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# Technologies for Increased Transparency and Integrity



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Good governance is a target for governments, as it has been firmly established that there is a close relationship between the development desired by citizens and the implementation of principles of good governance, including:

a. Having a vision supported by a mission and purpose. b. Emphasizing efficiency while focusing on core tasks.

c. Transparency in providing data and granting the right to access information.

d. Citizens' and investors' ability to anticipate changes in regulatory procedures while ensuring their stability for reasonable periods.

e. Involving citizens and stakeholders in decisionmaking and emphasizing the majority opinion.

f. Holding officials accountable and holding those who demonstrate poor performance, especially intentional ones, accountable.

g. Commitment to law enforcement while considering legislative justice upon issuance.

Over the past four decades, technologies have rapidly evolved, providing new mechanisms for performing tasks that have disrupted traditional systems named as"disruptive systems" because they have dramatically altered work models. In order for governments to keep pace with this significant change in the private sector and to bridge the gap between them and to satisfy citizens and investors, governments have begun to modify their structures to rely more on technology tools that provide flexibility and speed in adapting to events and changes, along with increased efficiency in performance. Additionally, these tools offer higher accuracy in decision-making due to the ability to collect and analyze larger amounts of data and create simulation scenarios. The figure below illustrates one of the current government structure designs.

Current and Emerging Technologies: Accelerating and Closer Than We Think

Below, we provide a brief overview of the most important current technologies, classified into three categories: Stable and Widely Used, Rapidly Growing in Use, and Emerging Sooner Than We Think.

First: Stable and Widely Used Technology

Government Network

This network connects government entities to facilitate data transfer, save time, and eliminate the need for citizens or investors to request documents from different government agencies.

Data Centers and Cloud Computing

These are data centers with dual infrastructure for electricity and internet connectivity, ensuring a reliable power source and internet access. They can host a vast number of computers and storage units. One key advantage is that it relieves users from the burden of technical support, maintenance, data security, and the need for specialized personnel, thus significantly reducing operating costs.

#### Mobile Phone Usage

The development of mobile applications (Apps) has opened the door for various uses, including government services and information accessibility.

Financial Technology (Fintech)

Following the development of mobile applications, a wide range of financial applications for payments, money transfers, and lending emerged. Fintech filled a gap for individuals without bank accounts or limited credit qualifications, providing ac-

## Information is the foundation of investment

decisions, starting from the preparation of feasibility studies and extending to the establishment of companies and the acquisition of land with the appropriate size in the desired location. This has led countries to establish platforms for investors to obtain data transparently and to provide services easily and quickly

cess to financial services and e-commerce.

Electronic Signatures

There was a need for a secure electronic signature tool that prevents forgery, denies the denial of a person's signature, or transfers the signature from one document to another. The public key infrastructure has fulfilled these requirements, and many countries now grant legal validity to electronic signatures, similar to handwritten signatures.

### **Digital Identity**

Building on remote identity verification systems using encrypted codes or biometric identification, such as fingerprints, electronic identities can be created for use with internet applications.

Geographic Information Systems (GIS) and Geographic Data Digital maps have become an integral part of data management and classification systems, as most data has a close geographical association. The examples below illustrate how GIS can be an effective planning tool.

Second: Rapidly growing technology

Artificial Intelligence

Artificial intelligence refers to a set of algorithms and software packages capable of making decisions similar to those made by humans. The goal is twofold: first, to ensure the continuity of performance with the same efficiency, as humans can make errors due to stress or distraction, and second, to provide more comfort and well-being by allowing humans to have more time to engage in better tasks (this article will not address the issue of potential job opportunities being reduced).

**Computer Vision** 

Computer vision involves a set of algorithms and software packages capable of analyzing images captured by cameras connected to computers. It can recognize objects and individuals and provide assistance to computer users in accessing information or guiding a computer system to perform a task. Its applications are diverse, including quality control in production and security-related tasks such as fingerprint and facial recognition.

Internet of Things (IoT)

Advancements in electronic chip technology have allowed for a large number of electronic circuits to be integrated onto a single chip. Simultaneously, sensor research has progressed, enabling the integration of network circuits and sensors into small devices. This has made it easier and more cost-effective to collect data from various devices. This technology, along with the rapid development of nanorobotics research, is expected to bring about a breakthrough in several fields.

Big Data and Analytics

The amount of data being collected has become massive, thanks to advancements in storage technology. The enormity of this data necessitated the development of algorithms and software packages capable of analyzing it and uncovering relationships that are not easily inferred or observed using traditional methods. The applications of this technology are present in almost everything around us, from analyzing various product sales to investigating fraud and terrorism.

