E-government Adoption in Egypt: Analysis, Challenges and Prospects

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ABSTRACT─E-government is a kind of governmental administration which is depend on ICT Services. The core of e-government is using information technology to break the boundary of administrative organizations, and build up a virtual electronic government. various governments applied the Information and Communication Technologies (ICT) are increased to deliver their services at the locations convenient to its citizens. Egypt, as a developing country with an economy in transition, started to invest in building its communication and information technology infrastructure since 1985 as a vital tool for development. Egypt is still faced by many challenges in its efforts to implement e-government initiatives successfully. This is basically attributed to the conventional problems or obstacles that could restrict growth of any government. This paper aims to study E-government, presents e-government in Egypt, Challenges of the E- government in Egypt. Furthermore, it's provides solutions to these challenges.

Keywords: *ICT, E- Readiness, E-government, Egypt, E-government adoption*

I. INTRODUCTION

In recent years, growth of the Information and Communication Technology (ICT) has had a substantial impact on the way of the local state and national governments function. Information and Communication Technology (ICT) refers to technologies such as the Internet, Intranets, Extranets, ERP and other such technologies. the Information and Communication Technologies (ICTs) have been adopted by governments around the world Since the mid-1990s for enhancing their governing procedures. The use of ICTs has assisted governments to redesign the way in which they are organized and how they function so as to deliver more efficient public services to citizens [1].

Internet) or to the technological infrastructure required to deliver those services [6].

Moreover, from a citizen's point of view, [2], [3], [4] offered that the main purpose of adopting ICTs by governments is to provide citizens with the opportunity to be more actively involved in decision-making processes. These reforms and changes have helped to generatenew forms of administration. By adopting ICT in government, several benefits can be achieved such as increasing efficiency, improving accountability, and enhancing resource management.

[5] emphasizes that more than 80% of e-government projects in developing countries (Egypt is one of these countries) manifest some kind of failure. [1] presents the reasons of the failure are 1) The focus through the design are merely on the technical aspects without any consideration of the softer aspects like people, culture, and politics (hard-soft gap). 2) governments attempt to set up systems originally developed for the private sector. the public and private sectors have fundamental differences (private- public gap). Lastly, it's not simple to deploy an e-government system designed and prepared for a developed country in a developing country. As such, local factors must be taken into consideration and in fact developed from that point of view (country context gaps).

II. E-GOVERNMENT

In the past, government organizations paid little attention to service quality or responsiveness to clients, but this changed with the approach of E-Government. E-government was introduced in the field of public administration in the late 1990s, though it has not been clearly defined and understood by scientists and Experts of public administration.

The term e-government created by analogy to the concepts and practices of E-Commerce (electronic commerce) applied to the public sector, referring to the delivery of government services to the public „on-line" (typically over the

E-Government initially started as an intra-governmental communication tool. Initially the government organizations developed websites with information, then developed to onlinetransactions - which made the citizens to engage in online participation that connect citizens and decision-makers [7].E-Government refers to the use of technologies specially internet and communication technology (ICT) and world wide web (WWW) to provide governmental services to citizens, businesses, government employees and other organizations electronically. The United Nation describe e-government as the use of internet and World Wide Web for delivering government information and services to the citizens. E-government not only provides benefits such as inexpensive and reliable services to citizen and business but also offers the potential to reshape the public sector, and remark the relationships between citizen, business, and the government by allowing for open-communication, participation and public dialogs in formulating national regulations [8].

There are several benefits for e-government programs. These benefits are summarized as a following [6], [9], [10]:I. Cost reduction and efficiency gains: through using all internal and external services online that means decreases the processing costs of many activities as well as will increase the government efficiency. II. Quality of service delivery to businesses and customers: E-government mean to enable access to all services by using the internet, as well as services online will enhance reducing the bureaucracy process inside the government, improving the procedures and offering fast and convenient transactions. III. Increase the capacity of government: E-government aims to use ICT tools to support organizations to organize their work inside and outside the organization, leading to greater efficiency, effectiveness and further improve the type of services provided in the public sector or the business sector, as well as assistance in making decisions. IV. Network and community creation: E-government is seeking to create an atmosphere of interaction between all partners in e-government through the exchange of information on a network and an integrated and harmonious community.

A wide range of different definitions from researchers have been identified [11], [7], [12], [9] summarize the most definitions in the table 1.

