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**Exploring the potential of Mobile Internet Services in
emerging countries: a look towards the future**

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Abstract: The purpose of this paper is to present an overview of the relation between Governance and Information and Communications Technologies (ICTs) for development.

After revisiting current e-Government and ICTs for development trends and initiatives, claimed to be the “leapfrogging” solution for developing countries, the paper discusses about the risks and challenges that ICTs bring about, especially when it comes to dealing with complex governance matters in developing and emerging countries.

In defining the organizational and institutional dimension, the paper positions e-Government activities within the broader framework of e-governance (i.e., the governance with and of ICT), as a learning type of dynamics. e-Governance involves at the same time a constrained and open relationship with local and global actors and the redefinition of the interaction between freedom and dependencies.

In this connection, it allows in turn to fully explore the promises of Mobile Internet Services for next generation e-Government. Mobile Internet, in fact, is a relatively new phenomenon whose potential is largely unknown and unexplored but is already considered by many to be a key element in support of development strategies and poverty reduction initiatives, especially in emerging countries, where the uptake of mobile telephony is very high and the demographic trends are in continuous expansion. Young skilled and motivated population could eventually grasp the benefits of this technological and societal change. But what are the conditions and key enabling factors for this to become a reality? How to really reach the next billion users? Indeed, mobile services and technologies have rapidly evolved. However, the use of these technologies is still in its infancy and remains to be further researched and documented. Discussing some cases and applications worldwide, the paper identifies a number of risks and research questions to be further elaborated. In practice, are we about to go through a major adapting societal move, partly due to ICTs but also to other co-factors likely to influence our near future (socio-political-economic and environmental trends), or are we just passing through a natural evolution (eventually faster than others occurred in the past)? Within this particular dynamic, the paper further addresses the importance of looking at what the various emerging scenarios at the horizon 2015 and further may be and which ones have to be considered and eventually deployed in terms of policy-relevant and favourable cost-benefit perspectives in order to effectively address poverty reduction and development.

Keywords: e-Government, e-Governance, development, ICTs, mobile Internet

1. Introduction

The debate regarding the effectiveness of using Information and Communication Technologies (ICTs) to help achieve development goals arises not only around questions concerning the evidence in support of relationship between ICTs and development, but also more substantially from inherent doubts about the relevance of ICTs to achieving sustainable development and fears that investment in ICTs will draw resources away from traditional development goals.

ICTs instead can be a powerful tool for development, both because of its inherent characteristics and the mounting empirical evidence that suggests it can, in fact, contribute a great deal to development goals. It can do so at both micro and national levels by increasing the effectiveness and reach of development interventions, enhancing good governance and lowering the costs of service delivery. Moreover, the right complement of targeted ICT-interventions has the potential to play an even more substantial role in accelerating a sustainable dynamic of social and economic development in developing countries.

However, it should be clear from the outset that ICTs is not a panacea for the problems of the developing world. Social and Economic development is dependent on many factors, which should be addressed through an overall development strategy. Factors such as political stability, macroeconomic governance, transparency and accountability of national and local administrations, the rule of law, physical infrastructure (for example, clean water and energy), and basic literacy should also be addressed in an explicit manner, and ICTs should not be seen as a substitute.

Nevertheless, the integration of ICTs into overall national development strategies can help facilitate implementation, expand scope and coverage, and increase the results for most of these factors. Moreover, development goals cannot be achieved by government efforts alone. The involvement of civil society and the private sector is crucial, and ICTs can help the different stakeholder to be aware, provide and exchange information and communicate among each other.

This is much more important if we consider that full and effective participation in the emerging global information network is of fundamental importance for developing countries, that want to avoid marginalization from the globalization process and is essential for the full participation of its citizens in all spheres of life. ICTs can contribute to their integration in the world economy, and it can create the conditions for information and knowledge exchange and utilization.

ICTs offers tremendous potential to raise standards of living and enlarge opportunities for individuals, communities, countries and regions. While many in the world still remain directly untouched by the information revolution, one cannot deny the transformative effect they already had on our global society.

Within this context, the paper aims at outlining the essentials elements of the relationship between ICTs for Development, and in particular mobile Internet policies, and governance mechanisms, and in particular as regarding the driving impact this domain of activity may have on overall societal goals.

In doing so, the paper will then consider some likely evolutions of e-Government, among which m-Government, as one example of the trend towards more ICT-supported mobile effectiveness, and again, evaluating its potential impact on a broader reality in developing and emerging countries. Finally, the paper will examine some of the conditions under which m-Government can play a stimulating or even a driving role, in specific contexts, to renew the perspective of service delivery and for users to be potentially a stakeholder or even more in those target processes, supposedly beneficial in multiple ways, and in particular to address poverty reduction and development.

2. Governance implications of ICTs for Development

Governance is a concept that must be approached from a multidimensional perspective in order to include its political, economic, environmental, cultural and social aspects. All levels of governance, local, national and international are relevant. All these aspects are interlinked and must be addressed in a holistic, balanced and comprehensive way. Governance processes cannot be reduced to one specific component. Promoting governance in developing countries involves enforcing the respect for ownership, dialogue between partners and focus on incentives for result-oriented reforms in the broader context of poverty reduction and sustainable development objectives.

The integration of ICTs in governance processes can greatly enhance the delivery of public services to all citizens and thus the overall objective of improving the performance of governance systems at all levels, as well as increase the democratic governance framework of the society at large. The potential for ICTs for development in developing countries, however, remains largely unexploited, perhaps because of the difficulty in achieving the revised organizational structures and skills; degree of decentralization of decision making; new forms of leadership; transformation toward public-private partnerships; and effective involvement of stakeholders, that is required.