Blockchain

Algorithms that ensure the linkage of data to its creator and prevent forgery and manipulation using a distributed method of storing data in the form of a chain.

**Digital Currencies** 

One of the applications of blockchain technology, digital currencies are expected to see much higher growth rates when central banks legalize and regulate their use.

Unmanned Aerial Vehicles (Drones)

Drones are now being used for surveillance, rescue operations, and delivery. Their usage is expected to increase, and their applications will expand further.

Self-Driving Electric Vehicles

The combination of computer vision, artificial intelligence, and the development of a new generation of batteries has led to a significant revolution in the automotive industry. The applications of self-driving electric vehicles are expected to change many aspects of our daily lives.

Thirdly, rapidly emerging technologies that are closer than we think.





## Quantum Computing

Using quantum mechanics to solve complex problems at a much faster rate than traditional computers. When we talk about faster speed, we mean hundreds or thousands of times faster. Imagine the scale of problems we will be able to solve with computers in the near future.

Web 3.0

Web 3.0 relies on blockchain technology, which enhances the concept of decentralized management and token-based economies. It is expected to increase security, privacy, and scalability in various domains and combat the dominance of major tech companies. However, it may also open the door to the exchange of anonymous or hard-to-trace information.

Examples of using technology to achieve transparency and integrity.

Here is a brief overview of some examples of how technology contributes to facilitating the implementation of good governance rules:

Government Services

Providing services online has achieved two goals:

a. Transparency: Service seekers have a clear understanding of the requirements and their rights.

b. Eliminating unnecessary additional payments due to the distance between the service seeker and the service provider. Social Safety Networks

Verifying support eligibility poses a challenge in densely populated countries, especially if the state has a large geographic area. Linking databases provides a high success rate, as providing data such as electricity consumption, telephone bills, quality of children's schools, rent or ownership, family employment, or whether the family is widowed, and other parameters directly indicates the socioeconomic status of the family and their eligibility for support.

**Government Procurement** 

Government procurement is a major gateway for corruption, where requests for needs and tendering are often concealed. Having a mandatory portal for announcing government contract awards achieves transparency and closes these loopholes. Enterprise Resource Planning (ERP)

Software packages that handle all organizational transactions, including accounting, asset management, procurement, inventory, and human resources, ensuring the speed, accuracy, and monitoring of data exchange.

Asset Management

Using Enterprise Resource Planning systems has helped stop the mismanagement and loss of assets and neglect in their regular maintenance, which can lead to their deterioration and loss of value.

#### Planning

Since 2011, the idea of linking planning with geographic data has emerged. The steps involved include:

- Mapping population densities on a map.

- Studying the population's service needs. For example, the

likelihood of a couple giving birth to a premature baby requiring a neonatal care unit.

 Mapping available services on the map. For example, the number of available infant incubators in government, private, and nonprofit hospitals.

- Comparing the population density's needs with the available services directly reveals the priority areas for support in the financial plan.

Budget Information and Implementation Plans Accessibility

Planning systems, through geographic information, have provided applications for smartphones that identify the projects being implemented in a particular area. This allows individuals to provide feedback and notes on the execution, serving as an additional supervisory tool for officials. This achieves two pillars of good governance: transparency, information accessibility, and participation.

Performance Monitoring

Most internal communication software packages can provide statistical reports to top management, indicating the organization's performance indicators. For example, it is possible to determine the percentage of transactions completed within the appropriate timeframe or the average time each employee keeps documents on their desk.

Healthcare System

Health insurance systems are prone to fraud due to the magnitude and diversity of operations. Having a digital system that operates through identification codes for each illness, medical procedure, active ingredient in medication, linking them to the patient's file, doctor's invoice, hospital, and pharmacy has become crucial and has shown significant cost savings.

Investor Information Accessibility

Information is the basis of investment decisions, from feasibility studies to company establishment and acquiring suitable land in desired locations. This has prompted countries to establish platforms for investors to access data transparently and easily perform services with speed and efficiency.

Expedited Justice

Technology has provided transparency, speed, and efficiency in the judicial system, from filing lawsuits to monitoring procedures and court session schedules, and even obtaining a copy of the executive formula of the judgment. Elections

Technology has facilitated the use of identity cards during

## Government procurement is one of the major sources of corruption in governments, where needs requests are hidden, tenders are not

announced, and contracts are awarded without transparency. The mandatory portal for announcing the awarding of government contracts achieves transparency and closes all these doors Technology has enabled the use of identity cards in voting in a way that prevents anyone from voting repeatedly and prevents anyone from voting on behalf of another person and other practices known to influence the outcome of elections

voting in elections, preventing individuals from voting multiple times or voting on behalf of others, and other known practices that aim to influence election outcomes.

