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Artificial Intelligence and its Effect on Labor Market-with Reference to the Area of Middle East and North Africa-

Ibtissem Alliouche Kerboua*

University of Tamanrasset (Algeria), ak.ibtissem@gmail.com

Abstract:

Through this research paper, we will try to identify artificial intelligence and its effect on labor market with reference to the Middle East and North Africa region, and the main objective of the research is to identify How AI and its applications will impact the labor market, whether negatively or positively, in light of the major changes that occurred at the global level, most notably the COVID-19 pandemic and the digital transformation that has become inevitable.

Based on the statistics and studies provided, the study reached that the impact of AI on the labor market is complicated and multifaceted, with both opportunities and challenges. It underscores the importance of proactive strategies to manage transitions, promote inclusive growth, and ensure that the benefits of AI are shared widely across society.

Keywords: Artificial Intelligence; generative AI; labor market; Automation; the Middle East and North Africa region.

JEL Classification Codes: J40; O33, O53; O55.

INTRODUCTION:

Artificial intelligence is considered as one of the top trending topics recently. This latter shows a fast development as well in all domains. Therefore, it has become one of the most controversial issues in the current era (the technology era). Furthermore, it penetrated many sectors and markets, mainly the labor market which has got benefit from the digital revolution, as the artificial intelligence applications varied, positively affecting productivity, and streamlining processes, and this has led to radical changes in the labor market.

*Corresponding author

Artificial Intelligence (AI) enhances the effectiveness of information systems, making them capable of executing tasks with high accuracy and skill, which will affect positively labor and production, but here a fundamental question comes to our minds: As AI evolves over time, how will it affect the labor market on a global level and in the MENA region?

Sub-questions: In light of the pre-mentioned main study problem, the following sub-questions are to be raised:

- ✓ What is meant by artificial intelligence? And what are its different applications?
- ✓ How will AI affect the labor market in the future?
- ✓ How will AI affect the labor market and the different business markets?

Aim of the Study: The current study aims at:

- Conceptualizing theoretical artificial intelligence.
- Evaluating labor's future under artificial intelligence.
- Identifying the effects of artificial intelligence on market labor, Manpower and business sectors.

Methodology of the Study: A descriptive research approach has been utilized to collect theoretical data. The researcher has used some statistics and studies which serve the current study.

Structure of the Study: The researcher has structured this study as follows,

- ✓ **First Section:** Introduction to artificial intelligence.
- ✓ **Second Section:** Evaluation for the future of labor market.
- ✓ **Third Section:** The effect of artificial intelligence on the labor market, Manpower and business sectors.

Section One: Introduction to Artificial Intelligence

The term was first used by John McCarthy and others in their 1955 proposal for the 1956 Dartmouth Conference, the first conference on artificial intelligence, which they defined as its goal, which was to develop machines that demonstrated signs of human intelligence. Below is a set of concepts related to artificial intelligence.

1- Digital Technology: Digital technology refers to all forms of devices and software used to perform tasks, from binary code used in traditional data tables or calculators on personal

computers, to network systems and advanced algorithms that enable computer systems to make decisions based on information analysis (Mohamed Abdelhadi, 2021).

2-Artificial Intelligence and Generative Artificial Intelligence: Artificial intelligence (AI) is a term that represents a range of technologies aimed at performing tasks associated with human intelligence. John McCarthy is credited with coining the term "artificial intelligence" in 1955, interpreting it as the science and engineering of intelligent machines (McCarthy). Generative Artificial Intelligence is a type of AI that uses machine learning techniques and deep neural networks to simulate human capability in creating new data or original and innovative content, such as text, images, and videos. Generative AI models can generate outputs of the same type as the inputs (SDAIA, 2023).

