring, updating, maintaining, and utilizing accumulated human knowledge for problem-solving purposes.
3. Optimal use of knowledge, experience, and storage of information related to AI.
4. Addressing issues of knowledge damage, lack, and forgetting through the use of scientific and applied methods.
5. Generating or developing new knowledge and experiences, activating computerized knowledge, and integrating it into decision-making processes.

Furthermore, Al-Taie (2023, p. 406) highlights the following motivations for focusing on AI research:

1. AI has become an essential and widespread tool in various fields.
2. AI aims to reduce the human effort required to complete a task.
3. AI emphasizes self-development through machine learning and the use of software.
4. AI facilitates sensory-based learning that meets the needs of the development of the industrial, agricultural and service sectors.

SECTION 3

AI and its Contribution to Achieving SDGs

The contribution of AI to the development of the economy of any country can be observed through AI indicators. The analysis of any country's position in the field of modern technologies is proportional to the exploitation of advanced technologies. Technical committees at the United Nations and other organizations have continuously developed common indicators that enable them to know the extent of the digital gap in all fields and help various countries develop appropriate strategies to exploit it. The most important indicators can be summarized as follows (Nayef, 2023: 595).

1. The Network Readiness Index, which was developed by experts at the World Economic Forum since the year 2000.
2. ICT Development Indicators for measuring the level of innovation in ICT technology, monitor its development, and evaluate and highlight areas of improvement.
3. E-Government Development Index for measuring the extent of e-government application and the establishment of information and communication technology applications for individuals in order to increase the efficiency of systems and simplify them to promote sustainable development.

I. The Impact of AI on Individual Economic Well-Being

This paper explores the hypothesis that the development and application of AI technologies have significant positive impacts on economic growth in developed countries. He argues that AI's contributions to national output, labour and capital productivity, sectoral productivity, income, and investment will lead to a significantly faster rate of economic growth compared to developing countries.

The analysis is based on historical precedents of technological progress driving economic prosperity. The paper cites examples such as the steam engine in the 19th century (productivity increase of 0.3%), industrial robots in the 20th century (increase of 0.4%), and information technology in the early 21st century (increase of 0.6%). This well-established trend places AI as a key indicator of economic growth alongside traditional measures such as per capita adoption of Fourth Industrial Revolution technology, national income, and gross domestic product. In addition, factors such as inflation, which is traditionally used to measure economic health, are included in the analysis. The paper posits that AI, through its various technologies and applications, will directly contribute to the well-being of society by promoting a tangible and lasting improvement in living standards. The adoption of AI is framed as a cornerstone of the technological revolution, with its potential to raise individual economic well-being through information-based knowledge creation. This knowledge creation, in turn, fuels innovation, leading to positive societal outcomes such as increased productivity, income growth, and improved living standards. The paper also highlights the potential role of AI in reducing

poverty and improving the global food system. By leveraging data analysis and reuse, AI can enhance service delivery, enhance market efficiency, and create new job opportunities within the private sector through growth-driven expansion (Al-Sharqawi, 2023, pp. 314-318).

II. Applications of AI in the Educational Sector

This section examines the growing impact of AI on the educational landscape. Based on the research of Al-Attarbi (2019) and Al-Rashidi (2016), the paper highlights the important role that AI can play in enhancing the educational process.

The paper identifies several advantages associated with integrating AI into education (Cohort, 2019, p. 43):

1. AI systems provide valuable insights to guide educational decision-making.
2. AI applications have the potential to raise the overall quality of education.
3. AI can contribute to the development of basic educational skills among learners.
4. AI tools can enhance learners' cognitive achievement.
5. By leveraging AI, teachers can equip students with the skills needed to meet the challenges of the modern world.

Al-Rashidi (2016, p. 46) continues on these positive effects, explaining specific functions of AI in education:

1. AI systems have a major role in school administration, with the aim of achieving administrative burdens by converting management systems into electronic systems, which contributes to making the right decisions, distributing curricula and classes to teachers according to their ability and tendencies, and discovering talented students, promoting them, and investing in them.
2. Smart applications help the learner to be free from learning in one way. For example, smart lesson applications and various education platforms have become compatible with each student according to his inclinations, trends, and needs.
3. AI programs provide great potential for education and self-development, such as education, logic, self-correction, and self-programming machines.
4. Creating an organized knowledge database that is not available in books or other sources of information, as information is stored effectively so that employees in the organization can obtain knowledge and learn experimental rules smoothly.
5. Storing information and knowledge related to AI, as it enables the institution to protect private knowledge from leakage and loss, due to the leakage of employees by transfer, resignation from the institution, or death.
6. Create a mechanism that is not subject to human feelings such as heart, fatigue, or exhaustion.
7. AI can help people with special needs in various special ways, such as translating text from writing to voice and from voice to writing.
8. AI can contribute to discovering new frontiers for education and creating innovative technologies, by assisting people with visual or hearing disabilities using information and communications.

