The Egyptian Cabinet
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Policy Perspective

Digitalization in Egypt:

Present, Future, and Challenges

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A non-periodic publication issued by the Cabinet's Information and Decision Support Center (IDSC). It covers the most prominent topics in the scene from all aspects to present a comprehensive vision regarding such topics relying on experts' perspectives.

IDSC's Commentary

In light of the rapid advancements shaping the world today, digital transformation has become the cornerstone of comprehensive development worldwide. Governments have intensified their efforts to leverage digital transformation technologies to automate and digitize public services, enhancing citizens' quality of life, promoting transparency, and fostering accountability.

In alignment with these global developments, Egypt's leadership has committed significant efforts to advancing its digital capabilities. It aims at stimulating economic growth and enhancing development in key sectors, including modernizing education, improving healthcare services, and strengthening citizen-centric service delivery.

Within this context, government entities have invested in developing user-friendly platforms that provide accessible and efficient services for citizens. These initiatives range from e-government portals to mobile applications streamlining citizens' daily transactions.

Building on this progress, this edition of the "IDSC Policy Perspective," published by the Cabinet's Information and Decision Support Center, highlights Egypt's persistent efforts in digital transformation. It examines advancements in artificial intelligence (AI) and data processing while addressing the challenges facing the country. The publication also explores the future potential of digital transformation in Egypt.

Digitalization in Egypt:
Present, Future, and Challenges

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AI has become a buzzword nowadays. But before AI, we need digitalization because it empowers AI systems and also allows better services to people in this era.

We live at the heart of the fourth industrial revolution and are on the verge of the fifth one, where we will witness more synergy between humans and machines. At the heart of these revolutions reside three main pillars: computing power, communication, and data. Computing power to process data and communication to transport data. Of course, data must be in digital form; hence, the need for digitalization is crucial for any country; otherwise, it will be left behind in our digital world.

This document tells the story of Egypt's path to digitalization. We will discuss the government's efforts, what has been accomplished, and the challenges that must be addressed.

The first thing to know is the conditions for successful digitalization. We can summarize them in the following points:

- The fast transformation of any non-digital documents to the digital format. This step is called digitization.
- The availability of high-performance computing infrastructure to process the data.

- The availability of enough reliable storage to store the digitalized data.
- The existence of a reliable and fast communication infrastructure to move the data between service providers (e.g., e-government services), data centers, and people.
- Preparing a generation that can deal with the continuous advancement of technology in the digital age, ranging from e-governance to AI and cybersecurity, etc.

Egypt's government has taken sensible steps in the above points, as discussed in the following sections.

Digitalization Efforts:

Egypt has prioritized digitalization efforts because the advantages cannot be ignored. These include providing fast and accurate services to people to help in decision-making and facilitating work sharing and interaction among different governmental units. The last decade has shown significant progress in digitizing governmental and non-governmental documents, positively influencing many of the services the e-government portal provides. Let's look at the UN E-Government Development Index (EGDI), which indicates the country's ability to provide government services online. We can see good progress from Egypt in that regard. You cannot provide online services without digitalization. In 2024, Egypt ranked 95 out of 193 countries, from 103 in 2022 to 111 in 2020.

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Having data in digital format is necessary but not enough to use technology in this digital age. Data needs to be processed so we can extract useful information and contribute to providing services and decision-making. This requires high-processing computing power.

Processing Power:

Egypt used to store and process its data abroad (e.g., using services like AWS, Azure, etc). However, there is a need to keep data and process it locally, even if this means more expenses and maintenance for the machines.

Egypt currently has about fourteen data centers. This number is expected to increase due to the importance of the infrastructure for Egypt. For instance, in 2022, the government launched the “Egypt Digital Platform”, which delivers about 170 government services. Recently, in April 2024, Egypt launched the first government data and cloud computing center, whose main role is to be the central repository for all governmental data and allow smoother interaction among governmental entities. This data center is located along Ain Sokhna highway and is an alternative to the new Capital Data Center, ensuring better reliability.

The market of data centers in Egypt is expected to increase, reaching a value of USD 513 million by 2029 from USD 182 million in 2023. This increase is due to several reasons. First, Egypt’s large population, with an increasing percentage of internet usage, is a driving force for the continued enhancement of the IT infrastructure. Second, there are various data center providers in Egypt (e.g. HPE, IBM, CISCO, Dell, etc.), ensuring continuous

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equipment availability. Third, the continuous effort for digitalization in Egypt is a strong driving wheel for always upgrading and scaling the IT infrastructure. Fourth, the data centers are equipped with several petabytes of storage, but data centers need communication infrastructure to be successful in a country-wide digitalization effort.

Communication Infrastructure:

Egypt has a strategic geographic location. Regarding IT, this location is extremely important because Egypt hosts many of the world's subsea cables passing through the country, connecting Asia, North Africa, and Europe. Simply speaking, when it comes to submarine infrastructure, everything goes through Egypt. To be more specific, the traffic going through Egypt makes up around 17% of the world's internet traffic. This makes the continuous upgrade/update/maintenance of IT infrastructure important not only for Egypt but beyond Egypt's boundaries.

Given the increased demand for higher bandwidth, Egypt has already invested in and is continuing to develop the fiber connectivity needed.

