



# Artificial Intelligence in the Middle East and North Africa



Strategic Gears  
Management Consultancy

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# Key Takeaways

The Artificial Intelligence (AI) in the Middle East and North Africa (MENA) report reviews the landscape of AI across the MENA region and features a case study of Egypt. The report highlights the promise of AI and how it is being integrated across sectors in MENA countries and assesses Egypt's progress in implementing the four pillars of its National AI Strategy: AI for government agencies, developmental sectors, human capacity, and international activities. Below are the key takeaways:

**AI technology is transforming the way companies operate, pushing the boundaries of growth.** By leveraging AI tools to make decisions based on data, automate tasks using machine learning, tighten cybersecurity, and streamline business-to-customer management systems, businesses are acquiring productivity gains and unlocking greater growth prospects.

**The digital gap remains a perennial challenge for non-rich economies in the MENA region.** While GCC countries have invested sizably in making internet connectivity more accessible, middle and lower-income ones do not have the fiscal resources to do so, ultimately constraining the potential return on AI for the region.

**MENA economies are projected to generate USD 320 billion in AI revenues by 2030.** Among these economies, Saudi Arabia is set to reap the greatest share, accounting for 42% of the total AI revenues, followed by the UAE at 30%, and Egypt at 13%.

**The policy environment for AI in MENA countries is maturing, with nine states in the region ratifying national AI strategies.** While the sophistication of AI technologies varies across countries and sectors, notable steps toward wider integration in Saudi Arabia, UAE, Bahrain, Jordan, Qatar, Tunisia, Algeria, Morocco, and Egypt are being made.

**Egypt is phasing AI to diverse sectors in alignment with the four pillars outlined in its AI strategy.** The integration of AI in Egypt is covering government agencies and industries like agriculture, healthcare, manufacturing, and finance, propelling the country to rank first in North Africa, second in Africa, seventh in the MENA region, and 62nd out of 194 countries globally in terms of preparedness to implement AI, according to the Government AI Readiness Index 2023.

**Egypt is advancing AI in its policy agenda without disregarding the country's challenging economic conditions.** In addition to endorsing the National AI Strategy in 2021, Egypt adopted a structural reform program that prioritizes private sector activity, inclusive growth, better governance, and digital transformation, echoing a commitment to its Vision 2030 and macroeconomic stabilization.



# Artificial Intelligence in the Middle East and North Africa

## Introduction

Over the last decade, digital transformation has gained traction in the agendas of governments worldwide. This momentum was only catalyzed following the Covid-19 pandemic and surfaced technologies like Artificial Intelligence (AI) that carried disruptive potential for the private and public sectors alike. Today, digital transformation sits at the center stage for policymakers, with a formidable mandate of designing regulations that allow AI to yield positive welfare effects for developed and developing economies.

The promise of AI, defined as the ability of computer software to perform activities that previously necessitated human cognition, is remarkable. Productivity gains from the use of generative AI tools, like ChatGPT and Copilot, could yield between \$2.6 trillion and \$4.4 trillion to the global economy every year according to recent estimates.<sup>1</sup> More so, large enterprises are increasingly receptive to automation technologies, as 42% of firms in developed and developing economies are already adopting AI in their businesses and 40% are considering and attempting to do so.<sup>2</sup>

MENA countries are not sitting idle amid this transformation and untapped potential. The region is embracing AI, not only by keeping with global trends, but also by aligning it with its domestic agenda that is anchored in economic diversification and societal progress. As of 2023, nine MENA countries have already ratified national AI strategies, and the region as a whole is poised to generate \$320 billion in AI revenues by 2030.

Among MENA countries, Egypt is making strides in advancing AI in its policy agenda without disregarding the country's economic challenges. In addition to committing to a corrective macroeconomic program with the International Monetary Fund, Egypt endorsed foundational building blocks for an AI policy, namely the national AI council, the national AI strategy, and the charter for responsible AI. As it stands, the country has the second-highest annual market growth rate for AI in the MENA, trailing Morocco, standing at 28% compared to the region's average of 25%.

This report addresses three themes. First, the report unpacks how AI can perform business functions to generate economic value. Second, it highlights AI's growth prospects for MENA economies and the region's steps toward integrating AI technologies. And third, the report provides a case study on Egypt and assesses the country's progress in implementing its National AI Strategy across its four pillars: government, developmental sectors, human resources, and international activities.

# AI and the World of Business

It is a matter of when, not whether, businesses will integrate AI into their workflows

The contribution of AI to enterprises is pervasive along the business value chain, spanning operations and strategy. The value that AI brings to businesses includes generating content, enhancing efficiency, and analyzing insights, which frees up mental space and time for business leaders and employees to perform more creative and problem-solving activities. Simply put, firms adopting AI benefit from a compounding effect of productivity gains, ultimately endowing them with a competitive advantage compared to firms that are AI-averse.

This section assesses five business functions that AI can elevate for enterprises across industries.

1. AI-driven decision-making
2. Automation using machine learning
3. Product development and customer experience
4. Cybersecurity
5. Customer relationship management (CRM) systems



## 1. AI-driven decision-making

Traditionally, business decisions were made by leaders based on intuition and human-analyzed data, a process inherently exposed to cognitive biases and data limitations. AI has the potential to reduce both constraints by processing large datasets and modeling scenarios. By analyzing historical data quickly, AI can unlock insights that would have otherwise been inaccessible for businesses, including small ones.

- a. From data-driven to AI-driven decision making: AI can improve workflows, reduce human errors, and provide business leaders with more throughputs to make decisions.<sup>3</sup>
- b. By leveraging AI in stages from product development to digital marketing, businesses can improve strategy development.

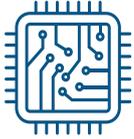


### Example

**AIR Canada is harnessing AI-driven predictive modeling, which streamlines intricate systems by removing unnecessary details and forecasts the consequences of events with rapid responsiveness, allowing for proactive management of disruptions.**

### AI Labs to improve forecasting and decision-making.

Boeing 787 Dreamliner with its predictive maintenance system, which assists in doing regularly scheduled checks and predicting maintenance of components.<sup>4</sup>



## 2. Automation using machine learning.

The benefits of machine learning cut across different industries, including:<sup>5</sup>

- a. **Retail:** Machine learning can advance the understanding of consumer behavior and analyze determinants of consumer purchasing habits, market trends, and popular products through price optimization, demand prediction, and customer segmentation.
- b. **Finance:** Machine learning can be integrated into financial analysis to better predict business expenses, perform cost analysis, and process complex tasks such as algorithmic trading and fraud detection.
- c. **Manufacturing:** Machine learning can and unlock scalability and save time during the manufacturing stage by optimizing the manufacturing process to identify and address pain points predictably.



### Example

**Tesla utilizes machine learning to offload some of the monitoring and vulnerability assessment tasks to an automated algorithm, which is employed in the development of self-driving cars. Automated algorithms analyze sensor data to enhance the automotive industry through AI chips and Advanced Driver Assistance Systems (ADAS).**

### AI chips & Self-Driving Tech for training machine learning models (Nvidia- Dojo)

- Helping train models to recognize a variety of items from video feeds collected.
- Developing autonomous vehicle software.<sup>6</sup>



### 3. Product Development & Customer Experience

AI helps engineers adopt a systematic methodology at each stage of the product development and launch cycles, from planning and designing to testing and promoting.<sup>7</sup>

- a. Resource Management: Using AI-powered tools to estimate the allocation of resources and establish budget requirements.
- b. Translating Strategy to Tasks: AI gathers project requirements and converts user stories into functional requirements, which helps in the product execution



#### Example

**Unilever coordinated artificial intelligence as a feature of product enhancement at the organization, with robots working cooperatively with 250 Research and development specialists to automate the development of science-backed products.**

#### AI-powered data analysis

- Creating performance-boosting enzymes for use in home care products.
- Helping identify alternative ingredients that can strengthen the resilience of the supply chain.
- Making formulations more sustainable and cost-efficient<sup>8</sup>



## 4. Cybersecurity

As a byproduct of digital transformation, cyberattacks have become a growing threat. The development of practical AI tools and algorithms for digital safety, such as search engines and facial recognition software, is a prominent aspect of AI's integration into cybersecurity.<sup>9</sup>

- a. Due to different hackers' tactics, threats can be overwhelming. To mitigate this, companies rely on an AI-based security log analysis, which helps organizations identify potential threats.
- b. AI in cybersecurity goes over enormous volumes of data to find possible risks by removing behaviors that do not present a hazard.



### Example

**Walmart uses simulated intelligence to further develop its security posture and protect its customers and employees from cyberattacks.**<sup>10</sup>

### Generative AI systems-Grinch Bots.

- Finding patterns and making sense of the trillions of pieces of data generated each year.
- Blocking hundreds of millions of potential attacks annually.
- Allowing analysts to hunt for specific factors that might indicate suspicious cyber activity.



## 5. Customer Relationship Management Systems

Businesses incorporate AI into their CRM platforms to improve communication with clients, rendering it more personalized and persuasive. The return on investment for integrating AI in CRM is also already established for firms regardless of their size, estimated at 245%.<sup>11</sup>

Based on customer segmentation and spending habits, well-integrated AI-powered CRM systems assist businesses in executing smarter marketing campaigns, while AI's predictive analytics also improves companies' direct interactions with customers via customer service, ultimately boosting client retention and capitalizing on leads.



