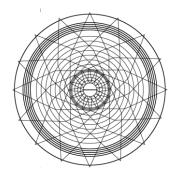
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Artificial Intelligence and Industry 5.0: Paving the Way
for an Economic Revolution in the Arab World



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# ARTIFICIAL INTELLIGENCE AND INDUSTRY 5.0: PAVING THE WAY FOR AN ECONOMIC REVOLUTION IN THE ARAB WORLD

### Roumate F.

PhD, Full Professor of International Economic Law and AI,
Mohammed V University;
Founder,
Global Network on AI and International Society (GNAI&IS)
(Rabat, Morocco)
roumate.fatima@gmail.com



### Abstract:

Artificial intelligence (AI) offers innovative solutions for economic development of the Arab world. However, considering the significant investment on AI by some countries in this youngest region of the world, these innovative tools could cause here an economic "revolution". This article is divided into four sections. Section two analyses the competition between countries in the Arab world to develop and implement AI. In section three, we explore the impact of AI on different sectors of the economy considering current and future changes in this field. Additionally, this section highlights the implications of AI for labor markets. Section four concludes that focusing on ethical principles is essential for building national AI strategies, given the rise of emerging economic powers in the region within the context of a new global economic order.

**Keywords:** Al, generative Al, Al transformation, Industry 5.0, economic revolution, Arab world, labor market

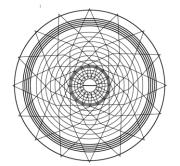
### Introduction

Artificial Intelligence (AI) is paving the way for an economic revolution in the Arab World, as it is deeply fostering growth in the region. This impact extends to all sectors from industry to the labor market. The transformation of AI in industry is affecting the balance of economic power in the Arab world, and its implications extend to rules, the governmental framework, and national strategies.

The key questions that could guide us are:

How will AI drive economic development in the Arab world? Which sectors are influenced by AI and Industry 5.0? How does AI transformation influence these sectors and what implications does it bring to the labor market in the region?





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To address these questions, we will discuss the integration of AI into various sectors and its significant role in the transition from Industry 4.0 to Industry 5.0. This analysis will encompass the regional race for AI which characterizes the new economic order based on a new balance of power.

Our research is based on comparative, technological, and economic approaches. It starts with an overview the transformation of Al in industry in the Arab World, comparing it to other regions. This is followed by a country-by-country analysis of current opportunities, challenges, and trends related to Al transformation in industry and the labor market.

### The race for Al: The growing Al transformation in industry in the Arab world

Artificial Intelligence (AI) is revolutionizing the global economy, fostering deep changes in the balance of economic power. Tangible and intangible implications of Al are extended to all sectors and actors in international economic society. These implications relate to the global race for Al between different regions of the world and inside each region. According to PwC, "Al could contribute up to USD 15.7 trillion to the global economy in 2030" (PwC, 2024), and the Middle East is expected to accrue 2% (USD 320 billion) of the total global benefits of AI in 2030 (ibid). In its report titled "The potential impact of Al in the Middle East", PwC states that "The annual growth in the contribution of AI is expected to range between 20-34% per year across the region, with the fastest growth in the UAE followed by Saudi Arabia" (PwC, 2023). As noted by Grand View Research in its report on the MENA Artificial Intelligence Market Size, Share & Trends, the Middle East and North Africa Al market size was estimated at USD 11.92 billion in 2023 and is expected to grow at a compound annual growth rate (CAGR) of 44.8% from 2024 to 2030 (Grand View Research, 2024). According to Grand View Research, "The growth is attributable to actively embracing AI to build smart and sustainable urban environments in this region" (Grand View Research, 2024).

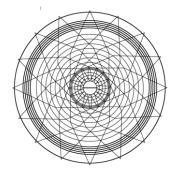
This growing contribution of AI to the global economy is also observed between regions with different characteristics, particularly between the Global North and the Global South. This gap is explained by different factors. The first factor is AI spending, both at regional and national level. The second factor is the ability of a country to ensure sovereign AI, i.e. to develop and provide responsible AI for all its citizens and sectors. Sovereign AI "refers to a nation's capabilities to produce artificial intelligence using its own infrastructure, data, workforce and business networks."<sup>1</sup>.

