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ARAB YOUTH CENTER

الزمالـة التقنيـة للشـباب العربـي

ARAB YOUTH TECHNOLOGY FELLOWSHIP

Second Edition

Foreword

الزمالة التقنية للشباب العربي
ARAB YOUTH TECHNOLOGY FELLOWSHIP

مركز الشباب العربي
ARAB YOUTH CENTER

> We truly have an opportunity to change the course of the Arab world through youth education and empowerment. We wholeheartedly welcome this challenge, and look forward to seeing the fruits of it.
>
> We are here to create tomorrow through empowering youth.
>
> **Shamma Al Mazrui**
> **Minister of State for Youth Affairs**

In today's world, any discussion on technological advancement must refer to the role of youth. This young "digital" generation built, improved, conditioned, and consumed technology at an accelerated pace. Arab youth are no exception.

Our countries are rapidly moving forward with digitalisation strategies and embracing the use of technology in building societies that have nimble, adaptable businesses and government institutions

As such, one of our priorities is to prepare our youth for this digital future. In fact, they are with us step by step. The **Arab Youth Center** initiated the **Arab Youth Technology Fellowship program**, in order the empower youth and to identify the new skills that are required by Artificial Intelligence (AI). At a time when we are witnessing the emergence of new industries, products, and services, our partners at **Why5 Research** developed valuable visions and recommendations on the skills needed in the job market.

Through our partnership in this report, we were able to **highlight the skills** youth need to navigate a world of jobs steered by big data and AI techniques. A world in which **technological skills** and coding literacy are key in understanding and developing AI, not to forget personal, **leadership, and creative skills** which are becoming more central as the human force gets increasingly devoted to creative work. Employees are currently expected to maintain a **lifelong learning approach** and stay up to date with everything new

We believe that investing in young people's training, reskilling and upskilling now will secure their places in the future, and will help them become active partners in development and economic growth in our region.

The **United Arab Emirates (UAE) is used to navigating rapid change and advancements in today's world. As such, we will keep investing locally and regionally in the potential of young people. No youth will be left behind; they are our most valuable asset** and the makers of our future. If we miss out on this opportunity to prepare young people for the future, we will lose out on the immense talent and ingenuity that could transform our region

We truly have an opportunity to change the course of the Arab world by educating and empowering youth. We wholeheartedly welcome this challenge, and look forward to seeing the fruits of it.

Foreword

WHY5
r e s e a r c h
IT'S ALL ABOUT PEOPLE

Rapid technological advancements place the workforce in a perpetual challenge to acquire the skills necessary for emerging roles in the labor market. Education and training can ensure the development of skills and competencies that are compatible with the future requirements of technologies, including AI techniques. This research paper aims to highlight the essential skills need for AI development, notably technical competencies. This emphasis reflects sponsor's (the Arab Youth Center) genuine concern for youth, the future of the young workforce, and their ability to keep pace with everything new and secure their place in future job markets.

In order to actively participate in economic and social development, the new workforce must keep up with the dynamics and evolution of technological advancements. This entails being proactive, committed, innovative, leading, and trained to take charge, and to benefit from all what new technologies have to offer to serve the society and create a better quality of life, and a happier future.

Achieving that requires carefully building bridges of trust between youth and their governments, through the latter's commitment and its support to young talents. It is also key to provide the foundation for an active partnership between industries, academic institutions, international organizations, and youth empowerment organizations. Young Arab talents would then be able to implement their ideas and translate their creativity into innovation.

Through its human-centric philosophy, Why5 Research seeks to support all efforts in areas of human development and the promotion of sustainable development through the in-depth understanding of people, their behavior and needs and addressing them. Therefore, in collaboration with the **Arab Youth Center**, we seek to identify the real needs of Arab youth and the skills they truly need for tomorrow's jobs market.

Managing Director- Why5 Research
Middle East & North Africa
Ahmed Sulaye

Executive Summary

Despite the knowledge challenges facing Arab youth and their ability to adapt to the requirements of AI, studies show that the workforce, regardless of age, is ready to integrate the new digital reality and is keen to acquire the skills that will help it stay relevant with AI.

The changing demand for AI-required skills, as well as the rapid technological advancements place Arab youth in a constant state of challenge. These skills must be acquired through practice and experience rather solely in a classroom. In order to closely link technology and education, it is crucial for governments, educational institutions, and businesses to continuously innovate, to focus on developing technological research, to better engage the industrial sector, as well as to strengthen international cooperation in education.

A foundation in mathematics and statistics (algebra, linear algebra, calculus, data analysis statistics, probability) is necessary for learning AI. An in-depth understanding of the Python programming language and its various libraries is another crucial requirement. For Arab youth to successfully enter the workforce and ensure their part of the new jobs created by new technologies, it is essential that they develop these new skills. Personal skill development is also vital. A combination of four main competencies is key, especially for leadership and managerial positions - **(deep thinking, creativity, social and emotional intelligence, and perceptual skills)**. In fact, it is anticipated that as smart technologies proliferate, humans will be more devoted to innovation will increase, and the demand for managers will rise as the relevance of leadership and managerial positions would increase.

The efforts necessary to prepare today's youth for the future economies led by AI are enormous and the path is long and ongoing. These require adopting a lifelong learning approach, through specialized education that is responsive to the needs of the workforce, one that is fast and continuous, adapted to the dynamics of technological development, as well as experimental enough to consolidate the technical knowledge base. What underscores the need for increased effort and persistence is the significant knowledge gap reported in the World Digital Competitiveness ranking; Only four Arab states made the ranks (United Arab Emirates, Kingdom of Saudi Arabia, Qatar, Jordan). Despite the UAE's improved ranking, the path to export technologically skilled labor is still long.

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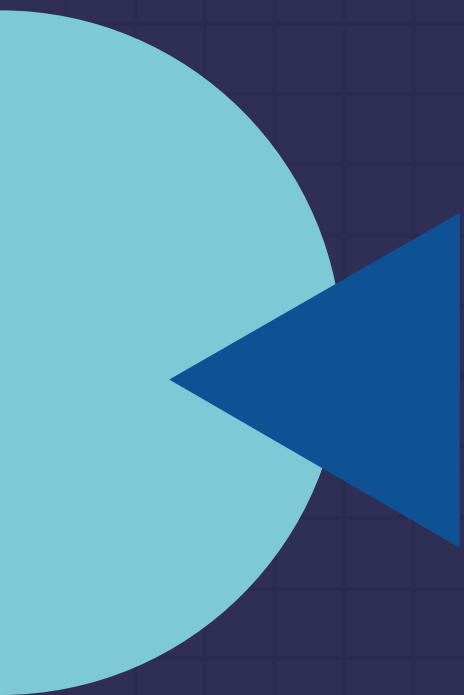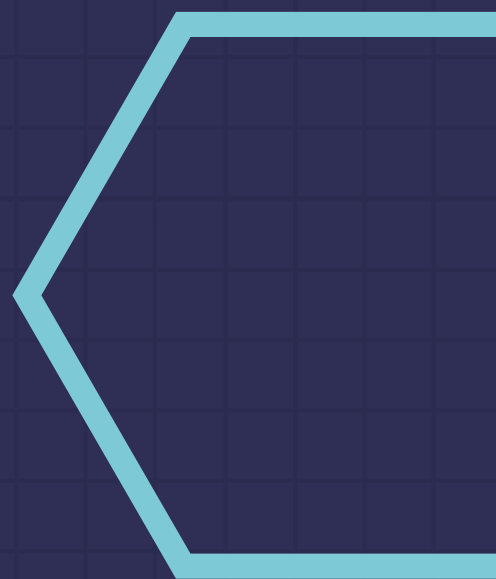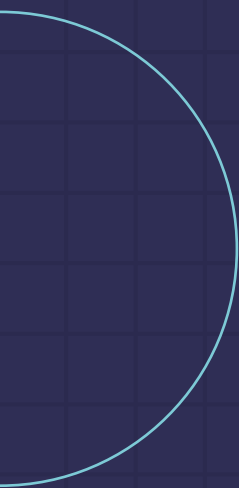
Introduction