Therefore, it can be said that AI has a major role in improving the quality of higher education in Iraq by achieving development and improvement in university education systems in a comprehensive manner. This includes raising the level of academic programs and specializations offered, modernizing curricula, developing teaching and evaluation methods, and improving the scientific research environment. Encouraging innovation and entrepreneurship, enhancing communication and cooperation with industry and the labor market, developing university infrastructure and facilities, and improving the efficiency of academics and administrative staff. According to a report (World Bank, 2019), the importance of the quality of higher education in Iraq is highlighted by the following points:

1. **Developing skills and competencies:** Quality higher education helps develop students' academic and professional skills and competencies, enabling them to compete and adapt in the modern labor market and areas of innovation and technological development.
2. **Economic and social development:** Quality higher education enhances economic and social development in Iraq by providing a strong knowledge base and developing the human capabilities necessary to achieve progress and sustainable development.
3. **Innovation and scientific research:** Quality higher education promotes scientific research and innovation in various fields, which contributes to the development of new solutions and innovative technologies that achieve scientific and technological progress.
4. **Strengthening leadership and distinction:** Quality higher education helps develop leadership and distinction in various academic and professional fields, and contributes to building a generation of graduates, creatives and innovators capable of achieving change and development in society.

It is clear from this that the quality of higher education in Iraq has a significant impact on developing human skills and capabilities, promoting economic and social development, promoting scientific research and innovation, and building leadership and distinction.

III. Applications of AI in the Healthcare Sector

AI techniques are a technological revolution that will contribute to serving human knowledge, especially in the health sector. Recent years have witnessed great progress in the field of medical sciences and the use of AI techniques. Therefore, the uses of AI in the health care sector can be summarized as follows: (Al-Sharqawi, 2023, pp. 311-312).

1. **Diagnosing diseases:** AI has achieved remarkable progress in terms of early diagnosis and detection of diseases in their early stages and perhaps before they occur or spread and worsen through the analysis of radiology images, as the possibility of predicting diseases and their spread through the use of AI analyses, which depends on data analysis and prediction. With diseases, especially cancer, IBM Watson, one of the most important AI companies in the United States of America in the field of medical care, has issued a program to diagnose diseases with an accuracy exceeding four times the accuracy of human diagnosis.
2. **Precision medicine:** Deep learning techniques can analyze the genetic data of large numbers of individuals and determine the appropriate medication or protocol for each disease case based on the patient's genetic make-up, lifestyle, and different response to treatment.
3. **The use of biotechnology:** The use of biotechnology and biological techniques (NATO technology) leads to breakthroughs in the medical field through tissue engineering and treatment using stem cells, and the use of cell and gene therapy together to reach the best results in an attempt to treat diseases.

4. Managing work within the hospital: Hospitals benefited from AI techniques to manage work and organize patient files after entering a set of huge data into computer systems, thus transforming into digital hospitals that display data related to patients to the extent permitted by law, while preserving patient privacy as it can. The doctor must review the information related to his patient before determining the treatment mechanism to ensure that he receives quick and accurate health care.
5. The use of robots: The integration between human intelligence and AI is evident through robot manufacturing technology and its use in the medical field, including the therapeutic robots Natur and PORT that are injected into the blood to treat blood clots, surgical robots that the doctor directs to perform delicate surgical operations, and robots for sterilization and expulsion. Infection from rooms, taking samples and transporting them to laboratories, analyzing them, preparing drug doses, and providing care at the patient's bedside, and remote monitoring. Many countries have used robots to confront the Corona pandemic.

As for the impact of AI in achieving the goals of sustainable development, the heads of state and government met at the United Nations headquarters in New York in September 2015 and developed a plan for sustainable development that includes 17 new global Sustainable Development Goals until the year 2030. This plan recognized the importance of technology to achieve the goals of Sustainable development. Technology was not only referred to in Goal 17 as a main means of implementation, but in fact, out of the 169 goals, 48 of them are related to technology, whether direct (14 goals) or indirect (34 goals). There are also dimensions Technology for other (121) purposes, as technology is one of the most important means of implementing them. The expansion of the uses of AI achieves economic gains. Its first goal is to achieve sustainable development goals. The applications of AI and its ability to learn, analyze, and make decisions will enhance the efficiency and increase the productivity of economic sectors. And promoting them, and then helping to confront economic problems, reduce hunger, poverty and unemployment, achieve economic growth and improve the living standards of individuals in all societies, in order to achieve the goals of sustainable development (UNESCO, 2021).

