MOBILE GOVERNMENT AND ELECTRONIC GOVERNMENT: COMPLEMENT OR SUPPLEMENT?

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ABSTRACT: The definition and scope of e-government have advanced as technology increases its impact on public administration and the relationship channels between governments and users. One of said channels are wireless technologies, which have become so important, along with their contributions, that their use came to be known as "mobile government". This definition has turned out to be difficult, since the literature places them in two categories, both as a complement and as a supplement to electronic government.

KEYWORDS: ICT, mobile technology, public administration.

INTRODUCTION

When the first generation of tablets was launched in 2010, Steve Jobs (1955-2011), the founder and CEO of Apple, said that "PCs will become like trucks, they will continue to exist but only a small part of the population will need them" (García, 2012). According to the entrepreneur, the post-PC era had begun, one in which, theoretically, the use of mobile devices would surpass (without completely substituting) desk or wired devices, offering users of these technologies a type of freedom that, according to (Castells; Fernández-Ardèvol; Linchuan Qiu; Sey, 2007) would break the limitations of time, space and even cultural and social norms.

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This takes us the concept of ubiquity, which, according to (Islas, 2008, p. 5) was inspired by the speech given by Kunio Nakamura[1] in 2004, during a conference called "Creating an Ubiquitous Society in Japan, A Nation Built On Technology", and can be summarized in "anytime, anywhere, anyone communication", i.e. "space is no longer sized by a geographical situation, but determined by connection capabilities of new technologies such as Skype, social networks, *streaming* and chats".

Based on these ideas, in the Post-PC era, the personal or desktop computers that forced users to remain in a fixed location, close to electronic cables, internet connections or ports for printers, have been partially or completely replaced by devices that can be used anywhere, can be easily transported (even in your own pockets), and do not need cables (wireless) for certain functions such as connecting to the internet or sending documents to a printer, thus taking full advantage of mobile connectivity (WiFi, 3G or 4G).

The Post-PC era is a phenomenon in which people, organizations and governments have become immersed, willingly or unwillingly, to satisfy the needs of clients or users.

Thus, companies and governments launch mobile web sites, apps with specific purposes and mobile services that complement the traditional uses of the Internet through a PC or in-person.

Statistics show growth in the use of mobile devices, against "wired" devices, i.e. landline telephones and desktop computers. According to data from the International Union of Telecommunications (UIT)[2], in its report *Measuring the Information Society* (2017), landline telephone subscriptions have gone from 1.26 thousand million in 2006 to 1 thousand million in 2016 and an estimate of 972 millions in 2017, which was complemented by pointing out that the growth of mobile phone subscriptions has been accompanied by a diminution in the number of subscribers to landline telephones.

However, some time after Jobs's prediction was made, desktop computers are still used by a large part of the population, even if in a minor degree, in comparison with mobile devices. A post-PC era? Not completely yet, but the dominance of mobile over desktop devices is undeniable.

Kopomaa (2000), quoted in Oksman (2010), argues that there is such a thing as a mobile information society in which mobile technologies take on a central role in aspects such as information, communication, health, finances, commerce, entertainment and government –the main interest of this article.

Almost unavoidably, fashion technologies have become part of government chores, thus creating electronic government (e-government), and the

1 President of *Matsushita Electric Industrial*.

2 UIT is the specialized organism of the United Nations for Information and Communication Technologies-ICT.

importance of mobile devices has been such that the term "mobile government" has also come up. It is noteworthy that, if e-government can be defined by the use of ICT by public administration, and mobile technologies are among them, why to give their use a special name?

The purpose of this work is then to establish the relation between electronic government and mobile government, answering the questions: what is mobile government exactly? Does it complement or substitute e-government? Can m-government and e-government be separated? The method is essentially qualitative, executed with the technique of document revision.

In the first section, a theoretical revision is made of the literature about the contribution of technology to organizations and the working of public administration, using the theory of bureaucracy and the new public management as references. We also take on the element of multichannels as a form for explaining the co-existence between e-government and m-government.

Thus, we move onto the next section where we revise what has been written about the relation between electronic and mobile government in order to understand if the second term is the complement or the supplement of the first one.

In another section, we describe the tools of mobile government, such as apps, mobile sites, social networks, text messages and what are the contributions of each of these tools to a government's administrative function. We also explain the challenges or areas of opportunity in which work must be done for consolidating mobile government as a reality. Lastly, we offer conclusions as well pending tasks regarding the research on mobile government.

1. THEORETICAL FRAMEWORK. MOBILE GOVERNMENT WITHIN THEORIES OF PUBLIC MANAGEMENT

Before fully entering the topic of what is mobile government, we considered important to do a theoretical contextualization about the need for using technologies on behalf of governments and their public administration.

The incorporation of technology on behalf of the public sector is nothing new. Criado, Ramilo and Salvador (2002) note that since the 1960s public administrations have been frequent users of technology, although in limited ways. The information technology function was understood as a separate activity within a department or agency, run by experts, but made operational in similar fashion to the use they used to give typewriters.