The broad assumptions that ICTs policies can influence good and democratic governance has yet to be proven. To date there is little empirical evidence of the "multidimensional" effects of ICTs on democratic governance, which can in turn inform national policies, and the causal connection -if any- between ICTs and innovation in governance for socio-economic development is little understood. As well, the recognition of the potential of ICTs for development comes from a few successful pilot applications around the world. Attempts are currently underway to evaluate some of these projects so that the real extent of their impact can be understood and the factors inhibiting impact can be identified.

On the other hand, today's world is more and more referred to as being "networked" due to the advancement of ICTs but also because of the growing phenomenon of the involvement of non-state or non-governmental actors into policy-making, either in a consultative way or through the development of new participatory approaches, often enabled or enhanced by the use of ICTs. This is dispersing State power into autonomous local governance systems, while the industrial revolution in the past rather centralized it. The opportunity of using ICTs for communicating on a global scale has added new dimensions to possibilities of pursuing national, regional and local development; that is where economic and social impacts can be more valuable to the administration users and the citizens.

This "dynamic tension" between global and local levels of policy and socio-economic intervention is growing independently and without clear regulatory frameworks. The role of the traditional "Nation state" is increasingly becoming weaker and less defined, and not capable to respond to the pressure of the fast evolving societal needs. The State, as it is defined by political scientists, is losing its certainties, and the boundaries between the Government, in the wide sense, and the private sector and the citizens, as well as "new stakeholders", sometimes "created" by the ICTs themselves, as communities of practitioners, are becoming less and less clear.

In this context, reinforced local means to express needs, projects and alliances in separate terms grow in parallel with globalization pressure and transnational forms of economic competitiveness; it is therefore no surprise to see the State entering into a phase of redefinition. Sovereignty is often the core of the discussion, but more profoundly, what seems to be the essential of State prerogatives in most regions of the globe, is being reshuffled: public service delivery can often be delegated, with then a necessary re-enforcement of policy-making and regulation capabilities towards more efficiency, ethically consistent supervision of services. It is of course particularly the case of industries traditionally owned by the State in many countries (telecommunications, energy industries, transport, health, etc.), but also of more specific administrative services (let us think of geographic information systems for instance). At the same time, in a future-oriented perspective and considering the rapid technological changes taking place, we can look at the already emerging ubiquitous society as a stimulating opportunity, but also as a possible risk on enlarging the already existing digital divides.

3. Discussing e-Government and e-Governance for Development: limits and potential

The integration of ICTs in governmental operations introduce the concept of e-Government, that is often seen as a panacea to public sector reform and automatically linked to improvement (or even creation of) good governance. Up to now, this assumption is more a wishful thinking than proven and documented reality. Beside inherent costs and shortcomings often typical of easy win operations (one concentrates only on one efficiency function at the time), and which have to be evaluated intrinsically, the deficit of cross-functions, seamless operations in which non State-stakeholders can play a proactive role seems to be only superficially reduced. At the same time, enterprise-based and private individuals' e-activities develop quite freely and growingly. All these aspects suggest that there is room for a different type of steering that the one e-Government promotes, a wide form of governance and knowledge management in connection with ICT development.

Still, e-Government is often an effective starting point to initiate transformative process, bearing in mind that the result is not automatically achieved by the mere digitization of existing administration procedures. Being definitions of e-Government so numerous, "our definition" of e-Government is a middle-of-the-road concept. We conceive e-Government as the composite trend where governments, at all level, but mainly through their operational arm, the administration, and in a subsidiary form through the access of citizens to public affairs, aim at promoting 1) a better and more efficient administration, 2) more effective inter-administration and administration-enterprise relationships and 3) user-empowering servicing and more transparent access of citizens to political decision-making.

In this framework, ICTs can allow government's internal and external communication to gain speed, precision, simplicity, outreach and networking capacity. This can be converted into actual cost reductions and increased effectiveness –two desired features of all government operations, but especially of public services. It can also be converted into 24/7 usefulness, transparency and accountability, networked structures of public administration, information management and knowledge creation in public administration, moreover in an increasingly ubiquitous form of access. But is it really working? There are very little data about rates of success and failure of e-Government projects in industrialized and developing countries. Some baseline estimates indicate that behind the high-tech glamour of these projects, lies a less enthusiastic reality – the majority of complex ICTs projects, in both industrialized and developing countries, fail either totally or partially. This is due principally to the lack of "e-readiness", and the oversize gaps between project design and on-the-ground reality (known as "design-reality gaps"), meaning the lack of assessment of needs, constraints, priorities and collateral dimensions to be taken into account prior to the implementation of a project. We also must acknowledge the "normal" existence of external and internal barriers in introducing ICTs in government, in particular when this leads to organizational boundary and role-status modifications. While in broad terms most elements for success are known by now, their interpretation and application must be re-invented locally. However, it is generally recognized that if a public administration does cross the "digital divide", it opens formidable opportunities that are practically inaccessible by any other means. This is true for all public administrations in the world, regardless of the level of economic development, human capacities, and social and cultural context prevailing in the community or country concerned.