Table 1: E-government definitions

E-government definition	Perspective
The use of Information and Communication Technology (ICT), and particularly the Internet, as tools to achieve better government	Technology
The use of ICT to improve the efficiency, effectiveness, transparency and accountability of government	Management
The use of ICT in public administrations combined with organizational change and new skills in order to improve public services, democratic processes and strengthen support to the public policies.	Change Management
E-government should be divided into four distinct areas of activity, namely e-democracy, e-service provision, e-management and e-governance.	E-government dimensions
Utilizing the Internet and the World-Wide Web for delivering government information and services to citizens.	Technology
a government's use of technology, such as the Internet, to aid the delivery of information and services to citizens, employees, business partners, other agency and other government entities	The relationships with partners

E-government offers an opportunity for governments to re-organize themselves, get closer to the citizen and co-operate with a variety of societies.	Political
Government's use of the modern technologies in government sector to better delivery of services and information to citizens, effective interactions with business and industry, citizen empowerment through access to information, more efficient and effective public-sector management, or lead to less corruption, increased transparency, greater convenience, revenue growth, and cost reductions).	Management
E-government is defined as the combination e-administration and e-democracy to achieve the objective of balanced e-government.	Political
E-government can be defined as a way for governments to use the most innovative information and communication technologies, particularly web based Internet applications, to provide citizens and businesses with more convenient access to government information and services, to improve the quality of the services and to provide greater opportunities to participate in democratic institutions and processes.	Political, Technology

III. E-GOVERNMENT SERVICES

According to [3], [6], [8], [7], different types of E-government services are categorized in to eight types. 1) Government-to-Citizen (G2C); 2) Citizen-to-Government (C2G); 3) Government-to-Business (G2B); 4) Business -to-Government (B2G); 5) Government-to-Employee (G2E); 6) Government-to-Government (G2G); 7) Government-to-Nonprofit (G2N); 8) Nonprofit-to-Government (N2G). Table 2 gives definition for these of e-government services.

E-Government should be implemented with the following features [13]:
1)**Comprehensive.**citizens should be able to do everything they have to do or want to do with their government through one E- government portal.

special needs of the disabled, and make it possible for them to use these systems as easily as the non-disabled.

6) **Secure.** E-government systems want to protect the confidentiality of data provided by citizens, the records created and stored by government, and the content and existence of citizen-government transactions performed over the Internet.

7) **Private**. Data about citizen-government transactions, and the content of those transactions, requires to be fiercely protected by the government.

2) **Integrated.** All **E**-government applications should be integrated with each other to save time and money by not needing to re-enter data.

3) **Ubiquitous**. users/citizens can access E-government portal from any Internet-capable connection, Internet appliances.

4) **Transparent/Easy to Use**. most novice of computer users can readily find the information they need, provide the information requested by the government agencies with which they are dealing, and otherwise perform all E-government transactions.

5)**Accessible**. The design and operation of E-government systems should, from the ground up, take into account the

8) **Re-engineered**. It is necessary to thoroughly re-evaluate the overall mission of the jurisdiction and then design a digital structure that creates a government-citizen.

IV. STAGES OF DEVELOPMENT OF ELECTRONIC GOVERNMENT

The E-government revolution offers the potential to reshape the public sector and remake the relationship between citizens and government.

Currently, there are four stages in the development of an Electronic Government [13], [14], [15].

In the first stage (**Information**), a state web portal is created in order to advertise state services and to publish general information such as business hours, lists of contact persons and phone numbers.

In the second stage (**Interaction**), interaction of the government with citizens and businesses grows. State bodies are able to provide broad and dynamic information to citizens using database search and e-mail communication capabilities.

In the third stage (**Transaction**), state bodies conduct online transactions, and financial and legal services are offered.

In the fourth stage (**Transformation**), a dynamic transition takes place in which new technologies allow the use of information on an interdepartmental level in order to provide new types of services.

