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Review of M-Government in Developing Countries: Case of Egypt

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ABSTRACT

In response to advances in Information and communication technologies (ICT) and the need for more effective and efficient administration, governments in a number of countries have devised m-government initiatives to increase the amount of information and online services accessible to citizens, government agencies, and businesses. The utilization of IT to bridge the gap that exists between administrative entities and establish a virtual government is at the heart of the concept of mobile government (m-government). As a developing country, Egypt started investing in communication and IT infrastructure in 1985, while it was still in economic transition and development. Egypt is currently struggling to overcome a variety of challenges that have prevented it from fully implementing m-government applications. In contrast to other nations across the world, Egypt is still in the early stages of m-government development, which is reviewed in this paper. The challenges facing implementing and developing m-government in Egypt include a discussion of the services for mobile applications provided by the government that are already being utilized. The research methodology involves reviewing the literature on the success of m-government to identify the advantages, challenges, and success factors adopted by each study. The success factors are then categorized according to their influence on the effective implementation of the m-government. Additionally, suggestions are made for how Egyptian m-government could evolve moving forward, and the advantages of using various m-government services for citizens are outlined.

Keywords: *E-government, developing countries, m-services, m-government*

ABSTRAK

Menanggapi kemajuan teknologi informasi dan komunikasi (TIK) dan kebutuhan akan administrasi yang lebih efektif dan efisien, pemerintah di sejumlah negara telah merancang inisiatif m-pemerintah untuk meningkatkan jumlah informasi dan layanan online yang dapat diakses oleh warga negara, lembaga pemerintah, dan lembaga pemerintah. dan bisnis. Pemanfaatan TI untuk menjembatani kesenjangan yang ada antara entitas administratif dan membangun pemerintahan virtual merupakan inti dari konsep mobile Government (m-Government). Sebagai negara berkembang, Mesir mulai berinvestasi dalam infrastruktur komunikasi dan TI pada tahun 1985, ketika Mesir masih dalam masa transisi dan pembangunan ekonomi. Mesir saat ini sedang berjuang untuk mengatasi berbagai tantangan yang menghambat penerapan aplikasi m-Government secara penuh. Berbeda dengan negara-negara lain di dunia, Mesir masih berada pada tahap awal pengembangan m-Government, yang akan diulas dalam makalah ini. Tantangan yang dihadapi dalam penerapannya dan pengembangan m-Government di Mesir mencakup diskusi tentang layanan aplikasi seluler yang disediakan oleh pemerintah yang sudah dimanfaatkan. Metodologi penelitiannya meliputi peninjauan literatur mengenai keberhasilan m-Government untuk mengidentifikasi keuntungan, tantangan, dan faktor keberhasilan yang diadopsi oleh setiap penelitian. Faktor-faktor keberhasilan tersebut kemudian

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dikategorikan menurut pengaruhnya terhadap efektifitas implementasi m-governance. Selain itu, saran-saran juga diberikan mengenai bagaimana m-Government Mesir dapat berkembang ke depan, dan keuntungan dari penggunaan berbagai layanan m-Government bagi masyarakat juga diuraikan.

Kata Kunci: E-goverment, negara berkembang, m-services, m-goverment

I. INTRODUCTION

Innovation in ICTs has changed not just how businesses are operated but also how government services are delivered (Trimi & Sheng, 2008; Elbatanouny et al., 2023). Since the 1990s, public-sector organizations throughout the world have used the Internet and other ICTs in creative ways to provide services, engage citizens, and enhance efficiency through a collection of techniques known as electronic government (e-government) (Magsamen-Conrad & Dillon, 2020).

In order to deliver seamless services to citizens, businesses, and public agencies, e-government is quickly taking over as one of the government's most important tools (Ntaliani et al., 2008). Better government is achieved through utilizing ICT as a tool (Tavares et al., 2020). Because of the distinct features of mobile communication and computing technology, as well as the high penetration rate of smartphones (Mensah, 2021; Osei & Mashamba-Thompson, 2021; Upchurch & Love, 2020), the government and major stakeholders have successfully redirected and rethought the way public services are delivered, moving from the elementary e-government system to the advanced m-government system (Althunibat et al., 2021; Mahmood, 2021). Governments have been able to transition from e-government to m-government because of the acceleration in the usage of mobile technology, such as mobile phones, laptops, and personal digital assistants (PDAs), which can connect to wireless networks (Yang et al., 2021; Elbatanouny et al., 2023). Mobile government (m-government) refers to the use of mobile communication and computer technology to redirect and develop e-government services (Althunibat et al., 2021; Mahmood, 2021).

Mobile government is a comprehensive approach that utilizes all mobile and wireless technology, services, devices, and applications to enhance the benefits for key participants in e-government systems, including businesses, citizens, and all government departments (Kushchu & Kuscu, 2003). Instead of making an unnecessary trip to an administrative building, residents may take advantage of government services wherever they have mobile computing capabilities (Song & Cornford, 2006). As a result of the widespread adoption of mobile technology in both federal and state agencies, residents no longer have to make in-person visits to government buildings to get services (Song & Cornford, 2006). Mobile government facilitates higher efficiency and effectiveness compared to e-government by facilitating the sharing of information in a more convenient, inexpensive, and rapid fashion; fostering m-democracy by increasing public participation; and reducing corruption (Mensah, 2021; Osei & Mashamba-Thompson, 2021).

M-Government is a new development in the delivery of public services and is associated with a larger phenomenon known as mobile-enabled development (m-development) (Trimi & Sheng, 2008). It is also defined as the public sector's use of mobile technology to renovate and facilitate the delivery of services and information via mobile technology to citizens at any time and place (Ahmad & Khalid, 2017; Ishmatova & Obi, 2009; Criado et al., 2013). As a result, governments are rapidly adapting to the public's growing need for more accessible and efficient service delivery by introducing mobile government (the integration of existing mobile infrastructure and wireless technology) as a new communication route (Kuscu et al., 2008; Al-Khamayseh et al., 2006). For a wide range of businesses, the public, and the government, it encourages and ensures mobility and portability (Mengistu et al., 2009). Additionally, immediate access to information, information access personalization, and ease of access to information are all guaranteed to enhance the advantages of using information and, as a result, provide even more advanced e-government services (Krishnan et al., 2013). In comparison to e-government, mobile government is more efficient and effective thanks to cheaper, simpler, and quicker information interchange, increased accountability, less corruption, and improved citizen participation (Trimi & Sheng, 2008; Bertot et al., 2010; Krishnan et al., 2013; Bannister & Connolly, 2014). However, the primary obstacles for governmental agencies are delivering safe mobile services with a strategic effect, handling the complexities of several mobile technologies, and creating safe connections for dependable service (Althunibat et al., 2021).

The pervasiveness and rapid expansion of mobile and wireless technologies present an opportunity to improve mobile government services due to the mobility of mobile government, which allows and simplifies citizen access to ubiquitous services that are inaccessible in e-government (Chen et al., 2016; Kim & Hwang, 2012). Mobile technology's location-based features allow it to estimate a device's location, develop a service that is dependent on that location, and then transmit the location-enhanced service to the device in demand (Samsioe & Samsioe, 2002). Based on the predicted location of individuals, these features of context awareness and ubiquitous access can make it easier to offer mobile government services. For example, this location-based potential has made it possible to provide mobile government services for disaster management and service delivery (Aloudat et al., 2016). However, the opportunity for developing countries in mobile government largely remains unexplored, even though governments in developing countries are making increasing efforts to expand mobile network infrastructure in order to provide citizens with greater access to information and services via wireless devices (Kim et al., 2004; Mahmood, 2021).