Introduction

The fourth industrial revolution that the world is witnessing today is characterized by the emergence of several technologies and global drivers that have started to change the face of the world; these include Artificial Intelligence (AI), the Internet of Things (IoT), Genetics, 3D Printing, Quantum Computing, Nanotechnology, Self-driving Cars, Big Data, Virtual Currencies, among other technologies and scientific advancements. This revolution's main dimensions sets it apart from its three predecessors, these are:

1 **The rapid spread with which the technologies of this revolution spread**

2 **The breadth and depth of its effects in all areas**

3 **Its ability to induce drastic change in production systems and economic relations**

In fact, this revolution contributes to bringing about tangible changes in economic models, as it will lead to the restructuring of the economic systems and infrastructures and a shift towards knowledge production sectors and high-value-added technologies, in exchange for a decline in the economic contribution of the traditional production sectors, particularly those that did not profit from this revolution's technological advancements. Technological advancements that focus on finding cheaper, more sustainable, and more environmentally friendly alternatives to raw materials will lower their cost and that of basic commodities by eliminating the scarcity factor that used to reinforce their high prices.

These developments motivate every society and country to adapt to the requirements, trends, and potential effects of this rapidly growing technological revolution. In fact, they provide an opportunity for leaders around the world, including the Middle East and North Africa (MENA), to diversify their economies, promote economic growth and create job opportunities by benefiting of the accompanying technologies, especially AI techniques, to build a more sustainable future and a better quality of life.

The Definition of Artificial Intelligence

The Definition of Artificial Intelligence

The term Artificial Intelligence (AI) refers to the systems and machines that simulate human intelligence in order to perform tasks. These systems and machines can improve their own performance based on the data they collect. In other words, AI is "a system's ability to correctly interpret external data, to learn from such data and to use those learnings to achieve specific goals and tasks through flexible adaptation."

The term was first coined in 1956 by John McCarthy, a scientist and professor of computer science at Stanford University. McCarthy suggested that human intelligence can be replicated, more precisely, he referred to the possibility of producing a machine that can simulate human behavior.

AI systems are powered by algorithms using techniques that include:

1 Machine learning	**2** Deep Learning	**3** Data Science

These techniques show machines as "intelligent", since advancing the future of AI relies largely on investing in Data Science and Deep Learning, which offer AI deductive reasoning and independent thinking and self-learning. In fact, Deep Learning uses multiple layers of algorithms that mimic the human nerve cells, which enables AI to process vast amount of data, analyze it, and infer patterns that translate it into meanings and ideas.

In the sense of analysing images and sounds the way a human mind does and building a reaction or opinion around it, Data science techniques have enabled AI to see as we see, and machines to hear as we hear, and to succeed in voice recognition.
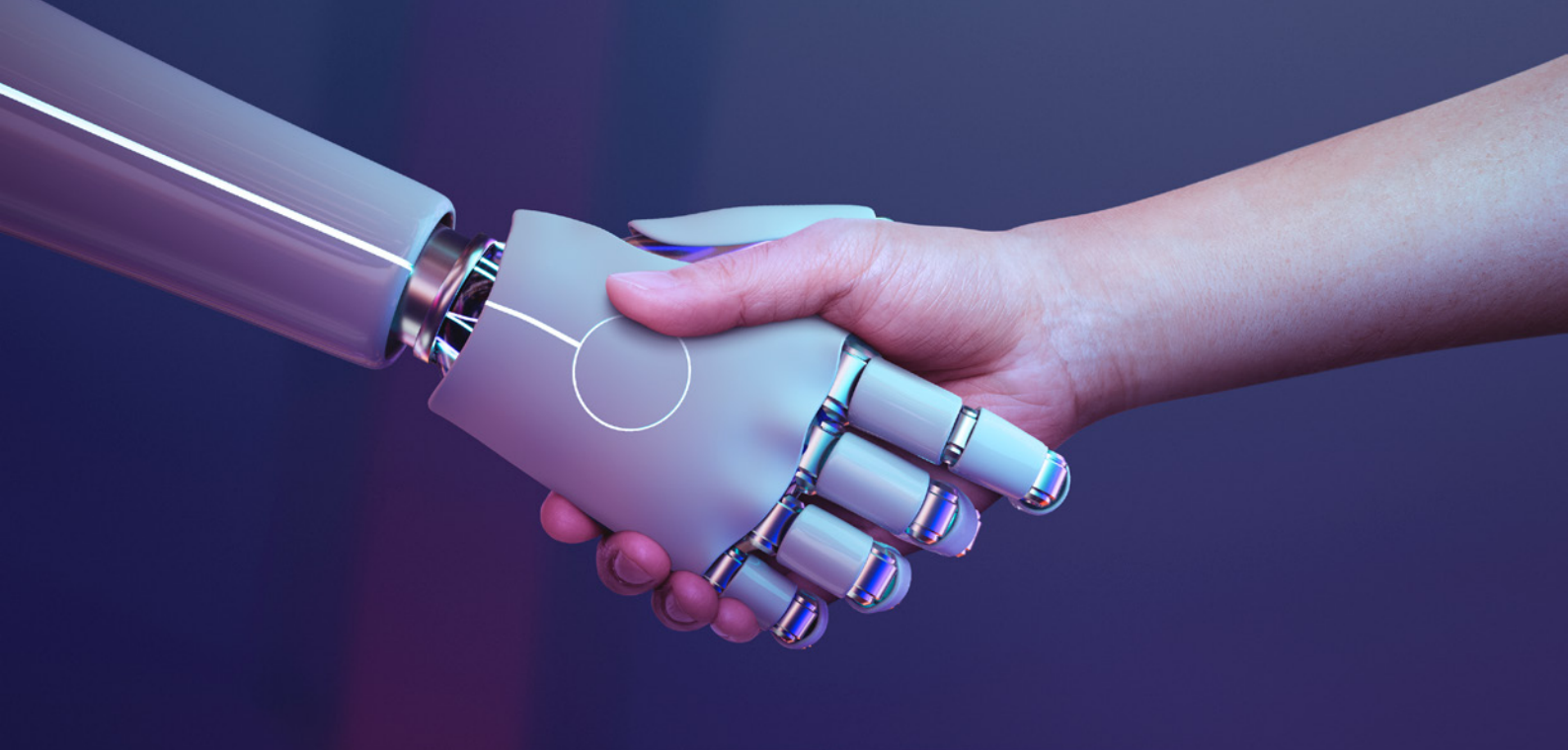
Machine Learning

1 A subset of artificial intelligence that includes a set of complex technical statistics that enable machines to improve its tasks through the accumulation of experience and data. Machine Learning is considered an entry point to Deep Learning.