V. ICT IN EGYPT

Information and communication technology (ICT) infrastructure plays an important role in a success of eGovernment in any country. In developing countries, ICTs   was

Table 2. E-Government services

Types	Definition
Government-to-Citizen (G2C)	It is an e-government service, from government to citizen in the form of offering valuable information and know-how's.
Citizen-to-Government (C2G)	It is an e-government service, offered for payment of bills and other valuable feedback from the citizen to government.
Government-to-Business (G2B)	It is an e-government service providing transactions and procurement facilities for government purchases and call for tenders.
Business -to-Government (B2G)	It is an e-government service providing communication, collaboration, transactions and procurement of goods and services for business initiatives.
Government-to-Employee (G2E)	It is an e-government initiative that will facilitate the management of the civil service and internal communication with governmental employees to encourage paperless office.
Government-to-Government (G2G)	It is an e-government initiative to provide the Government's departments or agencies cooperation and communication online. It includes internal exchange of information and commodities.
Government-to-Nonprofit (G2N)	It is an e-government initiative that provides information and communication from government to nonprofit organizations, political parties and social organizations, Legislature, etc.
Nonprofit-to-Government (N2G)	It is an e-government initiative that enable exchange of information and communication from non-profit organization to government organizations, political parties and social organizations, Legislature, etc.

internet and mobile technologies centered on political, social, natural, physical, human and financial aspects. Egypt is considered to be one of the oldest states in history and is characterized by a highly central government [16].

Egypt has achieved significant success in exporting ICT services. In 2014 the value of such exports grew by 7%, according to the Information Technology Industry Development Agency (ITIDA). Asia (including the Gulf) was the primary destination for Egyptian ICT exports in 2013, accounting for 55%

of the total value. This was followed by North and South America with 27%, Europe with 12% and Africa with 5%. Call center services accounted for 41% of exports. Software and application development made up a further 15%, while technical support accounted for 14% [17].

The Egyptian IT is disrupted due to political crisis in recent years. A more stable domestic political and economic environment, combined with a supportive policy environment, will assist the market to return to a robust growth trajectory. Computer Hardware Sales: EGP7.06bn in 2014 to EGP7.87bn in 2015, up 11.5% in

local currency terms. Depreciation of the Egyptian pound against the US dollar is a factor that barrier the growth of the market in 2015. but strong demand for low-cost tablets will ensure growth continues. Software Sales, EGP2.51bn in 2014 to EGP3.02bn in 2015, up 20.4% in local currency terms. IT Services Sales, EGP3.50bn in 2014 to EGP4.21bn in 2015, up 20.3% in local currency terms. The internet usage has grown from 20.136 million in 2009 to 32.62 million in 2012 to be 40.311.562 in 2014 [9], [17]. As shown in table 3.

Table 3: ICT in Egypt

Computer Hardware Sales	EGP7.87bn
Software Sales	EGP3.02bn
IT Services Sales	EGP4.21
Internet usage	40.311.562

VI. E-GOVERNMENT READINESS IN EGYPT

E-Readiness is briefly defined as the degree to which a country is prepared to participate in the networked world. The e-government development index in Egypt is 0.4594. In the global ranking, Egypt is dropped from high-EGDI to medium-EGDI. It is dropped 28 points from 80th in 2014 to 108th in 2016. As shown in the table 4 and 5 [18].

VII. E-Participation in Egypt

E-participation is a tool that enables governments to dialogue with their citizens. To enhance government's ability to request, receive and incorporate feedback from citizens, government websites have polls or surveys or feedback bottom for engaging citizens. Table 6 shows E-Participation Index (EPI) and its utilization by stages for Egypt [18].

Table 4. E-Government Development Index (EGDI) levels in Egypt

Israel	Chile	Republic of Moldova	DPR of Korea	Panama	Eritrea
Italy	China	Romania	Dominica	Paraguay	Gambia
Japan	Colombia	Russian Federation	Dominican Republic	Rwanda	Guinea
Lithuania (+)	Costa Rica	Saint Kitts and Nevis (+)	Egypt (-)	Saint Lucia	Guinea-Bissau

Table 5. E-Government Development Index (EGDI) in Egypt

Rank	Country	EGDI Level	EGDI	Online Service Component	Telecomm. Infrastructure Component	Human Capital Component
50	Czech Republic	High	0.6454	0.4783	0.5952	0.8627
153	Democratic People's Republic of Korea	Medium	0.2801	0.0217	0.0363	0.7822
180	Democratic Republic of the Congo	Low	0.1876	0.0870	0.0788	0.3970
9	Denmark	Very high	0.8510	0.7754	0.8247	0.9530
187	Djibouti	Low	0.1337	0.0217	0.0698	0.3095
109	Dominica	Medium	0.4577	0.3043	0.4305	0.6384
98	Dominican Republic	Medium	0.4914	0.5072	0.2992	0.6676
74	Ecuador	High	0.5625	0.6304	0.3438	0.7134
108	Egypt	Medium	0.4594	0.4710	0.3025	0.6048
104	El Salvador	Medium	0.4718	0.4855	0.3265	0.6035
165	Equatorial Guinea	Low	0.2403	0.0797	0.1337	0.5174