The primary objective of this paper is to gain a better understanding of the idea of mobile government in developing countries, specify the services with the most impact, highlight M-Government adoption barriers in developing countries, and discuss some of the primary problems and opportunities in offering mobile services in developing countries, as well as the steps to effective implementation and the factors that influence citizens' adoption of m-government services in Egypt.

This study represents a novel examination of the existing literature on the efficacy of mobile government. Its primary objective is to identify the various benefits, challenges, and factors associated with the success of mobile government initiatives, as reported in previous studies, and provide the researchers with accumulative knowledge.

The current report is divided into the following sections: Section 2 presents m-government and application. Section 3 mentions m-government adoption barriers in developing countries, while Section 4 challenges mobile government in developing countries. Section 5 is about m-government initiatives in Egypt. Section 6 is devoted to conclusions and recommendations.

II. M-GOVERNMENT AND APPLICATION

An overview of relevant research efforts is provided in this section, including m-government, e-government, applications of mobile government, and the idea of mobile services.

A. M-Government

Mobile government (m-government) and electronic government (e-government) should not be viewed as separate concepts. E-government is the utilization of all available technologies to provide services to citizens, enhance government activities, and simplify government procedures. M-government is considered a subcategory of e-government. Figure 1 depicts the employment of mobile and wireless communication technologies within government administration and in the delivery of services and information to citizens and businesses (Kushchu & Kuscu, 2003; Al-Khamayseh & Lawrence, 2006). In contrast, mobile government is an extension of electronic government that is limited to the use of mobile technologies such as mobile phones, PDAs, Wi-Fi-enabled devices, Bluetooth, and wireless networks in the delivery of services. Furthermore, m-government is a superior alternative to e-government for providing information and public services to citizens since it is available anywhere, at any time, and via any internet-enabled device (Ahmad & Khalid, 2017).

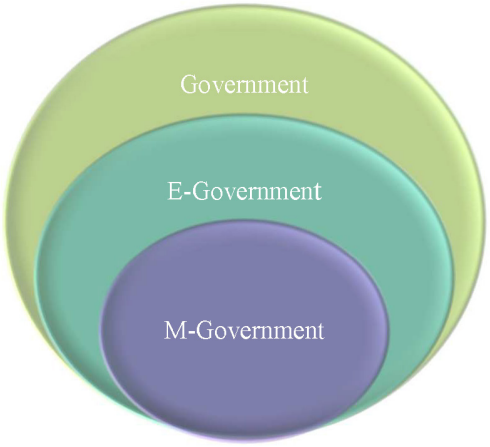

Figure 1: M-government and E-government. Source: Mahmood (2021)

The movement towards m-government has been supported by the increasing capabilities of mobile technologies and their associated systems, devices, and infrastructures, as well as their acceptance in both developing and developed countries (Rakotonirainy et al., 2000). Similar to electronic government, mobile government functions on four distinct interaction levels, as seen in Figure 2.

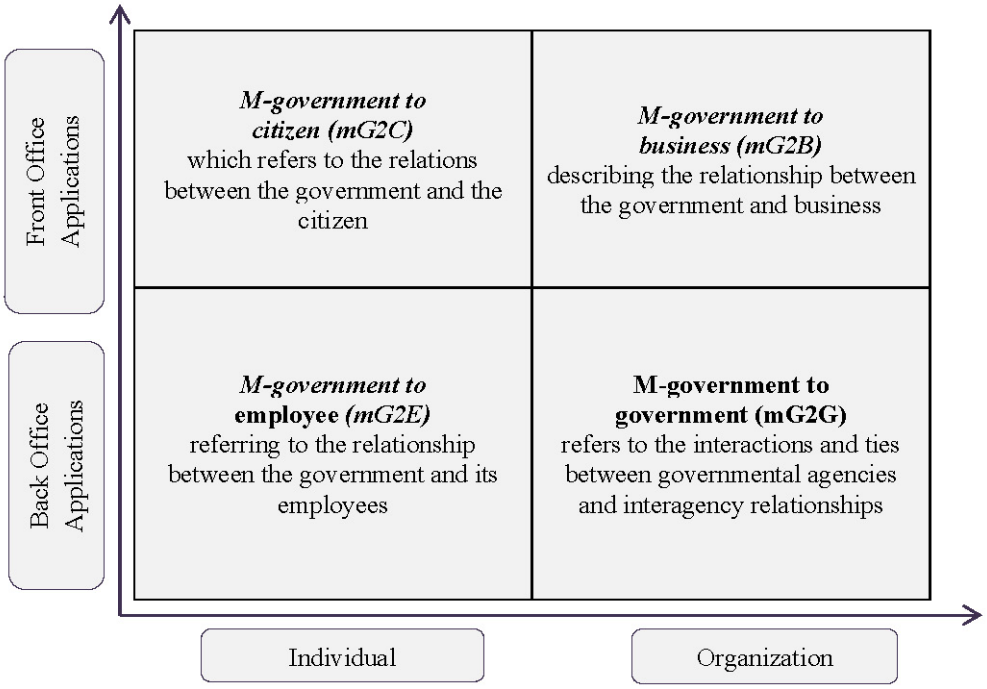

Figure 2: M-government Services' Nature. Source: Mengistu et al. (2009)

Currently, mG2C is the most developed kind of engagement on a worldwide scale (Binbasioglu & Turk, 2020). Hence, mG2C interaction is the focus of our study, allowing individuals convenient, anytime, anywhere access to government services. According to Ntaliani et al. (2008), m-government services may offer the following assistance and solutions to citizens:

Table 1: M-government to Citizen (M-G2C)

Support and Solutions	Descriptions
Mobility and accessibility	The primary benefit of m-government is its unparalleled mobility, which enables you to communicate with individuals all over the world at any time and from any location. This feature expands the reach of government by allowing people to access government services outside of normal business hours (Pepper et al., 2009; Azeez & Lakulu, 2019).
Location-based public service delivery	Location-based public services are made possible by the geographical capabilities of mobile devices (Nzimakwe, 2018).
Information is delivered on time	The real-time connectivity and speedier access provided by mobile devices can ensure the timely availability of vital and specialized data and information (Azeez & Lakulu, 2019).
Ease of use	Because of their increasing adaptability and versatility, mobile devices have become increasingly useful and user-friendly (Abu Bakar et al., 2017).
Emergency services	Mobile and wireless technology can be used to swiftly share information during crises and natural disasters (El-Kiki & Lawrence, 2006; Li et al., 2018).

M-government seems to be a useful method for minimizing wasteful government spending and assisting residents and businesses in rural areas, which are far from the places where decisions and policies are made (Li et al., 2018).

B. Why M-Government?

Youngblood & Youngblood (2018), Abu Bakar et al. (2017), and Li et al. (2018) highlight some of the alluring characteristics that encourage mobile government adoption in developing countries.

Mobile technologies are becoming increasingly popular due to their increasing penetration, accessibility, low cost, ease of learning, easy infrastructure setup, improvement in e-government efforts, and increasing scope of electronic government. M-

government applications may become a crucial way in developing countries to contact individuals in remote places and encourage communication exchange (Li et al., 2018).

C. Applications for M-Government

M-Government can be used for four primary government and public administration functions, including m-communications, m-services, m-democracy, and m-administration, as stated in Mengistu et al. (2009), Hossain et al. (2015), Aljazzaf et al. (2020), and Binbasioglu & Turk (2020), illustrated in Figure 3:

- M-Communication: Transmission is not an easy operation. It serves as the basis for citizens. Citizens cannot develop knowledgeable judgments or act meaningfully on problems they care about unless they have access to relevant information.
- M-Services: Facilitating G2C transactions and setting up a channel of engagement between citizens and the government via SMS, including M-Library, M-Teacher, M-Parking, and emergency communication, are a few instances of pre-existing M-Services.
- M-Democracy: As an m-government application, m-Voting has the potential to greatly increase citizen engagement in political decision-making through the use of SMS and mobile devices.
- M-Administration: M-government presents possibilities for improving the efficiency of government agencies.