In an attempt to advocate a "muddling through approach" rather than an idealistic one, and in this, supported by our fieldwork evidence, we can summarize our analysis by saying that not all e-Government developments matter the same, and that priority should be given to:

- those services or interfaces which serve the most intensive clients of the administration (impact-oriented);
- those services or groups for which the learning curve can have a spill-over impact on other domains or activities (triggering a collective mastering progression or learning);
- those services which innovate, thanks to a niche feature or a new technology, and deliver or facilitate problem-solving of a new kind (pilot activity), conveying some strategic potential.

In addition, these recommendations mean that for each technological implementation, for each e-service delivered, beyond their obvious instrumental level, there is an organizational and institutional dimension, more governance-oriented, to be taken care of, in which ICT-deployment must be defined within the framework of a policy-compliant and inter-stakeholder knowledge management-effective

perspective. This is what suggests an institutional and even paradigmatic slide from e-Government to e-Governance.

Differently from e-Government, e-Governance stresses the importance of the several components of the knowledge equation, and not just the know-how, the effective learning residing much more in the causality chain and its multi-purpose, multi-faceted, multi-stakeholder change that can be addressed, than the other way around. Society in fact is not harmonious and just saying that e-Governance, like governance, is about the transactional aspect of inter-actor life would not account for the complexity of what really takes place; it is also confrontational and open-ended. Stakeholders have to muddle their way through even when they are not fundamentally friends, inter-industry-wise and inter-level-wise, and even when in spite of that they have to invent common solutions. This is why e-Governance can be seen as the expression of a "dynamic tension" between institutional frameworks and ICTs.

The fact is that among these solutions, that have at all costs to be found and managed, there are quite a few ones which have to deal with the ICTs themselves and not only the productivity but also the stakes and controversies they convey. At this level, it is important to stress that there is a basic asymmetry between the two sides of the coin that define e-Governance (governance with and of ICTs, see for that Misuraca, Rossel, Finger, 2005 and Misuraca 2007): where "with" means basically "bureaucratic", web-based and connective type of technologies and applications or better said mediation-supportive technologies and applications; meanwhile governance "of" ICTs rather means dealing, in terms of innovation and regulation with all the technologies of the Information society (from tele-surveillance to GPS, through transport telematics and virtual community management applications, as well as digital rights and privacy issues, just to mention a few).

e-Governance is also knowledge creation and management practice, and therefore a learning type of dynamics, involving internal forces of organizations, as well as outside or across the board of socio-economic actors (partners as well as others, often) in a meso-societal type of change process, with a diversified array of necessary knowledge to be triggered and enhanced; as such, we like to identify it to the practice of the kite-surfing.

As a matter of fact, this e-Governance scheme fits a larger evolution pattern of ICTs and the Information Society as a whole, in particular all aspects dealing with the coming age of the , or growing user-driven influence on the forms, ethics, business models and technological choices at stake in the development of the Internet and all the applications linked to it, including such dynamics as Web 2.0 and the various types of e-mobile services. We pass here from change I to change II or change of the second-order (emphasizing the how more than the what, with the underpinning learning that goes with it) or even change III (open-ended, hyper-complex) when conditioned by or aligned with the agenda of the information society as a whole.

4. Promises of Mobile Internet Services for next generation e-Government

Within this framework, Mobile Government (m-Government) is emerging as a relatively new phenomenon whose potential is largely unknown and unexplored^{iv}, but that is already considered to be the most important subset of future e-Government services. One of the key recommendations of e-GovWorld 2006 organized by a number of International Organizations in South East Asia^v, was that joint efforts should be done to investigate the use of mobile and wireless technologies for future electronic Public Services as well as to enhance the reach of existing e-Government applications to larger sections of the society. It was also felt that in order to understand user perspectives there is a strong need of dialogue among telecom service providers, government agencies, industry and citizens as stakeholders.

A number of actions have been started in this field, including, for instance, the creation of a knowledge portal and observatory on m-Government to follow the developments in the field as well as start a structured (or claimed to be) discussion among the stakeholders^{vi}; a discussion group titled mGov has been also created to enhance networking and knowledge sharing between practitioners, academia and researchers from all over the world^{vii}. These are just examples of the interest that is surrounding this concept.

Indeed, mobile services and technologies have rapidly, and in some cases astonishingly, evolved. Let's look for example at the exponential deployment of mobile telephony in some European countries

where the uptake of mobile telephony has been quite striking, and also in emerging countries in North Africa and Asia.

As an example, the table here below shows a comparison of some emerging and European countries where the uptake of mobile telephony has been rather impressive (see the case of Italy for instance, where each citizen holds, at least one mobile phone).

Table 1. Illustrative country comparison of mobile telephony rapid growth and uptake

Country	Fixed line teledensity		Mobile telephony density	Global Density
	2000	2005	2005	2005
Algeria	5,79	7,82	45,24	53,06
Morocco	4,96	4,26	39,37	43,63
Tunisia	9,99	12,47	56,32	68,79
Egypt	8,64	14, 04	18,41	32,45
South Africa	10,88	9,97	19,36	29,33
Nigeria	0,49	0,93	14,13	15,06
France	-	59,01	79,44	138,45
Spain	-	42,91	96,81	139,72
Sweden	-	86,71	93,31	180,02
Italy	-	41,98	124,28	166,26

(Source: ITU, 2006)

At the same time, several experiments have been initiated worldwide to make best use of mobile and wireless technologies towards better service delivery, including eventual co-production of solutions. For example, with the launch of 3rd Generation technologies (and the future envisaged 3.5 and 4 generation mobile technologies), mobile devices are going to be equipped with additional features of larger computing power for the taking care of voice, text and multimedia content. This provides a potential opportunity for government agencies to explore the ways to enhance the outreach of e-Government services with the use of mobile and wireless technologies.