Table 6. E-Participation Index (EPI) and its utilization by stages

Rank	Country	EPI	Total %	Stage 1 %	Stage 2%	Stage 3%
188	Democratic People's Republic of Korea	0.0169	3.3%	5.9%	0.0%	0.0%
173	Democratic Republic of the Congo	0.0847	10.0%	14.7%	5.3%	0.0%
22	Denmark	0.8136	81.7%	94.1%	63.2%	71.4%
191	Djibouti	0.0000	1.7%	2.9%	0.0%	0.0%
156	Dominica	0.1864	20.0%	29.4%	10.5%	0.0%
91	Dominican Republic	0.4915	50.0%	70.6%	31.6%	0.0%
72	Ecuador	0.5763	58.3%	70.6%	57.9%	0.0%
107	Egypt	0.4068	41.7%	55.9%	31.6%	0.0%
76	El Salvador	0.5593	56.7%	67.6%	57.9%	0.0%

IX. E-GOVERNMENT PORTAL IN EGYPT

In 2001, The Egyptian e-government program in Egypt began within the Ministry of Communication and Information Technology (MCIT) and was a component of the Egyptian Information Society Initiative (EISI), Egypt Information and Communication Technology (ICT) strategy.

In 2004, the program was transferred to the Ministry of State for Administrative Development (MSAD), as an element of administrative reform and development, together with the institutional reform of public administration.

In January 2004 the Egyptian Prime Minister

Very-High-EGDI (Greater than 0.75)	High-EGDI (Between 0.50 and 0.75)	Middle-EGDI (Between 0.25 and 0.50)	Low-EGDI (Less than 0.25)

and Microsoft Chairman Bill Gates started the e-Government solution using Microsoft technology. It is based on three different tiers. The front-end user interface is the upper tier. This is the Portal (www.egypt.gov.eg), which has a bilingual Arabic-English interface and acts as the entry point for all government-related services. The middle tier is the Portal Gateway, which was developed by LINKdotNET. It represents as a bridge between the upper tier and the lower tier. Through the gateway, central authentication, registration, and service routing are performed. It uses

Extended Mark-up Language (XML), Single Object Access Protocol (SOAP), and Web services to integrate seamlessly with any ministry's back end to deliver cross-platform application integration. The last tier involves the development and integration of multiple government-to-business online services at several ministries [16], [14], [10], [9], [19], [20]. As it shown in the figure 1.
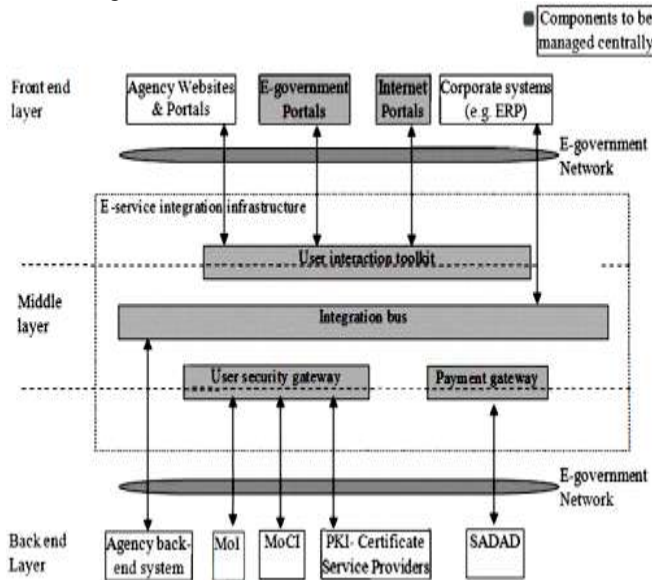

Fig 1. Technical architecture of E-government project Yasser [21].

The e-government portal provides content in both Arabic and English to offer services for individuals, businesses, and foreigners. The website introduces e-payment facility and the availability to download the necessary documents for accomplishing government services.