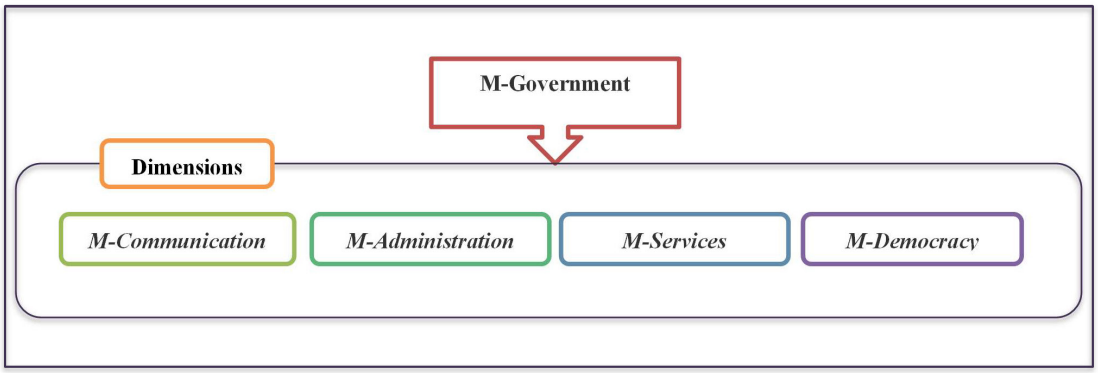

Figure 3: Mobile Government Dimensions. Source: Amailef and Lu (2008)

According to McKelvey et al. (2021), the application may be divided into four interactions and two domains, such as back-office and front-office applications. The use of wireless or mobile technology in intra- and inter-governmental affairs (mG2E and mG2G) to increase government efficiency and reduce costs is mostly concerned with back-

end technology. The second area focuses on employing wireless and mobile technology to provide government services to companies (mG2B) and consumers (mG2C).

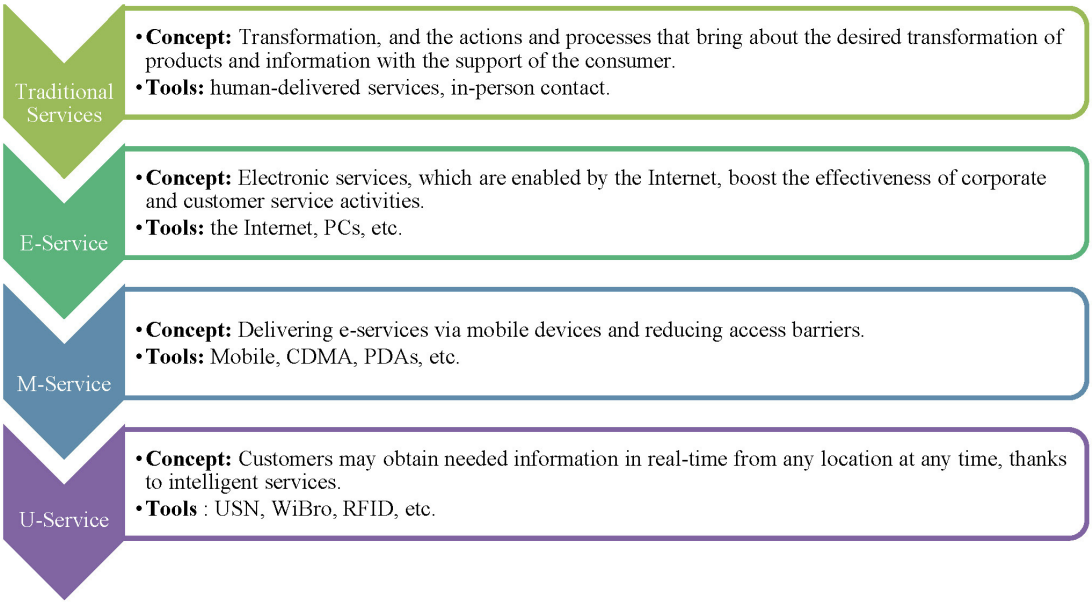

Figure 4: Several Service Generations. Source: McKelvey et al. (2021)

D. M-Services

Electronic services, also known as e-services, are a solution that is frequently used to integrate information and communication technologies into the customer support process. They relate to any and all traditional forms of services that can be provided in an electronic format. Expand e-services with wireless internet and m-services, which are services that can be used on portable electronic devices like cell phones and PDAs (McKelvey et al., 2021). Figure 4 is a list of the different types of services and how they have transformed over time. Table 2 lists the services based on the two mobile government application domains. The table also indicates the services' level of complexity and cost.

Table 2: M-government application services

Complexity/Cost	Front Office Applications	Back Office Applications
Low ↕ High	**Information provision:** SMS alerts for different situations (such as energy shortages, results notifications, and meetings), job postings, public transportation, tourism, weather, and location-based services are all available (LBSs).	**Field survey/inspection:** management of data, meter reading, land usage and pricing, consumer price indexes, etc.
	Emergency report response: reporting accidents, fires, and other severe disasters, as well as implementing emergency steps.	**Facility/project management:** buildings, parking spaces, transportation facilities, construction projects, storage inventories, etc.
	Information collection/poll/voting: bulletin board, monitoring of policy, opinion polling, voting, etc.	**Regulation/police/law enforcement:** enforcement of driving and parking laws, incident reporting, and monitoring of pollutants, etc.
	Permit/licensing/registration: submitting an application, registering, obtaining a permit, etc.	**Teleworking/collaboration:** out of the office; penalties and transactions; wireless information exchange among departments and agencies; etc.
	Tax/payment: Payment can be made for taxes, fees, charges, and fines via mobile devices.	

Source: McKelvey et al. (2021)

III. CHALLENGES TO M-GOVERNMENT ADOPTION IN DEVELOPING COUNTRIES

Regarding the state of the technical environment and infrastructure, developing countries are much less developed than developed countries, most likely because technology is created in developed countries while developing ones import it. Due to a lack of a domestic ICT industry, several developing countries import ICT. Researchers have implicated strategic, technological, policy, and organizational factors in this issue (Mensah & Mwakapesa, 2022). There are a variety of legal, political, social, and economic obstacles that prevent developing countries from fully utilizing e-government; this led to the development of mobile government (Karadimas et al., 2008; Wirtz & Birkmeyer, 2018).

According to Zhu & Hou (2021), introduce the elements influencing the success of electronic government. There is a lack of effort to promote the benefits of e-government, a lack of skilled employees and training, a lack of financially stable institutions, a lack of

trained staff, and an absence of strategic planning. In the end, this will cause individuals to act against their m-government. The failure to successfully deploy m-government in developing countries is predicted to be caused by the factors summarized in Table 3 (Azab et al., 2009; Azeez & Lakulu, 2019; Creutzberg et al., 2023).