The objectives of using ICT have been the simplification and administrative modernization and/or administrative reform (Pardo; 2006; 2010; 2015)

(Sánchez; 2010; 2014) (Pichardo, 2004) (Dussauge, 2009), (Bonina, 2005) and, in more complex dimensions, for democracy and governance (Criado, 2009), as well as for the open government (Sandoval-Almazán, 2015).

To further sustain the importance of technology in government, we will resort to administrative theories.

For a long time, the public sector was organized and functioned based on a bureaucratic model idealized by Max Weber, with the justification of achieving a professional administration in line with legality, formal procedures and the principle of authority. At the time, bureaucracy as a form of organization was seen not only as "one more organizational option, but as the normative model of organizational rationality; as an organizational form or configuration that was undoubtedly superior in terms of effectiveness and efficiency" (Prats, s/f, p. 3). However, reality surpassed the idealized model and, in practice, faults began to show, as well as the so-called "bureau-pathologies", i.e. "the dysfunctional behaviors of organizational structures" Thomson (1961), as cited in Merlo (2014).

The contextual changes, new economical models, new technologies and more active societies that claimed for a more active role in government action surpassed the bureaucratic model and –as Aguilar (2009) mentioned it– did so for being able to guide society towards more acceptable goals of development, wellbeing and social security, as well as for giving answers to the problems that its society was facing for achieving the desired life conditions or as it was demanded by the Constitution.

In order to exceed the model's failures, and in conjuncture with the breaking and stressing of the benefactor-interventionist State (Aguilera, 2012) and the tendency to its reduction, administrative reforms began being implemented, opening the door to new paradigms called managerial, which aimed to leave traditional bureaucratic values and principles behind in order to transit towards a government that is organized and works on corporate principles aimed at achieving results (Barzelay, 1998), and also incorporating ICT for achieving its objectives (Bonina, 2005), (Hood, 1991).

In this way, the use of ICT began taking a more important role for the public sector and, from 1999 and on, received the title of electronic government, which has been used to define, in broad terms, the use of ICT by public administration, a categorization that has evolved through time.

The main, and most popular tool, of electronic government has been the web sites, defined as "an access portal integrated to the government's web site providing, to both external entities and government personnel alike, a single online point of entry for the State's resources and information" (Gant, Ganty & Johnson, 2002).

However, the quick and constant evolution of technology has given place to new channels of action for electronic government, i.e. the means through which government relates with the users of its services. These channels for providing public services and citizen assistance have also evolved (for example, the web has evolved from 1.0 to 2.0, 3.0 and on), as well as some new contact channels between the government and the users (companies, citizens, organizations, employees and other governments), that co-exist, given way to multichannels, understood as "the provision of public services through different means but in an integrated and coordinated manner" (ONU, 2014, p. 96).

The channels did not substitute each other but coexisted, giving users the opportunity to select which was the most adequate for their needs and capabilities, as well as which of the channel's advantages served them best; advantages that –as the Europpean Commission (DG Enterprise and Industry Homepage (2004)) points out– can be flexibility, security, accesibility and the channel's quality. Multichannels also allow users to exercise their right "to employ, or not, electronic means, which can mean that, in a single file or in a single group of relationships, many interested parties may coincide, with those that wish to relate through electronic media and those who doesn't. This would push to recognize the right of both and to allow the concurrence of different access modalities" (CLAD, 2007, p. 16).

For the United Nations, UN (2012), multichannels are a necessary element for the consolidation of electronic government that also offers the benefit of a larger penetration of electronic government, by increasing the efficiency and effectiveness of public services and contributing to sustainable development, while also "adding value through a positive user experience or, along the same line, subtracting it by a negative experience for the user" (ONU, 2014, p. 97).

In its study on electronic government of 2014[3], the UN enlisted the following channels that make the provision of electronic government services possible:

1. Counter service (in-person)
2. Telephone service (voice) and call-centers
3. Web sites
4. E-mail
5. SMS and other text messaging services
6. Mobile web site
7. Apps
8. Social networks

3 In the UN studies on electronic government of 2012 and 2014, is where multichannels and mobile government are given a greater emphasis.

9. Kiosks
10. Intermediaries through public-private associations

2. MOBILE GOVERNMENT IN THE ELECTRONIC GOVERNMENT LITERATURE. A COMPLEMENT OR A SUPLEMENT?

The present section is a theoretical revision that would allow us to answer the following questions: what is mobile government exactly? Does it complement or substitute electronic government? Can electronic and mobile government be separated?

Electronic government is understood as an evolving concept that, in broad terms, is defined as the use of ICT by public administration. On this, there have been a series of categorizations –which are not the purpose of this book–, which is why we will focus on the mobile aspect.

For Abdelghaffar and Magdy (2012), the literature on ICT in the public sector focuses its attention on the adoption of electronic government, but not on mobile government –an argument that is reinforced by Criado and Gil-García (2013), who consider their study to be in the agenda of pending research projects on electronic government, a field with a great future; as well as Antovski and Gusev (2005), who affirm that mobile government is in its beginning stages of development, an argument that is also supported by Carrol (2006), who points out that mobile government is at a very early stage and still faces great challenges in order to become a reality.