The services provided by the e-government include digital assets repository, land transportation services, traffic attorney and vehicle licenses services, as well as online services for businesses such as qualified Industrial zone services and environmental services. Moreover, the e-government offers online services to foreigners such as Egypt airline ticketing services and cultural services [10], [9]. As it shown in the figure2.

X. FACTORS FOR E_GOVERNMENT ADOPTION IN EGYPT

[9], [11]suggests e-Government factors to develop the implementation and increase citizen adaptation in Egypt. these factors are enclosed by governing, social and information technology factors

I) Vision should be from start from planning process, creating a picture of the future, realistically and clarify to generate commitment to performance.

II) Leadership: is one of the important factors for the E-Government success. e-Government adoption is a strong leadership with vision.

III) Training: is important factor in e-Government because if people can't use the technologies, they can't take responsibility.

IV) Collaboration: e-Government requires collective efforts from many government public sectors.

V) Awareness: includes using the mass media to introduce the concept of E-Government for people in the public sectors, and show the benefits of E-Government and important of implementing E-Government.

VI) Information and Communication Technologies: is important key in implement and develop e-Government is communications infrastructure, not only a sufficient distribution of computer technology or social, but also the general applying of telecommunication services is an essential for the attainment of a certain standard of E-Government system.

VII) IT Standards: which mean specifications for hardware and software, for helping people to manage and use technology, Single integrated gateway model for adoption of E-Government is expected to provide access to its information and services that requires the government public sectors must share information, knowledge, participate positively, and collaborate to provide E-Government service.

Fig. 2: E-government in Egypt

XI- E-GOVERNMENT ADOPTION BARRIERS IN DEVELOPING COUNTRIES AND ARAB COUNTRIES

Developing countries are far less advanced than developed countries in the areas of technological environment and infrastructure, probably because the technology is produced in the developed nations, while the developing nations import it. Some developing countries import ICT due to lack of an indigenous ICT industry. Researchers have attributed this problem to strategic, technology, policy and organization factors [1].

The ability of developing countries to obtain the full benefits of e-government is limited and is largely restricted by the existence of a combination of political, legal, social and economic barriers [8].

[22]introduces that the barriers of E-government in Sudan are Lack of integration of administrative simplification with e-government development plans, Lack of infrastructure and human resource capacity, Gap between e-services supply and demand, Lack of technical skills, High cost of technology, Ineffective government regulations.

[23] presents the barriers of the adoption that organizational or staff resistance, Lack of support from politicians and high-level bureaucrats and lack of public support.

[24] offers that the challenges that are likely to influence the adoption of e-governance in Arab countries. First is the Lack of Access to Government Information: Public access to information, the second issue is awareness and public-sector marketing., The third issue is lack of coordination and collaboration within and between governments of Arab countries, fourth, the nonexistence of critical evaluation of an E-government plan in the majority of Arab countries. Fifth, infrastructure and Technical Issues, sixth is the lack of back-office capability in most Arab public-sector organizations, seventh, lack of stakeholder's involvement In Arab countries. Eight, lack of trust in a national online portal of government, Intranet, internet and sharing information represents a direct challenge in most of Arab countries where prevailing bureaucratic culture remains an obstacle toward sharing information, ninth, the employee resistance to change. In most Arab countries, the public sector remains the largest employer and change might bring fearless for job losses and power reduction for employees.

[25]introduces Changing ministers, Citizens' expectations prior to e-government, Complication in processes, Corruption, Cost of living and Internet, Data security, Funding issues, Government's priorities, Lack of e-government understanding, Lack of IT skills, Legacy systems, Parliament's priorities, Previous experience with government projects, Public sector

weaknesses, Resistance to change, Regulation and legislation, War in Iraq and wasta.

[6] introduces the factors affecting the success of E-government Resistance to change to electronic ways: Lack of policy and regulation for usage, Lack of partnership and collaboration, Lack of strategic planning, Financial Barriers, Lack of qualified personnel and training, Lack of programs to promote E-government benefits and advantages.

[1], [26], [27]. summarize the barriers of the development of e-government are summarized in the Table 7.