### Example

**With the rewards program that Starbucks launched, the company started using a cloud-based AI engine to customize experiences and enhance customer overall experiences.<sup>12</sup>**

### AI Analytics

Helping to better predict what customers may be in the mood for by considering such factors such as weather, location, and user preferences.



# AI in MENA

Digital transformation and AI sit center stage for the MENA region, yet progress towards inclusion is primarily led by GCC economies.

A fundamental step in unlocking the potential of AI and ensuring it serves businesses and people alike is to make it inclusive.<sup>13</sup> In this regard, the MENA region is not a homogenous group.<sup>14</sup> Rich economies in the GCC with ample fiscal capacity, like Saudi Arabia and Qatar, have invested in Information and Communications Technology (ICT) to make internet use and subscription more affordable and accessible to different demographic groups. While middle and lower-income MENA countries still face persistent constraints like undeveloped infrastructure, large population groups vulnerable to digital illiteracy, and outdated regulations.

In parallel, AI technology is advancing in MENA's list of priorities, with its growth in the region (45%) outpacing the global average.<sup>15</sup> Unlike some developed economies where the AI agenda is driven by the private sector, in the MENA region governments are driving the

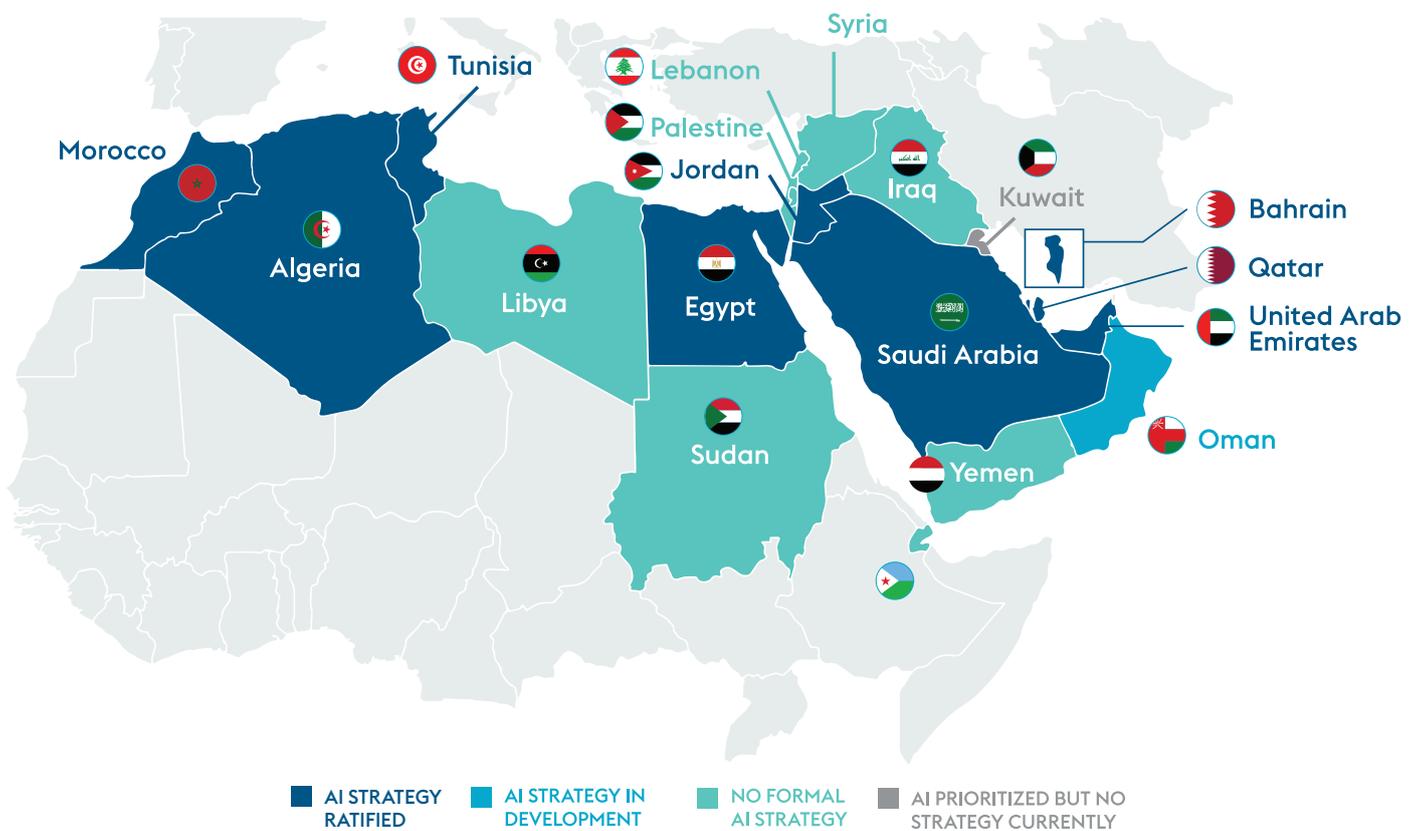
momentum to advance an AI policy that is aligned with best practices. According to recent global rankings of government AI strategies, Saudi Arabia ranks first in terms of most capable AI strategy, ahead of the United States and China, while Egypt ranks 23<sup>rd</sup> and UAE 24<sup>th</sup>, among 62 countries.<sup>16</sup>

This section reviews the landscape of AI adoption in MENA countries to identify the development status of each country's national AI strategy, AI's growth prospects, and the sectors integrating AI. More specifically, the section is structured as follows:

- 1. Benchmark of AI strategies**
- 2. AI's market potential and economic value**
- 3. The sectors adopting AI**

# Benchmark of AI strategies

The policy environment for AI in MENA is maturing, championing nine national AI strategies in the region.



## MENA countries with an AI strategy





Saudi Arabia

### National Strategy for Data & AI<sup>17</sup>

- Launch AI and data-related initiatives & events
- Implement national multi-tier data & AI workforce certification program.
- Activate regulatory frameworks for data & AI activities & incentive schemes to attract data & AI companies & talents.
- Build targeted funds & investor support programs to attract & guide domestic/foreign investments in data & AI.



UAE

### The UAE National Strategy for Artificial Intelligence 2031<sup>18</sup>

- Build a reputation as an AI destination.
- Increase the UAE's competitive assets in priority sectors through the deployment of AI.
- Develop a fertile ecosystem for AI.
- Adopt AI across customer services to improve lives and government.
- Attract and train talent for future jobs enabled by AI.
- Bring world-leading research capability to work with target industries. Become a test bed for AI.
- Ensure strong governance and effective regulation.



Qatar

### Qatar's National AI Strategy<sup>19</sup>

- Developing data governance rules and guidelines that facilitate broad access and sharing of data.
- Aiming for AI technology to have an impact on the future of employment and occupations in the coming years.
- Using AI to transform the economic and business landscape in Qatar.
- Making AI education an integral part of the curriculum at all educational levels in all disciplines.
- Increasing pervasiveness of AI in Qatari personal lives and work, which poses many ethical and public policy questions.



Bahrain

### Strategy for Artificial Intelligence in Bahrain<sup>20</sup>

- Building a strong AI ecosystem that fosters innovation through emerging technologies across Bahraini society.
- Fostering AI-driven innovation through global partnerships and attracting global talent.
- Embedding new and emerging technologies within the government.
- Encouraging economic growth in the Kingdom via leveraging the potential of the Cloud and Big Data.



Jordan

### Strategy for AI and its 2023-2027 implementation plan<sup>21</sup>

- Accelerate the social and economic development of citizens in key areas such as Health, Education, Social Protection, Employment and Well-Being
- Create a supportive and stimulating environment for establishing artificial intelligence systems at the national level.
- Develop human skills and raise the efficiency of education at all educational levels.



Egypt

### National Artificial Intelligence Strategy<sup>22</sup>

- Attain the country's sustainable development goals.
- Facilitate regional cooperation within the African and Arab regions.
- Establish Egypt as an active international player in AI.



Tunisia

### National Artificial Intelligence Strategy<sup>23</sup>

- Position Tunisia as a regional hub for AI research and innovation
- Focus on several areas, including research and development, and talent development.
- Promote AI startups and entrepreneurship.



Algeria

### National strategy on research and innovation in artificial intelligence<sup>24</sup>

- Improve Algerians' skills in AI through education, training, and research.
- Exploit the potential of AI as a development tool in key socio-economic sectors (e.g., education, health, transport, energy).



Morocco

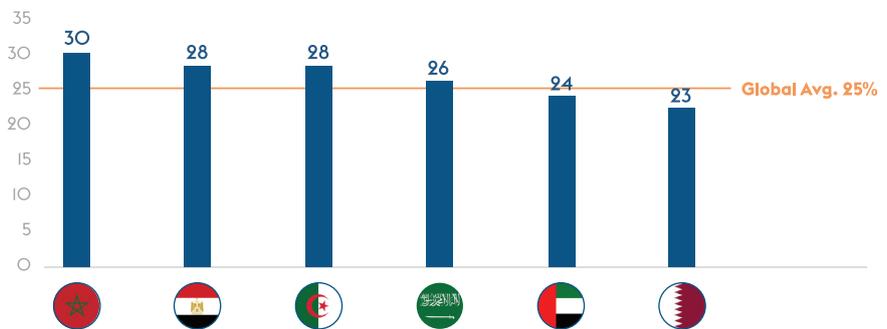
### Morocco's National AI strategy<sup>25</sup>

- Promote excellence in AI education and research.
- Partner with universities and industry to drive innovation.
- Build AI-enabled solutions and uphold the guiding principles of diversity and inclusion, stewardship and integrity, creativity, and innovation.