This is the case, for example, of Dubai, where the government has launched an initiative called m-Dubai, to provide information and services to the citizens on mobile phones^{viii}, or of Malta, where a specific m-Government strategy has been designed^{ix}. More recently, in Luxembourg the City Government has launched the "eCity" initiative, deploying mobile payment for governmental services and aiming at creating a Virtual City based on a sort of "wireless Internet area network" for the overall city^x.

This type of initiatives is rapidly growing and it is most likely only a beginning. Due the deployment of an overall trend in the building of the Information Society, bottom-up and user-driven initiatives are going to spread in an increasingly pervasive manner (like the evoked "Web 2.0" trend, for instance), playing with light practices, multiplicity of channels, real-time reputation building and informal benchmarking, to force more culturally congruent private-public interaction forms to survive rather than others. This ongoing process is also likely to benefit from upcoming technological convergences, such as the one concerning seamless interoperability between the wireless domain and the mobile telephony one, (the "next generation" leitmotiv, also known as Mobile Internet).

While mobile government is seen by many as the next paradigm in delivery of public services, many countries are still lagging on the vision to implement these services which have the far reaching goal of enhancing the service-delivery, for example to the rural areas and disadvantaged people, the main "victims" of the digital divide.

The mobile phone has in fact become a symbol of ubiquitous access and eventually prosperity in many emerging and developing countries; but what is its true value to their economies?

According to a study on the wireless markets in China, India, and the Philippines^{xi}, the economic impact of all wireless activity on these countries is up to four times the value to the wireless operators alone. An estimate of the economic benefits of wireless activity in fact, must include not only wireless operators but also auxiliary players and end users. Much of this value appears to come from the productivity gains and economic surplus that wireless customers receive simply by using their mobile phones. These results, according to many, should therefore encourage regulators and operators to get mobile phones into more hands more quickly.

Currently about 1 billion users worldwide is actually part of what is defined (sometimes in a very simplistic manner) the Information Society, mostly connected to the Internet in OECD countries. But how to realistically reach the next billion users and where will they reside? How to really bridge the digital divide?

In this regard, m-Government should not be seen just as a specific area of e-Government (limited to the notion of mobile access), but on the contrary take upon the current dominant movement in favour of mobile technology usages, and steer experiments and initiatives in a way that ultimately benefits to, and even empower better the users and citizens in their various flexibility needs. Mobile Internet is seen by many, in fact, as a potentially powerful change factor, not only in terms of technologies, but especially in the way it can modify the relationships among actors with a more citizen-centric focus.

However, m-Government per-se cannot be considered as a paradigmatic shift. What we should look at is instead if, within the broader phenomenon of Mobile Internet services development, it will represent an element which could bring about a "change II" mode of transforming relationships among different stakeholders, as well as redefining organizational boundaries, value chain configurations and institutional settings.

Indeed it is perceived so by many, but on the other hand, would it be just a new fantasy, a gradual transformation which some actors try to force into the future and with themselves as lead players, thanks to the classical push-type of rhetoric buzz word?

In practice, are we about to go through a major adapting societal move, partly due to ICTs but also to other co-factors likely to influence our near future (socio-political-economic and environmental trends), or we are just passing through a natural evolution (eventually faster than others occurred in the past)?

To the average mobile-phone user, the benefits of mobile communication seem to be obvious. Considering the numbers, worldwide, about one billion people purchased new handsets in 2006. In Algeria, for example, 21 million of mobile phone subscribers out of 32 millions of population in less than 5 years demonstrate the exponential growth of mobile telephony in emerging economies^{xii}. In Afghanistan, according to *The Economist*, the wireless population has grown from 20,000 users five years ago to 1.3 million today. In China, many of the nearly 100 million rural migrant workers rely on a mobile phone not only for their work, but to stay connected with the families they have left behind. The explosive growth of wireless subscribers – 1.2 million new users added daily in emerging economies around the globe – is leveraging new economic options for society. Generally speaking, users are captivated by the freedom, security, and enhanced productivity that mobile phones make possible^{xiii}. However, the use of wireless technologies is still in its infancy and remains to be further explored and documented. Attaching figures to the value of these benefits is difficult, as it is identifying exactly how society gains from all those handsets in pockets and purses. On balance, all surveys emphasise a productivity increase, considering that a dynamic wireless industry seems to be a benefit to any economy. But for the moment, there is little hard data available to quantify its current impact on productivity, and even less information on the public policies and industry actions needed for its potential value to be achieved. Moreover, beyond the mere substitution rationale, there are not yet appropriate business models to be deployed, perhaps due to the lack of multi-disciplinary approaches.

An overview of the Mobile penetration in relation to income of countries worldwide is reported in the figure here below.