Table 7: Barriers of Developing e-Government Projects

Area	Barriers
Strategy	Lack of shared e-Government goals and objectives Over-ambitious e-Government milestones Lack of ownership and governance Absence of implementation guidance Funding issues
Technology	Lack of architecture interoperability Incompatible data standards Different security models Inflexibility of legacy systems Incompatible technical standards
Policy	Concerns over citizen privacy Data ownership E-Government policy evolution
organization	Lack of agency readiness Slow pace of government reform Absence of an e-Government champion Legacy government processes Lack of relevant in-house management and technical expertise

In Egypt, [14] offers specific challenges faced by Egypt's government. These challenges are the Lack of E-signature Mechanism, Security and Privacy Concerns, E-Payment Transactions Challenges (Low Penetration of Credit cards- Lack of Payment Tools for Simple Citizens), Inconvenience of Delivery Mechanisms and its effects on Reputation of E-Services Quality, Computer Illiteracy and Low Internet Penetration Rate, Lack of Citizens Awareness, Participation and Study, Reluctance and Mistrust of Automation, Inflexibility to Modify Workflows, Lack of Integration and Information Sharing among Governmental Bodies, The Lack of Unified Standards and the Overlap among Service Providers.

Some recommendation can help successful adoption of E-government in Egypt [14], [6], [9], [16]

1) Reengineering processes of the government activities according to the requirement of the e-Government.

2) Reviewing technical and administrative experiences of some countries in order to benefit from their experience in the field of implementing the e-Government.

3) Unifying the Home page working policies on the internet and the general standards which will be followed at government authorities to create their pages for easy linking in the future.

5) Egypt E-Government portal should be separate e-payment system linked to all channels of the Egypt banks to handle all online transactions.

6) Government must work in close cooperation with the private sector and citizens for ensuring secure use of e-government portals

7) Develop applications suits citizens' needs and characteristics, including simple and convenient payment methods.

8) E-government services must be reviewed regularly by service providers to ensure that these services are workable, performing and accessible.

9) Work flows and procedures must be reviewed to ensure accessibility, simplicity, efficiencyand cost reduction, through the use of E-governmentservices.

8) Evaluate and report on these regularly to all stakeholders involved for the purpose of introducing corrective actions required

9) Extend e-service access, and benefits from CITs through enhancing infrastructure coverage in underserved areas, promoting greater use of CITs among organizations located outside the technology parks, and launching innovative ways to reach to Arabic speaking users.

9) High attention must be given to the provision of services and content development using mobile platforms.

10-Free Internet and PC for each student or home, which can help in solving e-service access problems and improve the Internet penetration rate.

11) Evolve and deliver free executive training programs to help citizens access, such as IDCL, Internet Driving computer license). To provide e-government services through kiosks, IT clubs, cyber cafes, and community

centers, to ensure the benefit of the majority of the population from e-services.

12) Work in partnership with the private sector in developing relevant e-content and trainingprograms. Citizen-driven information content should be relevant to local population.

13)Create a favorite environment that supports the development of e-content and company websites in local language.

14)Evolve relevant applications that use audiovisual components, along with written materials and incorporate educational programs in e-government projects.

15) Plan and implement advertising campaigns including broadcast media (TV and Radio programs), print media (newspapers and magazines articles and columns), and e-media.

16) Deliver some basic educational materials on E-government at the school level.

17) Reluctance to modify workflows, which might be attributed to inflexibility or fear of change.

18) Multiple auditing bodies, which might lead to a slowdown in workflows.

19) Overlap authority among government bodies, which might hinder cooperation and integration.

20) Develop an action plan for implementation according to the gradual approach, in order to handle resistance to change and to ensure the reforms will not seem devastating to the bureaucracy.

22) Ensure the involvement of government employees in the workflows redesign process through organizing regular meetings between e-government policy makers and the key workforce.

XII. CONCLUSION

E-government success needs Changing how government works, how it deals with information, how officials view their jobs and interacts with the citizens, and active partnerships between government, citizens and the private sector. Moreover, input and feedback from the citizens, businesses and officials who use e-government services are continuously needed in the E- government process.

E-government vision in Egypt is focused on citizen-centered and provides citizen centric presentation of services. Egypt made growth in its e-government project and did remarkable improvement in e-participation. Egypt is still lagging far behind other Arab countries,

particularly Gulf countries that launched their e-government programs recently.

More ever, the e-government development index in Egypt is 0.4594. In the global ranking, Egypt is dropped from high-EGDI to medium-EGDI. It is dropped 28 points from 80th in 2014 to 108th in 2016. Egypt is still faced by many challenges in its endeavors to implementing e-government
initiatives successfully.

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