Deep Learning

2 The subset of machine learning that consists of algorithms that allow a program to train itself to perform various tasks, such as speech and image recognition, by presenting massive data to multi-layered neutral networks.

Data Science

3 A multidisciplinary field that uses approaches combining statistics and computer science, along with scientific knowledge to analyze and interpret data and extract results that can be built upon.

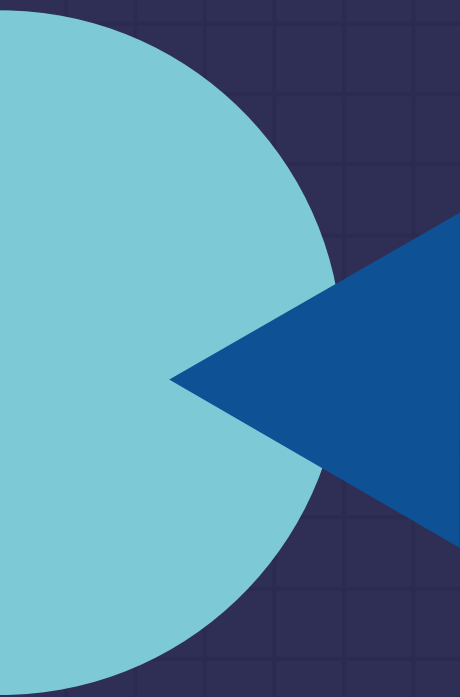## Artificial Intelligence

4 Any technology that enables computers to imitate human intelligence using AI techniques or Deep Learning or statistical techniques such as logic, decision trees.

The Definition of Artificial Intelligence
Source:Why5Research Analysis framework 2022, The Economist Intelligence Unit.

AI
Enablers

AI Enablers

Once advancements in technology and AI techniques enable machines to handle a significant part of today's human work, they present an important opportunity for governments that utilize them to diversify their sources of income and to refocus human capabilities towards creative tasks. This opportunity requires a deep understanding of how human intelligence complements machine intelligence, and a reassessment of the skills needed for the future, as well as how to integrate this flow of new technologies with learning methods. This would entail the adoption of lifelong learning to keep pace with these rapid technological developments.

Capitalizing on AI techniques is a challenge for countries to plan, keep pace, and balance between available human, technical, and economic capabilities, and the requirements for AI adoption. In fact, studies forecast that AI techniques could boost the global economy by $2.95 trillion in the coming decade, whereas McKinsey & Company estimate that AI could generate $13 trillion by 2030. Therefore, the extent to which countries prepare themselves and be proactive in the adoption of AI techniques will define their share of the of the wealth generated by AI.

What are the prerequisites to AI Development?

A suitable ecosystem for growth and development is necessary for investing in and utilizing AI techniques, in addition to identifying the main factors that would enable the field to advance.

The two main AI enablers are:

1 Raw Capabilities

2 Institutions

> Securing the main enablers for AI as well as setting guiding ethical standards and principles will feed into the development of responsible AI and maximize its benefits.

1 Raw Capabilities

Raw Capabilities: considered one of the main inputs that define the successful development of AI techniques, these include:
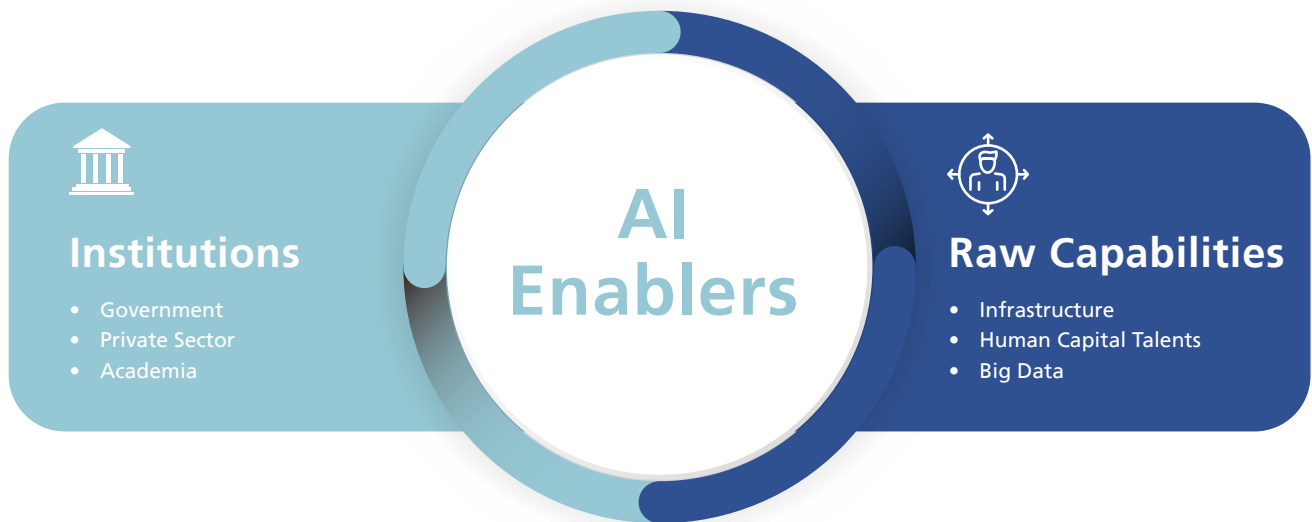
- Technical infrastructure: primarily telecommunication infrastructure, basic internet access, and the computing power required to produce and develop AI systems.

- Human capital talents: those needed to understand and advance AI systems, taking into consideration early education in science techniques, technology, engineering, mathematics, with a focus on incorporating AI techniques in higher education and lifelong learning.

- Data: refers to Big Data and high-quality data that can be used to train AI algorithms (Machine Learning) to reduce the level of pre-existing biases in discriminative outcomes to a minimum level.

2 Institutions

Institutions: The institutional base for developing responsible AI through its Ecosystem includes:

- The Government: to develop policy frameworks that regulate the development of AI, or to establish the authority in charge of developing AI techniques. Such authority would develop the country's AI vision, estimate its technological capabilities (tools and their availability), as well assess the government's readiness to deploy AI techniques in the provision of public services to its citizens.

- The Private Sector: includes developers and investor in AI, who can motivate innovation and investment in AI techniques and contribute to the economy.

- Academia: notably scientists that contribute to R&D in AI and to the training and development of the workforce in the field of AI.