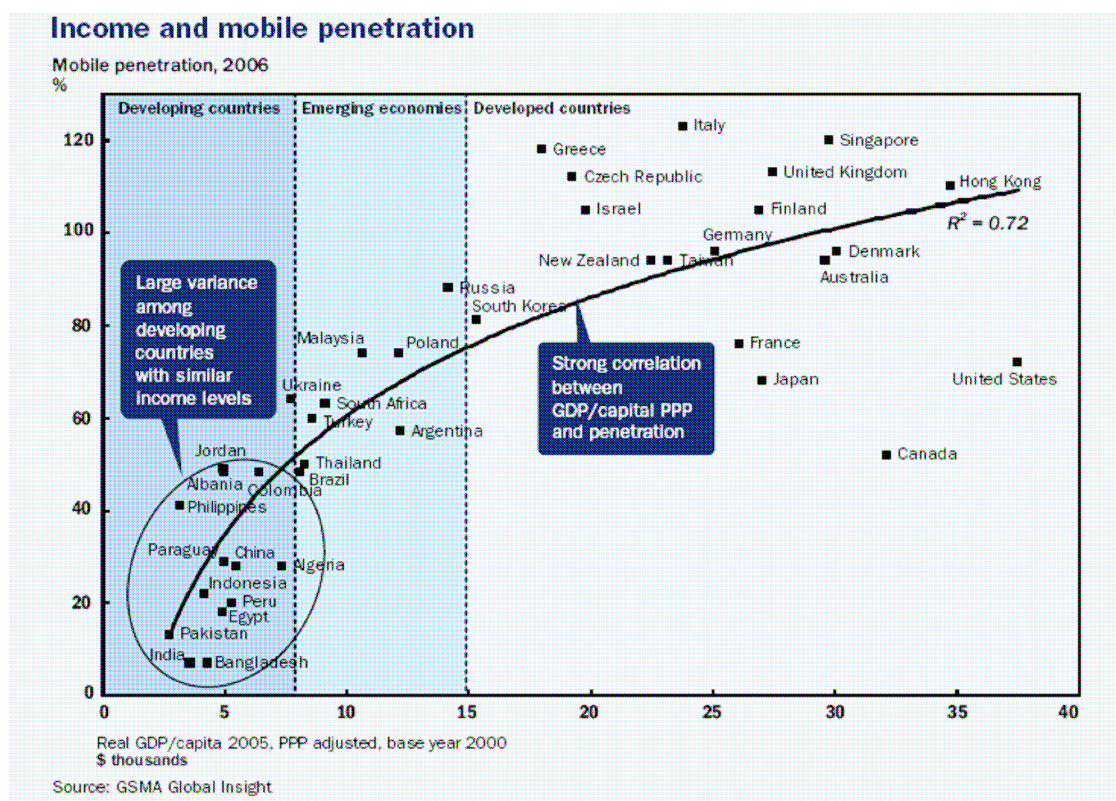


Figure 1. Income and Mobile penetration in 2006 (Source: GSM Association^{xiv})

But what lies really ahead of the current achievements in terms of mobile penetration, is not so much the ubiquitous access paradigm, which somehow constitutes a base line for more ambitious goals (or perhaps new nightmares if we think to the excesses of use of mobile telephony, its "intimacy" and the role these devices play in our daily-life, sometime even substituting real relationships), than a new cultural horizon for which administrations and governments might have to adapt, much beyond the e-Government stage model. The question is still open, however, as we still lack the tools for robustly evaluating the benefits of m-services and even more so, how m-government induced practises and service delivery may trigger wider societal benefits. More than that, anyone analyzing this process has raise his/her own doubts or whether he/she is analyzing facts and reports or if he/she is himself/herself a vector of the storytellig. The only way to go beyond this paradox is to raise the need for criteria and indicators. For indicators, we will fall into the same type of complexity as with eGov 1.0 measuring attempts, but it will have to be done some day. Let us start therefore with the easier task of setting up criteria of suspecting positive use and development trends, as the whole dynamic is still in its infancy.

One first and obvious question is to ask whether government is the right channel in achieving new forms of effectiveness and need's satisfaction for the wide social benefits that have been targeted so far.

As a matter of fact, some scholars suggest a refined model to understand what is taking place, involving vertical interactions and forms of integrations and overall a pivotal role of m-Government in the deployment of e-Government (m-Government as a tool to get higher forms of efficiency, effectiveness, openness and proximity).

Some interesting experiments have been initiated exactly in this direction. For example, New York City is planning to allow mobile phone users to send text and multimedia messages to 911 and 311, and a private project in Washington D.C., which publishes District-provided road work data overlaid on a Google map, represent two cases of the changes in the way citizens can interact with government using mobile devices. Displays showing the status of pothole repairs, but effectively, keep the city's Department of Public Works on its toes. These examples also illustrate an important aspect of the Web 2.0 world. Some call it "sousveillance," which happens when people turn the tables and monitor government activity.

Another area where m-Government is taking place is the integration of mobile technologies and applications (such as GSM for example) combining with Geographical Information Systems (GIS) and Global Positioning System (GPS). This is already somehow a reality in some countries that are experimenting these technologies, in particular at the local and municipal level, in order to provide real-time information about local transportation, directions with maps integrated in the mobile devices, traffic monitoring and crisis prevention, or even indications about the locations of camera to monitor traffic speed or other (see the case of Barcelona, Tampere or Switzerland for example). Another phenomenon that is growing is related to the integration of cultural information into mobile devices (see the experiment in the city of Barcelona again, about multimedia information about museums integrated into a PDA); somehow reproducing with new technological combinations what was proposed already in the nineties with I-Mode in Japan.

Somehow mobile devices have the potential to change people's interactions with government according to the growing scientific understanding of the principle of "swarm intelligence" that is an important aspect of this potential transformation of government. The term suggests that groups of people may be capable of a higher level of collaborative behaviour than could be predicted from the abilities of individual members.

According to many "m-Government optimists", the main developments of mobile technologies and applications in convergence with Web 2.0 experiments and technologies could in fact represent a "change II" mode of transforming relationships among different stakeholders, as well as redefining boundaries and institutional settings, thus creating room for the paradigmatic shift that e-Government was supposed to bring about.