3- Machine Learning: Machine learning is a branch of artificial intelligence that enables computer systems to perform tasks characterized by intelligence. These systems perform complex operations by learning from data rather than following pre-programmed rules. Recent years have seen significant advances in machine learning capabilities due to increased availability of data, advanced algorithms, and increased computational power. Many people interact with machine learning-powered systems, such as those used for social media tagging, voice recognition systems, and recommended systems used by online retailers (Mohamed Abdelhadi, 2021).

4- Deep Learning: A subfield of machine learning that uses multiple hidden layers in neural networks to solve complex problems by identifying the most important underlying features of input data (SDAIA, 2023, p. 6).

Section Tow: Evaluation for the Future of Labor Market

After discussions of the future of labor were closely related to artificial intelligence and automation, and concerns about how robots would replace large sectors of workers and employees, perspectives on the future of labor have started to change after the emergence of the COVID-19 pandemic. Various elements converge to determine the future of labor, including economic,

technological, demographic, social, health, and environmental factors, all contributing to shaping the contours of the future of work. Therefore, it is important to anticipate the future, especially by developing appropriate visions and strategies for economic and political actors.

1- Future of the Labor Market in the Era of Artificial Intelligence:

The COVID-19 pandemic has brought about major shifts in workplaces and has widely pushed for remote work. This pandemic has contributed to three pre-existing trends in the future of work, which are likely to continue post-pandemic, with varying degrees and effects. These will be further explained below (Diani, 2022).

a. The First Trend:

Continuing work online, the pandemic has shown that 20 to 25% of workers in developed economies, and about 10% in emerging economies, can start working online on a full or intermittent basis (two to five days a week), especially for computer-based office work, this ratio is considered to be four to five times the level it was before the pandemic. These developments, in virtual reality, augmented reality, reinforced reality, and robotics, reduce the need for people's participation in physical space or workplace presence and reduce the demand for mass transportation, restaurants, and crowds in urban centers.

b. The Second Trend:

This accelerated the pandemic. It was the continued growth in the share of e-commerce and the "delivery economy", which in 2020 became two to five times faster than it was before the pandemic and created jobs that helped offset job losses in other professions. This trend also accelerated the decline of low-paid jobs in traditional shops and restaurants, while increasing the mobility of distribution and delivery centers. The rapid shift to e-commerce and other virtual interactions is likely to continue, due to the comfort and efficiency they provide. In short, online medicine consulting has been commonly used by many people.

c. The Third Trend:

Accelerating the COVID-19 pandemic to embrace the employment of automation and artificial intelligence, which has increased significantly in dealing with the disruptions of this pandemic, will continue at the same pace in the coming years, placing more robots in factories and warehouses, adding customer self-service stalls, service robots in dealing with customers, etc. Many companies have halted unnecessary investments, focusing on the development of critical digital tools and platforms. To enable telecommuting and customer access, and to better cope with the sharp increases in demand caused by the pandemic, to reduce density in crowded spaces, and to provide customers with untouched service experiences, for example, by self-paying in stores, ordering apps, or by QR codes in restaurants.

As some other labor future trends are related to learning challenges, including higher education, vocational training, skills improvement throughout job career and the flexibility and possibility to change it. All the learning pre-mentioned trends have a capital importance in the fast and continuous change. Besides, labor markets showed new occupations and employees' situation which have developed to become more flexible, independent, free, meaningful, and more experienced.

The new labor trends include new styles for expressing oneself and experiencing the daily occupational life (regarding the number of work hours or environments). This will affect necessarily payment systems and vacations. Finally, it is certain that the questions of equality and employment will become increasingly acute in the future, whether due to the gross disparities in wages between men and women, or due to increased polarization in wages. These are some of the most important trends that will determine the future of work in the foreseeable and long term (Diani, 2022).