Guidelines & Ethics

Institutions

- Government
- Private Sector
- Academia

AI Enablers

Raw Capabilities

- Infrastructure
- Human Capital Talents
- Big Data

AI Enablers
Sources: Why5Research Analysis Framework 2022,
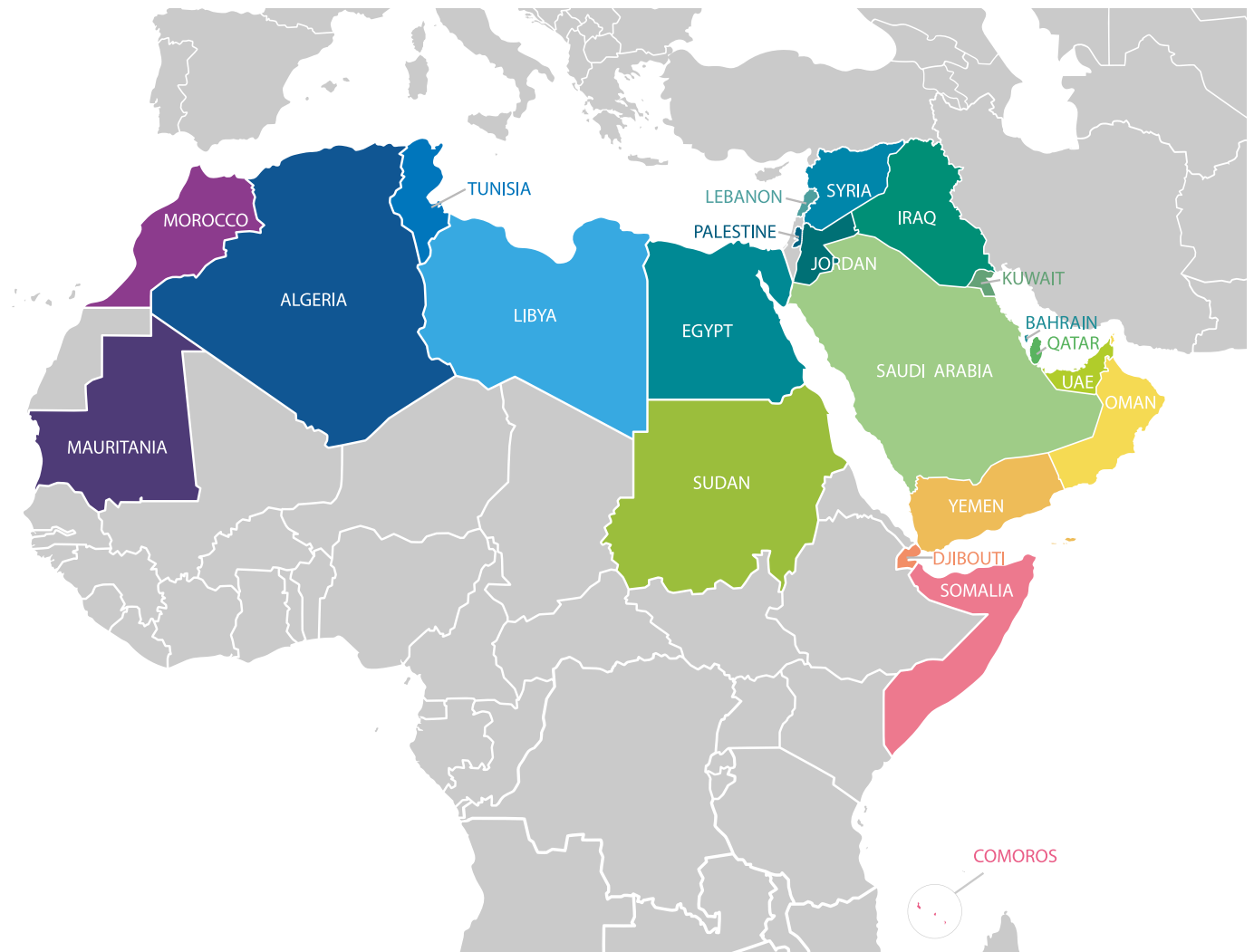Tortoise Media (2021); Oxford Insights (2021); Economist Intelligence Unit (2018),
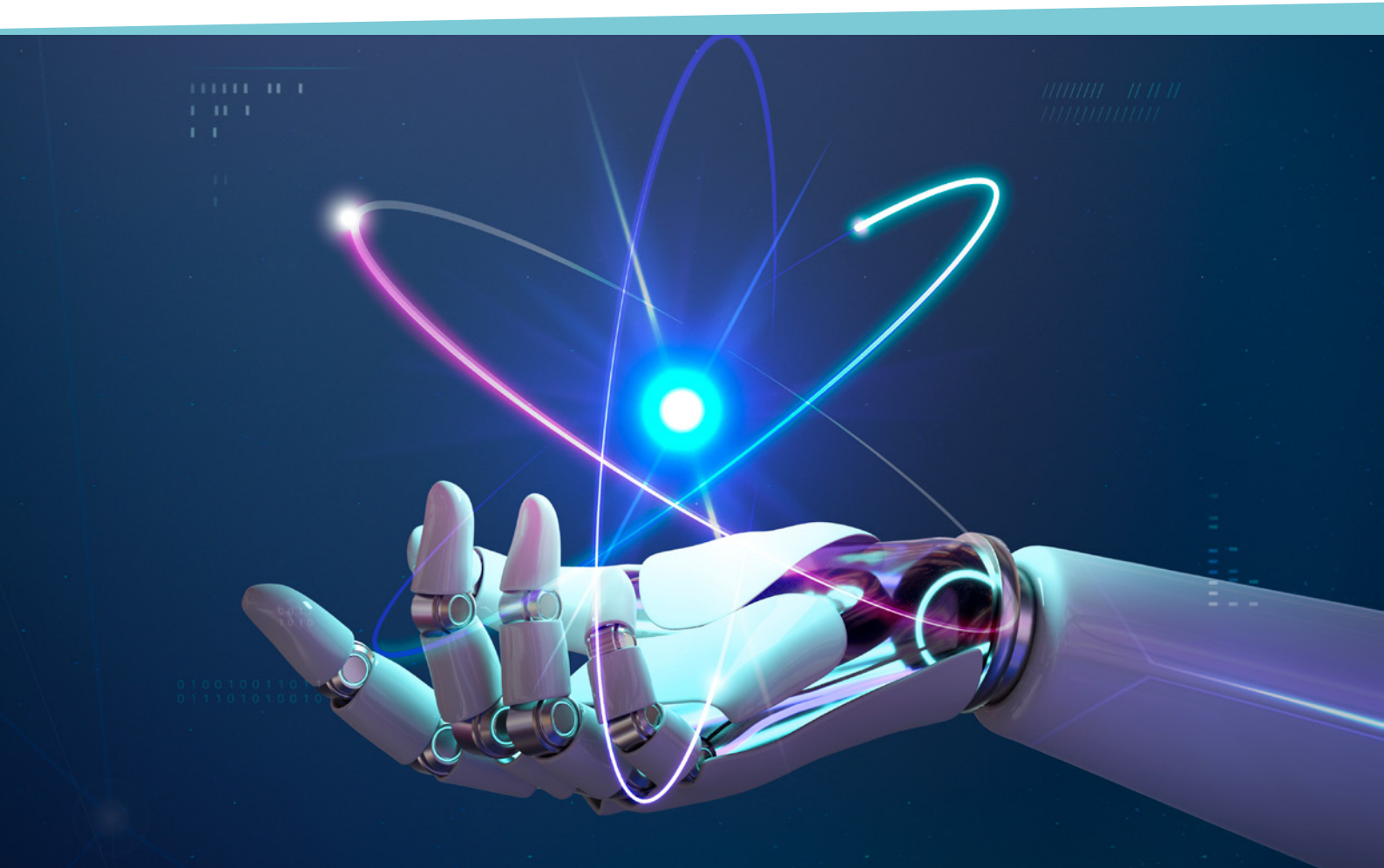
AI Readiness in the Arab Region

Readiness for AI in the Arab Region

Readiness for AI in the Arab Region

The human element is one of the main inputs for the development of AI techniques. Investing in humans is one of the most important prerequisites to reaping the benefits of AI. The Arab region has good potential for growth as youth under 30 constitute around 60% of its population and are the generation that is most adapted to the needs of AI. Youth use the internet the most and best respond to new technologies. This suggests that investing in and gaining from the young generations has a positive demographic impact on economic development. These returns require a re-evaluation of the current skillsets and those that are needed to succeed in the future. This is even more important considering the technical advancements brought on by AI, which imposed new dynamics on the job market, creating new jobs while eliminating many traditional ones. The knowledge economy has a significant influence on modern employment trends.