# AI Market Potential and Economic Value

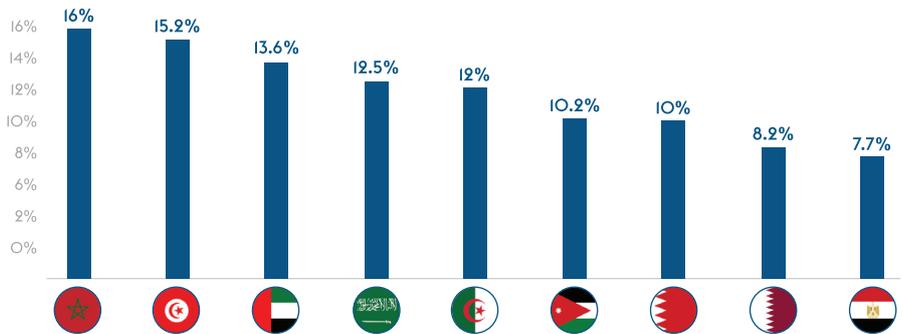
The MENA region is proving fertile for AI, representing \$320 billion of AI revenues by 2030 and growing at an annual rate of 45%.

Projected AI Annual Average Market Growth Rate from 2023 to 2030<sup>26</sup>



Egypt is projected to grow at an annual average of 28% from 2023 to 2030, on par with regional players. This is also higher than the projected global average of 25%.

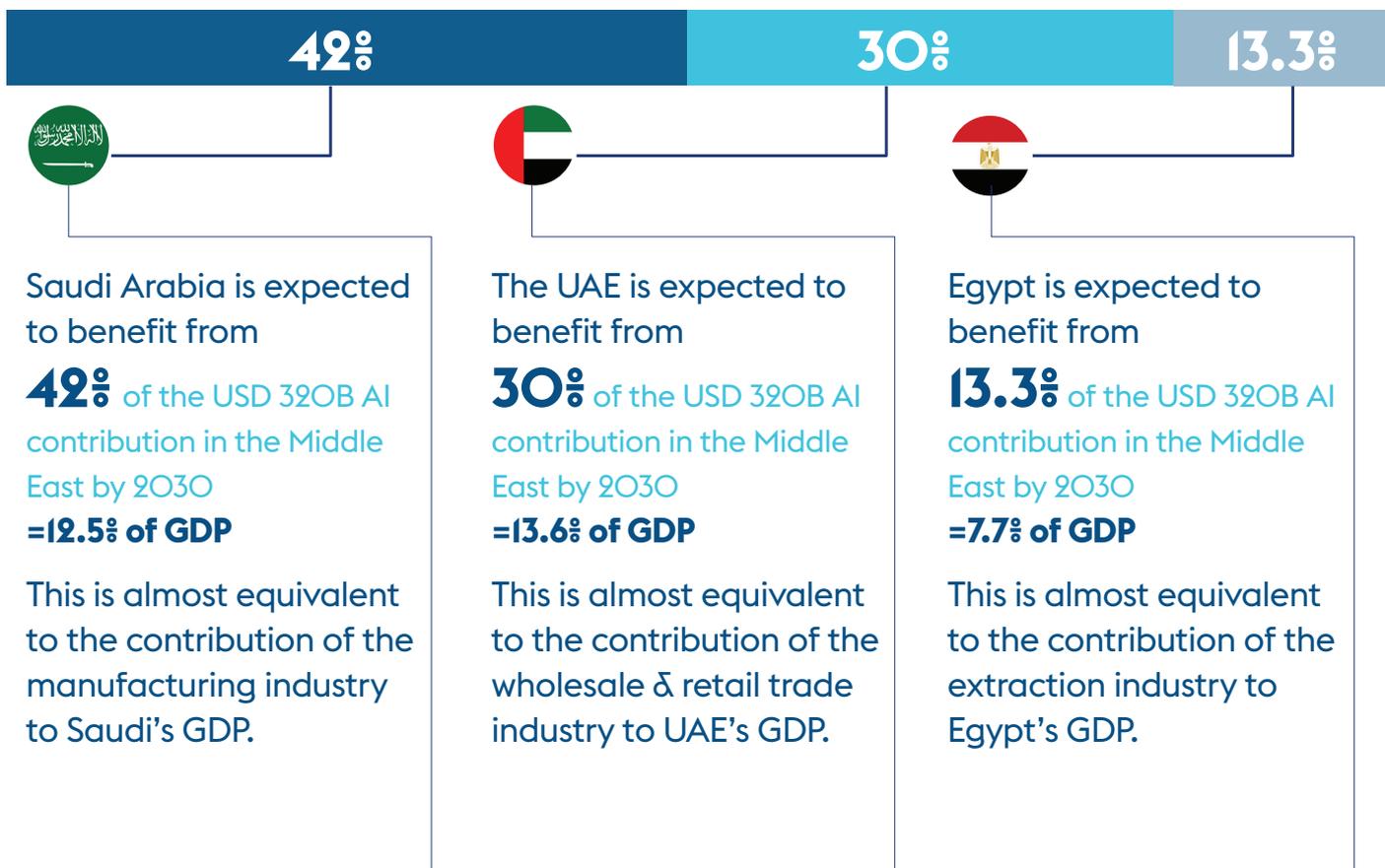
Projected AI Contribution to the Economy by 2030 (% of GDP)<sup>27</sup>



## MENA's contribution to overall AI revenue by 2030

**USD 320B**

Of which :



# Sectors Adopting AI



Saudi Arabia



## Finance & Banking

- Saudi Central Bank is utilizing AI into reducing fraudulent transactions by 70%.<sup>28</sup>



## Energy

- Saudi Aramco has been cutting the cost of well drilling by 15% by using AI in its operations.<sup>29</sup>
- SABIC is utilizing AI to enhance production.<sup>30</sup>



## Transport and logistics

- Aramex is utilizing AI and robots to enhance the quality of delivery and shipping in Saudi Arabia.<sup>31,32</sup>



## Retail and E Commerce

- Panda Retail Company has utilized artificial intelligence to assist in determining the pricing strategy for its extensive range of products available in nearly 200 supermarkets and hypermarkets.<sup>33</sup>



## Manufacturing

- The Saudi Ministry of Industry and Mineral Resources has inaugurated the AI Center for Manufacturing and Mining, in partnership with SDAIA, to leverage data and AI, aiming to transform the Kingdom into a global logistics hub and boost industrial growth and local content.<sup>34</sup>



## Government and public services

- AI has been also integrated with health services through governmental platforms like Saudi Health Information Exchange.<sup>35</sup>



## Education

- Saudi Arabia has used AI tools and applications to support remote teaching and learning.<sup>36</sup>

# Sectors Adopting AI



UAE



## Finance & Banking

- Emirates Islamic Bank, Emirates NBD and First Abu Dhabi Bank are leading providers of digital banking services by adopting more innovative applications of AI.<sup>37</sup>



## Energy

- AIQ, a joint venture company between ADNOC and Group 42, aims to develop and commercialize AI products and applications for the oil and gas industry.<sup>38</sup>



## Transport and logistics

- UAE's Autonomous Transportation Strategy aims to transform 25% of the transportation in Dubai to autonomous mode by 2030, using AI.<sup>39</sup>



## Retail and E Commerce

- Carrefour Dubai opened the first automated supermarket powered by artificial intelligence technology without cashiers.<sup>40</sup>



## Manufacturing

- Dubai Electricity and Water Authority started using 'iService', to detect service interruptions and initiate rectification procedures automatically, and enhance the efficiency of operations in Dubai's water network.<sup>41</sup>



## Government and public services

- Dubai Paperless Strategy acts as one of the promising initiatives which aim to eliminate paperwork by adopting AI-powered solutions for digital transactions and document verification.<sup>42</sup>



## Education

- Mohamed bin Zayed University of Artificial Intelligence, the world's first AI university, in Abu Dhabi in 2019, offers graduate-level programmes in AI and aims to create world leaders in AI by fostering research and innovation.<sup>43</sup>

# Sectors Adopting AI



Qatar



## Finance & Banking

- Commercial Bank of Qatar utilizes AI to improve customer relations, fraud detection, and risk management.<sup>44</sup>



## Energy

- Qatar Gas has partnered with engineers at Texas A&M University's campus in Qatar to use machine learning to detect underground leaks of carbon dioxide and other gasses and fluids related to oil and gas production.<sup>45</sup>



## Transport and logistics

- The Qatar Mobility Innovations Center works with the government in Qatar to develop smart mobility solutions using technologies such as AI.<sup>46</sup>



## Retail and E Commerce

- Lulu Hypermarket, in one of its Qatari branches, has been using AI to improve its inventory management, pricing, and customer service.<sup>47</sup>



## Manufacturing

- Qatar general electricity and water corporation launched a platform that is backed by AI technology to enhance the professionalism of operations and customer experience.<sup>48</sup>



## Government and public services

- Qatar's Ministry of Communications & Information Technology has collaborated with Microsoft to better address AI in developing advanced applications via Microsoft Azure.<sup>49</sup>