We have been discussing the hardware side of the digitalization effort. The software side is where all the magic happens. We are in the Era of Artificial Intelligence (AI)—more specifically, the second spring of AI, a field whose starting point was the Dartmouth workshop in the summer of 1956. But now, whenever people mention AI, they usually mean one sub-field of AI, which is machine learning (ML). ML requires a lot of data to be trained before it can be deployed.

Big Data & AI:

If any country wants to incorporate AI in its internal workings, it needs data. This data needs to be big, unbiased, and, of course, correct. AI is another driving force for Egypt to keep enhancing its IT infrastructure. One important goal for Egypt's strategic plan is to be in the top 20 in AI readiness by 2030. Let's explore a few snapshots of AI efforts in Egypt.

- There is a political push and encouragement for more advances in AI innovation in Egypt. This is clear from the message of the Egyptian president: "Egypt is keen to embrace the digital era, as advancements in technology continue to evolve every day. These developments create promising opportunities for laying the foundation for a national economy based on the emerging technologies of the Fourth Industrial Revolution, most notably Artificial Intelligence."

- Therefore, in November 2019, the Egyptian Cabinet approved the formation of the National Council for Artificial Intelligence (NCAI), which will include experts from different government entities and experts in AI and related fields, like high-performance computing, from research centers and universities.

- The main objective of NCAI is to formalize and govern the implementation of Egypt's National AI Strategy.

- Different projects are proceeding parallel to the use of AI in different governmental entities and projects related to health, water management, agriculture, and Arabic NLP.

- In addition, Egypt is open to collaboration with different international organizations.

- Venture Capitalists investments in AI in Egypt have grown by about 400% between 2017 and 2020.

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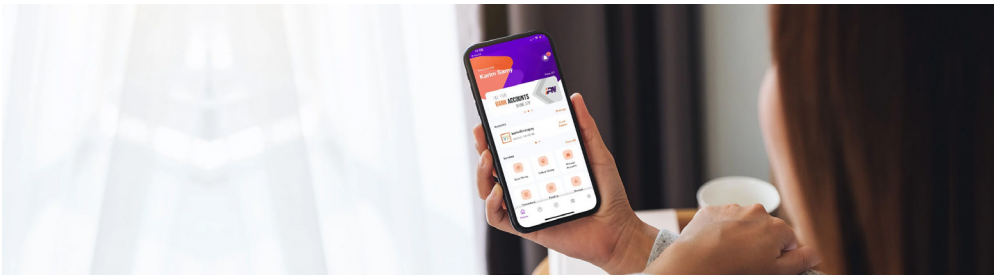
- The Ministry of Communication and Information Technology (MCIT) established the Technology Innovation and Entrepreneurship Center (TIEC), whose mission is to incubate startups in digital technologies, including AI, of course.

Egypt must have a continuous pool of talented researchers and developers for the above plans to continue. This means implementing a massive movement to educate people about AI so that the layperson will not be afraid of adopting the technology, ensuring that universities offer their students the latest information and research about AI, and training college graduates about AI, software engineering, and cybersecurity. Several steps on all these fronts have already been implemented, including, but not limited to:

- Many universities across Egypt have introduced new departments of computing and AI.

- Launching the Digital Egypt Builders Initiative (DEBI) aims at empowering college graduates with knowledge about digital technologies and preparing them to be leaders in these technologies to continue fulfilling Egypt's AI vision. DEBI consists of 8-12 months training in AI, embedded systems, cybersecurity, software engineering, cloud computing, etc. This initiative is orthogonal to the computer science departments in universities because it targets students graduating from other departments.

- The Information Technology Academia Collaboration (ITAC) initiative aims at encouraging collaborative research and development between industry and universities through funded projects.



With the software and hardware sides of digitalization in place, digital banking can flourish. The starting point was in 2020, when the Central Bank of Egypt (CBE) started exploring digital banking, resulting in Banking Sector Law No. 194 of 2020. By July 2023, CBE released the rules for licensing, monitoring, and supervising digital banks. Fast-forward a few more months, and in May 2024, CBE announced its preliminary approval for Misr Digital Innovation (MDI) to launch one bank, the country's first-ever digital native bank.

All that we have discussed in this report gives a bright look at the future of IT in Egypt. However, challenges still need to be addressed to achieve the best outcomes from all the above plans and initiatives.

Challenges and Future Perspectives:

- Even though Egypt has Computer Science departments in almost all universities, with AI gaining most of the interest, there are very few universities with Data Science departments. Today, data is the oil of the 21st century and is the driving force for all current AI technology. Collecting the data, ensuring its correctness, ensuring that it is unbiased, etc., require dedicated departments, not one or two courses in CS departments.
- There is a brain drain from researchers and developers, which needs to be stopped or, at least, slowed down to ensure the continuous pool of talents needed by Egypt.
- Even though the internet is much better than in the past, the need for a higher bandwidth keeps increasing.

- The data collected so far on different domains is not yet enough. More data is needed to ensure better services and AI systems.
- Related to the previous point, data must come from multiple domains, not only from digitizing documents. Widespread usage of the Internet of Things (IoT) can generate useful data such as traffic and weather-related data. Nowadays, many ML models are multimodal, so this data will be very useful.

In Conclusion,

Egypt has taken very successful steps in digitalization efforts and IT in general. However, more efforts are needed to ensure success for Egypt's ambitious vision for its IT sector. Moreover, Egypt is a very strong market, measured by its size and average age of population, and it is a valuable partner for collaboration with its pool of talented developers and researchers.

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