Table 3: Barriers to Developing M-Government

Area	Barriers
Strategy	Absence of shared e-government aims and objectives
	E-government milestones that are overly ambitious
	Not having enough ownership and governance
	Lack of implementation instructions
	Funding problems
Technology	Architectures that don't work well together
	Data standards that are incompatible
	Several security models
	Older systems are difficult to replace
	Technical standards that don't match
Policy	Concerns about the privacy of citizens
	Changes in e-government policy
Organization	Agency readiness is lacking. Slow rate of change in government
	Lack of a leader in e-government
	Government processes that have been around for a long time
	Lack of the right management and technical skills in-house

Source: Azab et al. (2009), Azeez and Lakulu (2019), and Creutzberg et al. (2023)

By utilizing current e-government infrastructure, developed nations are already benefiting from mobile governance. By creating a new channel, mobile government platforms give individuals a more convenient and reliable way to access government services. Using the GPS capabilities of smartphones, the systems also provide services at a more neighborhood level (Fei, 2021).

Because the quantity of fixed phone lines and personal computers in developing countries is so low, the use of wireless networks or mobile devices seems to be preferable. As a direct consequence of this, mobile devices, interactive voice response (IVR), and the short message service (SMS) are all deployed (Karadimas et al., 2008). Even though it's hard to get people to use it, m-government is a better option in developing countries where there isn't a lot of infrastructure for the internet but there is a lot of mobile connectivity. Tools like SMS can help the government talk to its citizens in a good way (Mensah & Mwakapesa, 2022).

The Internet could serve as an alternate network connection method for accessing electronic services. It could also save money and time for the governments of developing countries by making it possible for them to use less of the heavy infrastructure needed for wired networks (Ghyasi & Kushchu, 2004). Delivering information is a crucial duty of the government to keep people informed about what is going on around them, especially in situations where they must make decisions. Mobile networks might be a key conduit for governments to give timely information, demonstrating the government's accountability to the country's democracy (Marinkoviæ & Kaliniæ, 2020).

M-Government implementation faces challenges despite its benefits. M-government must handle usability (limitation on mobile devices), interoperability (platforms, roaming), and privacy protection (Abbassy & Mesbah, 2016).

Privacy: Privacy and security are special issues in wireless technology due to the anonymity provided by network connections. Citizens expect government agencies to protect their essential data from unauthorized agencies and hackers to prevent misuse. For instance, internet payment infrastructure still lacks confidence and is prone to credit card abuse. Wireless networks deliver protected data across public airwaves, which hackers may readily intercept and manipulate. Hence, m-Government planning should priorities picking secure and private mobile devices (Zaied et al., 2017).

Citizens' Readiness: M-government requires citizens' acceptance and support. In developing countries, individuals require instruction on how to utilize mobile technology for transactions since they are unfamiliar with electronic government and mobile government (Mengistu et al., 2009).

Legal Issues: Before implementing m-government practices, governments must consult with citizens. There are still many countries that have not adopted the law on fair information practices, which outlines data subjects' (citizens') rights and data holders' responsibilities (government). In some circumstances, mobile documents and transactions are not recognized by the law. The government's ability to operate, rules, and laws regarding e-transactions, e-signature, and e-taxable transactions need to be clarified (Mensah & Mwakapesa, 2022).

Compatibility: Content, semantics, and interoperability must be standardized globally across agencies and networks if mobile services are to be used as a means of communication between the government and its citizens. Developing long-term architectural and technology frameworks is essential for meeting important interoperability and scalability requirements in light of the proliferation of new opportunities in communication technology, the quick introduction and changing of standards, and the large variety of mobile devices with diverse technological capabilities (Mengistu et al., 2009).

Power Limitation: A problem that does not exist in a dispersed wired system, mobile computers are concerned about their restricted power supply. Increasing battery life and reducing weight are also possible through hardware advancements. In addition, efficient software activities can reduce power usage (Zakaria, 2015).

Download rates are slow because wireless networks offer less bandwidth than wired networks. Mobile applications must thus be carefully created to manage bandwidth use. Data compression and recording requests to aggregate many short ones are among the software strategies needed to enhance efficient bandwidth use (Mengistu et al., 2009).

According to Mensah & Mwakapesa (2022) and McKelvey et al. (2021), there are three basic ways for governments in developing countries to begin utilizing m-government.

First, during disasters like earthquakes, fires, floods, and epidemics, it is important to have a way to quickly and easily get in touch with the public. Most of these services are given by the government to its citizens, and information only goes in one direction. **Second**, more citizens will be able to take part in government activities if more interactive m-government applications are created. This will lead to more participation, more accountability, and a stronger democracy. **Finally**, the potential exists to create highly engaging m-government applications (Ghyasi, 2009). These applications range from the most fundamental tasks, such as paying taxes and bills, to conducting inquiries, and go all the way up to mobile identity cards, in which a citizen's mobile phone acts as a driver's license, health insurance card, payment wallet, and identification card (Anwar et al., 2021).

IV. CASE STUDIE (CURRENT E-GOVERNMENT AND M-GOVERNMENT SERVICES IN EGYPT)

In Egypt, Zakaria (2015), Liang et al. (2021), and Elbatanouny et al. (2023) discuss some of the challenges that the Egyptian government is experiencing. Among these difficulties are the lack of an e-signature mechanism, privacy and security issues, e-payment transaction obstacles (credit card penetration is low, and there appears to be a paucity of payment tools for ordinary citizens), delivery mechanism inconvenience and its impacts on e-service quality reputation, low internet penetration rates, as well as a lack of computer literacy. Concerns have been raised regarding a lack of citizen awareness, engagement, and study; reluctance towards and mistrust of automation; and rigidity towards change.

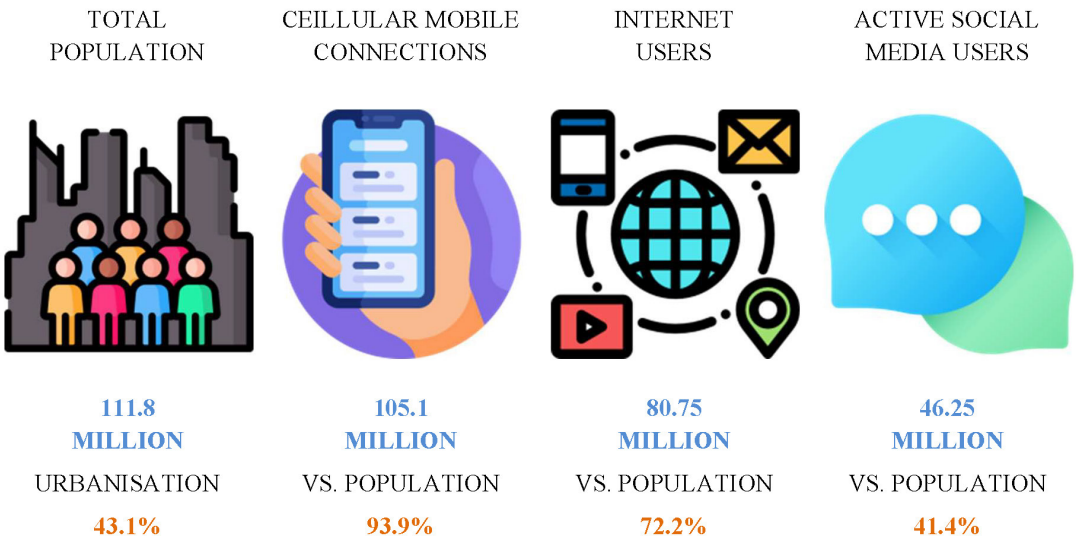

Figure 5: Essential Digital Headlines. Source: MCIT (2023)

As previously stated in earlier sections, the implementation of m-government services is in its early stages. Yet, a beginning has been made, for instance:

Table 4: Current M-Government Services in Egypt

	Applications	Government Agencies	Description
Government News/ Information Updates	IDSC	The center for information and decision support was launched in 2020	Provides updated data and information from its various sources to highlight the performance of different sectors.
	Egypt - Ministry of Justice	Egypt's Ministry of Justice was launched in 2021	Provides the most important and largest legal information, whether in law, court rules, or the Encyclopedia of Public Prosecution.
	Presidency of the Arab Republic of Egypt	The presidency of the Arab Republic of Egypt, launched in 2020	Presidential-related information can be found here, such as news, Palaces 360 tours, former presidents, national projects, Egyptian currencies, augmented reality, and much more interesting stuff, etc.
	Egyptian Ministry of Finance	Egyptian Ministry of Finance	Access to the required information in the fastest and easiest way.