However, this is far to be a reality, and it is not clear if and how this will be realized. The experiments and the claim that m-Government will be the channel of next generation e-Government in the years to come, is still limited by the absence of clear results about the up-take of m-Government services, and their trends, as well as any quantification of cost savings that can be realised by performing transactions using mobile technologies, versus traditional services or e-Government services.

Moreover, serious concerns about the potential of m-Government rely on the limited content so far developed in this area, and the still limited capacity of mobile devices to really act as a substitute to traditional e-Government channels, such as computer screens. In this regard, a fundamental component of success will be the way in which the private sector will be associated to the public sector to develop m-Government services, in both content design and delivery process. Improving media-streaming and broadcasting functionalities will be pivotal, as well as the large use of m-payment systems, in order to expand the number of usages and users, that already rapidly increasing due to online games and TV-on-demand, two of the central services so far used and soon to be made available on mobile phones, following the success of "mobile music" with iPod and iTunes.

But at the same time, Governments should develop their own strategies and policies to anticipate potential change that will inevitably come due to user pressure and increased involvement of citizens, facilitated in turn by the development and channelling of content in real time provided directly by the users themselves (let's think at the You-Tube approach for example).

The mix of mobile and web 2.0 technologies into a Mobile Internet paradigm, is potentially leading to new forms of participation pushed by enhancement of social awareness, as well as capacity of users. And this is more and more the case in emerging markets, where the demographic growth is exponential, and education is also increasing, thus making the availability of a large population of young and skilled people ready to use the latest device, and ready to be part of what someone call the "ubiquitous society" (see for example u-Korea, u-Japan, etc^{xv}): a society where mobility of content is required and mobile access is pervasive and considered as a pre-requisite (thus often given for granted).

This emergent behaviour enabled by the convergence of personal communications and publishing technology with massive private and government data sources could empower individuals in their relations with governments. But this remains to be verified by actual observations and facts.

Smart mobile phones, PDAs and other communications devices, all connected to Web 2.0 applications on the Internet, have the potential to utterly transform the way people react to natural disasters, terrorist attacks, or even ordinary fender benders. This was the case, for example when private citizens collaborated during the aftermath of Hurricane Katrina to share information, help reunite families, and pick up the slack where government failed; or after the 11 March 2004 terrorist bomb attack in Madrid, when citizens exchanged information regarding the government position

before election using mobile telephones (and someone argue this made change opinions of vote for many).

The same happens more and more with regards to civic engagement. The "mobile trends" are highly promising for organizing civic action campaigns, and engaging citizens on issues that matter most. For example, activists have used mobile phones to swing elections through innovative get-out-the-vote activities, to ensure impartial voting through poll monitoring, to organize collective action to free political prisoners, and to lobby legislators to pass environmental laws.

A concrete example is the case of Ghana where, during the electoral process, the opposition equipped some observers in each electoral building with mobile telephones and these informed in real time of the results of votes that were then diffused via local radio, so to avoid eventual "mistakes" when the ballots would have reached the central Presidency Office to be verified (and this made the opposition win the elections after a long period of "stability").

Mobile phones have been used to mobilize hundreds of thousands of peaceful demonstrators in countries across the world with text messages and political ringtones. They are being used in environmental campaigns in Argentina, and to advocate for an independent judiciary in India, for support of emigrant and migrant communities in the Philippines, and for increased disease detection and prevention in Rwanda.

In short, there is significant innovation – and a new tool for use in social change campaigns. Recently, a global network of people, tools, projects, and resources focused on the use of mobile phones for activism, campaigns, and civic engagement has been created (MobileActive). This group is actively engaged in expanding access to knowledge, ideas and experience supported by the use of mobile technology; reduce learning costs for civil society organizations; accelerate the use of effective tactics in campaigns; and provide a comprehensive platform for building partnerships, and for facilitating access to technology and funding. Probably a new business model around mobile technology and civic engagement has been defined.

All these may be identified, in my opinion, as weak signals... of an expected evolution (a heavy trend), reinforced by the fact that mobile technology can guarantee user proximity, easier accessibility capacity, and real time access, thus have the potential, in theory, to leverage effects of usage and, once Mobile Internet will be a reality, it may rapidly increase the access to Internet, so as to reach the next billion Internet users in a shorter period of time.

But, is a real paradigmatic shift indeed taking place? If yes, to what extent and with what impact? And what are the indications? Is this a real change, and what would be its supportive indications?

One needs therefore to turn to other kinds of criteria, that will other resonate and reinforce m-Government premises or keep them in the low-profile achievements category.

One second most obvious question is to observe and ask relevant questions about the next billion mobile telephony consumers and the triggering role that the emerging and the developing countries will play in terms of pilot countries, pilot domains and applications, pilot expertise and learning tracks, and how governments will play (or not) a stimulating part in that process, hopefully capable of triggering expectations, for technological innovation as well as socio-economic changes. Under the pressure of emerging countries like China, India or Brazil, as well as a series of smaller but determined countries, there is room for the kind of experiments and market pull that are precisely needed. At the end of the day, provided that nothing comes interfering with the growth rate evoked so far in mobile telephony diffusion (a wild card is always possible), all will finally reside in the effective service delivery level: will it be a minor improvement upon existing ICT servicing, generating divides and ineauqlities at the same pace as productivity and growth or will it allow local forms of uptake, consistent business solutions and government for once supporting rather than undermining social benefit?