IV. The Relationship between AI and Economic Development

The paper begins by highlighting the burgeoning value of AI, noting its expected growth from \$93.8 billion in 2021 to \$1.129 trillion by 2030 (36.4% growth rate). It acknowledges the inherent difficulty in accurately predicting future progress but emphasizes the potential of AI for deeper integration with technologies such as the Internet of Things (IoT), robotics, and natural language processing (NLP). This convergence is expected to lead to more powerful systems with wide-ranging applications in diverse fields. The analysis positions the robotics industry as a primary source of AI applications. The resulting high-quality technologies have stimulated economic development, especially in countries with significant investments in this area. Positioning AI as a critical tool for the transition to the digital economy is a noteworthy contribution. The paper emphasizes the ongoing transformation in the business environment due to the integration of AI. Manufacturing, marketing, sales, and customer service have undergone major changes. The role of AI is emphasized in understanding the market, anticipating economic trends, enhancing productivity and quality control, and improving the production process. Additionally, the ability to better understand consumer preferences through AI leads to improved advertising and product marketing strategies. The potential social and economic ramifications of reduced employment due to AI-powered automation have been recognized. This factor is presented as a major obstacle in moving on the path towards economic and societal transformation, which ultimately aims to achieve economic well-being.

The paper relies on Abdel-Sadiq (2018: pp. 15-27) to explain the relationship between AI and economic development through several key points:

1. AI contributes to achieving high economic and social development by reducing production costs, simplifying service delivery, and enhancing the efficiency of transportation and communications. This enhances new market opportunities, stimulates economic growth by expanding internal and external demand, and attracts foreign direct investment. In addition, the creation of new job opportunities in technology-driven fields is facilitated.
2. AI generates new revenue streams through innovative business models, products, services and new digital solutions. The analysis highlights the importance of big data and analytics in this context. By leveraging customer behaviour insights derived from data analysis, AI enables companies to gain an advantage in the market.
3. Quality control, flexible customer-focused production applications, process and product diversity insights, performance improvement through forecasting algorithms and integration through remote sensing and tracking contribute to cost reduction and operational efficiency. AI promotes digital transformation, process automation, and a more strategic approach to the use of human resources. Algorithmic computing enhances comprehensive planning and collaboration, leading to market expansion.
4. AI greatly impacts companies on the supply side. New technologies create innovative ways to meet current needs, as new entrants leverage global digital platforms for research, development, marketing, and distribution. This fosters competition, potentially disrupting established players by offering superior product/service quality, faster fulfilment, and competitive pricing.

In essence, AI bridges the gap between economic growth as a passive phenomenon and economic development as a deliberate act.

V. Economic Repercussions of Activating AI Technologies

Activating AI technologies is expected to lead to many economic benefits (Salem and Ahbali, 2023, pp. 43-46). These include:

1. AI is expected to streamline production and consumption patterns, leading to significant cost reductions and productivity gains. International studies indicate that AI can stimulate economic growth through smart investments in various sectors. In addition, AI can contribute to cost savings by reducing paperwork and simplifying administrative processes.
2. Adopting AI can improve project performance and possibly reduce dependence on expatriate workers. This may lead to a more balanced demographic composition within the labour market and lower financial flows associated with diaspora remittances.
3. Strategic investments in AI can improve transportation systems, reduce carbon emissions, and reduce environmental pollution. This can be achieved by improving logistics, reducing parking requirements, and lowering project completion costs. Furthermore, AI can contribute to a decreased reliance on human labour, which could lead to higher-quality products and lower overall spending.
4. AI acts as a critical driver for building a competitive and highly productive knowledge-based economy. This is achieved by promoting innovation, scientific research and adopting modern technologies.

As for the future challenges of AI, it is expected that the growing role and expansion of AI applications will lead to a number of challenges that can be summarized as follows (Abdul Sadiq, 2023, 14-15).