The revision of this literature shows an expectation on mobile government that is mostly positive or optimist, since it is considered as an emerging field as well as a very fertile one. Authors like M. Jae Moon (2004) find that mobile government could revolutionize citizen access to digital services and will alter the ways in which public servants have traditionally carried out essential tasks; even Kuscu, Kushchu and Yu, (2007) affirm that mobile government is something inevitable.

In a similar manner to the way in which electronic government was defined, mobile government can be defined as the provision of electronic public services through mobile interfaces such as cell phones, *smartphones* and *tablets,* looking for the "expansion of the government's capabilities delivering services focused on citizens and companies" (OECD/UIT, 2011, p. 26). However, these definitions are more complex than they seem at first glance. To explain what is mobile government, based on our revision of said literature, there are two offshoots: to view it as a complement of electronic government or as a supplement of electronic government.

– ***Offshoot 1. A complement of electronic government***

In this offshoot, we will include the arguments of authors that have pointed out that mobile government complements electronic government, i.e. they consider it to be more a channel for the relation between a government and its users, as well as an electronic purveyor of services.

In this stance, mobile government is addressed as a channel for providing electronic services, which does not substitute electronic government. All of these definitions of traditional e-government are set to characterize or reach a definition of mobile government. Then, it is said that "mobile government services are replicas of the services of electronic government but on mobile platforms" (Kushchu; Kuscu, 2003, p. 6). These authors also add that mobile services cannot be seen as a substitute of electronic government; i.e. web sites will continue to predominate and coexist with kiosks, electronic signatures, interoperability and social networks, among other technologies, Kushchu; Kuscu (2003). Jain and Ranawat (2017) point out that mobile government complements electronic government due to the limitations and incapability of mobile phones (even the most sophisticated ones) for transmitting the large information flows that desktop computers can handle.

Social Intelligence Unit (SIU), a consultancy firm and nonprofit organization focused on the use of ICT for the development of societies, considers mobile government as "a complement of electronic government (e-government), that allows the establishment of a new access channel to the digital public space" (SIU, 2015, p. 2).

The Organization of American States (OAS) defines mobile government as "the combination of knowledge and apps of electronic government on mobile platforms" (OEA, 2012, p. 2).

However, there are more complete definitions. For Kushchu; Kuscu (2003, p. 2), mobile government "can be defined as a strategy whose implementation implies the use of all kinds of wireless and mobile technologies, services, apps and devices for improving the benefits of all parties involved in electronic government, including citizens, companies and different government units".

If some say (perhaps in a precipitated manner) that mobile devices will replace wired or desk devices, could we think that mobile government will replace or could be capable of replacing electronic government? The aforementioned authors' answers seems to be no.

Studies made by the UN, particularly from 2012 to 2018, allow us to reach the conclusion that large part of the experiences that accompany mobile government also accompany those of electronic government and are indeed more connected to multichannel strategies, in which the web sites and social

networks that can be found in desktop devices and mobile offers such as apps or mobile versions of a government web site can coexist.

– ***Offshoot 2. A supplement of electronic government***

In this offshoot, authors point out that it is possible to set a separation between mobile and electronic government. Thus, it would be possible to design strategies from mobile technologies, without having passed through traditional web sites or other tools.

Following this offshoot, Sotelo and López (2005) consider that mobile government surpasses the current limitations of electronic government, supported by characteristics such as mobility, accessibility and ubiquity. Raja and Melhem (2012) consider mobile government to be of value or added advantage over electronic government because of the mobility it offers, freeing its users of all physical limitations or of those related to a fixed location and inherent to the provision of conventional services that are part of electronic government's traditional services.

For his part, Hellström (2009) argues that the definitions of mobile government have the weakness of considering electronic government as indispensable for mobile government due to the infrastructure of servers and networks.

The research of AI-khamayseh (2009) on whether electronic government is an indispensable requisite for mobile government is quite interesting. This argument relates to the fact that the Internet and mobile devices have a larger penetration than fixed devices do (as they were mentioned in the first section) –a discernment backed by statistics. The methodology was a survey of several well-versed experts on the subject and their opinion over the importance of e-government over m-government. Among the survey's many answers and opinions, the following stand out:

– E-government is internet-based solutions; m-government is the same thing, but using wireless technologies.
– In order to use mobile government, it is necessary for the population to become familiar with electronic government.
– The administration of e-government programs contributes to a good design of m-government programs.
– Electronic government is a key facilitator of mobile government.
– Mobile government and electronic government are not mutually required as a pre-requisite.