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<sup>&</sup>lt;sup>1</sup> Strier, K. (2024). Nvidia.

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This includes all types of Al: assisted, automated, augmented and autonomous. This leads us to the third factor which is Al infrastructure, including cloud services, electricity, connectivity, digital tools, etc.

In the Arab World, Al transformation is growing massively in the economy. The leading country is the Kingdom of Saudi Arabia with USD 135.2 billion (12.4% of GDP in 2030) followed by the United Arab Emirates with USD 96.0 billion (13.6% of GDP in 2030) and the Gulf Cooperation Council countries (Bahrain, Kuwait, Oman, and Qatar) with a combined total of USD 45.9 billion. (8.2% of GDP in 2030). Despite the significant efforts deployed by Egypt, Morocco, Tunisia, and Algeria, Saudi Arabia, the UAE and the GCC will maintain their dominance in Al development in the Arab world.

According to a ranking released by PricewaterhouseCoopers in 2024, top five countries in the region are the UAE with 28, Saudi Arabia (31), Turkey (39), and Qatar (42) (Tortoise, 2023). This ranking is based on factors such as talent, infrastructure, and operating environment, which indicate a country's ability to implement AI (Figure 1).

The top five countries in this region according to the ranking released by PWC in 2024 are UAE with 28, Saudi Arabia 31, Turkey 39 and Qatar 42 (Tortoise, 2023). This ranking is based on the talent, infrastructures and operating environment. That means the ability of states to implement AI (Table 1).

**Table 1.** Top 5 Countries to Implement AI

Country	Rank	Talent	Infrastructures	Operating Environment
UAE	28	48	4	42
Saudi Arabia	31	53	20	18
Qatar	42	62	25	47
Egypt	52	43	55	55
Bahrain	58	61	39	43

Complied by the Author based on the statistics<sup>2 3</sup>

<sup>&</sup>lt;sup>2</sup> TORTOISE. (2023). The Global Al Index. <a href="https://www.tortoisemedia.com/intelligence/global-ai/">https://www.tortoisemedia.com/intelligence/global-ai/</a>

<sup>&</sup>lt;sup>3</sup> PWC. (2018). USD 320 Billion by 2030? The potential impact of AI in the Middle East. https://www.pwc.com/m1/en/publications/documents/economic-potential-ai-middle-east.pdf

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For talents, this region has a high potential due to the young, particularly Generation Z, who are skilled in Al use and show an aptitude for creating, innovating and developing Al systems and applications. Generation Z will change the economic balance of power both globally and within the region thanks to their significant role in creativity and innovation driven by a high spirit of risk-taking that only teenagers and young adults possess. The Arab world's investment in Al and the significant potential of young talent will contribute to accelerating economic growth and development in the region. Promoting investment in Al startups and higher education is a means to speed up this process.

According to OECD, "Young people (aged under 30) constitute more than half (55%) of the population across the Middle East and North Africa (MENA), compared with 36% of the population across OECD countries." (OECD, 2022). According to the Arab Barometer in 2023, the median age in the Middle East and North Africa was 22 compared to a median age of 28 in the world<sup>4</sup>. Gen Z and NEET<sup>5</sup>'s contribution to Al implementation and use in various sectors has facilitated AI transformation in industry in the Arab world. However, this contribution is contingent on the availability of digital infrastructure. Therefore, several countries in the region have facilitated access to the Internet at a low cost (Internet Society, 2020). The goal is to ensure easy connectivity between all stakeholders and sectors within and outside the countries. Over the past decade, the number of Internet users has increased, as access to the Internet has become the first individual right in the era of Al. It facilitates access to all fundamental rights, including education, health, and labor, particularly through e-government services, such as elearning, e-health, and online employment. This has led to all countries in the region making efforts to ensure easy access to content infrastructure, cloud services, and digital tools at low costs, without leaving anyone behind. Al infrastructure, including local content infrastructure, is a cornerstone of sovereign Al and technological sovereignty (Roumate, 2024, p. 60). Therefore, it is crucial to have national AI strategies based on a gender-inclusive approach, involving young people and Generation Z (Table 2).