## Education

- Qatar's Ministry of Education & Higher Education has embarked on an initiative to develop a robust AI strategy, in a significant move towards integrating AI into the educational sector.<sup>50</sup>

# Sectors Adopting AI



## Finance & Banking

- Bank ABC initiated an ambitious digital transformation initiative aimed at enhancing customer experience, resulting in the creation of «Fatema» - the first emotionally intelligent AI-driven digital human assistant in the MENA region.<sup>51</sup>

## Energy

- Tatweer Petroleum developed the initial cloud-based big data platform by gathering information from various IoT platforms and utilizing them in machine learning to produce maintenance reports that forecast issues in advance. Additionally, Tatweer Petroleum utilizes AI technology to identify crude oil emulsions.<sup>52</sup>

## Transport and logistics

- The Bahrain Airport Company is employing artificial intelligence and blockchain technology to enhance its facilities, logistics, and cargo operations.<sup>53</sup>

## Manufacturing

- Aluminium Bahrain (Alba) is using AI & machine learning algorithms to drive sustainability and optimize their power plants' performance.<sup>54</sup>

## Government and public services

- The Bahraini Ministry of Interior is using machine learning algorithms to analyze social media data and identify potential threats. This is helping to prevent crime and keep people safe.<sup>55</sup>

## Education

- The Bahraini Ministry of Education is using AI to personalize learning. The ministry is using machine learning algorithms to analyze student data and identify each student's learning style.<sup>56</sup>

# Sectors Adopting AI



Jordan



## Finance & Banking

- “AhliGPT”, was introduced by Jordan Ahli Bank to integrate AI into its operations, improve the quality of provided services and provide its customers to get accurate answers to their problems and issues.<sup>57</sup>



## Energy

- The Ministry of Digital Economy and Entrepreneurship (MODEE) oversaw the signing ceremony for the contract to implement a project involving the utilization of artificial intelligence in the planning and operation system for electrical loads.<sup>58</sup>



## Manufacturing

- The Bannari Amman Institution has inaugurated an AI-Based Industrial Automation laboratory designed to equip both students and industry professionals with the advanced AI tools necessary for developing tailored solutions in industry 4.0, factory automation, and robotics.<sup>59</sup>



## Government and public services

- E-Government Jordan has made progress toward providing easy access for citizens to use such services that can be done without physical visits to government offices.<sup>60</sup>

# Sectors Adopting AI



Egypt



## Finance & Banking

- ADCB-Egypt is considered the first implementing bank of the AI-Powered Fraud Detection solution via SAS.<sup>61</sup>
- The National Bank of Egypt has also been using AI to detect frauds via tracking social media data to identify potential frauds.<sup>62</sup>



## Energy

- To obtain more insights, drive intelligent operations, and create a safer and more sustainable business, Egyptian Natural Gas Company has collaborated with software provider QSIT.<sup>63</sup>



## Transport and logistics

- The Egyptian Ministry of Transportation is working with several companies to develop self-driving cars. These cars could be used to improve traffic flow, reduce congestion, and make transportation more accessible to people with disabilities.<sup>64</sup>



## Retail and E Commerce

- Carrefour Egypt, one of the country's largest retailers, has employed a personalized recommendation engine that suggests products based on customers' browsing and purchase history.<sup>65</sup>



## Manufacturing

- Ezz Steel has been using AI to optimize its production processes, reduce costs, and improve quality. They also use AI to monitor their environmental impact and reduce emissions.<sup>66</sup>



## Government and public services

- Digital Egypt, is one of the main visions, laying the foundations for the transformation of Egypt into a digital society, which reflects the government's commitment to providing citizens with efficient, accessible, and user-friendly digital services.<sup>67</sup>



## Education

- Since 2019, Century Tech, an advanced machine learning platform, has been employed in Egypt to develop personalized learning paths for students, and it is currently operational in three Cairo schools: Cairo English School, the British International School of Cairo, and Kipling School.<sup>68</sup>

The background of the page features a large image of the Tunisian flag on the left and the ruins of the El Djem Roman Amphitheatre on the right. The flag is red with a white circle containing a red star and crescent. The ruins are made of stone and feature several arches. The sky is blue with some clouds. There are also decorative blue geometric shapes overlaid on the image.

## Sectors Adopting AI



Tunisia



### Finance & Banking

- The Ministry of Finance has applied AI and other innovation techniques to its public finance management information. The ministry also implemented an AI auditor within their accounting system to assist Tunisian taxpayers in advocating for their human rights, aiming to establish an accountable and transparent tax collection system.<sup>69</sup>



### Transport and logistics

- The Bus Software in Tunisia leverages AI to address incumbent issues such as manual ticketing, lack of real-time statistics and user information, and the absence of dynamic planning and management within Tunisia's public transport sector, aiming to offer optimal and reliable transport services to users.<sup>70</sup>



### Government and public services

- AI has played a crucial role in enhancing Tunisia's transportation infrastructure. Intelligent traffic management systems have been implemented to optimize traffic flow, reduce congestion, and improve road safety.<sup>71</sup>



### Education

- The digital school program "Solution Numerique Pour Tous", a Tunisian initiative, seeks to enhance the quality of education by promoting the use of digital tools in the learning process.<sup>72</sup>

# Sectors Adopting AI



Algeria



## Finance & Banking

- Contemporary methods such as machine learning, particularly the application of the Support Vector Machine (SVM) algorithm, have been utilized to forecast the favorable progression of the Algiers Stock Exchange with high accuracy.<sup>73</sup>



## Energy

- Sonatrach, the largest oil and gas company in Algeria and Africa, has initiated research into utilizing modeling, digital simulation, and artificial intelligence in the Oil & Gas field in collaboration with the University of Constantine.<sup>74</sup>



## Transport and logistics

- Air Algérie is using AI and digital maintenance to improve its flight operations, reducing downtime and predict passenger demand, which helps to optimize the scheduling of flights.<sup>75</sup>



## Retail and E Commerce

- Monoprix, a French supermarket chain that has been operating in Algeria since 2011, is using AI to provide personalized recommendations to shoppers, as well as to optimize inventory management and fraud detection.<sup>76</sup>



## Manufacturing

- Cevital, an Algerian conglomerate involved in a variety of industries, including manufacturing, agriculture & energy, is using AI to improve its manufacturing processes, as well as to develop new products.<sup>77</sup>



## Government and public services

- The Ministry of Post, Telecommunications, Technology, and Digitalization has launched a national strategy for digital transformation, which includes the development of AI-powered e-government services.<sup>78</sup>

# Sectors Adopting AI



Morocco



## Finance & Banking

- Attijariwafa Bank, one of the largest banks in Morocco, is using AI to improve its customer service, detect fraudulent transactions, and manage risk.<sup>79</sup>



## Transport and logistics

- CloudFret in Morocco employs Artificial Intelligence (AI) to identify vacant cargo vehicles moving from Europe to Africa, matching them with goods in need of transport, thus reducing wasted space on the trucks that commute between the two continents daily. In May, the company secured \$1 million in funding to support its expansion in African and European markets.<sup>80</sup>



## Government and public services

- Morocco's public administration has undergone a significant digital transformation, marked by the introduction of various applications and e-portals to simplify the process of obtaining necessary documents for administrative procedures and access to basic public services in key areas such as education, vocational training, and healthcare.<sup>81</sup>



## Education

- Using AI, MASSAR Platform data connects students and mentors together based on specific data sources (urban, satellites).<sup>82</sup>

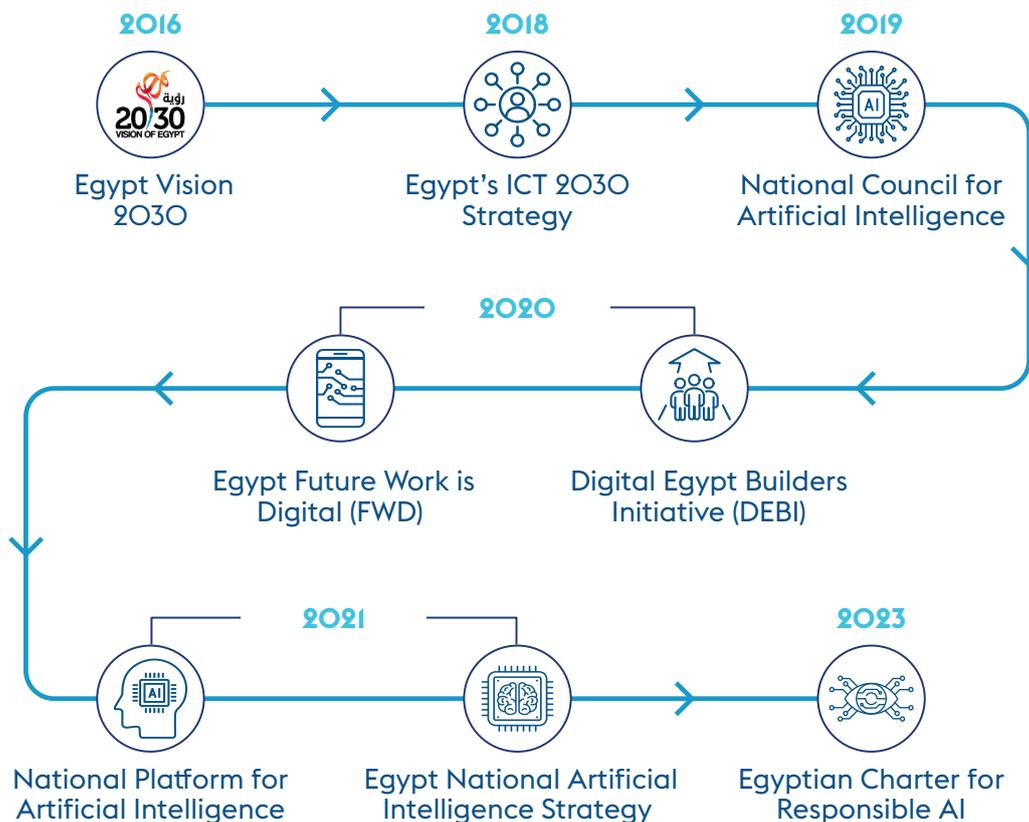
# Case study: AI in Egypt

The year 2019 marked a turning point for the AI market in Egypt. It was the year the Ministry of Communications and Information Technology (MCIT) began to draft a strategy to set the groundwork for the artificial intelligence sector in Egypt.