Government Services	Egypt Health Passport	Launched in 2020 under the patronage of the Ministry of Health and Population	Egyptian nationals and residents registered in the COVID-19 vaccination program can safely sign up for an account, check their vaccination records, and share information with others. User vaccination records, including scheduled appointments, are displayed.
	I would like to make a power of attorney	Ministry of Justice Egypt Launched in 2022	Enables the citizen to reserve a special role by mobile before going to the documentation office.
	Smart electricity services	The Egyptian Electricity Holding Company was launched in 2022	Compatible and integrated with all other electronic services provided to the citizen, which enable the citizen to apply for his own services electronically through an integrated and secure digital system that depends on the application of citizen-needed standards of effective use and the provision of electronic payment services to citizens.
	Shoaa	The Egyptian Electricity Holding Company was launched in 2022	Delivering a genuine reading to the citizen and ending the problems related to reading errors and averages using all documented and safe technological means.
	Calculate your bill	Agency for Regulatory Control of Electricity Utilities and Consumer Protection, launched in 2022	Provides a set of services that help the consumer know how to calculate the electricity bill and its various segments, as well as the most important guidelines and tips to rationalize electricity.
	My NTRA	The National Telecommunications Regulatory Authority of Egypt (NTRA) launched in 2021	Provides the user with comprehensive information regarding the Egyptian telecom service and how to use it securely. It also informs users of their rights and responsibilities when using telecom services in Egypt. In addition, it offers the user interactive content, such as service

		quality maps, and interactive services, such as querying mobile number portability (MNP) requests, creating complaints, testing internet and network quality, etc.
Egaby	The Center for Information and Decision Support was launched in 2022	The application can be made by submitting an official complaint to the competent authorities, and it can also be used to obtain some government statistics and follow up on government news and developments.
Egypt Post	Egypt Post 2022	Carrying out some tasks such as knowing the addresses and locations of post offices, knowing the postal code for any area, tracking shipments, and calculating the cost of the shipment.
My reading (water meter reading)	The Holding Company for Drinking Water and Wastewater Launched in 2021	Communicating with all clients to update the actual reading avoids accumulations that occur due to the reader's absence or passing at inappropriate times for the subscriber.
The Holding Company for Drinking Water and Wastewater	The Holding Company for Drinking Water and Wastewater Launched in 2022	Users receive notifications, water cut-off periods, corporate news, and state updates. The firm also provides water-saving advice on an information screen. The app lets citizens submit complaints and suggestions to the company for any governorate or region.
Kalem Masr	Egyptian Ministry of Emigration Launched in 2021	Featuring a wide range of informative content, including the Ministry's latest news articles from local and regional media outlets, an embassy locator in Egypt based on your location, a section with many valuable offers, and a complaints section where users can submit feedback on issues and get quick answers.
EGYPTAIR	Ministry of Aviation Launched in 2020	flight booking to flight status and check-in.

	Egyptian National Railways	Egyptian National Railways Launched in 2021	The user of the application can purchase an electronic ticket for railways; the ticket can be read electronically by the electronic gates and presented for validation by the controller.
	Egyptian Knowledge Bank	Egyptian Knowledge Bank Launched in 2021	The Egyptian Knowledge Bank for Egyptian students all over the world helps the student know everything about education in all educational stages.
	CPA-Consumer Protection Agency	Consumer Protection Agency Launched in 2022	Provides citizens with data about consumer products, advice, guidance, and news that emphasizes the CPA's functions in service and consumer protection.
	At your service	The Center for Information and Decision Support was launched in 2022	It gives citizens privacy when dealing with the various agencies of the Egyptian government via the unified system of government complaints.
	E-Tadweer Misr	The Ministry of Environment launched in 2022	Empowers the supply chain for the recycling industry. As well as decrease the environmental impact of e-waste contamination on the environment.
	Egypt Hajj	Ministry of Health and Population launched in 2020	The Egyptian Medical Mission in the official Hajj Mission facilitates the receipt of services they may need, provided by the official mission of the Egyptian Ministry of Health. This application is special for the pilgrims of the Egyptian official mission to Hajj.
	Egyptian e-Invoicing	Egyptian Tax Authority launched in 2022	Allows taxpayers to manage their invoices, credit notes, or debit notes on the go.
	NUCA	Urban Communities Authority Launched in 2020	"NUCA" was established to connect the ministry, citizens, and investors. The application informs investors about new city investment possibilities.

	Egypt - Ministry of Justice	Egypt's Ministry of Justice was launched in 2022	An application specifically for the Egyptian Ministry of Justice to offer electronic services to judges
	Noor	The Egyptian Information and Decision Support Center launched in 2022	This application was launched to create an audible digital library for blind and visually impaired researchers and access to all publications within the Egyptian government's desire to improve the quality of life for people with special needs.
Agricultura Services	Bashaier	Egyptian Ministry of Agriculture Launched in 2022	The application helps farmers learn about approved methods for getting rid of agricultural pests. It also gives constantly updated lists of all the registered pesticides, companies, and distributors and explains the best way to use pesticides to grow crops that meet health, safety, and security standards, whether for export or the local market. The application also makes it easier to talk with exporters and companies. agricultural industrialization
Financial Services	Sahl	EgyptPay Agency Launched in 2022	A simple and secure way to manage, track, and pay your bills, all in one place.
	InstaPay Egypt	The Central Bank of Egypt launched in 2022	Enables citizens to pay and receive money promptly, safely, and easily using their mobile phone, 24 hours a day.
Law Enforcement	Egyptian Ministry of Interior Services (MOI)	Egyptian Ministry of Interior (MOI) Launched in 2021	In addition to displaying Egyptian Ministry of Interior news and the most recent developments, the Egyptian Ministry of Interior application offers electronic services in seven main fields. Civil status, security wanted persons, Hajj services, lost cars, missing persons, work permits, and complaints are the seven areas.

Source: MCIT (2023)

The Ministry of Communications and Information Technology (MCIT) has begun constructing Digital Egypt as part of Egypt's digital transformation strategy and in line with Egypt Vision 2030. The goal of Digital Egypt is to turn Egypt into a digital society, and the strategy is comprehensive. "Digital Egypt" rests on many crucial pillars to facilitate this shift towards a digital society and to create a robust digital economy (MCIT, 2023).

1. Digital Transformation

To deliver public services more quickly and easily, Egypt has been implementing a solid plan and a strong course of action to transition the current community ecosystem and government services into a totally digital and data-driven ecosystem. MCIT aims to create public benefit by making it easier for people to access government services and information and by making it more efficient for the government to operate (MCIT, 2023).

Building and modernizing the national information infrastructure is the first step towards achieving digital transformation. The Administrative Control Authority (ACA) and state agencies worked together to create the information infrastructure, which helped create a complete digital picture of people's entitlements. Additionally, large data centers have been developed to host, safeguard, preserve, and protect data. The facilities were constructed to the highest technical and insurance specifications (MCIT, 2023).