Demand for non-skilled labor is predicted to decline by 25 to 50%, while demand will be higher for workers with skills in technology, engineering, math, sciences, logical analysis, creative thinking, and problem-solving will increase. Projections show that technological advancements will create around 58 million new jobs, primarily in industries related to technologies associated to AI.

Future job opportunities are reserved for the skilled and trained while the MENA workforce faces a knowledge gap challenge.

Numbers reflect a significant gap in the MENA job market. Skills that are available are way below the requirements, especially technical skills related to computing and AI. The World Digital Competitiveness Ranking that ranks 63 states includes only 4 Arab states: UAE, KSA, Jordan & Qatar.

The UAE ranked 12 globally and first in the Arab region in the World Digital Competitiveness Ranking in 2022, and 12 globally. When it comes to the Knowledge factor, one of the main components of the Index, the UAE ranked 18 in 2021 and second in its related sub-factor "Availability of foreign highly skilled personnel". The government's efforts were reflected in the Index on a different level when it comes to "Funding for technological development" (UAE ranked 8th) and "Use of big data and analytics" (UAE ranked 3rd). The country also made significant progress in its ranking on the sub-factor "Training and education", moving from 57 in 2017 to 25 in 2021.

In terms of the High-tech exports sub-factor, the UAE's score is still low (ranked 39 out of 63 in 2021), which indicates that the country still needs to put a lot of effort into producing high quality technologies such as AI technology.

Results in other Arab states are comparable to those in the UAE. In 2022, Qatar was placed 18 in the overall index, while the KSA and Jordan ranked 24 and 56, respectively.

Bahrain made a significant technological advance in 2022 and was ranked for the first time in the World Digital Competitiveness Index at 30, rendering it a very promising market for AI Technology investment. In fact, the country is working on rapidly improving its technological performance metrics globally, while simultaneously making significant investments in technological solutions for sustainable development.

Country	UAE	Qatar	KSA	Jordan	Bahrain
Global Rank 2020	9	14	24	58	-
2021	9	17	32	49	-
2022	12	18	24	56	30
Knowledge 2020	31	45	46	54	-
2021	18	44	50	48	-
2022	-	-	-	-	-
Technology 2020	4	25	24	44	-
2021	5	19	24	43	-
2022	-	-	-	-	-
Future Readiness 2020	11	24	28	58	-
2021	12	23	32	56	-
2022	-	-	-	-	-

Source: IMD world Digital Competitive Ranking 2021

Sub-Factor - Qatar

	2020	2021
Training and education	53	54
Digital/Technological skills	8	12
Foreign highly skilled personnel	7	8
Funding for technological development	8	10
Use of big data and analytics	1	2
High-tech exports (%)	62	60

Sub-Factor - UAE

	2020	2021
Training and education	44	25
Digital/Technological skills	17	10
Foreign highly skilled personnel	3	2
Funding for technological development	11	8
Use of big data and analytics	2	3
High-tech exports (%)	58	39

Sub-Factor - KSA

	2020	2021
Training and education	34	34
Digital/Technological skills	15	17
Foreign highly skilled personnel	13	15
Funding for technological development	7	18
Use of big data and analytics	24	28
High-tech exports (%)	61	62

Jordan managed to rank 18th on the availability of "Digital/Technological skills," 33rd on the availability of "Foreign highly skilled personnel" (much lower than GCC countries), and 33rd on its provision of high quality "Training and education", despite the country's overall ranking on digital competitiveness and on the Knowledge factor (both in rank 48 in 2021).

Sub-Factor - Jordan

	2020	2021
Training and education	33	33
Digital/Technological skills	29	18
Foreign highly skilled personnel		32
Funding for technological development	28	24
Use of big data and analytics	11	1
High-tech exports (%)	60	61

Source: IMD world Digital Competitive Ranking 2021

Egypt is yet to achieve internationally recognized advancements in technology; however, the Egyptian government is currently addressing the job market gap by offering significant scholarships to youth in the fields of digital training and technology. One of the main national initiatives, Egypt FWD, trained more than 250,000 youth within 2 years in the field of data analysis, programming, web development, digital marketing, and machine learning. These initiatives may soon succeed in transforming the Egyptian human capital into a promising component of the AI job market.

The above figures highlight disparities across the abilities of Arab states in terms of AI adoption, when it comes to the availability of talents and technical skills as well as technical infrastructure. On the other hand, they reflect the commitment of governments to advance the use of AI in their societies, through the adoption of a clear vision, policies for training and continuous empowerment, as well as the adaptation of educational systems to better fit the technical trends in AI. The fact that only 4 Arab states were included in the Index reflect regional discrepancies within the region, and the different levels of effort needed to reap the benefits of AI.

Government-led AI Strategies: The Economic Impact

Government-led AI Strategies: The Economic Impact

The Arab region is characterized by a government-led investment strategy that aims to stimulate nascent tech sectors. Governments allocate relatively large budgets to invest in enhancing its national capacities in AI.

The KSA pledged $20 billions of public investments to establish 300 tech startups by 2030, within the lines of diversifying its economy and the need to stimulate its relatively small technology economic sector.

In the UAE, such investments are paying off; Careem became the first tech start up in the region to become a unicorn company. Other companies with success stories include STC Pay with a valuation of more than $1 billion.

Governments in the region significantly participate in establishing AI ecosystems, in addition to their efforts towards incorporating AI in governance. AI is seen as a main tool to accelerate public sector operations and improve the quality of public services. This is expected to lower costs on the long run. A 2019 study estimated that competencies brought by AI technologies can boost public budgets in the Middle East by $7 billions every year.

The potential impact of AI on economic growth in MENA ranges between 20 and 34%, with the highest growth expected in the UAE followed by KSA.

Sectors that drive such growth (% contribution to GDP):

- Retail with **19%**
- Public Sector (Health and Education) **19%**
- Transport and Logistics **15%**
- Technology and Media and Telecommunication **14%**
- Financial Services **14%**

When it comes to implementing national AI policies, it can be argued that the region's governments have achieved significant progress. Through these measures, countries emphasized the importance of fostering local talent, secure a favorable environment for AI. None of these countries, however, created a national framework for ethical and responsible AI.

Even though Qatar refers to ethics in its AI strategy, and Egypt mentions the launch of a charter for responsible AI, the UAE is the only country that developed a set of tools for AI ethics. The latter includes principles and guiding principles, along with a self-assessment form for developers who wish to ensure reliable and safe use of AI.