2. The Results of an Exploratory Study on The Future of labor and its Forms and Environmental Career: Citrix company made a collaboration with research company "Oxford Analytical" and future consulting company "Coleman Parkes" to

interview more than executive directors and 1000 employees from big and medium size companies in USA, UK, Germany, France and Holland to collect data about work strategies and model at the moment and in the future. The results obtained showed that: (Editorial Board 2002, p. 143-144)

- ✓ Robots will never replace humans, but it will make them more intelligent and qualified. More than three fourths (77%) of the participants think that AI will foster decision making and the employees' productivity to high extent.
- ✓ Work will become more flexible, and new models will be enabled by technology that gives all employees access to the tools and information needed to work anywhere.
- ✓ 67% of the employees and headmasters think that the PLATFORMs facilitate the communication between groups and individuals using digital technology and it will become well widely utilized in the future labor.
- ✓ 60% of the employees believe that permanent jobs will become rare in 2035.
- ✓ 80% of the executive directors see that technology platforms will offer an immediate arrival to highly skillful people who cannot work without in order to broaden the business area and to adapt with the changeable consumers' needs.
- ✓ 39 % of the executive directors think that in 2035, the majority of highly qualified specialists will work for themselves.
- ✓ According to 57% of the interviewees' leadership will take a new vision, AI will affect most of the business decisions as it may reduce the need for bosses.
- ✓ 75% of the participants believe that most of the companies will have a department for AI which will manage all sides of work.
- ✓ 69% of the respondents believe that executive directors will work in cooperation between human and machine with the AI section.
- ✓ Production will multiply. Hence, technology, which is included in human activities, will enable gradual jumps in production since the smart solutions work to foster human performance.

Third Section: Artificial Intelligence Effect on Labor Markets, work powers and business sectors:

1. Effects of Artificial Intelligence on Labor Market and Work Powers:

Artificial intelligence and machine learning has become more complicated and developed. This may lead to negative impacts on jobs and labor markets, as many tasks are replaced by these emerging technologies. In this regard, a Boston Consulting Group report predicted that robots are likely to increase four times from current levels by 2025, and Asimuljo and Rostrepo came to confirm this. According to that study, every unit increase in the rate of robots will reduce jobs by 0.36%. Wage growth will also be 0.37%. Also, according to a report issued by the Oxford Martin School and the OECD, it was estimated that approximately 57% of jobs are exposed to automation across the world. (Mohammed Abdel Hadi, 2021, P. 17-18)

In an analytical study of the potential impacts of AI on the economy, data from the O*NET database on tasks for more than 900 occupations in the US, and later extended to more than 2000 occupations in the European ESCO database, were used to estimate the share of total work or occupations vulnerable to labor automation by AI according to two criteria: Difficulty and importance of the occupation and industry.

Based on reviews of potential AI use cases, 13 work activities (out of 39 in the O*NET database) were classified as vulnerable to AI automation, based on the assumption that AI can complete tasks up to a difficulty level of 4 on a 7-point scale, i.e. 18% of professions or jobs globally are vulnerable to some degree of AI automation.

Based on the US Occupational Employment and Wage Survey (OEWS) employment share questionnaire for each occupation and disaggregated by industry, it was estimated that a quarter of current work tasks could be automated by AI in the US with the likelihood particularly high in administrative (46%) and legal (44%) occupations and low in physically demanding occupations such as construction (6%) and maintenance (4%).

Matching the same process in Europe through the ISCO European Job Classification System using the Eurostat Labor Force Survey (LFS) database produced estimates with similar proportions to the US for occupations that could be automated by AI (45 per cent) in managerial occupations, and (34 per cent) in legal occupations. The likelihood of automating physically demanding occupations such as agriculture (7 percent), maintenance and forestry is lower (4%).

Although the impact of AI on the labor market is likely to be significant, most jobs and industries are only partially exposed to automation, so it is possible that they will be supplemented rather than replaced by AI. The study categorized jobs and businesses in terms of their importance and task complexity and found that at least 50 per cent of jobs are likely to be replaced by AI, including legal, administrative, technology, and financial operations. While 10-49% of jobs are likely not to be completely replaced but complemented by AI, including fields that require physical strength, such as construction, agriculture, fishing, sales and customer service, community service jobs, education jobs, customer care jobs, design, arts and crafts, sports, and arts and media. 0-9% of jobs are unlikely to be affected or replaced by AI, such as food preparation and serving, building maintenance and cleaning, and transport (Al-Ballaa, 2023).