The MCIT collaborates with all parts of the government to make digital change happen. This is done through two pillars: providing services to people and making the government work better. All public services will be offered online, all over the country, to all citizens. Regardless of where they reside in the country, Egyptians will have access to these services in digital format. Several online payment options for service fees have been established (MCIT, 2023).

A website for the Egyptian government has been created to connect government buildings across the country. In total, over 33,000 buildings have been connected. Also, the government-to-government (G2G) system, which allows government agencies, departments, or organizations to share data and/or information systems electronically, has been improved. Through the system, state agencies can talk to each other and coordinate activities so that people can get services from a single entity (MCIT, 2023).

2. Digital Egypt e-Platform

To facilitate citizens' use of many different types of government services, the Egyptian government has launched the Digital Egypt e-platform. In collaboration with the Ministries of Supply and Internal Trading, Justice, Public Prosecution, Interior, and Agriculture, a variety of entirely digital services have been introduced on the platform. Services offered in collaboration with the service-providing companies are made accessible on the platform

in the form of traffic, supply, notary, real estate, court, commercial register, and real estate tax, as well as social housing, civil status, and licensing. Additionally, there are other features that will be made progressively available (MCIT, 2022).

- **There are four channels via which citizens can access government-provided digital services:**
  - Call Center
  - Post Offices
  - Mobile Applications
  - Digital Egypt e-platform (https://digital.gov.eg/, http://misr.gov.eg/)
- **Various payment options have also been made available, including:**
  - Mobile wallets
  - e-Payment companies
  - Bank cards

3. Electronic Signature

In accordance with Law No. 15 of 2004 on Electronic Signatures, the Egyptian Root Certificate Authority (Root CA) was established under the auspices of the Information Technology Industry Development Agency (ITIDA). In addition to establishing foundations for digital transformation and creating IT applications and tools for e-signature use, the law controls the e-signature system and digital transactions. Intending to speed up the digital transformation plan and realize the country's vision of converting the government into an advanced digital platform, the information and communications technology minister's decree No. 361 of 2020 amended the law's executive regulations (MCIT, 2023).

With the help of an e-signature, a citizen's identification can be digitally verified from any location. With the advent of the electronic signature, it is now possible to get access to services that formerly necessitated physical presence and identity verification (Ppallan et al., 2021). ITIDA worked with departments and organizations to develop apps for the government and law enforcement. Additionally, to assist the transition to the new administrative capital, e-government technologies were built, with each employee having access to an e-signature tool to promote effective paperless operations in the new workplace (MCIT, 2022).

4. Mobile Phone Services

Mobile networks have been set up along major roads and in some parts of governorates to improve contact. Mobile services for people are also improved by making it faster for mobile companies to get permission to build cell towers and by giving them access to new frequencies that enhance the functionality and reliability of communication networks. MCIT is also making rules that will make it easier and faster to build new cell towers (MCIT, 2023).

5. Legislations and Governance

Egypt is going through big changes in the way it provides telecommunications services and moves toward becoming a digital society. Because of this, the Egyptian government has made it a major priority to expand the information and communications technology (ICT) industry, adapting to new technologies and developing a cutting-edge ecosystem. MCIT is collaborating with other agencies of the government to alter the legislative process by proposing several new laws. Laws have been passed about cybercrime, intellectual property, customer security, and electronic signatures. The Personal Data Protection Law that Egypt recently enacted is compliant with the European Union's General Data Protection Regulation (GDPR) and other international regulations, as well as the executive order putting "the Anti-Cyber and Information Technology Crimes" Law into effect (MCIT, 2022).

These recommendations can facilitate Egypt's effective implementation of M-government (El-sofany et al., 2012; Zakaria, 2015; El Batanony & Abd El Aziz, 2015; Abbassy & Mesbah, 2016; Zaied et al., 2017; Youngblood & Youngblood, 2018; Sharma et al., 2018; Barnes et al., 2019; Hur, 2019; Mossey et al., 2019; Correa et al., 2020; Rocha et al., 2021; Pan & Zhang, 2021).

1) Reengineering government procedures in accordance with m-government requirements.
2) Reviewing other countries' administrative and technical experiences in order to benefit from their experience in the implementation of m-government.
3) All online transactions in Egypt should be managed by a dedicated m-payment system integrated with all of Egypt's banking channels as part of the country's m-government application.
4) For m-government portals to be utilized safely, the government needs to partner closely with business companies and individuals.
5) Create applications that are suited to the requirements and characteristics of individuals, including simple payment options.

6) Service providers must routinely examine M-government services to guarantee their functionality, performance, and accessibility.
7) Through the use of M-government services, work processes and methods must be examined to guarantee simplicity, efficiency, accessibility, and cost savings.
8) Assess and report on these on a regular basis to all stakeholders in order to implement any necessary corrective actions.
9) Increase access to m-services and the benefits of CITs by expanding infrastructure coverage in underprivileged regions, encouraging wider use of CITs by enterprises situated outside of technology parks, and introducing creative methods to target Arabic-speaking users.
10) The development of services and content using mobile platforms needs to receive a lot of attention.
11) Free Internet, which can aid in the resolution of m-service access issues and increase Internet penetration.
12) Collaborate with the commercial sector to provide appropriate m-content and training programs.
13) Provide a favorable environment that stimulates the creation of mobile content in the local language.
14) In order to be useful to the community, citizen-generated content must be relevant to its target audience.
15) Create and implement advertising plans for print media (magazines and newspapers), electronic media, and broadcast media (radio shows and television).
16) Create audiovisual and textual applications, as well as educational programs, for use in m-government initiatives.
17) Process resistance that stems from a lack of adaptability or apprehension of change.
18) Make some basic e-government teaching materials available to students in elementary and secondary schools.
19) Develop an action plan for gradual adoption in order to cope with resistance to change and guarantee that the changes do not look damaging to the bureaucracy.
20) Encourage government employees to participate in the workflow reform process by scheduling regular meetings between m-government officials and essential employees.
21) Having more than one auditing body could slow down work.
22) Authority overlaps across government agencies, which may hinder integration and collaboration.

V. CONCLUSIONS AND RECOMMENDATIONS

Developing countries should assess the possibilities of mobile technology to enhance access to public information and services for the general populace and change their current plans, programs, and procedures accordingly. M-government needs to be put in place as an important part of e-government reform. Access to information is the first step in implementing m-government, which will allow citizens to do things like retrieve messages, report emergencies, pay taxes and fees, and apply for licenses and registrations.

The success of m-government involves both government and citizen participation; hence, providing services is just one part of the m-government formula. Obtaining acceptance and widespread, consistent use by citizens is a further, more difficult challenge. It's important for services to be provided in ways that customers are comfortable with and open to using. The content should be concise, focused, and pertinent. Applications that are required to have security must have the user comply with a minimal set of standards. Acceptance of m-government services is possible with correct design and implementation. Egypt's m-government should have a vision of enhancing the effectiveness and productivity of the public sector, providing efficient services to individuals and businesses in a comfortable manner, and enhancing the integrity and timeliness of access to government data. The results of this study have revealed that Egypt offers a relevant and helpful online portal as well as a variety of mobile applications for e-government services and transactions. Due to a lack of publicity, many citizens are unaware of them.