<sup>&</sup>lt;sup>4</sup> Arab Barometer. (2023, July 14). Youth outlooks: Life quality and economic conditions (Part I). https://www.arabbarometer.org/2023/07/youth-outlooks-life-quality-and-economic-conditions-part-i/

<sup>&</sup>lt;sup>5</sup> NEET, an acronym for "Not in Education, Employment, or Training", refers to those unemployed and not receiving an education or vocational training.

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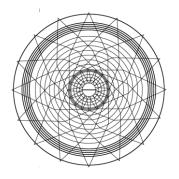


 Table 2.

 Al Strategies and Initiatives in Arab Countries

Country	Al Strategy	Institutions/Bodies	
United Arab Emirates	The National Strategy for Artificial Intelligence of 2031 aims to make the UAE one of the leaders in AI (2019)	The UAE AI Office	
Kingdom of Saudi Arabia	The National Strategy for Data & AI (NSDAI) aims to make the country a global leader in AI by 2030	Saudi Data and Al Authority The National Centre for Al (NCAI) was established in August 2019	
Turkey	NATIONAL AI STRATEGY 2021-2025	Digital Transformation Office of the Presidency of the Republic of Turkey (CBDDO) Ministry of Industry and Technology Scientific and Technological Research Council of Turkey Science, Technology and Innovation Policies Council	
Egypt	The National Al Strategy is a key priority in supporting Egypt's efforts to achieve its sustainable development goals	Ministry of Communications and Information Technology National Council for AI (NCAI)	
Qatar	Qatar is launching its National Artificial Intelligence Strategy	Ministry of Transport and Communication	
Morocco	Digital Strategy 2030	Ministry of Digital Transition and Public Administration	

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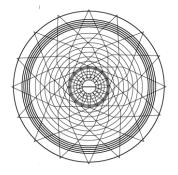
Some countries, such as the United Arab Emirates, Saudi Arabia, Turkey, Egypt, Morocco and Qatar, have adopted national AI or digital strategies (UN ESCWA, 2020). These strategies share a common feature: they are all based on a rigid approach. This means that a strategy is developed by governmental bodies without consultation with other stakeholders and is based on risk management, which can be an obstacle to innovation. Arab countries adopting this rigid approach are influenced by the experience of the European Union, including the EU AI Act based on risk management and sanctions depending on the level of risk. Additionally, these national strategies are based on ethical principles and consider international instruments on AI ethics, particularly, the UNESCO Recommendation on AI Ethics adopted in 2021, and some regional instruments, especially the OECD AI Principles and the EU Artificial Intelligence Act (Roumate, 2024, p. 134).

Other countries from both the Global North and the Global South have adopted national strategies based on innovative approaches which presuppose a close coordination between government and other stakeholders. Such Al strategies based on multidisciplinary and gender-inclusive approaches have been elaborated by the USA, China, and Russia. In contrast, some Arab countries have lunched several initiatives as starting points to their national Al strategies. For example, in Bahrain, the Ministry of Transportation and Telecommunications has proposed Al procurement guidelines.

# Al and Industry 5.0: Implications for Economic Sectors and the Labor Market in the Arab World

According to Market Research, Industry 5.0 market size is expected to reach about USD 658.4 billion by 2032 from USD 131.13 billion in 2022, growing at a CAGR of 18.0% (Market Research, 2023). In its Industry 5.0 Market Report, Market Research explains that this industry is built on three pillars related to Al. The first pillar is interconnectivity through 5G and IoT. The second pillar is "information transparency", which means that all relevant data is accessible to all stakeholders in the value chain, allowing for data-driven decision making (Market Research, 2023; Roumate, 2024). The third pillar involves technical assistance through the use of advanced technologies, such as augmented skills, to help humans (Market Research, 2023; Roumate, 2024, p. 140). These three pillars are all linked to Al and demonstrate their importance to the industry, explaining the reasons for a race for Al investment. The Industry 5.0 revolution, linked to the Al revolution, is transforming the world's economic balance of power (Roumate, 2024, p. 382). There is a gap between Gulf countries and other Arab countries in the Middle East and North Africa region, which results from the strong investment from Gulf countries and government support to businesses, particularly to Al startups, as compared to lower spending in other countries,

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for example in North Africa. However, the implementation of AI is affecting all sectors in Arab countries – from agriculture to industry, trade, services and the labor market.