Applying these estimates and probabilities to the US labor market, it was found that 7% of jobs in the US could be replaced by AI, 63% of jobs could be complemented by AI, and 30% of jobs would not be affected by AI.

2- The Impact of Generative AI on Business Sectors: A report entitled “Wealth Outlook 2024” showed that technology and finance may be of the most sectors influenced by artificial intelligence in the few coming years; whereas natural resources and weather technology will be the most sectors affected by it (CITI, 2023, pp. 80-81).

2-1 Financial Technology: Generative artificial intelligence can help improve the quality of investment, markets, and algorithmic trading, enabling more powerful use of data and allowing for better analysis and pricing of insurance risks. Other

opportunities include improving customer service through automated chat programs and digital assistants, enhancing fraud detection and prevention, and improved automated compliance monitoring.

2-2 Consuming Sector: Companies in the basic consumer goods sector, such as food and beverages and makers of household and personal products, are exploring and deploying artificial intelligence tools across their operations. This could mean faster innovation and more efficient use of data in manufacturing activities, supply chain, and marketing. Enhancing sustainability by reducing waste and energy consumption is another method. "Citi" believes that the traditional entertainment sector is adapting more slowly. Jewelry companies see potential in design, but not yet in polishing processes.

2-3 Healthcare: Artificial intelligence is likely to have profound impacts on drug discovery and design. It will also lead to advancements in patient selection and recruitment for clinical trials, as well as improvements in sampling and sales. Generative AI can also assist in patient communication, such as reminding them of healthy habits, in addition to streamlining doctor tasks including note taking and data entry in digital health records. Improvements can also be seen in coding patient risks, payment integrity, and ensuring treatments are cost-effective and necessary. Adopting this technology involves creating systems to protect the privacy of patients, doctors, and hospitals, among other data concerns.

2-4 Industrial Technology and Transportation: Industrial processes are increasingly being digitized. Internet of Things platforms (IoT) allows end-users to create industry-specific and process-specific applications. Generative AI can greatly expand the ability to generate code, significantly opening the market for data analysis on industrial IoT platforms. In the automotive and mobility sector, AI has numerous uses in autonomous vehicles and may lead to the development of products, manufacturing, and customer-facing services. There is also the potential for smarter decision-making processes in defense systems.

2-5 Real Estate: Generally, the real estate sector is less exposed to generative AI compared to other sectors. At least in the first few years of adoption, there is expected to be an increased demand for data centers. AI can play a role in smart buildings helping to automate temperature, lighting, alarm systems, leak sensors, and security. Meanwhile, chatbots can enhance consumer-facing applications in hotels and residential properties. Office spaces may receive a short-term boost from the demand of AI companies, but they could struggle in the event of a broader implementation of AI functions.

2-6 Natural Resources and Climate Technology: Strong productivity gains from artificial intelligence are initially less likely in this sector due to a relative lack of customer-facing roles. However, opportunities may arise alongside increased electrification and connectivity, along with more smart devices and more distributed power, such as rooftop solar energy. AI can be used to analyze the resulting increase in data produced to manage demand and facility usage, leading to more efficient energy use. Below is a diagram illustrating the use cases of artificial intelligence in various business sectors.

Fig1. The Use of AI in the Different Business Sectors



Source: CITI, Wealth Outlook 2024, p80.

From the diagram, the extent to which AI affects the different business sectors is clearly shown. However, it differs from one sector to another.