1. The disappearance of existing jobs, and then affecting the increase in unemployment among those who cannot adapt to the new skills that will also appear, as estimates indicate that 800 million workers will lose their jobs by 2030, which will have an impact in increasing poverty, the digital gap, and inequality within the society.
2. The significant impact on personal data and the handling of it, which would affect the privacy of users or citizens, especially with the increased use of surveillance cameras in addition to smart phones, and this will lead to a struggle for control and acquisition of that personal data between the companies operating the services on the one hand and the users. The owners of that data and the government to which the citizen belongs, on the other hand, especially with the opportunities for exposure to cybercrime, hacking, and cyberattacks.
3. Although AI can be employed in cyber defense operations against cyber-attacks, it can also be used to develop malicious software and launch cyber-attacks, whether against establishments, individuals, or the government and private sectors, which could exacerbate financial and economic losses in the future.
4. Problems of bias in AI applications due to the nature of the formation of the algorithms that rely on them to analyze data, and its impact on the process of providing services or jobs or discrimination against specific groups or ideas that ultimately result in unfair decisions.
5. The increasing risks of employing AI in deep fakes, whether by producing audio and video clips, by producing content and text, or by creating digital characters similar to politicians or celebrities, or characters that resemble unreal human forms.
6. Fears of the centralization of influence in the hands of a small handful of companies working in the field of AI or major countries, in a way that is reflected in the strengthening of cyber hegemony and the militarization of AI applications in a way that affects making the benefits of those applications available to everyone without discrimination and employing them in development, especially since the potential gap in possessing AI applications, it will have devastating effects on the social level and international stability.
7. Many companies that played a major role in social media, such as Google, Amazon, Apple, and Microsoft, have now become leaders in the field of AI, which raises fears of repeating the bitter experience imposed by those platforms regarding the misuse of personal data or data. To be employed by security and intelligence agencies.
8. Despite the progress made by the Chat GPT program and other deep learning applications, it still faces problems of privacy violations, misinformation, and false awareness, as it collects data about users, and the difficulty of revealing the mechanisms it relies on, in addition to other cultural and linguistic problems, some of which it may improve in the future, while the other remains linked to the nature of that software, which is still controlled remotely by companies or countries.
9. As for the challenges facing the education sector in activating and applying AI, they are represented by three things, the first is the safety of transfer of AI applications, the second is the safety of translation and the quality of Arabization of the transferred AI applications, and the third is the localization of AI applications.

CONCLUSIONS

The main findings are summarized below:

1. AI applications enhance efficiency by accelerating the completion of tasks due to their superior speed and accuracy.
2. AI effectively reduces employee burden by taking on complex and tedious tasks.
3. Despite the undeniable value of AI technologies, their high cost represents an obstacle to their adoption, especially for financially constrained organizations.
4. There is a positive relationship between human resources development and the use of AI. Effective training programs enable employees to benefit from advanced working methods facilitated by AI.
5. Investing in human resource development enhances exceptional technological performance and contributes to overall success in AI implementation.
6. The studied algorithm showed a remarkable ability to adapt in dealing with diverse data types.
7. The prevailing political instability in some Arab countries, especially those dependent on oil, hampers their near-term readiness to fully embrace the benefits of the fourth industrial revolution (Industry 4.0) led by AI.
8. AI has the unique ability to anticipate customer needs and provide not only desired products or services but also unexpected offers that meet underlying requirements.
9. AI outperforms human capabilities in data analysis, allowing patterns and trends to be identified faster and more accurately.
10. The current legal framework in Iraq lacks the necessary provisions to accommodate the integration of AI applications. It is worth noting that there is an absence of specific legal texts that address the repercussions of using smart applications.
11. Contrary to concerns about job displacement, the study suggests that AI has not led to the elimination of specific types of jobs. Instead, it has fostered the emergence of entirely new business opportunities.
12. The application of AI in education has led to varying economic impacts across different sectors. The timeframe for automation within these sectors significantly impacts whether AI technologies will achieve the expected gains in either generating or enhancing economic value.

Recommendations

1. Study the impact of using AI in analyzing and monitoring factors affecting investment decisions, such as financial market fluctuations, price changes, and economic indicators.
2. We propose to the Iraqi legislator to legislate a law called (AI Ethics Law), which stipulates the formation of a center that includes a group of lawyers and specialists in modern technology, in order to supervise the quality of manufactured and imported health and civil smart systems, and to indicate the quality of their purchase and establish controls for their use and address their errors, and the most important thing is Guiding people on how to use it ethically.
3. Providing access to modern technology and facilitating its transfer to Iraq.

4. Emphasizing the dialectic of the relationship between economic sustainability and AI applications.
5. Introducing the subject of AI into the curriculum for all educational levels, up to preliminary university studies, and according to specialization, due to its multiple applications in all fields.
6. Working to increase the number of specialists and technicians with experience and competence in the field of using AI in all sectors of health, education, trade, services...etc.
7. Conduct more courses and workshops, to explain to him the benefit of AI, as well as raise awareness of the moral and behavioral harms, when AI is used poorly.
8. The necessity of using leading international and local models in the field of AI, to serve as a roadmap that can be developed in the future in a way that suits Iraqi society and its requirements.
9. Allocating a financial cover that allows the purchase of these applications for use by institutions because of their positive return on the institutions' profitability.
10. Paying attention to the process of training employees to use these applications with the aim of abandoning foreign labor and creating job positions for the new employee.
11. Educating institutions about the necessity of using AI applications in managing the activities of institutions, especially those of an economic nature, and benefiting from these applications as much as possible in facilitating the institutions' processes and trying to make them create added value for the institution.
12. Relying on AI technology in education requires defining the goal behind its use. Is it used for knowledge, to control others, or for mass destruction, that is, for the change in educational, cultural, and social values that will be imposed on the margins of AI and will lead to a widening of the gap and inequality between The rich and the poor.

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