The MENA region's AI strategies place a strong emphasis on building AI talent and fostering an AI-friendly corporate environment. In terms of strategies that guarantee the responsible use of AI, these strategies still need require further work.
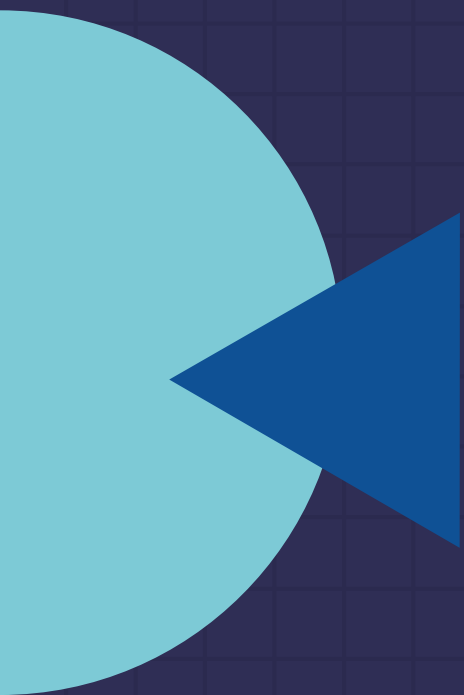
AI Skills
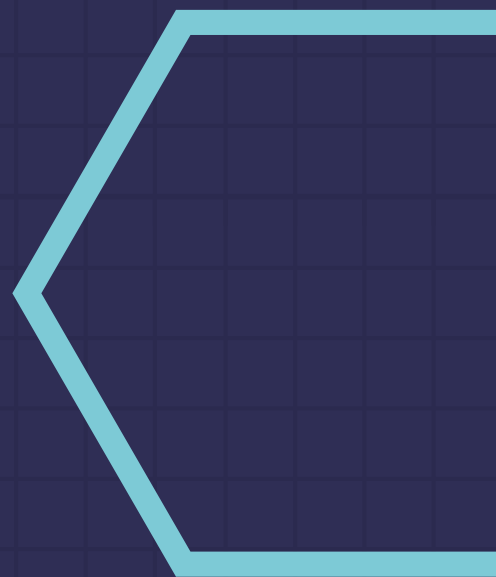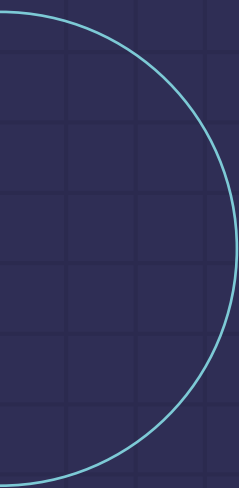
AI Skills

The changing demand for AI-required skills place Arab youth in a constant state of challenge. These skills must be acquired through practice and experience rather solely in a classroom. Academic and training institutions are not currently equipped for such capacity building as curricula need to adapt to the evolving demands for skills; innovation means survival. In order to closely link technology and education, it is crucial for governments, educational institutions, and businesses to continuously innovate, to focus on developing technological research, to better engage the industrial sector, as well as to strengthen international cooperation in education.

Learning AI requires the existence of a knowledge base of mathematics and statistics (algebra, linear algebra, calculus, data analysis statistics, probability). Another essential prerequisite is an extensive knowledge of Python's programming language and its various libraries (Pandas, Numpy, scikit-learn, statsmodel, Eli5, MLflow, tensorflow, keras).

It is vital for Arab youth to acquire these new skills, for them to smoothly transition into the job market and to guarantee their share of the new roles defined by new technologies. Equally important is the development personal skills. A combination of four main areas is key especially in leadership and managerial positions, namely: complex thinking, creativity, social and emotional intelligence, and perceptual skills. In fact, the relevance of leadership and managerial positions is expected to expand with the spread of smart technologies and the increased devotion of the human force to innovation and creativity.

The skills required for AI need to match the dynamic nature of AI techniques, hence the importance of adopting a PACE educational curriculum (Personalized, Accelerated, Continuous, Experiential) . This curriculum entails offering continuous and fast educational plans that are inclusive to all workers, as well as adaptable to the training needs of the workforce and that of start-ups with full consideration to gender balance and the non-skilled workforce in all empowerment and training processes.

The Required Skills for AI

Basic Skills

Science Skills Mathematics & Logical Analysis STEM

Professional Skills

Data Analysis Programming Languages such as Python

Personal Skills

Creative Thinking Emotional & Social Intelligence

The Required Skills for AI
Sources: Why5Research Analysis Framework 2022, Arab youth technology fellowship-Accenture in the Middle East 2021

Building capacities in the field of AI requires a special set of skills that include specializations in programming and Data Science, along with creative personal skills that feed into the leadership and guidance of AI technologies. Emphasis should also be on adopting a learning approach that is customized, rapid, continuous, and experimental.

In order to mitigate AI's effects on unemployment in general and on youth unemployment, developing the essential skills for AI is of the utmost importance in the Arab world. This is particularly true for people in the MENA region between the ages of 15 and 24 who have a **27.2%** unemployment rate in 2021, are four times more likely to be unemployed than adults and have a lower likelihood of finding well-paying jobs.

According to the World Digital Competitiveness report, only 4 Arab states took part of the global ranking, none of whom ranked high on the Knowledge sub-factor. This reflects the amount of effort needed to develop the skills and capacities of the workforce.

Despite the knowledge challenges facing Arab youth and their ability to adapt to the requirements of AI, Accenture's 2022 opinion polls reported that the workforce, from all ages, is willing to adopt the new digital reality, and is eager to acquire skills that will help it stay relevant with AI.

Python
The Most
Important AI
Skill

Python The Most Important AI Skill

Python and R are the main programming languages used in Deep Learning algorithms. However, Python is the most popular language for developing Deep Learning algorithms, particularly after the release of its recent edition Python 3.8.0. More than 57% of developers use Python and 33% rank it as their first choice for developing algorithms.

Python has also been at the forefront of Deep Learning development for the past 2 years, as it offered high level frameworks and interfaces (API) with its Tensor Flow library, which also contributed to coding and encoding that made Machine Learning and Deep Learning easier. Python also offers a wide range of other libraries that support programing in different fields of AI, such as Theano, Scipy, Pytorch, scikit-learn, keras, MXNet.
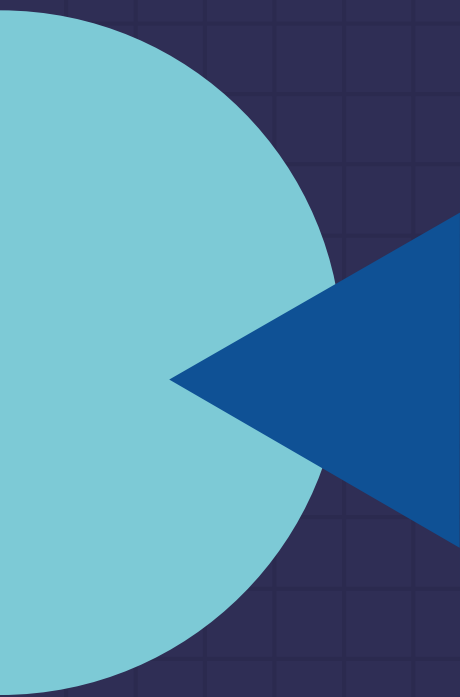
> Python is quickly rising to prominence as the leading programming language in computer science in general and in AI in particular.