By 2023, according to the Government AI Readiness Index 2023, Egypt ranked first in North Africa, second in all of Africa (after Mauritius), 8th in MENA, and 62<sup>nd</sup> (out of 193 countries) supported by Egypt's focus and determination to implement its digital transformation plans by 2030.

The framework of Egypt's Vision 2030 (which was introduced in 2016 and has associated economic, social, and environmental dimensions), calls for making Egypt a global digital hub, growing the online community to increase the effectiveness and transparency of all institutions, and aiming for a Digital Creativity sub-index rank of 30 by 2030 on the Global Innovation Index (ranked 104 in 2022).

## A timeline of official agendas



## A timeline of official agendas

2016



Egypt Vision  
2030<sup>83</sup>

Egypt's Vision 2030 is based on «balanced regional development» and «comprehensive sustainable development.» Through principles of justice, social integration, and the participation of all people in political and social life, Egypt Vision 2030 focused on improving the quality of life of citizens.

2018



Egypt's  
ICT 2030  
Strategy<sup>84</sup>

Within the objectives of Egypt's Vision 2030, Egypt developed its ICT to boost digital transformation and build Digital Egypt. Egypt drafted its ICT 2030 strategy as the cornerstone for developing modern ICT infrastructure, building capabilities, and encouraging innovation.

The ICT sector currently contributes up to 5% to GDP, with Vision 2030 aiming to increase this contribution to 8%. As one of Egypt's double-digit growth sectors, the ICT sector averaged about 15% annual growth over the last five years, catalyzed by the pandemic, which increased demand for internet and digital services.

In 2021, the ICT sector also witnessed the launch of 65 new government services on the Digital Egypt Platform, the electronic litigation platform for the Economic Courts, and the launch of digital transformation services in the agriculture sector, in collaboration with the Ministry of Agriculture.

2019



National  
Council for  
Artificial  
Intelligence<sup>85</sup>

The Egyptian government established the National Council for Artificial Intelligence in 2019. The Council, which includes several AI specialists and organizations, is headed by MCIT.

**The Council's main responsibilities include:**

- Outline the National AI Strategy and establish follow-up procedures its implementation.
- Determine safe applications of AI for the country.
- Promote regional and worldwide collaboration in relation to the technological, legal, and economic framework of AI applications while also recommending national policies and suggestions.
- Examine international conventions and agreements pertaining to AI.
- Promote national-level skills and knowledge.

## A timeline of official agendas

2020



### Digital Egypt Builders Initiative (DEBI)<sup>86</sup>

In partnership with a number of foreign institutions that specialize in cutting-edge technologies and multinational businesses that specialize in ICT, MCIT established the Digital Egypt Builders Initiative (DEBI) in September 2020.

The project, which consists of a free scholarship, intends to increase human capital in highly technological fields and foster young people's inventive abilities. Additionally, it aims to yearly provide 1,000 university graduates with engineering and computer science majors with crucial training sessions in fields including data science, AI, cybersecurity, robotics, automation, and digital arts.

#### DEBI has three pillars:

- Digital Transformation
- Capacity Building
- Digital Innovation

2020



### Egypt Future Work is Digital (FWD)<sup>87</sup>

To improve Egypt's global IT competitiveness, MCIT revealed a capacity-building initiative titled "Egypt Future Work is Digital" (FWD) in December 2020, as a fully funded scholarship powered by the Information Technology Industry Development Agency and US-based tech and education consultancy Udacity.

The initiative focuses on several fields such as web applications, data science, and digital marketing and intends to teach and link 200,000 graduates with digital technologies, local market prospects, and remote working abilities. It offers comprehensive training programs that were created and delivered in association with leading IT firms and are accessible through Udacity.

2021



### Egypt National Artificial Intelligence Strategy<sup>88</sup>

Egypt's National AI Strategy was launched in 2021 by the National Council for Artificial Intelligence following the nation's sustainable development objectives. **The strategy is within the framework of the digital transformation plan to fulfill the following:**

- Integrate AI into government operations.
- Utilize AI in key development sectors.
- Create a thriving AI ecosystem and encourage Investments in AI.
- Create a hub for AI education, support lifelong AI learning and produce skilled labour.
- Capitalize on AI initiatives that promote human advancements.
- Facilitate cooperation on the Arab, African and global levels on different AI topics.

## A timeline of official agendas

2021



### The National Platform for AI<sup>89</sup>

Launched in 2021, the National Platform for AI serves as Egypt's official portal in the field of AI. The platform provides an opportunity for exchanging views and experiences among stakeholders; the government, public and private sectors; academia; and startups, on AI issues, especially those related to the opportunities enabled by such technology and the principles and ethics of its use.

#### The platform features:

- Egypt's National AI Strategy.
- Events, news, and details of projects in this field present in Egypt.
- Capacity-building programmes provided by various authorities.
- Egypt's key AI achievements.

2023



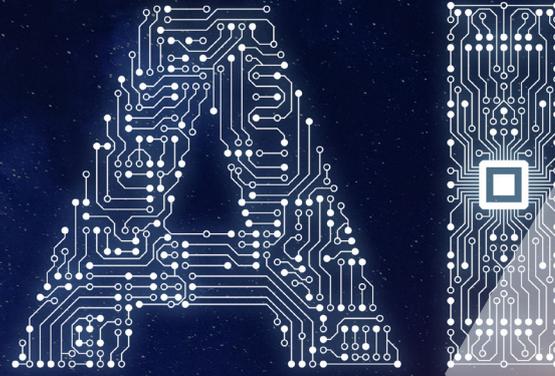
### Egyptian Charter for Responsible AI<sup>90</sup>

The National Council for AI launched a charter for the responsible use of AI. The Charter intends to raise Egypt's standing in metrics assessing the Government AI Readiness Index and to aid AI developers who want to operate in Egypt or promote their products there.

The Charter serves 5 core values: Human-Centeredness, Transparency and Explain-ability, Fairness, Accountability, and Security and Safety.

#### The Charter targets two main goals:

- To make it possible for individuals to learn about the legal frameworks for the responsible use of AI and for all parties involved to be aware of and include ethical issues relating to AI in their plans.
- To draw investments in this area by emphasizing Egypt's willingness to adhere to appropriate AI methods in all areas.



ARTIFICIAL INTELLIGENCE

# Progress of AI Strategy in Egypt

This section reviews Egypt's progress in implementing its AI strategy and provides global practices that can serve as lessons to build on. The section structures each pillar of the AI strategy below based on the AI technology being used, its purpose, and its adopting body.



## 1. AI for Government



### 2. AI for Development, including the following sectors:

- 2.1 Agriculture, Water Management and Environment
- 2.2 Healthcare
- 2.3 Manufacturing and Smart Infrastructure Management
- 2.4 Finance and Banking
- 2.5 Others (using AI for economic planning and Arabic Natural Language Processing)



### 3. Capacity Building: AI for Training



### 4. International Activities



# I. AI for Government

Egypt has been counting on AI to accelerate its governance quality and provide its citizens with accessible and digital public service delivery through e-government platforms.<sup>91</sup>

Technology	Adopting body	Details and purpose
Natural language processing (NLP)	Egypt's Government Services Portal <sup>92</sup>	Used for: <ul style="list-style-type: none"> <li>• Answering customer queries</li> <li>• Processing transactions</li> <li>• Detecting fraud</li> <li>• Providing recommendations</li> </ul>
Cloud computing and big data analytics		
Data Analytics	Digital Egypt e-platform (the platform is an important enabler of Egypt's digital transformation and would be automating different entities and government processes). <sup>93</sup>	<ul style="list-style-type: none"> <li>• Access more than 165 government services</li> </ul>
Computer vision		
Machine learning algorithms	Egyptian Postal Museum <sup>94</sup>	<ul style="list-style-type: none"> <li>• Launching a knowledge-mining application.</li> <li>• Launching virtual assistant application.</li> <li>• The application builds a Knowledge Index of the museum's Holdings derives information about each content facilitates the experience of museum visitors and identifies items and information.</li> </ul>

## Future Trends & Opportunities

- Agreements with other countries on AI-powered applications in different areas, and the adoption of best practices from other nations.
- New government initiatives and financing aimed at improving government performance, expanding e-services, lowering digital infrastructure costs, and ensuring system-wide integration.
- The launch of new digital government platforms, such as Digital Egypt e-platform and others, that can assist in the development of an AI-ready workforce.