This emerging technology is revolutionizing economic development in the region. It finds application in traffic management, energy optimization, and public safety, fostering more efficient and secure cities. For example, Dubai has deployed Al-powered smart traffic control systems that use real-time data from traffic cameras and sensors to analyze traffic patterns and optimize signal timing, effectively reducing congestion and improving overall transportation efficiency.

In the agricultural sector, Al offers a new way to address the challenges imposed by the growing population and climate changes, particularly the water crisis in both Gulf and North African countries. These issues have led to an increase in investment in the Internet of Things and smart farming to ensure food security. In Arab countries, where agriculture is a major sector, such as Tunisia, Morocco or Egypt, investments in Al for agriculture are increasing. Smart farming offers a good solution for ensuring efficient management of water resources. These advanced technologies form the basis of the Green Generation 2020-2030 initiative lunched by Morocco in 2020 to promote Al and digital transformation in the agriculture sector. The key goal of this strategy is to install over 100,000 solar-powered irrigation pumps. Such emerging technologies rely on a combination of big data on the level of fertilizers, water resources, and weather, and use satellite and drone imagery. Other best practices can be seen in Egypt, which uses Al and big data to foster the agricultural sector accounting for more than 85% of the country's share of the Nile. The Egyptian government uses advanced technologies as part of a nationwide strategy to modernize this sector, for example through the use of mobile devices for irrigation (Tricarico, 2021).

Smart farming and smart irrigation are connecting points between all countries in the Middle East and North Africa, but in Gulf countries the level of investment is much higher than in other countries of the region (Tricarico, 2021). Another point of difference is that smart irrigation is used to address water challenges linked to climate changes in Egypt, Tunisia, Morocco, and Lebanon. In Gulf countries, where 80% of food is imported, smart irrigation enables plants to grow in sandy soil and develops fertilizers to increase food production efficiency (Bahn, Yehya, and Zurayk, 2021).

According to the World Bank's report on World Development Indicators published in 2021, the contribution of smart agriculture to the economy in the region is modest, ranging between 1% in Gulf countries to a more than 30% in Comoros (World Bank, 2021). However, its impact on the economy is significant in some areas like agri-food sector. This includes production of inputs, food processing, logistics and financial services.

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For Al in industry, research conducted by the International Data Corporation shows that in 2021, USD 28.3 million, or 25% of all Al investment in the region, was spent on developing Al solutions (Shirer, 2023). In Arab countries, there are significant opportunities for Al use in different sectors of industry, such as finance, automotive, manufacturing, retail and public services, including education and healthcare. Moreover, other emerging technologies, such as automation, rule-based systems and expert systems, are also used as part of Al transformation and Industry 5.0. The significant increase in Al implementation in the region has a deep impact on economic development and could lead to advanced positions in the global economic ranks and all other ranks related to Al, innovation, research, and development. The evolution of the market size of Al and Industry 5.0 is revolutionizing labor markets in the Arab world.

Al is creating important changes in the labor market due to automation which is changing jobs and skills. Al and 5G are expected to "transform the nature of work and the workplace itself" (Manyika & Sneader, 2018).

According to J. Grudin, principal researcher for Microsoft, there are three scenarios for Al. The first one is that a significant number of jobs will disappear in the future (Smith and Anderson, 2014, p. 6). The second scenario is that new jobs will appear, and the third scenario is that unemployed people will need new policy actions to ensure their dignity (ibid).

In the Arab world, the transformation of AI in the job market ranges from traditional jobs to those created by AI. Two trends that characterize the region are a significant increase in the AI market due to investment in AI and spending on it by leading countries; and the massive use of AI by the NEET generation. AI transformation is also explained by the emergence of smart cities, smart agriculture, smart businesses, EdTech, etc. These new sectors are the key causes behind the appearance of a landscape of career opportunities and the need for new skills<sup>6</sup>.