Several features of Python's make it popular and relevant for developers and programmers:
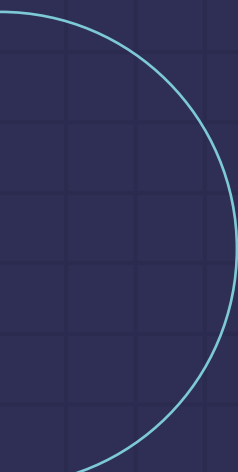
- A constantly evolving language: programmers are continuously working to develop it along with its various applications, and there is an integrated library to process GUI, HTML, and XML.

- Ease of code writing in a unified system, that can be used in different systems. Python codes are also easy to read, organized, and formatted and can be used for Windows, Linux, and Mac OS X.

- Python is a free open-source language that can be used by everyone, all its tools are available for free.

- Python offers many applications and uses be it as a main programming language for AI models and fields, or as a tool in data analysis and Data Science in general.

- Python is considered the fastest in terms of Big Data processing among the different languages given its huge libraries.

- Python offers advanced support for Audio & Sound Data and can be used in 2D graphic design and photography such as Scribu, Paint Shop Pro, GIMP, and INKscape. Python can be used also in 3D animation along with many other uses in computing, programming and business.

- Python also offers high level Neural Libraries for Machine Learning and Deep Learning such as Tensorflow, which is a Neural Library that can be used for Deep Learning algorithms and Scikit library that can be used to extract data, analyze it as well as AI.

Recent advancements and future trends in AI confirm the need for academic and training programs to incorporate Data Science and coding languages, particularly Python, in order to provide the workforce with the knowledge and skills necessary to understand and build Deep Learning in AI. This would feed into achieving significant leaps in the future of AI and optimizing the uses and benefits of its existing techniques.

AI Future Trends

AI Future Trends

AI is the future, Deep Learning is the future of AI, and the development of neural networks is the future of Deep Learning and the way forward in the field of AI. In fact, the use of AI in life today and in the future will go beyond imagination. AI Logarithms will be used across all fields; from weather prediction, satellite navigation, medical operations, market analysis, to expanding the production of self-driving cars among other developments. In sum, the shadow of AI is in all aspects of life.

Advancements in this field will generally feed into making machines operate with the least amount of complexity and the lowest feasible margin of error. As Deep Learning labs work towards developing more powerful machine models with almost zero error rate, Deep learning has the key main headline in the future of technology. These labs focus on developing new computational methods (Electronic Cleaning System- ECS), including neural networks, in order to reach more effective uses of artificial intelligence

Main Trends in The Future of Deep Learning and The Development of Neural Networks:

Self-Supervised Learning:

A machine can learn just like humans and with self-supervision, making it less costly especially in the case of large models. As such researchers seek to reduce costs by developing self-training and self-learning machine models. Developers are working in smart laboratories to generate data algorithms capable of performing such processes.

Natural Language Processing (NLP):

▶ through developing "textless NLP" or what is known as Generative Spoken Language Model (GSLM), a tool for modeling language, especially the spoken one, by generating and extracting speech from audio and video without any label or text. This paves the way for modeling and defining all world languages even those spoken or unwritten.

Neuroscience Based on Deep Learning:

▶ the main goal is to build a deep artificial neural network that can simulate human capabilities and tries to surpass them. It is based on investing in the development of Deep Learning based on research in the development of neural networks, through which researchers are working to make strong developments in this field.
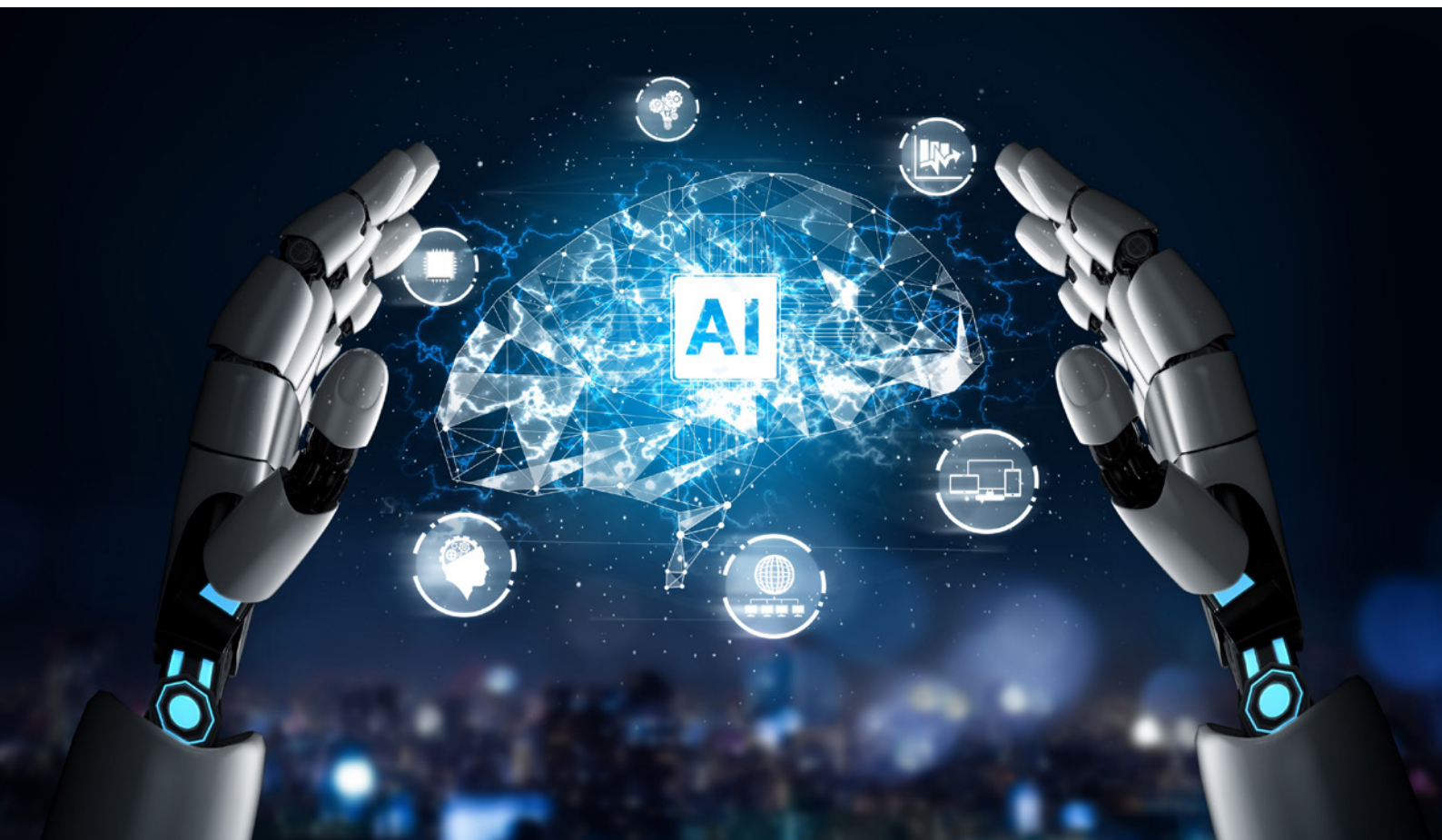
AI Challenges
in the
# Arab Region

AI Challenges
in the Arab Region

AI offers countries a unique opportunity to improve the future quality of life, and to dedicate human resource to creative tasks. Nevertheless, seizing this opportunity requires planning, keeping pace, striking a balance between the two main prerequisites for AI development **(Raw Capabilities and Institutions)** on the one hand and the available human, technical, and economic resources on the other. By achieving complementarity between these two aspects a countries' share of the benefits and advantages of AI is increased.