Managerial implication The Egyptian government has made substantial investments to make the e-government portal and its mobile applications available. However, the return on investment cannot be realized unless end users are familiar with, embrace, and completely employ these tools. Therefore, the management of MCIT is encouraged to consider the identified factors for raising awareness about MCIT. In addition, they are encouraged to enhance the mobile application requirements stated in this study. The infrastructure and realities of Egypt present several obstacles to the incorporation of mobile government into the way the government operates to guarantee the delivery of high-quality services. Mobile phones are pervasive in the majority of the community, and although they are not free, they are stable and virtually ubiquitous. Utilizing existing technology and infrastructure to guarantee quality service delivery offers numerous advantages. However, relatively few studies have been conducted on the use of mobile technology in social research in Egypt, which differs from the rest of the world in that the technology is not used primarily for its mobility but rather for its ability to access communities, collaborate, and communicate. There are very few mobile applications available to assist government agencies in delivering quality services. This research has emphasized some of the prospective ways in which the implementation of m-government systems will empower citizens in developing countries. Therefore, the implementation of

m-government will afford developing countries the chance to utilize mobile phones as a crucial instrument for empowerment and development.

REFERENCES

Abbassy, M. M., & Mesbah, S. (2016). Effective e-government and citizens adoption in Egypt. *International Journal of Computer Applications*, *133*(7), 7-13.

Abu Bakar, N. S., Abdul Rahman, A., & Abdull Hamed, H. N. (2017). m-Government: Benefits and its Key Attributes for Personalized Services.

Ahmad, S. Z., & Khalid, K. (2017). The adoption of M-government services from the user's perspectives: Empirical evidence from the United Arab Emirates. *International Journal of Information Management*, *37*(5), 367-379.

Aljazzaf, Z. M., Al-Ali, S. A., & Sarfraz, M. (2020). E-participation model for kuwait e-government. *International Journal of Advanced Computer Science and Applications*, *11*(2).

Al-Khamayseh, S., & Lawrence, E. (2006). Towards citizen centric mobile government services: a roadmap. *CollECTeR Europe 2006*, *129*.

Al-khamayseh, S., Lawrence, E., & Zmijewska, A. (2006). Towards understanding success factors in interactive mobile government. In *the Proceedings of Euro mGov*.

Aloudat, A., Michael, K., Chen, X., & Al-Debei, M. M. (2014). Social acceptance of location-based mobile government services for emergency management. *Telematics and informatics*, *31*(1), 153-171.

Althunibat, A., Alokush, B., Tarabieh, S. M., & Dawood, R. (2021). Mobile Government and Digital Economy Relationship and Challenges. *International Journal of Advances in Soft Computing & Its Applications*, *13*(1).

Amailef, K., & Lu, J. (2008). m-Government: A framework of mobile-based emergency response systems. In *2008 3rd International Conference on Intelligent System and Knowledge Engineering* (Vol. 1, pp. 1398-1403). IEEE.

Anwar, A., Thongpapanl, N., & Ashraf, A. R. (2021). Strategic imperatives of mobile commerce in developing countries: the influence of consumer innovativeness, ubiquity, perceived value, risk, and cost on usage. *Journal of Strategic Marketing*, *29*(8), 722-742.

Arab Republic of Egypt Ministry of Communications and Information Technology. (2023). Egypt's ICT 2030 Strategy. Available: https://mcit.gov.eg/en/ICT_Strategy ,Last accessed: [7th July 2023]

Arab Republic of Egypt Ministry of Communications and Information Technology.(2022). Egypt's ICT 2030 Strategy. Available: https://mcit.gov.eg/en/ICT_Strategy ,Last accessed: [12th Dec 2022]

Azab, N. A., Kamel, S., & Dafoulas, G. (2009). A suggested framework for assessing electronic government readiness in Egypt. *Electronic Journal of e-Government*, *7*(1), pp11-28.

Azeez, N. D., & Lakulu, M. M. (2019). Review of mobile government at developing countries: benefits and challenges. *International Journal of Economics, Business and Management Research*, *3*(2), 198-219.

Bannister, F., & Connolly, R. (2014). ICT, public values and transformative government: A framework and programme for research. *Government information quarterly*, *31*(1), 119-128.

Barnes, S. J., Pressey, A. D., & Scornavacca, E. (2019). Mobile ubiquity: Understanding the relationship between cognitive absorption, smartphone addiction and social network services. *Computers in human behavior*, *90*, 246-258.

Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010). Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies. *Government information quarterly*, *27*(3), 264-271.

Binbasioglu, H., & Turk, M. (2020). Mobile technology acceptance among Turkish travelers. In *Digital Marketing Strategies for Tourism, Hospitality, and Airline Industries* (pp. 111-140). IGI Global.

Chen, Z. J., Vogel, D., & Wang, Z. H. (2016). How to satisfy citizens? Using mobile government to reengineer fair government processes. *Decision Support Systems*, *82*, 47-57.

Correa, T., Pavez, I., & Contreras, J. (2020). Digital inclusion through mobile phones?: A comparison between mobile-only and computer users in internet access, skills and use. *Information, Communication & Society*, *23*(7), 1074-1091.

Creutzberg, J. H., Klein, A. Z., & de Matos, C. A. (2023). Factors that influence the adoption of mobile government (M-gov): a proposal of A unified model. *Information Systems Management*, *40*(1), 29-46.

Criado, J. I., Sandoval-Almazan, R., & Gil-Garcia, J. R. (2013). Government innovation through social media. *Government information quarterly*, *30*(4), 319-326.

El Batanony, S., & Abd El Aziz, R. (2015). Investing in information technology to acquire a competitive advantage in Egyptian companies: a mixed methods approach. *International Journal of Applied Engineering Research*, *10*(9), 21711-21728.

Elbatanouny, S., Dafoulas, G., & Saleeb, N. (2023). Exploring Factors Affecting Mobile Government Services Adoption in the Egyptian Context. Journal of Theoretical and Applied Electronic Commerce Research, 18(4), 1820–1837. MDPI AG. Retrieved from http://dx.doi.org/10.3390/jtaer18040092

El-Kiki, T., & Lawrence, E. (2006). Mobile user satisfaction & usage analysis model of MGovernment services. In *Verified OK*. Consortium International.

El-sofany, H. F., Al-Tourki, T., Al-Howimel, H., & Al-Sadoon, A. (2012). E-Government in Saudi Arabia: Barriers, challenges and its role of development. *International Journal of Computer Applications*, *48*(5).

Fei, D. (2021). Chinese telecommunications companies in Ethiopia: The influences of host government intervention and inter-firm competition. *The China Quarterly*, *245*, 186-207.

Ghyasi, A. F. (2009). m-Government: Cases of Developing Countries. Mobile Government Lab. http://www.mGovlab.org. Last accessed: [12th July 2022]

Ghyasi, A. F., & Kushchu, I. (2004). m-Government: Cases of developing countries. In *Proceedings of the 4th European Conference on E-Government, Castle Dublin, Ireland* (pp. 887-898).

Hossain, M. S., Samakovitis, G., Bacon, L., & MacKinnon, L. (2015). A conceptual framework for design of mobile governance in developing countries: The case of Bangladesh. In *2015 18th International Conference on Computer and Information Technology (ICCIT)* (pp. 161-166). IEEE.

Hur, J. W. (2019). Mobile technology integration and English language learners: A case study. In *Early childhood development: Concepts, methodologies, tools, and applications* (pp. 1049-1065). IGI Global.

Ishmatova, D., & Obi, T. (2009). M-government services: user needs and value. *I-WAYS, Digest of Electronic Commerce Policy and Regulation*, *32*(1), 39-46.

Karadimas, N. V., Papatzelou, K., & Papantoniou, A. N. (2008). M-government services in Greece. In *22nd European Conference on Modelling and Simulation, Proceedings, ed. LS Louca, et al* (pp. 71-74).

Kim, D. J., & Hwang, Y. (2012). A study of mobile internet user's service quality perceptions from a user's utilitarian and hedonic value tendency perspectives. *Information Systems Frontiers*, *14*, 409-421.