## Challenges

- **Impact on Privacy:** The widespread use of these technologies has heightened concerns about privacy and data confidentiality, as surveillance cameras, smartphones, and the internet facilitate extensive data collection and monitoring of individuals, increasing the risk of compromising their privacy.
- **Exacerbating Income Inequality:** There is a growing global concern about the implications of shifting from human to AI labor on income and jobs, with Goldman Sachs estimating that over 300 million people in the US and EU could be replaced by AI.<sup>95</sup> In Egypt, concerns over AI replacing humans in the labor market are being discussed at a government level. In fact, a request was made by a member of the House of Representatives to the ministries of planning & economic development and manpower in June 2023 for plans that mitigate job losses due to AI integration.<sup>96</sup>

## Lessons Learned from Other Countries



### United States

Accelerating the adoption of AI in government, the General Service Administration (GSA) launched the AI Center of Excellence in September 2019, along with the AI Community of Practice soon thereafter. The AI Center of Excellence was later codified into law by the AI in Government Act of 2020.<sup>97</sup> These efforts are supporting and coordinating the use of AI in Federal agencies, helping to deploy scalable solutions, and facilitating the sharing of best practices and tools for AI adoption.

Technology	Adopting body	Details and purpose
Intelligent traffic management systems <sup>98</sup>	Department of Transportation	<ul style="list-style-type: none"> <li>• Used to analyze traffic data to improve traffic flow and prevent accidents, as well as predict traffic congestion and provide real-time routing instructions to drivers.</li> </ul>
Project Maven <sup>99</sup>	The Department of Defense	<ul style="list-style-type: none"> <li>• Using reinforcement learning and artificial general intelligence to develop autonomous weapons systems and to analyze intelligence data.</li> </ul>
BurnPro 3D <sup>100</sup>	The WiFire Lab in California	<ul style="list-style-type: none"> <li>• It uses real-time data to predict the spread of the fire, allowing firefighters to prioritize their efforts and adjust their strategies in real time.</li> </ul>



## 2. AI for Development

The sectors prioritized in the Egypt AI strategy within AI for Development include:



Agriculture, Water Management and Environment



Healthcare



Manufacturing and Smart Infrastructure Management



Finance and Banking



Arabic Natural Language Processing



### Agriculture, Water Management and Environment

The use of AI in Egypt’s agriculture sector has the potential to revolutionize the way farmers grow crops. By using AI to analyze data on soil quality, weather patterns, and crop growth, farmers can optimize crop yield, reduce waste, and promote sustainability. While there are still challenges to overcome, such as the high cost of technology and the need for training and education, AI in agriculture has the potential to help Egypt reach its food security goal.<sup>[O1]</sup>

Technology	Adopting body	Details and purpose
Natural language processing (NLP)	ICT Ministry and Agriculture Ministry (which invented the “Hudhud” application using these technologies). <sup>[O2]</sup>	<ul style="list-style-type: none"> <li>• Creating more effective communication with farmers through providing digital guidance on topics of interest to farmers and small-holders, facilitating their access to advice and proper guidance</li> <li>• The “Hudhud” application is one of the AI applications, which emphasize Egypt’s determination to develop its agriculture sector via integrating AI applications and technologies.</li> </ul>
Machine learning		
Big data analytics	Smart Farmers’ Card Service <sup>[O3]</sup>	<ul style="list-style-type: none"> <li>• Recording information about farmers, their land, and their crops.</li> <li>• Collecting and analysing large amounts of data about agriculture in Egypt.</li> </ul>

## Future Trends & Opportunities

- Partnerships with global companies to implement AI solutions in Egypt’s agricultural sector.
- Linking the Smart Farmers’ Card Service with the Meeza payment system to allow farmers to make agricultural purchases.
- Pilot projects to use AI in different areas, including agricultural inventory, as well as to help farmers with weather forecasting and boosting the rationalization of irrigation water consumption.
- Setting up a joint laboratory for smart agriculture to enhance Egypt’s agriculture sector.
- National initiative for smart green projects, which aims toward attaining sustainable and smart development and addressing the environmental dimension and effects of climate change.

## Challenges

- Lack of awareness of the benefits of digital tools. At present, many farmers do not understand how the introduction of new technologies will benefit them, and as such, further training will be helpful in encouraging farmers to utilize new tools.
- AI applications often require high-performance computing and storage capabilities to process and store large amounts of data and due to the lack of access to electricity and the internet in some rural areas of Egypt, relying on AI technology may require some time to be applied in agriculture.
- Some farmers in Egypt may be hesitant to adopt AI technology, due to concerns about its cost, complexity, or reliability.

## Lessons Learned from Other Countries



### China

China is the world’s leading user of AI in agriculture. The Chinese government has been investing heavily in AI for agriculture, and the country is now home to several leading AI companies in the agricultural sector.

Technology	Adopting body	Details and purpose
MAP Beside traceability system	The Modern Agriculture Platform (developed by China’s largest agriculture input enterprise Sinochem) <sup>104</sup>	<ul style="list-style-type: none"> <li>• The system provides tailored seed suggestions before the planting season, and weather forecasts with a focused accuracy of one square kilometer to help with sowing, spraying, watering, and harvesting.</li> </ul>
Remote sensing & drone-assisted agricultural insurance <sup>105</sup>	Ministry of Science and Technology - The Science and Technology Department	<ul style="list-style-type: none"> <li>• A classification and extraction insurance software was deployed for local specialty crops Goji, melon, grape, and jujube. The remote sensing information model was developed by studying the relationship between the hyperspectral data of plants and domestic high-grade satellite images. The support vector machine-based classification methods use disaster distribution surveys and other data as a basis for risk assessment and premium determination. The technique can reduce insurance investigation costs and streamline the claims process.</li> </ul>



## 2. AI for Development



### Healthcare

Egypt is following suit amid the protracted pandemic and its evolving healthcare system. As indicated by the CIT ministry in Egypt, several health-tech startups started to focus on facilitating bookings for patients via booking apps and other virtual diagnosis technologies.

Technology	Adopting body	Details and purpose
Image recognition	Faculty of Medicine Kasr Al Ainy <sup>106</sup>	<ul style="list-style-type: none"> <li>Surgical robots perform precision operations and surgeries.</li> <li>More than 50 surgeries were performed using the robot in the specialties of urology, gynecology, surgery, interventional radiology devices for blood vessels and diagnostic and therapeutic endoscopy devices.</li> </ul>
Path planning		
GPS technology	Health-tech startups (Chefaa) <sup>107</sup>	<ul style="list-style-type: none"> <li>Helping patients have safe and sustained access to their recurring pharmacy needs.</li> <li>Managing chronic patients' monthly prescriptions.</li> </ul>
Machine learning		
Natural language processing	Health-tech startups (Vezeeta) <sup>108</sup>	<ul style="list-style-type: none"> <li>To create chatbots and use them to help answer patients' questions about healthcare.</li> <li>Matching patients with doctors who are the best fit for their needs, based on factors such as the patient's medical history, symptoms, and location.</li> </ul>
AI-powered algorithm		
Deep learning	Health-tech startups (DilenyTech) <sup>109</sup>	<ul style="list-style-type: none"> <li>Detecting breast cancer with greater accuracy than human radiologists.</li> </ul>

## Future Trends & Opportunities

- New networks like Health 2.0 Egypt whose purpose is to connect digital health stakeholders with both the local and global innovation community.
- Developing a new health insurance IT system.
- Launch of the first phase of the university hospitals' system in Egypt, which aims to automate healthcare processes and create integrated medical files for all citizens receiving care from the university hospitals.
- Launching applications for the care of atopic dermatitis patients' «eczema» Atopic Dermatitis and providing remote medical consultations powered by AI.

## Challenges

- Lack of infrastructure, digital literacy and lack of high-quality health data in Egypt.
- The need for clear regulations and standards for the use of AI and Chatbots in healthcare.
- Lack of communication among different segments of healthcare in Egypt. Such as in the case of person-centered EHRs, patients have limited access to their electronic medical records (EMRs) within each sector of a health system.

## Lessons Learned from Other Countries



UK

By 2023, the UK Government has already invested £123m into 86 AI healthcare technologies to optimize cancer screening, cardiovascular screening, stroke diagnosis, and monitoring conditions at home. AI healthcare is currently enhancing patient outcomes while decreasing tedious tasks for NHS workers.<sup>110</sup>

The NHS AI Lab in the UK was created to simulate an environment for collaboration and co-creation by bringing together programs that address the barriers to developing and deploying AI systems in health and care. This will unlock the potential of AI to revolutionize healthcare, whilst ensuring we can determine the right guidance and regulations to protect patients.

Technology	Adopting body	Details and purpose
AI algorithms and ML	The Royal Free London NHS Foundation Trust <sup>111</sup>	Using AI and optical coherence tomography to develop a new system for predicting heart attacks. The system uses data from electronic health records and wearable devices to identify patients who are at risk of a heart attack.
AI algorithms and ML	The University of Oxford <sup>112</sup>	Using AI to develop a new system for diagnosing cancer. The system uses deep learning algorithms to analyze medical images, such as mammograms and MRI scans, to identify potential signs of cancer. The system is still in development, but it has the potential to improve the accuracy of cancer diagnosis.
AI and ML	Drug discovery companies (Exscientia) <sup>113</sup>	Using AI and machine learning to design new drugs that are more likely to be effective and have fewer side effects than traditional drugs.
Robotics	HCA healthcare UK <sup>114</sup>	The da Vinci Surgical System is a robotic surgical system that is used to perform a variety of procedures with greater precision and accuracy than traditional surgery.