– Not all services can be provided by mobile technologies, so mobile government without electronic government is possible but in a limited fashion.
– Electronic government and mobile government will always be together**.**

The author concludes that the existence of e-government is a pre-requisite for m-government, based on the level of functionality of the m-government's services and defines m-government as:

> A strategic system that extends the static systems of electronic government by allowing the interoperability between wireless technology and a mobile heterogeneous one through apps for different sectors (government, employees, companies, citizens, etc.). This allows them to interact with or within the government or with other governments without time and location becoming a factor, improving the provision of services to support the role of governments and decision-making processes, as well as supporting relations with the government (AI-khamayseh, 2009, p. 145).

It should be said that the mobile government's approach as a supplement of electronic government is more feasible at a local level, in small and well-defined spaces with more homogenous characteristics. At a national level, countries count on the diversity of channels for electronic government, just as the UN studies show. However, at a local level, conditions are not always met for this to be possible, like for example, in rural areas where citizens cannot access a desktop PC and lack finances and digital abilities (Costopoulou, Karetsos, & Ntaliani, 2005), i.e. within the limitations of certain regions, there are also areas of opportunity for mobile government.

A close case in which mobile technologies would be a better option to wired technologies is at the rural municipality of Santiago Nuyoo, in the state of Oaxaca, 240 km away from the capital of Mexico, where there are no telephone operators, and the population was forced to travel across large distances to pay or collect personal payments or from government support. In 2013, Telecomm, a public company, allied with other mobile telephone companies and the banking sector for implementing a pilot program of "mobile payments" with the objective of financially including rural communities that are far away from financial operators and telecommunications. The program worked through handing phones and debit cards among the people of those communities. "Thanks to the appropriation of mobile phones, they were able to achieve strategies for communicating with their inner markets without the

need to make expensive transactions for labors such as taking orders, aside from eliminating transferences and mobile recollection of money" (Mariscal and Martínez, 2014, p. 30).

FOR "CONCLUDING" THE DEBATE

After these revisions of the available literature and statistical tendencies on the use of mobile devices, we move to answering the initial questions of this section.

To what does the term mobile government refers to?

After revising the literature, the definition that is considered to be more pertinent is that mobile government refers to taking advantage of mobile technologies for the re-design of the administrative function of the State, the relation between government and society and the opening-up of the government.

Regarding the redesign of the State's administrative function, there are references of new ways of carrying out the government's objectives through the administrative apparatus. Omar Guerrero (2004) divides these activities of public administration in functional and institutional. As it was mentioned, for a long time, public administration was organized and functioned in a manner that was bureaucratic, vertical, centralized, based on paperwork, procedure manuals and time and place restrictions –all of which we can call government 1.0. The surge of electronic government allowed governments to become more agile, efficient, horizontal, immediate and interactive –a government 2.0 that breaks the barriers of time and place with the use of web sites, kiosks and interoperability, but still using an element of "wired or desktop" technologies, to which you can also add mobile devices that make them more ubiquitous (without wire restrictions), accessible (the low costs of mobile devices) and easy to use. By the same token, this represents an opportunity for dematerializing the administrative function, saving costs in running expenses and eliminating redundant procedures. This can be achieved through procedures that do not require any physical interaction, thus even reducing the opportunity for corruption practices (Roseth, Reyes and Santiso, 2018).

On the relation between government and users, large part of the success of all strategies of technology implementation depend on knowing the target user, his/her needs and capabilities, and even their technological habits as well –which several theories have tried to explain, such as the Model of Technology Acceptance (Davis, 1989) that tries to explain the reasons why a certain technology is accepted by users and, subsequently, its use as an everyday

part of their lives. For this, it centers on two factors: its perceived usefulness, defined as the degree to which an user considers that a certain technology will improve their performance at some task; and its ease of use, understood as the degree in which an user supposes that the use of a certain technology will free him/her from performing physical and mental efforts.

Many criticisms of the State's administrative performance were due to its "bureaucratic" performance, which was far from the users' needs –as Villoria (2009) explains it–, did not consider human needs and presented a series of barriers that, beyond the perception of a bad service, had effects on "the right and the effective access to services and public goods" (Peeters, 2018, p. 9).

The use of ICT (including mobile technologies) by public administrations belongs to administrative paradigms that seek an approach centered on the user, where the only worries are not financial savings and increases in efficiency but also considers the easiness in which users can relate with the administration (Berntzen, 2013). This would imply a redesign of administrative apparatus, i.e. "a re-engineering of processes and the creation of an environment of transparency and accountability" (Banco Mundial, 2012, p. 89), i.e. the government opening-up and mobile technologies offer an opportunity to carry out the objectives that lead to an open government.

Finally, this re-design and opening-up would also require a change of mindset for public servants who are used to certain ways of working and to organizations in which corruption cultures are well rooted, and are well attached to certain procedures and shares of power.

Just as in electronic government, different relations can take place in mobile government, but in this case, it is through mobile channels. Each user or group of users will have different interests, needs, capabilities and expectations when interacting with the government through mobile means. OECD and the ITU (2011) identify the following:

- m-government to citizen (mG2C,m-government-to-citizen)
- m-government to businesses (mG2B, m-government-to-business)
- m-government to government (mG2G,m-government-to-government)
- m-government to employee (mG2E, m-government-to-employee)

Table 1 exemplifies how do relations take place within mobile government, pointing out the needs of each type of user and how do these relations happen in traditional bureaucratic scenarios and in mobile government.