Legislative Impact Study

Legislations, presidential decrees, and ministerial decisions are issued to pursue development and address emerging gaps resulting from global and local changes and the resulting overlaps and new tools (such as technology and others). Each legislation or decision targets one or more specific clear matters, but it inevitably deals with existing issues as well. The Organization for Economic Cooperation and Development (OECD) has initiated an effort to establish a mechanism known as legislative and regulatory impact analysis.

The legislative impact study system aims to anticipate the impact of proposed laws and decisions and their interaction with existing legislations and systems, and to analyze the stakeholders affected by the decision and ensure the financial, economic, and social models governing the implementation framework.

The basis of this program is the existence of a comprehensive inventory of all indexed legislations and decisions that helps draw the researcher's attention in the initial stage.

Conducting such analyses can help avoid some legal disputes or practical application consequences. Egypt already has a reasonably good quality database that can be relied upon, including:

- A database of laws, presidential decrees, and ministerial decisions published in the official gazette, overseen by LADS Company.

 - A database created by the Egyptian Initiative ERRADA. Through this, it is possible to:

- Before issuing any new decision or legislation, compile a list of all relevant keywords for each article.

- Enter this into the database using a dedicated program that performs data mining, which enables the exploration and discovery of all articles in all decisions and legislations related to the same subject and their degree of relevance.

- Researchers examine these results and study their compatibility and conflicts.

- At the same time, another group of researchers investigates the social and economic impacts of the legislation through simulation models, field research, and other available tools that provide a considerable level of accuracy.

Opportunities and Challenges

What we have presented above represents tremendous opportunities for governments; it is essential to note that these technologies come with a set of challenges, the most notable of which are the following:

## Data Security

The cat-and-mouse game of system hacking is not limited to amateurs who revel in their victories or professionals who demand money to retrieve or withhold stolen data. It has transcended that to intelligence agencies and armed forces, becoming a tool in wars between nations.

Since it is not logical to give up the advantages of technological systems, the solution lies in paying attention to data security systems and encrypting the vital information. The challenge here is that the number of countries possessing efficient tools in this regard are very few, and they can embed backdoors for infiltration or programs that send data in real-time to them. Therefore, we believe that developing our capabilities in this regard has become a crucial matter that should not be compromised.

#### Data Exchange

Unfortunately, most applications either require personal data to perform the service or request it even if it is not necessary because it is a treasure trove of information being exchanged. Therefore, users should be more cautious about the source of the application and the data it requests.

Data Hosting

The old model of having servers and storage units within an organization has almost come to an end due to its inefficiency and high cost, as we mentioned earlier. However, giant data centers have provided low-cost competitive services that have become enticing. But on the other hand, careful consideration must be given to scenarios of political disputes and their impact, as well as the availability of data to other countries' entities and many other matters that require hosting government data within centers inside their own country and under their control.

Application Developers (Intellectual Property Owners)

Most application developers are either major international companies or startups, and in both cases, they fall under the burden of:

- Control over obtaining new versions that fix errors or provide better features or the necessity of resorting to the company for specific customization.

Or

- The risk of the company going bankrupt and disappearing, resulting in the loss of technical support and version updates. Both of these factors impose on countries the need to care-

fully choose their partners and take steady steps to build this industry seriously at least in some areas.

Hardware Manufacturers (Patent Owners)

What we mentioned above about application development is even more complex in the case of physical components (hardware). Advanced countries impose restrictions on exporting certain technologies, and they also impose restrictions on companies in case of political disputes.

Unlike software and applications development, the journey of physical components to build a local industry is much longer, and often, even if the knowledge exists, the financial model of manufacturing economies fails due to the lack of the required quantity for production and distribution. Therefore, it is observed that even the most advanced countries manufacture in other countries. The current challenge is to address this by making good choices in partners, diversifying sources, and not relying on a single source or two.

Conclusions and Recommendations

In this article, we quickly provided examples of using technology to achieve more transparency and integrity. It is important to remember that these are just examples and are strongly linked to the publication date of the article. What is clear is that things are changing and evolving at a rapid pace, not just from year to year, but even from month to month. However, it is certain that governments that do not adapt flexibly enough to what is happening will decline in the rankings, and governments that realize that clinging to old structures and attempting to adapt them to modern technologies is not permissible are the ones that will win the race to satisfy citizens and achieve higher rates of development.