Kim, Y., Yoon, J., Park, S., & Han, J. (2004). Architecture for implementing the mobile government services in Korea. In *Conceptual Modeling for Advanced Application Domains: ER 2004 Workshops CoMoGIS, CoMWIM, ECDM, CoMoA, DGOV, and eCOMO, Shanghai, China, November 8-12, 2004. Proceedings 23* (pp. 601-612). Springer Berlin Heidelberg.

Krishnan, S., Teo, T. S., & Lim, V. K. (2013). Examining the relationships among e-government maturity, corruption, economic prosperity and environmental degradation: A cross-country analysis. *Information & Management*, *50*(8), 638-649.

Kuscu, M. H., Kushchu, I., & Yu, B. (2008). Introducing mobile government. In *Electronic Government: Concepts, Methodologies, Tools, and Applications* (pp. 227-235). IGI Global.

Kushchu, I., & Kuscu, H. (2003). From E-government to M-government: Facing the Inevitable. In *the 3rd European Conference on e-Government* (pp. 253-260). MCIL Trinity College Dublin Ireland.

Li, M., Xu, J., Liu, X., Sun, C., & Duan, Z. (2018). Use of shared-mobility services to accomplish emergency evacuation in urban areas via reduction in intermediate trips—Case study in Xi'an, China. *Sustainability*, *10*(12), 4862.

Liang, Y., Wang, W., Dong, K., Zhang, G., & Qi, G. (2021). Adoption of mobile government cloud from the perspective of public sector. *Mobile Information Systems*, *2021*, 1-20.

Magsamen-Conrad, K., & Dillon, J. M. (2020). Mobile technology adoption across the lifespan: A mixed methods investigation to clarify adoption stages, and the influence of diffusion attributes. Computers in Human Behavior, 112, 106456.

Mahmood, Z. (2021). Web 2.0, social media, and mobile technologies for connected government. In *Web 2.0 and Cloud Technologies for Implementing Connected Government* (pp. 1-18). IGI Global.

Marinkoviæ, V., & Kaliniæ, Z. (2020). Understanding consumers' continuance intention and word of mouth in mobile commerce based on extended UTAUT model. In *Impact of mobile services on business development and E-commerce* (pp. 108-125). IGI Global

McKelvey, N., Crossan, A., & Curran, K. (2021). How mobile technologies are leading to economic development in sub-saharan africa. In *Encyclopedia of Information Science and Technology, Fifth Edition* (pp. 1719-1726). IGI Global.

Mengistu, D., Zo, H., & Rho, J. J. (2009). M-government: opportunities and challenges to deliver mobile government services in developing countries. In *2009 Fourth International Conference on Computer Sciences and Convergence Information Technology* (pp. 1445-1450). IEEE.

Mensah, I. K., & Mwakapesa, D. S. (2022). The impact of context awareness and ubiquity on mobile government service adoption. Mobile Information Systems, 2022, 1-20.

Mensah, J. T. (2021). Mobile phones and local economic development: a global evidence. *Available at SSRN 3811765*.

Mossey, S., Bromberg, D., & Manoharan, A. P. (2019). Harnessing the power of mobile technology to bridge the digital divide: a look at US cities' mobile government capability. *Journal of Information Technology & Politics*, *16*(1), 52-65.

Ntaliani, M., Costopoulou, C., & Karetsos, S. (2008). Mobile government: A challenge for agriculture. *Government Information Quarterly*, *25*(4), 699-716.

Nzimakwe, T. I. (2018). Mobile technology innovations for improved governance and enhanced service delivery in South Africa. *Administratio Publica*, *26*(4), 115-132.

Osei, E., & Mashamba-Thompson, T. P. (2021). Mobile health applications for disease screening and treatment support in low-and middle-income countries: A narrative review. *Heliyon*, *7*(3). (Osei & Mashamba-Thompson, 2021)

Pan, H., & Zhang, Z. (2021). Research on context-awareness mobile tourism e-commerce personalized recommendation model. *Journal of Signal Processing Systems*, *93*, 147-154.

Pepper, R., Rueda-Sabater, E. J., Boeggeman, B. C., & Garrity, J. (2009). From Mobility to Ubiquity: Ensuring the Power and Promise of Internet Connectivity… for Anyone, Anywhere, Anytime. *The Global Information Technology Report 2008–2009*, 1943.

Ppallan, J. M., Arunachalam, K., Gantha, S. S., Jaiswal, S., Song, S., & Nigam, A. (2021). A method for enabling context-awareness at transport layer for improved quality-of-service control. *IEEE Access*, *9*, 123987-123998.

Rakotonirainy, A., Loke, S. W., & Fitzpatrick, G. (2000). Context-awareness for the mobile environment. In *proceedings of the Conference on Human Factors in Computing Systems*.

Rocha, N. P., Dias, A., Santinha, G., Rodrigues, M., Rodrigues, C., & Queirós, A. (2021). Smart cities: drivers to increase context-awareness based on a systematic review of the literature. *Trends and Applications in Information Systems and Technologies: Volume 3 9*, 609-618.

Samsioe, J., & Samsioe, A. (2002). Introduction to location based services—Markets and technologies. *Mobile Kommunikation: Wertschöpfung, Technologien, neue Dienste*, 417-437.

Sharma, S. K., Al-Badi, A., Rana, N. P., & Al-Azizi, L. (2018). Mobile applications in government services (mG-App) from user's perspectives: A predictive modelling approach. *Government Information Quarterly*, *35*(4), 557-568.

Song, G., & Cornford, T. (2006). Mobile government: Towards a service paradigm. In *Proceedings of the 2nd International Conference on e-Government, University of Pittsburgh, USA* (pp. 208-218).

Tavares, B. F., Pires, I. M., Marques, G., Garcia, N. M., Zdravevski, E., Lameski, P., ... & Jevremovic, A. (2020). Mobile applications for training plan using android devices: A systematic review and a taxonomy proposal. *Information*, *11*(7), 343.

Trimi, S., & Sheng, H. (2008). Emerging trends in M-government. *Communications of the ACM*, *51*(5), 53-58.

Upchurch, R., & Love, B. (2020). Mobile Media. *The Rowman & Littlefield Handbook of Media Management and Business*, *2*, 339.

Wirtz, B. W., & Birkmeyer, S. (2018). Mobile government services: An empirical analysis of mobile government attractiveness. *International Journal of Public Administration*, *41*(16), 1385-1395.

Yang, D., Zhou, Y., Huang, W., & Zhou, X. (2021). 5G mobile communication convergence protocol architecture and key technologies in satellite internet of things system. *Alexandria Engineering Journal*, *60*(1), 465-476.

Youngblood, S. A., & Youngblood, N. E. (2018). Usability, content, and connections: How county-level Alabama emergency management agencies communicate with their online public. *Government Information Quarterly*, *35*(1), 50-60.

Zaied, A. N. H., Ali, A. H., & El-Ghareeb, H. A. (2017). E-government adoption in Egypt: Analysis, challenges and prospects. *International Journal of Engineering Trends and Technology*, *52*(2), 70-79.

Zakaria, M. R. (2015). Towards categorizing e-government services: the case of Egypt. *International Journal of Business Research and Development*, *3*(3).

Zhu, J., & Hou, H. (2021). Research on user experience evaluation of mobile applications in government services. *IEEE Access*, *9*, 52634-52641.

Ethics Declarations

Conflicts of Interest

The authors declare no conflict of interest.

Ethical Approval

This article does not contain any studies with human participants or animals performed by any of the authors.