TABLE 1. CHANNELS AND ATTENTION EXPECTATIONS BETWEEN GOVERNMENTS AND USERS

User	Needs	Traditional bureaucratic expectations	Motivations for using the mobile channel	Possible restrictions for using mobile channels
Citizens	Information, procedures, services, support, payments, documents, political participation, open government, relief in emergencies and disasters.	Short lines, fast and kind service, to have complete requisites, public servants not requesting bribes, that information accesses are not denied, receiving printed information.	Performing procedures, payments and obtaining documents notwithstanding time and place, to avoid lines and visiting offices, not having to offer bribes for "speeding procedures", mobile notifications through apps or SMS.	Information security, legal backup of mobile channel, web site incompatibility with the device used for accessing.
Companies	Payments, permits, social security, information, acquisitions and government purchases.	Clear information, rapid responses from the administration, to avoid corrupt practices.	Carry out procedures, payments and obtaining documents notwithstanding time and place, to avoid lines and visiting offices, not having to offer bribes for "speeding procedures", mobile notifications through apps or SMS.	Information security, legal backup of mobile channel.
Governments	Communicate information, share databases, files, documents, inside documents, acquisitions, relief in emergencies and disasters, maps.	Coordination, avoiding redundancy in functions, uniformity in information.	Rapid communications, take advantage of the ubiquity and portability of mobile devices.	Large information volumes that cannot be supported by mobile devices.
Employees	Coordination at communications and work in quick and direct fashion.	Avoid redundant functions, information understanding in uniform ways.	Rapid communications, ubiquity, portability.	Legal backup of mobile channel, paperwork culture, resistance to change.

Source: Elaborated by the author.

On the questions of mobile government as a complement or substitute of electronic government and if mobile government and electronic government can be separated, literature shows examples where there is coexistence between e-government and m-government, as well as examples in which they exist separately.

In the case of coexistence, we have already mentioned multichannels and the way in which they offer users more opportunities and government services through tools such as web sites, kiosks, landline telephones, faxes, social networks, in-person attention, traditional mail and, of course, the mobile option, not only as a more efficient channel, but also as a means "to reach disadvantaged and vulnerable groups and to find more intelligent ways to increase use of online services" (ONU, 2014).

On the other hand, the fact that the use of mobile telephones surpasses the use of fixed location or desktop devices is an opportunity to consider ICT strategies in which the main channel –or even the only channel– is the mobile one.

We can conclude that both channels are not excluding, they can concur or exist separately, which would depend on aspects such as infrastructure, regulatory framework, ICT user access, skills for handling technologies, i.e. the abilities and knowledge not only of technological devices, but also of the objectives of the structure of a digital government (Khan, Moon & Rho, 2010); as well as the strategy launched by the government; that the objectives of incorporating the ICT are clear.

On this regard, the UN (2014) points out that it is necessary to draw a user profile, to know their needs and limitations, for example, in the case of vulnerable groups. For his part, Donner, Verclas and Toyama (2008), recommend that the following questions should be answered:

– Who is the target user?
– What kind of technology do they use?

Considering an approach from a public policy standpoint, to these questions one might add in which cases is mobile government a supplement or a complement for the transversal facilitators, here understood as "the fundamental elements that allow the deployment of a policy's components and have the objective of developing capabilities in each entity with the purpose of the implementation of said policy" (Ministerio de Tecnologías de la Información y las Comunicaciones, 2018, p. 40). In Mexico, the National Digital Strategy from 2013 to 2018 considered these facilitators as "the necessary conditions

for reaching the goals of the strategy and, in that sense, they are tools directly related to the lines of action". We propose the following:

- What is the region's infrastructure? To initiate a mobile government policy, it is considered as key to know what is the available telecommunication infrastructure, which includes hardware and software (operative systems); connectivity and security (Alghamdi, 2011).
- What is the demand of electronic services? A principle of these types of policies and derived projects is that their approach is focused on the user, i.e. the services delivered in electronic ways (mobile) are appropriate to the needs and desires of the potential user (Berntzen, 2013).
- What digital skills on electronic or mobile services do the potential users have? Another key factor of these policies is the capability of users to take advantage of the benefits of electronic services (including mobile ones). These skills are understood as "the ensemble of knowledge, concepts and capabilities for accessing, understanding, operating, handling and evaluating electronic government initiatives at their different stages" (Sali, 2011), according to the UIT (2018), since the more advanced are someone's digital skills, the more benefit he/she will be able to take from the progress of technologies and digital devices.

THE CONTRIBUTIONS OF MOBILE TECHNOLOGIES TO PUBLIC ADMINISTRATION. TOOLS, ADVANTAGES AND AREAS OF OPPORTUNITY

The incorporation of technologies to public administration is not a matter only related to technical aspects. As aforementioned, it involves an entire process that modifies the way in which public administration organizes itself and functions, but also in the way society demands it and participates in it –also, it changes the relation between government, society and companies.