After the meso-level (m-government, and its related administrative and policy-making parts), and the macro-level (the role developing countries will play in the overall ICT market of tomorrow), we must now examine the micro-level, the shop-floor reality of conditions which may make a difference. This is exactly where we are in our own research, oriented from now on to the examination of a few promising directions in the development and concrete of mobile Internet services.

5. Conclusions: cost-benefit perspectives in order to effectively address poverty reduction and development.

Two types of promises are being conveyed by the current trend. We have seen many of the forms direct m-services could take in the previous sections, and a few interesting promises linked with emerging ICT dynamics. We will still build upon that narrative of promises and possible successes, in terms of original and need-based service delivery, to examine briefly the open chance that mash-ups or new combinations represent: geo-location combining with GSM is currently one of the most trendy expansion of mobile services (waiting of course for the 3 and 3.5 G equivalents), but others are also being experimented, while others still may soon be strong options. In the emerging category, let us mention the mobile telephony systems in which users serve as relays of overall communication. We are still a long way to make those experiments safe and seamless, especially for local-global transitions, but a number of cities and telecom operators have here and there started their trials. We are in a learning phase and of course future standards may be better fitting that adaptation. The social benefit is the possibility to short-circuit, for the moment in a limited way, but quite open to all forms of improvement, the existing still largely incumbent-dominated telecom infrastructure.

This may result, in the medium term, in an increase of the battle on prices, incentive for innovation both in technological and application service terms; and of course, this evolution may be critical for developing countries who cannot afford building a complete hard-wired infrastructure in the near future. Mixes of infrastructures of all forms (satellite, wifi-wimax or successors, mobile telephony innovative solutions, as evoked in this section, along with copper and fiber cabling) may be tested, with narrow conforming patterns with local geographical, economic or even cultural situations. Yet, other forms of combinations are also emerging and worth mentioning, podcasts and peer-to-peer content exchange, with "nano" components (content or applications) circulating under the initiative of various types of actors, including end-users, in semantic web development, combinations between ontologies and folksonomies. In the near future, we have suggested that other mash-ups will be possible, like for instance the use of VoIP to transmit text in instant messaging applications (MSN type), eventually voice-command enabled. In this same perspective, new forms of interfaces are emerging, which will be piloted a variety of ways (beyond the mouse or trackball alternative) and ambient intelligent environments will become reactive and value-added to the user. Even if these more remote promises appear less accessible to the developing world, the number of interfacing capabilities passing simply through mobiles phones will indeed expand. The market these countries represent leaves open some reasonable expectations, one just has to see what is happening nowadays with the battle over low-cost computers to get a grasp of what is probably ahead of us (this is only an hypothesis on the use of existing weak signals of course, not a prediction).

In all cases, these technological and application-supported options need to be tried and validated in critical domains, education, health, SME activity, administration efficiency and effectiveness, transport and mobility, etc. They will also have to be encouraged by converging/sustainably supportive policy-making and regulations, either cross-sectorally, in specific territorial perspectives or in cross-border experiments. They will have to be sensitive to user-initiated processes, probably a very difficult task for any government. Finally, administrative managers and political decision-makers will have also to be aware of the risks these developments are bearing, in terms of divides, in terms of health, dependencies and even, and increasingly more so, in terms of environmental impact.

We thus define a set of indications, pathways or narrow doors of how a series of promises could be transformed into effective service delivery, organisational and institutional transformation and eventually socio-economic benefit, hopefully respectful of local characteristics. A lot of mistakes will certainly be made, confusing information and knowledge, equipment possession with real capability, index progression with innovation and as always, rhetoric claims with evidence-based accomplishments. But all in all, there is undeniably at stake an open perspective that should be explored. Under the criteria that were evoked in this paper (original mobile services, innovative mash-ups, government supported experiments for much needed services and domains of applications, in particular in developing countries, but also, of course, in OECD countries, more can be done in learning how to measure performance and define success, or furthermore, share knowledge and "replicate" in new contexts practises that worked.

On the one side, mobile technologies can (and have in principle the potential to) be more beneficial at the local level than at the global scale. In fact, if we talk about m-Government in particular, it is more likely that m-services provided by local administrations are useful to citizens, than some national services that eventually are used only once a year (exceptions are, of course, enterprises). In this regard, m-services can increase the degree of freedom and the proximity of local administrations with

citizens. It remains to be seen if they can actually deliver a real performance-level service to enterprises, we have only given some suggestions in that direction in the previous sections.

What instead seems to be realistic is to tend to explore future scenarios with service- and knowledge-intensive perspectives, as more promising objective than (or even to some extent, opposite to) a simple (and risky) information-intensive society evolution. In this regard, it is important to outline a fundamental research question: what kind of changes in the society will take place in the next 10-20 years? And what will be the role of ICTs and mobile technologies in particular, into government operations?

The key trends identified in an interesting research (and still actual despite it dates 1997) "Development and the Information Age: Four Global Scenarios for the Future of Information and Communication Technology,"^{xvi} can be distilled into two basic uncertainties related to the global community and national policies. Each uncertainty raises new questions. With regard to the global community: will its value systems become more inclusive and open, or more exclusive and closed? With regard to individual countries: Will they have a complete or partial (proactive or reactive) response to ICTs acquisition and use?