## 2. AI for Development



### Manufacturing & Smart Infrastructure Management

Aligned with Egypt's industrialization vision, manufacturing companies in Egypt started to utilize AI and automation procedures in their operations to increase efficiency, as Egypt is committed to adopting and harnessing Industry 4.0 technologies to develop the country as a sustainable technologically industrialized hub.

Technology	Adopting body	Details and purpose
Robotic Process Automation (RPA)	GB Auto <sup>15</sup>	<p>This helps to:</p> <ul style="list-style-type: none"> <li>• Optimize resource use.</li> <li>• Enhance accuracy.</li> <li>• Increase productivity.</li> <li>• Boost scalability.</li> <li>• Automate responses &amp; triggers.</li> </ul>
Plant control systems and process gas analytics solutions	Beni Suef Cement <sup>16</sup>	<ul style="list-style-type: none"> <li>• Optimizing production process to increase significant savings.</li> <li>• Reducing the Total-Cost-of- Ownership (TCO)</li> <li>• Increasing cement output</li> <li>• Improving operational flexibility.</li> </ul>
Industrial cloud tech for data analytics	Ezz Dekheila Steel <sup>17</sup>	<ul style="list-style-type: none"> <li>• Preventing asset failures.</li> <li>• Improving reliability at the lowest sustainable cost.</li> <li>• Reducing operating risk.</li> </ul>

## Future Trends & Opportunities

- New 1st Industry 4.0 Innovation Center to be established in Egypt in the Knowledge City at the New Administrative Capital.
- «Industry 4.0 Implementation program», which involves transforming traditional mechanisms and common practices of manufacturing electronics and home appliances to industry 4.0 techniques under «Egypt Makes Electronics»-EME Initiative in cooperation with world-class Industry 4.0 service provider «Fraunhofer IPK Germany».
- CIT launches «ManuTech Egypt» initiative for stimulating the development of Manufacturing Technology in Egypt, encouraging research and development, and supporting startups to develop innovative digital solutions for all sectors of the state, including the manufacturing sector.

## Challenges

- Automation equipment has a hefty price tag: Many companies tend to rely on labourers as this won't cost the same as automation equipment and enabling machines.
- Lack of digitally skilled labour, which incorporates the level of education that Egypt lacks in AI.
- The need to foster collaboration and coordination among different actors. Industry 4.0 requires the involvement and cooperation of various actors in the ecosystem, such as the government, private sector, academia, civil society, and international organizations.

## Lessons Learned from Other Countries



### Germany

Germany is widely recognized as a pioneer in the implementation of Industry 4.0, as one of the key factors that have made Germany a leader in Industry 4.0 is its strong manufacturing base. The German government has also played a critical role in the development of Industry 4.0, providing significant funding for research and development, as well as establishing partnerships between industry and academia. For example, the German Federal Ministry for Economic Affairs and Energy has invested more than EUR 200M in Industry 4.0 research projects since 2015.

Technology	Adopting body	Details and purpose
Vibration diagnostics	Manufacturing companies (Siemens) <sup>118</sup>	AI is being used to predict when machines are likely to fail. This allows manufacturers to take preventive action and avoid costly downtime. For example, Siemens is using vibration diagnostics to predict when wind turbines are likely to fail, which allows Siemens to send technicians to repair the turbines before they fail besides saving the company millions of euros each year.
Machine vision AI	Manufacturing companies (Bosch) <sup>119</sup>	AI is being used to automate quality control checks. This frees up human workers to focus on other tasks, such as problem-solving and innovation. For example, Bosch is using machine vision AI to automate quality control checks on car parts. This has allowed Bosch to increase the accuracy of its quality checks and reduce the number of defects.
Virtual models	Manufacturing companies (Siemens) <sup>120</sup>	AI is being used to create virtual models of manufacturing processes. This allows manufacturers to test and optimize their processes before they are implemented in real life. For example, BMW is using NVIDIA Isaac to create virtual models of its car assembly lines. This allows BMW to test new assembly methods and identify potential problems before they cause delays or defects.



## 2. AI for Development



### Finance and Banking – FinTech Focus

With more than 70% of the population still to have formal financial accounts, 22.4% of SMEs have access to financing and with the rise in mobile wallets and payments, AI provides an unprecedented opportunity to expedite financial inclusion for both businesses and individuals.

Technology	Adopting body	Details and purpose
AI-driven secure digital identification and authentication technology	Valify KYC solutions <sup>121</sup>	<ul style="list-style-type: none"> <li>• Biometric authentication</li> <li>• Digital user onboarding</li> <li>• Detecting fraud / AML compliance</li> <li>• Building digital identities for several industries</li> </ul>
Face verification and liveness detection		
Data extraction & document verification		
AI algorithms and ML	Cassbana (FinTech Startup) <sup>122</sup>	<ul style="list-style-type: none"> <li>• Providing credit scoring to the unbanked population</li> <li>• Detecting fraud</li> <li>• Provide credit scores and build financial identities for users</li> </ul>
	Thndr, digital investment brokerage <sup>123</sup>	<ul style="list-style-type: none"> <li>• Processing transactions</li> <li>• Providing data and analytics based on consumer behaviour</li> <li>• Detecting fraud</li> <li>• Stock ranking scores</li> <li>• Sentiment analysis, which can be used for social, news, or SEC filings.</li> <li>• ML-based return estimates</li> </ul>
	Government initiatives (Central Bank of Egypt)	<ul style="list-style-type: none"> <li>• Providing digital identities for increased financial inclusion</li> <li>• Biometric authentication</li> <li>• Digital user onboarding</li> <li>• Detecting fraud / AML compliance</li> </ul>



## Future Trends & Opportunities

- Blockchain
- Open banking
- Cybersecurity
- Regulatory technology (regtech)
- Neobanks



## Challenges

- Regulators and industry leaders must focus on proactively developing talents and acquiring systems to maintain our competitive edge within the region.
- Financial data is swiftly becoming more openly accessible around the world. Open sharing may soon become the norm as more and more initiatives, such as the U.K.'s Open Banking initiative and the European Union's modified payment services regulations (PSD2), lay down standards for rapid, open sharing to take place at scale.
- Cutting-edge technologies alone will not be sufficient to have an AI-powered capital market. Therefore, investing in tech talents and educating the capital markets workforce is key to adopting AI technologies.



## Lessons Learned from Other Countries



### South Korea

Under the Korean government's new policy framework for digital banks, K Bank and Kakao Bank successfully launched in 2017 with convenient and innovative products and services and brought a substantial impact on Korea's banking sector.<sup>124</sup>

With their businesses growing at a fast pace, these banks sought to increase their capital accordingly but encountered unforeseen regulatory issues on bank ownership which required new legislation and regulatory efforts to get resolved. After the first three years of operation, as of July 2020, the two banks show contrasting track records, mainly explained by differing challenges and successes in capital.



## 2. AI for Development



### Arabic Natural Language Processing (NLP)

In Egypt, in 2020, MCIT and the English company «Instadeep» signed a memorandum of understanding for the implementation of a joint project to develop an NLP platform using AI to enable the development of applications in standard Arabic and different dialects at the text or speech level and promote maximum utilization of the supercomputing infrastructure in Egypt, human capacity building and skills development.



### Lessons Learned from Other Countries

Country/Region	AI Use for Arabic NLP
 UAE	UAE has launched the National Artificial Intelligence Strategy 2031, which aims to position the UAE as a global leader in AI by 2031. One of the initiatives under this strategy is the development of NOOR, the world's largest Arabic NLP model, with 10 billion parameters. NOOR was created by the Technology Innovation Institute, an Abu Dhabi-based research center, in collaboration with LightOn, a Paris-based technology company. NOOR can perform various tasks such as text summarization, chatbot development, and language assessment. <sup>125</sup>
 Qatar	Carnegie Mellon University in Qatar has an NLP lab that works on problems related to multilingual processing and machine translation with a special focus on improving Arabic language technology and language learning. The lab has participated in several projects funded by Qatar National Research Fund, such as AQMAR, QALB, SmartReader, and Wiki TEA. <sup>126</sup>



### 3. AI for Human Capacity Building

The use of adaptive learning software, which incorporates basic AI tech has grown steadily in recent years. In Egypt, it has become a standard supplementary teaching aid for international schools, with programs used for homework, or to help drill in fact-based information.

Technology	Adopting body	Details and purpose
Machine learning Platforms	<ul style="list-style-type: none"><li>• Cairo English School (CES)</li></ul>	<ul style="list-style-type: none"><li>• Used for building personalized learning paths for learners.</li><li>• These machine learning platforms are generated by AI company 'Century Tech' which started to work in Egypt in 2019.</li></ul>
Adaptive learning software	<ul style="list-style-type: none"><li>• The British International School of Cairo (BISC)</li><li>• Kipling School</li></ul>	
Natural language processing	AI Adwaa app <sup>127</sup>	<ul style="list-style-type: none"><li>• AI adwaa app is a promising example of how AI can be used to improve education. It has the potential to help students to learn more effectively and efficiently by providing them with access to information and resources that are tailored to their individual needs.</li></ul>



## 3. AI for Human Capacity Building



### Future Trends & Opportunities

- The Artificial Intelligence Professional Programme (AI Pro) is a nine-month postgraduate professional training program in ML and AI, which offers a distinctive learning experience with the ideal balance between theoretical foundations and practical tools and applications, enabling a sizable number of job opportunities in the quickly expanding technology field. The French EPITA School of Engineering and Computer Science has collaborated on the development of the program.
- The Ministry of Communications and Information Technology (MCIT) signed an agreement with Amazon Web Services (AWS) to design and launch a training program for 500 employees at Small and Medium-sized Enterprises (SMEs), in AI and ML, utilizing cloud computing.
- An AI hackathon was organized for students and graduates in cooperation with Dell Technologies with the aim of contributing to reducing carbon dioxide emissions from vehicle exhausts using the creative ideas of young people.
- A program has been implemented to prepare academic cadres in five Egyptian universities to enable them to teach subjects related to artificial intelligence in cooperation with Dell.