The Ibero-American Electronic Government Charter itself points the public administration guidelines to be followed in the implementation of electronic systems. It also recommends actions such as: establishing adjustment programs so that public servants can adapt to new electronic government systems, adjusting procedures to new electronic communications and new management models, continuous improvements and innovations –all categories that fit the incorporation of the new technologies that make mobile government possible.

This implies an adoption and adaptation process of the new channels for providing public services like, for example, Borucki, Ibrahim and Kushchu

(2005), consider necessary to take measures for training and acquiring abilities for handling these new devices, considering the age and experience level of the users.

The tools that will make mobile government possible can be adapted (to the ones that electronic government already has) or adopted, i.e. exclusively mobile. Some of these tools are:

Mobile web sites: As aforementioned, web sites are the most common means for providing electronic government services. Governments have web sites that can be accessed from a computer and, at the beginning, "were designed for providing fixed and robust services that ruled the world of computers; the concept of ubiquity did not represent the importance in the obtained services, through the Internet" (Espinosa J. A., 2003, p. 13).

The transformation of a desktop computer web site to a mobile one happens through an "adaptable web design" (or adaptive), known as a RWD (Responsive Web Design). Thanks to this process "dynamic changes in the appearance of a web site, depending on the size of the screen and the orientation of the device that is used to see. In lieu of having to construct a special mobile version of a web site, that often requires the writing of a new code from scratch, this technique solves the problem of designing for the customers' multitude of available mobile devices" (ONU, 2016, p. 95).

According to this report of the UN, for 2016, 99 countries use the RWD technology for their national web sites (22 of Africa, 21 of America, 26 of Asia, 24 of Europe and 6 of Oceania). Image 3 shows, in schematic manner, how RWD should be, adapting contents to the specific characteristics of certain devices.

IMAGE 1. RESPONSIVE WEB DESIGN (RWD) SCHEME

Source: https://digital.gov/2014/07/18/solving-a-mobilegov-mystery-using-open-source-cms-to-implement-responsive-web-design/

SMS Messenger: Short Message Services provide the exchange of information, files, or even, to carry out monetary transactions. They are short messages because they allow up to 250 characters. The SMS extends the functionality of landline telephones that only used to be useful for voice calls. In 1992, "Neil Papworth, an engineer from Sema Group, wrote 'Merry Christmas', from a network. Subsequently, in 1999, Nokia incorporated this function into their cell phones, in their model 2110. According to ITU (2010), 20,000 messages per second were already being sent during that year.

From 2012, the UN focused its studies on the way in which governments use this tool, with 27 countries being the ones that already had some interactions with this medium, 34 in 2014, and 83 in 2018. Other messaging services are WhatsApp and Facebook Messenger, which allow the exchange of text messages, video, audio and multimedia contents. These are the messaging services with the largest number of users. According to statista.com[4], in 2019 the registry of 1600 million users in WhatsApp and 1300 million users in Facebook Messenger globally.

Mobile websites: These are monetary transactions carried out through a mobile device like a cell phone or a smartphone, which are backed by banking intermediaries. *Transactionality* is an advanced stage of electronic government, according to Sandoval and Gil-García (2009, p. 89), is also one of the most complex, and includes the possibility of receiving and paying a public service. In this phase, it is important to think about transaction security, data protection, electronic signature, authentication procedures and a legislation that can back them up and provide trust to this type of transactions. Mobile payments encompass a tool with "the potential to bank all unbanked and train poor people through a better access to finances and lesser transaction costs generates a growing enthusiasm. When all of these are there, the mature mobile money systems often have generated products and innovative services in insurance, credits and savings" (Kelly & Minges, 2012, p. 6).

According to the UN (2016), 34 countries offer the online payment of fines and other 63 countries offer the online payment of public services, even though they do not specify if it is through websites for desktop computers or through any mobile mean, but does stand out that developing countries (particularly in Africa) have so much expectations of this tool, and for the OECD (2011) mobile technologies are training citizens that before presented difficulties for processing cash transferences, deposits, withdrawals and other banking activities in secure forms.

4 https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/, consulted on August 24, 2018.

Applications (Apps): These are software programs that can be downloaded to a smartphone or mobile device like a tablet or phablet with a particular objective. They may have a cost, or not, as well as being compatible with some other operative system or with every one of them (IOS, Android, Windows, Blackberry). Companies and governments launch their own applications for delivering services or acquiring their products. Ganapati (2015) identifies two types of Apps, which are centered on the inner use for employees, and those directed towards the users of government services.

The study of electronic government by the UN (2012), points out that 29 countries used mobile applications as a channel for delivering services, and even, to improve the quality of life of the poorest people, placing greater importance on topics such as health, education, well-being, environment and work. For 2018, 83 countries offer some kind of mobile service through a short message service (SMS), mobile applications or their equivalent (ONU, 2018).