3-The Influence of AI on Business in North Africa and Middle East Countries:

According to the 2022 report "The Future of Artificial Intelligence in the Middle East and North Africa," the potential economic impact of AI on economic growth in the Middle East and North Africa region could reach \$320 billion by 2030 in value added by artificial intelligence. The key sectors likely to drive this growth include the retail sector (accounting for 19% of the region's GDP), the public sector, including health and education (19%), transportation and logistics (15%), technology, media, and telecommunications (14%), and financial services (14%). (Economist Impact, 2022, p. 20)

In the Arab region, six key sectors stand out as the most likely to benefit from the adoption of artificial intelligence. (Economist Impact, 2022, pp. 20-30):

- ✓ Governments in the region are taking initiatives to use artificial intelligence to increase the speed, accessibility, and effectiveness of government services.
- ✓ The financial services sector and banks are expected to be the largest spenders on AI technologies, accounting for 25% of the total AI investments in the region.
- ✓ The travel and tourism industry, contributing nearly 9% to the GDP of the Middle East and North Africa region, is evolving with various potential uses of artificial intelligence.
- ✓ The transportation sector is expected to contribute significantly to the economies of Egypt and the Gulf, reaching up to 15% of the GDP by 2030.
- ✓ The increase in retail and online commerce during the pandemic has led to the generation of larger sets of customer data that can be used to improve AI algorithms and enhance customer experience.
- ✓ The impact of AI systems in the energy sector, which has played a major role in the region, is expected to contribute over 6% to the GDP of the region by 2030.

In this context, the Gulf Cooperation Council (GCC) countries are the most advanced in this field, and the most prepared to localize the AI revolution. However, despite their ambitions, plans, and potential, institutions in these countries still fall short of achieving the desired benefits of AI.

Most other Arab countries, according to the "Global Artificial Intelligence Index (GAI)," which includes 143 indicators distributed across seven sub-pillars (talents, infrastructure, operating environment, research, development, government strategy, and business strategy), rank low on the international level. (Editorial Board, 2022, p. 150).

Conclusion:

After analyzing the statistics and information provided, the research concluded that the effect of AI on the labor market is still in its infancy and is evolving, but several key points had been reached:

- ✓ **Automation of Routine Tasks:** AI and automation technologies are able to automate routine and repetitive tasks across various industries. This may increase efficiency and productivity. However, it may also result in job displacement for employees whose tasks can be easily automated.
- ✓ **Creation of New Job Roles:** While some occupations may be automated, AI also creates new job roles and opportunities, particularly in the fields related to AI development, data science, machine learning, and robotics. These roles often require advanced technical skills and expertise.
- ✓ **Skill Shift and Reskilling:** The adoption of AI technologies will lead to a shift in the skills demanded by labor market. There is an increasing demand for workers with skills in areas such as programming, data analysis, artificial intelligence, and digital literacy. Thus, it becomes necessary to make ongoing efforts in workforce training and reskilling to ensure that employees can adapt to the changing job requirements.
- ✓ **Income Inequality and Job Polarization:** AI impact on the labor market has the potential to exacerbate income inequality and job polarization. While high-skilled employees in AI-related fields may see increased demand and higher wages, low-skilled ones

in routine jobs may face job displacement and downward pressure on wages.

- ✓ Policy and Social Implications: Addressing the impact of artificial intelligence on the labor market requires careful consideration of policy measures to support workers during transition, promote lifelong learning and skills development, and ensure equitable and inclusive access to opportunities. In addition, there are broader societal impacts, including questions about the future of work, social safety nets and the distribution of wealth and resources.
- ✓ The MENA region: The Gulf Cooperation Council (GCC) countries are the most advanced in this field, and the most prepared to localize the AI revolution. However, despite their ambitions, plans, and potential, institutions in these countries still fall short of achieving the desired benefits of AI. Most other Arab countries, according to the "Global Artificial Intelligence Index (GAI)", rank low on the international level.

To sum up, the impact of AI on the labor market is complicated and multifaceted, with both opportunities and challenges. It underscores the importance of proactive strategies to manage transitions, promote inclusive growth, and ensure that the benefits of AI are shared widely across society.

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