So, when talking about the challenges facing AI, we focus on the shortcomings in these two factors, and the MENA countries are no exception. The challenges facing AI in this region include gaps in the prerequisites to AI development first in terms of **Raw Capabilities:** (1) technical infrastructure (access to basic internet, necessary computing power to run and develop AI systems), (2) talent/human capital: (to understand and develop AI systems), and (3) lack of good Big Data (to be used to train AI algorithms). In fact, MENA countries vary in their**Raw Capabilities**, however they are all consistently working to improve their technological skill sets. GCC nations, specifically the UAE, are in the forefront in terms of technical capabilities, and available AI infrastructure.

Institutions, the second prerequisite to evaluate, is also a crucial component for creating an environment that is appropriate for AI and its enablers, whether in terms of (1) a clear vision for AI, (2) public commitment to investing in AI, (3) provision of training and empowerment, (4) as well as integrating the efforts of the public sector, private entities, and academic institutions.

The rating of global digital competitiveness, which only includes four Arab states, indicates the scope of these difficulties (at the levels of both the raw material and driving stakeholders and institutions).

Once again, Arab states perform differently when it comes to Institutions. A national AI strategy, which would be essential to coordinating efforts and directing them toward the efficient and responsible use of AI techniques in line with the advancement and future demands of AI, has not yet been adopted by any MENA nation. The World Digital Competitiveness ranking, which includes only four Arab states, reflects the magnitude and scope of the challenges the region faces when it comes to the prerequisites to AI development (Raw Capabilities and Institutions).
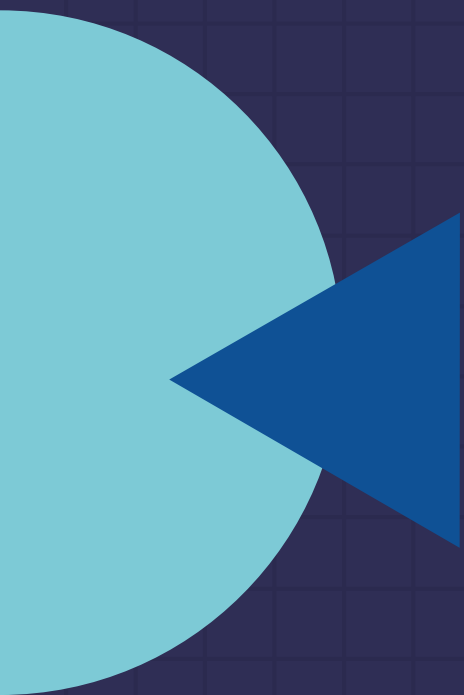
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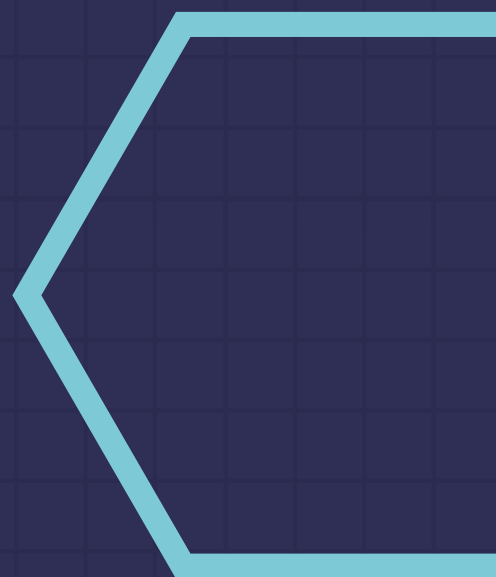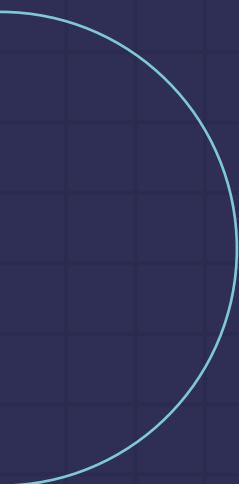
Recommendations

Achieving progress in AI techniques requires efforts to nurture the two main prerequisites to AI development: Raw Capabilities and driving stakeholders and institutions. This report recommendations will be presented along these lines:

1 Raw Capabilities

First: Digital Infrastructure and Data

▶ Enhancing fast internet access across Arab countries along with developing cybersecurity and data security for more reliable use.

▶ Developing tools to process data in Arabic, considering that this language is rich and diverse and that most data in the region is in Arabic. Such a step is crucial and necessary to building databases for AI.

▶ Securing high-quality, up-to-date and relevant data is key since the effective functioning of AI techniques require smart data. This can be done through monitoring data centers and moving all web data, application data, database performance, user experience, and log data into a cloud-based data system, which can automatically monitor limits and detect anomalies.

First: Digital Infrastructure and Data

▶ Developing human skills and capabilities to develop AI solutions that can be expanded to fulfil evolving needs.

▶ Developing curricula that are specialized in AI, training graduates, and nurturing young talents in this field.

▶ Focusing on programming languages, notably Python, and Data Dcience as an entry point to advance experiences and skills in AI.

▶ Highlighting the importance of personal skills: such as leadership, creating thinking, complex thinking, emotional and social intelligence. Incorporating these skills in school curricula and in early years to guide the human force towards creative work that require confident, proactive, and ambitious personalities.

▶ Emphasizing the importance of adopting curricula that are tailored to the needs of the workforce, ones that are fast, continuous, based on experience, and that offer solid and sustainable skills.

1 Institutions

▶ Developing the ethical and guiding framework for AI techniques as part of national strategies in Arab countries.

▶ Training policymakers on AI techniques so they would be able to understand the rapid developments in this field and make decisions accordingly.

▶ Promoting AI research and development (R&D), with an emphasis on managing the risks associated with it.

▶ Fostering partnerships among the industrial sector, the private sector, and academic institutions, to better track market demands and adapt curricula, as well as to promote and grow private investments in the field of AI.

▶ Emphasizing the importance of experience sharing and Arab success stories, to build on what exists and on lessons learned in this field.

▶ Embracing creativity and talent in the field of AI by securing adequate enabling environments in terms of skills and institutions that are willing to implement, develop, and fund creative ideas.

▶ Encouraging citizens to set up their own projects and establish businesses, given that the Arab workforce leans towards working in the public sector, which leaves fewer applicants who are eager to start or join AI enterprises.

▶ Advancing global fellowships in the field of AI to stay up to date and explore future trends.

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About the Arab Youth Center

The Arab Youth Center (AYC) was established to realize the vision of His Highness Sheikh Mansour bin Zayed Al Nahyan, Deputy Prime Minister and Minister of Presidential Affairs, to empower young Arabs and address their needs.

The Center offers a unique platform to develop youth capabilities and support innovation and creativity among youth. AYC implements purposeful initiatives across diverse sectors, in addition, it conducts research on young Arabs to help decision-makers shape policies that enable their progress.

The Arab Youth Technology Fellowship, one of the Center's initiatives, aims at contributing to the technological and digital empowerment of Arab youth, through both theoretical and practical world class training.

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