Some governments have taken apps seriously as a means of delivering services, providing information or interacting with citizens, and have created a repository of applications with diverse objectives, as it is shown on Table 2.

TABLE 2. REPOSITORY OF *APPS*[5] OF NATIONAL GOVERNMENTS

Country/web address	Subjects tended by the app	Operating System
Chile http://apps.gob.cl/	Health Sports Economy Transport	Android/IOS
United States https://www.usa.gov/mobile-apps	Education Culture Business National Defense Health Border	Android IOS Windows Blackberry
India http://apps.nic.in/	Health Government Communication Finances Transport Telecommunications	Not specified

5 Consulted on August 24, 2019.

Continued Table 2.

Mexico https://www.gob.mx/apps gob.mx/apps	Health GeoSpatial Information Security and Justice Education Economy Culture Tourism Finances	Android/IOS

Source: Elaborated by the author with information of the repository web sites.

Social networks: Social networks have come to revolutionize the way in which people and organizations communicate, exchange ideas, transfer knowledge, work and take part in public life. They are the result of the evolution of web 2.0 and allows the interaction among a web site's administrator and users who, according to Alonzo (2013), thanks to these types of social networks (Facebook, Instagram, YouTube, Blogs, among others) can become presumers that are able to share and transmit contents without the need to learn a deep knowledge on information technology. For the ONU (2016), the advantages of social networks are that they are relatively accessible, have no great cost, and constitute a channel for interaction between the government and the audience. According to the UN (2016), 87% of the 190 countries considered in the study of electronic government have some sort of channel of social network.

These socialization virtual spaces started being for desktop computers, but are presented as an opportunity for the mobile government, since mobile devices have become positioned as the number one device for browsing the Internet and also, as it is pointed out (Gómez Roa, 2016), they offer the ubiquity factor that allows a permanent connection.

Also, social networks have developed their own application, mobile web sites or some are for the exclusive use of mobile devices such as *Instagram*.

According to Criado and Rojas (2013), the most common social networks in the public sector can be divided in *broadcasting*, such as *YouTube*, *Instagram* or *Flickr*; networks for social relations such as *Twitter* and *Facebook*; and networks of working relations, like *Linkedin* and *Novagob.* Table 3 shows an outlook of the use of networks such as this by governments and governors.

TABLE 3. MOST USED SOCIAL NETWORKS BY GOVERNMENTS

Social network	World users	Governmental users
Facebook	2,320 million	181 countries
Twitter	330	179 countries
YouTube	1,900	154 countries
Instagram	1,000	154 countries

Source: Own elaboration with information from http://twiplomacy.com/ and www.es.statista.com/estadistica/600712/ranking-mundial-de-redes-sociales-por-numero-de-usuarios/

Multimedia: This type of files contains images, sound and videos. The most advanced cell phones (*smartphones*) and devices such as *tablets*, allow the creation of this type of contents. A camera can shoot video or photographs that the user can send directly to public administration, for reporting a criminal action, a traffic incident or infrastructural problems. For Sandoval and Gil-García (2009, p. 16), "it is primordial that users are able to quickly find the information they are interested in and this information that used to be presented only in text and image form, can now be presented in multimedia formats using video and audio as complementary alternatives to texts; in fact, this element is part of the new tools of web 2.0".

THE CHALLENGES OF MOBILE GOVERNMENT

As in every technological process, the incorporation of these mobile technologies into government present some critical factors that can limit or boost their development and success. According to the Pacific Council on International Policy (2002), if these factors are not taken into account, resources can be wasted, promises of the delivery of useful services can be unkempt and, therefore, increase public frustration with governments. That is why technological strategies of the developing countries must include certain conditions, needs and unique obstacles.

Security and Regulations:

On the securities of activities on mobile phones, these should be backed or regulated by a legal framework in aspects such as financial transactions, procedures and products (documents, certificates, digital signatures, receipts) that are generated electronically. For Gil-García and Pardo (2005, p. 195), it is important to boost legal changes in order to facilitate or to habilitate the adoption of emerging technologies.

Relying on legal and institutional frameworks in the topic of communications (including mobile ones) is not a matter of "many countries within the Organization for the Economic Cooperation and Development (OECD) have implemented a series of reforms, not only directed to modifying the public sector with the purpose of providing better services to citizens, but also aimed at transforming the industrial design through the establishment of independent regulatory organisms" (Culebro and González, 2013, p. 45).

On the other hand, the existence of legal and regulatory frameworks becomes essential, like the case of "cyber laws for providing a legal framework that supports the objectives of policies and projects of e-government" (Pacific Council on International Policy, 2002, p. 17) that provide certainty or legal security, the same that offers the trust to use these types of services to the user.