### Challenges

- Lack of technical expertise: Many teachers and administrators in Egypt may not have the technical expertise to use AI-powered tools and applications in the classroom. This will require training and support from experts in AI and education.
- AI-powered tools and applications can be expensive: There may be a need for government subsidies or other financial assistance to make AI more affordable.
- Acceptance by teachers and parents: Some teachers and parents may be hesitant to adopt AI in education, due to concerns about its impact on jobs and the quality of education. It will be important to address these concerns and build trust in AI among teachers and parents.



### 3. AI for Human Capacity Building

☐ —  
☑ —  
☑ — **Lessons Learned from Other Countries**



**China**

China is implementing AI technologies into its education and training, as part of the Chinese government’s plan to make China a global leader in AI by 2030.

Technology	Adopting body	Details and purpose
AI-powered cameras and software	The Jinhua Xiaoshun Primary School in eastern China. <sup>128</sup>	AI-powered cameras and software are used to monitor student behaviour and attendance. The cameras use facial recognition and behavioral analysis techniques to identify individual students and track their movements in real-time during the whole learning process.
AI-powered personalized learning programs	<ul style="list-style-type: none"><li>• Online platform 17zuoye (uses AI algorithms to streamline the homework distribution and grading process).<sup>129</sup></li><li>• Liulishuo (an English-language learning app like Duolingo, offers an intelligent tutor equipped with real-time personalized feedback systems).</li><li>• Squirrel AI (combines physical and digital schooling, where students can learn remotely online or go to one of the company’s bricks-and-mortar learning centers).<sup>130</sup></li></ul>	Based on each student’s strengths and shortcomings, these programs use algorithms to analyze student performance and develop personalized learning strategies. This enables teachers to customize their lesson plans for every student.



## 4. AI for International Activities

In fostering cooperation on the regional and international levels, Egypt has developed multiple AI partnerships, including:

- An MoU between Egypt's MCIT and Thales, a French leading company specializing in advanced technological solutions. The MoU is for cooperation in developing AI-powered applications in different areas, building capacity and promoting innovation and research in AI.
- Egypt participated in intergovernmental expert meetings to discuss a draft recommendation on the ethics of artificial intelligence, as well as the 41st UNESCO general conference, at which the recommendation on the ethics of artificial intelligence was adopted.
- Partnership with Microsoft to implement artificial intelligence solutions in the country's agricultural sector under the global initiative - Microsoft 'AI for Good'.
- In 2021, the Egyptian and Chinese scientific research institutions signed a memorandum of understanding to establish a joint laboratory for smart agriculture to enhance Egypt's agriculture sector.
- The Ministry of Health in Egypt is in talks with Cisco to discuss means of applying AI technology in the healthcare system.
- Egypt Healthcare Authority is seeking cooperation with Huawei Technologies to develop its digital transformation and strengthen its cyber security.
- The Egyptian government is pushing for universal healthcare and cross-industry collaborations, as well as boosting digitization across sectors. This is demonstrated by the recent agreement signed with British telecom operator Vodafone. Vodafone secured a £100M contract to assist Egypt in developing a new health insurance IT system modelled after the UK's National Health Service.
- Since 2019, Egypt and Germany started cooperating on developing Egypt industrial sector in terms of automation and AI adoptions in various industrial sections.

# Insights from Companies

In August 2023, Strategic Gears interviewed two companies in Egypt to get on-the-ground experiences on the adoption of AI. The interviews followed a structured format and aimed to unpack companies' perceptions of the benefits and challenges of the integration of AI in the country.



## Interview with Synapse Analytics



**About Synapse Analytics:** Synapse Analytics is an AI and data science company that offers products to help organizations better use and monetize their data.

### AI adoption opportunities

AI can be used across every tech-enabled industry. A few years ago, the greatest opportunity for AI adoption in Egypt would be where the most data are found. Today, after the prevalence of LLMs and commoditization of pre-trained models, the focus is shifting towards impact.

### The sectors typically enabled

1. Healthcare
2. Manufacturing
3. Financial Services
4. Automotive
5. FMCG

### Specific AI solutions that the company has developed

1. **Healthcare:** Preventive diagnostic models
2. **Manufacturing:** Gas consumption optimization models
3. **Financial services:** Credit scoring
4. **FMCGs:** Supply Chain Network Design

### Challenges in adopting AI

1. Lack of data or signal to build models
2. Lack of confidence in models' ability to make decisions
3. Navigating threat of replacing personnel within the organization
4. Changing existing processes to leverage technology
5. Scaling the infrastructure and continuous monitoring

### Benefits for companies when they adopt AI

1. Less reliance on personnel to perform certain tasks.
2. Scalability
3. Removing biases in decisions.
4. Efficiency gains

### Example:

**AI credit scoring reduced non-performing loans by 40%.**

## Interview with Remotera



**About Remotera:** A startup company specializing in smart home technology and Internet of Things (IoT) solutions in Egypt.

### **The promise of AI in the smart home sector**

1. Optimizing energy consumption by analyzing usage patterns, adjusting settings based on occupancy, and suggesting energy-efficient practices.
2. Enabling voice commands for controlling devices.
3. Enhancing home security by analyzing video feeds, detecting anomalies, and providing real-time alerts for potential threats or unauthorized access.
4. Anticipating the needs of residents in smart homes based on analysis of habits over time.

### **Factors needed to drive wider AI adoption**

1. Continued advancements in AI algorithms, machine learning techniques, and natural language processing.
2. The proliferation of IoT devices and their connectivity capabilities.
3. The availability of high-quality data, including sensor data, user behavior patterns, and environmental factors.
4. Establishing industry standards and protocols for interoperability among different smart home devices and platforms.

### **Success and improvement areas for AI in the smart home sector**

#### **o Success:**

1. Enhanced energy efficiency
2. Personalized user experience
3. Predictative maintenance for home appliances

#### **o Improvement areas:**

1. Data protection and security
2. Infrastructure and connectivity
3. Interoperability across devices
4. Affordability
5. User acceptance and training

# Moving forward: Lessons for Egypt



Sector	Purpose	Lesson Learned from
Government	Enhancing government services e-platforms.	<b>US:</b> <ul style="list-style-type: none"> <li>Supporting and coordinating the use of AI in Federal agencies.</li> <li>Developing defence projects, ex (Project Maven).</li> <li>Predicting natural disasters by incorporating AI labs and performing real time data analysis.</li> </ul>
Agriculture, Water Management & Environment	Provide support to farmers, collect and store data on the sector, and remotely operate land irrigation machines.	<b>China:</b> <ul style="list-style-type: none"> <li>Developing AI forecasting models to provide suggestions based on weather and other geographical factors.</li> <li>Remote sensing information's models and drones' projects.</li> </ul>
Healthcare	Used by health-tech startups and academia to perform surgical procedures, improve medical prescription access, and enhance patients' access to healthcare professionals	<b>UK:</b> <ul style="list-style-type: none"> <li>Healthcare AI Labs</li> <li>Pharmaceutical manufacturing using AI.</li> <li>Robotic Surgical Systems by incorporating ML and AI.</li> </ul>

## Moving forward: Lessons for Egypt

Sector	Purpose	Lesson Learned from
Manufacturing & Smart Infrastructure Management	Optimize production processes	<b>Germany:</b> <ul style="list-style-type: none"> <li>• AI Vibration diagnostics on Machines and turbines.</li> <li>• Automating quality control checks via Machine Vision AI.</li> <li>• Manufacturing Virtual Models designed by AI.</li> </ul>
Finance & Banking (Fintech Focus)	Enhance financial inclusion for both businesses and individuals.	<b>South Korea:</b> <ul style="list-style-type: none"> <li>• Formulating AI policy framework for digital banks.</li> </ul>
Training (Education)	Elevate teaching techniques and make the learning experience more personalized	<b>China:</b> <ul style="list-style-type: none"> <li>• AI Behavioral analysis techniques to monitor student behavior and attendance.</li> <li>• Personalized Learning platforms by AI.</li> </ul>
AI for Economic Planning	Budget planning & management, detect fraud and corruption, modelling and forecasting.	<b>China, India, the EU:</b> <ul style="list-style-type: none"> <li>• AI-based budget management system.</li> <li>• AI systems for managing finances.</li> <li>• AI and economic Models.</li> </ul>
Arabic Natural Language Processing	Summarizing text, chatbot development, language assessment, translations.	<b>The UAE &amp; Qatar:</b> <ul style="list-style-type: none"> <li>• Multilingual processing and machine translation via AI Labs.</li> </ul>

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