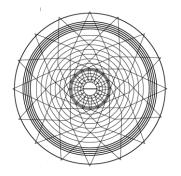
Al transformation in industry has extended to the job market, manifesting itself in two scenarios. The first is the transformation of traditional jobs, such as the use of Al in the oil & gas sector, which is a locomotive for the economy in Gulf countries. This sector is undergoing profound Al-driven transformation using Al in exploration, predictive maintenance, and operational efficiency. Al is also used in other key sectors such as agriculture and tourism in other countries of the region, particularly in North Africa. Furthermore, massive use of Al is seen in education, health services, and the increasing automation of several industries in the region. According to Mordor Intelligence, the Middle East and Africa Industrial Automation Market size is estimated at USD 4.93 billion

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<sup>&</sup>lt;sup>6</sup> World Bank. (2022, May 16). New World Bank report says MENA labor markets need a level playing field. https://www.worldbank.org/en/news/press-release/2022/05/16/mena-labor-markets-need-level-playing-field

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in 2024, and is expected to reach USD 7.43 billion by 2029, growing at a CAGR of 7.10% during the forecast period (2024-2029) (Mordor Intelligence, 2024). The second scenario is the creation of new jobs, such as AI Project Manager, Natural Language Processing (NLP) Engineer, Business Intelligence Developer, data scientist, etc. These two scenarios lead us to two challenges. The first challenge is automation, which will increase unemployment in one of the most unemployed regions. The employment range is between 20% for female labor to 26% for youth unemployment, while automation ranges, according to McKinsey, from 25% in sectors like financial analyst, engineer, or legislator to 65% in sectors like receptionist, courier, typist, welder and machine operator (McKinsey, 2016).

### Conclusion

In conclusion, the transformation of Al in the economy and the labor market in the Arab world is a starting point for a "revolution" at many levels, including legal framework, strategies, and policy actions. Several countries in the region have already launched Al or digital strategies. However, there are certain limitations related to the strategies and initiatives related to balancing risk management with innovation. Furthermore, these strategies are based on a rigid approach that does not include all stakeholders in their development, implementation and monitoring. As a result, despite the massive use of Al and the potential of the NEET generation, the region is facing a shortage of skilled human resources due to lack of innovation and creativity. This emphasizes the need for rethinking education and higher education, as well as scientific research policies.

Al transformation in the economy enhances challenges related to privacy and security due to the massive use of Al surveillance in smart cities, smart farms and smart businesses. Practical solutions to address these challenges could be provided by national Al strategies based on a pro-innovative approach to include all sectors, fields of science and research and establish coordination between government bodies, academia, industry, and civil society in a large sense. It is essential to strengthen legal and ethical frameworks and adopt pro-innovation, rights-based, and gender-inclusive approaches to ensure the shift of the Arab world from being an Al consumer to becoming a producer, thereby securing the technological sovereignty of the region in the future.

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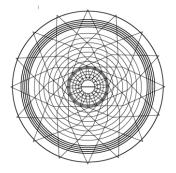
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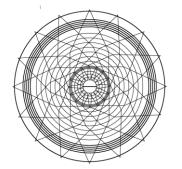
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# ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ И ИНДУСТРИЯ 5.0: ПРОКЛАДЫВАЕМ ПУТЬ К ЭКОНОМИЧЕСКОЙ РЕВОЛЮЦИИ В АРАБСКОМ МИРЕ

### Румате Ф.

РhD, профессор международного экономического права и искусственного интеллекта, Университет Мохаммеда V; основатель Глобальной сети по искусственному интеллекту и международному сообществу (GNAI&IS) (Paбat, Mapokko) roumate.fatima@qmail.com

### Аннотация:

Искусственный интеллект (ИИ) предлагает инновационные решения для экономического развития арабского мира. Однако, учитывая значительные инвестиции в ИИ со стороны некоторых стран этого самого молодого региона мира, эти инновационные инструменты могут вызвать здесь экономическую "революцию". Эта статья состоит из четырех разделов. Во втором разделе анализируется конкуренция между странами арабского мира за разработку и внедрение ИИ. В третьем разделе мы исследуем влияние ИИ на различные секторы экономики, рассматривая текущие и будущие изменения в этой области. Кроме того, в этом разделе освещается влияние искусственного интеллекта на рынки труда. В четвертом разделе делается вывод о том, что сосредоточение внимания на этических принципах имеет важное значение для разработки национальных стратегий в области искусственного интеллекта, учитывая рост развивающихся экономических держав в регионе в контексте нового глобального экономического порядка.

**Ключевые слова:** ИИ, генеративный ИИ, трансформация ИИ, Индустрия 5.0, экономическая революция, арабский мир, рынок труда