Quality of services and purveyors: The quality of the services being offered by the market of purveyors is related to regulations. Each country has different purveyors of mobile services and particular markets. There is a relation between the competition among purveyors and the quality of the services, since the fact that there is in fact competition "allows purveyors to be increasingly efficient and to offer a larger array of products and services for lower prices" (Intven, Oliver and Sepúlveda, 2000, p. 195). According to the OECD (2012), a poor competition has brought a scarce penetration as result. Therefore, the challenge is to rely on competitive markets that are affordable and of good quality, that allow the use the advantages of mobile technologies in aspects such as financial, health, education and governmental inclusion.

Political aspects: Countries have agendas and institutions for the technological development, inclusion and strategies of electronic government. The greatest problem is that the continuity of these agendas or projects is not guaranteed; for Barros (2012), there are aspects that condition the success of a technological project in the public sector, like the political climates and the changes of a government's priorities. For the Economic Commission for Latin America and the Caribbean (ECLAC), the challenge is that:

> Several countries still give a low priority to digital topics in public policies, there are no clear institutional leaderships, intergovernmental coordination presents frauds, the budgets destined to these areas are insufficient, policies are discontinued quickly or there are large differences between the suggested objectives in policy documents and their actual implementation, and national supports for digital agendas in the sub-national realm are deficient" (CEPAL, 2013, p. 45).

However, e-government and m-government policies should be viewed as State's policies that transcend government periods, partisan stamps or ideological inclinations.

CONCLUSIONS

Government has reached the era of mobile technologies. Just as it is in electronic government, there is no sole definition of what must be understood as mobile government. If, in very general terms, you can say that the use of mobile technologies by public administrations is not quite clear yet, then what are the reaches of m-government, even though its use is by now a reality, with the increase in use of mobile technologies in its favor, which is superior to the use of desktop devices, as well as those of tools that belong to these devices, such as apps and adaptable web sites. In the present article, we discussed mobile government from the standpoint of its contribution to public administration, considering the contribution of ICT to the functioning of the public sector, supported by bureaucratic and post-bureaucratic theories. In this sense, mobile technologies contribute to objectives such as efficiency, rapid and direct communications between a government and its users.

On the relation between electronic government and mobile government, which is the main topic of this work, the revision of the available literature showed that there are two offshoots to explain this relation: mobile technologies as a complement for electronic government or as a supplement to aid technologies. As a complement, mobile technologies are part of the strategy of electronic government, simultaneously combining diverse communication channels and provision of services, such as web sites, kiosks, open data, social networks and a mobile channel, which is known as multichannels. As a supplement, mobile government can be the main, or even the only, technological channel available.

It would be too risky to assume a conclusive position in determining if m-government complements or supplements e-government, since in some cases the decision of which approach is the most convenient will depend of the context in which the public policy in question is developed.

In this regard, both offshoots are considered valid, since there is no exclusion between the mobile government and the electronic government since these will depend of the circumstances of the place in which they are implemented, their objectives and of the characteristics of the users. The implementation of mobile payments policies such as the Digital Charging (CODI) on behalf of the Bank of Mexico is favorable for mobile technologies to be present, like the

charging system functions through mobile phones, as it was done in the case of Santiago Nuyoo, in which, due to its geographic characteristics, mobile technologies were the best option.

In the year of 2007, 21 countries signed the Iberoamerican Charter of Electronic Government, promoted by the CLAD (Latin American Administration Center for Development, by its Spanish acronym) in which the mobile element is quite scarce, since it is only mentioned as part of the technological adaptation, and the use of SMS messages is recommended for communications and procedures. It is important to mention that in the year in which this charter was signed, cell phones were used for voice calls, and sending texts. In fact, that was the year of the beginning of the smartphone era, when Apple launched the Iphone (Anh, 2016); which is why it would be recommended to perform an actualization of said international agreement, in which the current role of said technologies in the public sector and their related public policies is recognized, and that general guidelines are pointed out by national, sub-national and local governments.

A guideline for the development of mobile governments would be to reinforce legislations, so this tool can be more secure for the user. According to the World Index of Cybersecurity published by the UIT, of the 165 considered countries, only half of them counted on cybersecurity strategies and 25% with a legislation on this regard. According to the UN (2018), governments must work on this for guaranteeing more resilient e-government systems, and therefore also for mobile government, considering that this is the most used means for browsing through cyberspace.

Although mobile government is not entirely new, their study is still pending. Some of the proposed subjects for continuing the research on m-government have to do with the adoption and adaptation processes of the users of mobile government, thus using theories such as the Promulgated Theories, the Technology Acceptance Model, the New Institutionalism, the Theory of Innovation Diffusion. We also propose to know more of the role that mobile technologies take on the processes of open government and the cycle of public policies; the opportunity of mobile technologies in regard to closing the digital breach; instruments such as the Iberoamerican Charter of Electronic Government could be updated in regard to the role of mobile technologies; other topics could be the role of mobile technologies on the management of natural disasters such as earthquakes or floods, since, even due to technical aspects, m-government becomes more viable than e-government.

Finally, we probably won't be able to reach a sole consensus on whether m-government is a complement or a supplement of e-government, which can be seen as an area of opportunity to keep studying both concepts and this

can be reflected in public policies that improve the quality of life of a certain population.

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