Basic assumptions here are that the global community has two value systems jostling for power. "One is inclusive, open, and enabling with solid attempts to integrate the weak and disadvantaged. The other is exclusive, fractured, restrictive, a Darwinian world, red in tooth and claw, dominated by the strong and powerful for their own ends, with increasing concentrations of technology, wealth, and power and little regard for those left behind. The difference is not simply one between private and public. It is more the difference between cooperation and exploitation". We can add, it is also more to be arbitrated between the imitation of "good practises" by everybody and innovation linked with local contexts and characteristics.

More recent foresight studies are converging to a great extent with that set of premises, varying in the form and the perspective, but always leaving in the open how things will actually unroll (Several scenario-building exercises have been recently initiated, like eGOVERNMENT, in some cases also using innovative approaches, as blogs or virtual community, starting from the most famous Gartner Research on Government 2020.

New research fields are therefore open to explore precisely the kind of changes that m-Government is likely to produce; and this at least in five main areas:

- 1) In terms of Information Management, as it will change the way in which information is represented/managed/shared;
- 2) In terms of technical challenges that will emerge, for example simply with regard to new forms of data storage required, or new way of distributing access within a network, and new mash-ups and categories of services, etc;
- 3) In terms of organizational forms, business models (see for example Web 2.0), that may end up in innovative public-private partnerships for instance.
- 4) In terms of Governmental agents, with for example the "efficiency gain" due to the "mobility" of agencies and users.
- 5) In social terms, as it will increase the risks and the potential threats of information dissemination with regard to privacy and security concerns for example, as new mechanisms will be required to cope with the new forms of community of users, with consequences also on the way the communities will organize themselves, and eventually new forms of divides that may arise.

In this context, Governments should focus towards an horizon that is at the same time not too short-term, in order to identify policies and activities that will be able to produce results that can be further replicated and eventually generalized and, also, not too long-term, as technologies (especially in the mobile Internet arena) evolve very rapidly and may become obsolete before being assessed, both for global or local knowledge and the possible in power relations at all levels. The "m" factor is part of a rapidly changing landscape but will have to be ultimately evaluated against all those indicators^{xvii}.

References & Notes

- ⁱ See Heeks R., Manchester University, www.eg4d.org .
- ⁱⁱ In this regard, both OECD and United Nations compiled a list of "Guiding Principles for Successful e-Government". See OECD, e-Government Studies, "The e-Government Imperative", 2003, www.oecd.org (pag. 19); and United Nations, "World Public Sector Report 2003: e-Government at the Crossroads", New York, 2003, www.unpan.org, (pag. 8 and 9).
- ⁱⁱⁱ See also the Results of the UN Global e-Government Survey, 2003, www.unpan.org
- ^{iv} ROSSEL Pierre, FINGER Matthias and MISURACA Gianluca, 2006, "Mobile" e-Government Options: Between Technology-driven and User-centric", *Electronic Journal of eGovernment*, Volume 4 Issue 2 Dec. 2006
- ^v See: <http://www.egovworld.org/>
- ^{vi} See: <http://www.mgovworld.org>
- ^{vii} See: <http://in.groups.yahoo.com/group/mGov/>
- ^{viii} The m-Dubai initiative was launched in September 2005 and has put Dubai among one of the governments in Middle East that have taken the lead in m-Government initiatives to enable payment-based transactions of e-Government services on mobile phones.
- ^{ix} See: http://www.mobile.gov.mt/pl_mitts.asp?mb:lang=en
- ^x See: http://www.vdl.lu/Mairie+et+services+centraux/e_City-style-m.html
- ^{xi} Mc Kinsey Quarterly, Web Magazine, "The true value of mobile phones to developing markets", Luis Enriquez, Stefan Schmitgen and George Sun, February 2007
- ^{xii} A specific analysis of the situation in Algeria has been conducted by the author in the elaboration of the "e-Algérie 2015: Strategic Plan for the development of the Information Society in Algeria" (April 2007), by G. C. Misuraca in collaboration with M. Abida, within the framework of the EUROPEAID Project of Technical Assistance for the development of the Information Society in Algeria.
- ^{xiii} Mc Kinsey&Company, "Wireless Unbound: The Surprising Economic Value and Untapped Potential of the Mobile Phone", December 2006
- ^{xiv} See: <http://www.gsmworld.com/index.shtml>
- ^{xv} See: u-Korea IT839 Strategy, http://www.digitaltechnews.com/news/2005/07/ukorea_it839_pr.html; and u-Japan policy, http://www.soumu.go.jp/menu_02/ict/u-japan_en/index.html
- ^{xvi} See: "Development and the Information Age: Four Global Scenarios for the Future of Information and Communication Technology, Edited by J. Howkins and R. Valantin, (International Development Research Centre, IDRC-Canada and United Nations Commission on Science and Technology for Development, UNSTD), IDRC 1997, www.idrc.ca
- ^{xvii} This discussion is, in fact, at the basis of a Research initiated within the framework of the Executive Master in e-Governance at EPFL and of other researches of the College of Management of Technology at EPFL, and that will be pursued under the auspices of two main research supportive activities, namely COST Action 22/Swiss funded Research on The Future of ICTs, and the PhD Research of the author himself. The proposed Research plan includes, building upon the findings from past and current fieldwork analysis in developing and emerging countries, to substantiate and address the above mentioned research questions. The methodology of the research will be based, on one hand, on research already conducted at EPFL-CDM, and in particular on the various natures of changes taking place under the impact or involving ICTs development and, on the other hand, on more specific future studies and technology foresight methodologies, ending up, in particular, in the elaboration of a diversified set of scenarios to be evaluated.