THEORETICAL STUDY TO HIGHLIGHT THE SMART GOVERNMENT COMPONENTS IN 21st CENTURY

Iman Mohsin Hassan [1, 3], Alia Ahmed Mahdi [2, 3] and Nassir Jabir Al-Khafaji [3]

[1] Department of Finance Affairs/University of Karbala, Iraq
[2] Office of the Inspector General/Directorate of Health, Iraq
[3] School of Computing/Universiti Utara Malaysia, Malaysia
[1] emanmh_1986@yahoo.com ; [2] alia.moussaoui@yahoo.com; [3] nassirfarhan@yahoo.com

Abstract: With the emergence of internet and the evolution in technology, software and hardware, the governments are making their efforts to obtain new technologies to provide services to the citizens and facilitate the process of business with stakeholders. In 1990, Information and Communication Technology (ICT) was used by public sector to ensure E-government services to the citizens, but, unfortunately, still various groups of citizens like farmers have no access to these services. Therefore, with the adoption of M-government, these issues and challenges are being addressed, but, lately, these concepts are developed for the improvement of services and the communication of citizens and government (social media and cloud computing). Therefore, this work aims to provide insight about the four major concepts that supports the development of E-government and is transformed into Smart-Government (S-government).
Keywords: Smart Government, e-government, m-government, social media, cloud computing

I. INTRODUCTION

Since the mid-eighties, the governments in the world have been through a process of services re-evaluation. Where a conviction has been emerged with the development of communication and information technologies that:

a. The operational levels of the public sector will be transcended with the application of these technologies.
b. For the use of these technologies, a distinctive public sector perspective is needed.

This article will help in the explanation of smart governments (S-government) like cloud computing, E-government, M-Government, and social media.

II. E-GOVERNMENT

The technologies of information and communication are in huge administrative need [1]. For instance, ICT helps to create a structured network for interconnectivity, service delivery, decentralization, efficiency and effectiveness, interactivity, and accountability [2] [3] [4] [5].

As the nature of technology is dynamic, therefore there is no single definition for E-government.

E-government is considered a process of using new information and communication technologies like computer, internet and mobile devices for the purpose of providing easy access to government services, improving the services quality, and ensuring the participation of citizen in the democratic process. In other studies, different titles of E-government are: digital government [6], online government [7] and connected government [8].

Using three basic elements, the definition of E-government can be summarized:
1. Using information and communication technologies like internet, computer and mobile devices.
2. The support of government actions i.e. providing information and services.
3. Improving the government and citizen's interaction with help of creating channels or promoting the involvement of citizens in the political and administrative process.

Table 1: Definition of e-government

Author (s)	Year	e-government definition
West [9]	2004	E-government is considered the process of communicating the information and services of government with the help of internet.
Almarabeh and AbuAli [10]	2010	E-government is the uses information and communication technologies in order to provide the citizens with the opportunity of interaction and doing business with government through electronic media i.e. email, internet, self-service kiosks, and EDI.
Schware [11]	2005	In e-government, ICT is used for the purpose of improving the quality of services provided to citizens and businesses, which also increases the efficiency, transparency and accountability of government. .
Bhatnagar [12]	2004	E-government is the process of reforming the procedure of government work, sharing information and providing services to both external and internal clients.

In various studies related to E-government, four basic areas of E-government relationship, i.e. government-to-business (G2B), government-to-citizen (G2C), government-to-employee (G2E), and government-to-government (G2G) [13] [14] [15], as shown in Figure 1 below, are discussed:
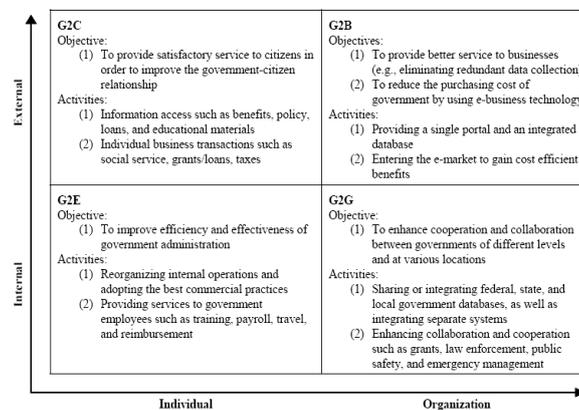

Figure 1: E-government interaction

As illustrated in Figure 1, G2C and G2E are considered for the interaction of government and individuals, while G2B and G2G are considered for the direct interaction of government and organizations. Moreover, the explanation of Heeks [16] related to these interactions is shown in Figure 2:

e-Administration

Improving government process by making processes time and cost effective, managing process performance, making strategic connections in government, and creating empowerment.

e-Citizens and e-Services

Connecting citizens by providing citizens with public sector activities details, increasing citizen input into government decisions and actions and improving public services

e-Society

Building external interactions by building relationships between public agencies and other public and private sector companies, non-profit and community organizations. This includes interaction between government and business.

Classification of Heeks to e-government interactions

Figure 2: classification e-government interactions

Furthermore, various models related to E-government development are present like Deloitte's six stage model [17], Layne and Lee's four-stage model [18], Hiller and Belanger's five stage model [19], and Moon's five-stage model [20]. The five stage model of Siau and Long is considered the most recent, which, with the help of mete synthesis method, explains the whole vision of E-government.

According to UN (United Nation)/ASPA (American Society for Public Administration) [21], a five stage model was introduced for the development of E-government:

1: Emerging Presence
• Information is limited and basic

2: Enhanced Presence
• Unidirectional
• Current and archived information on policies, laws, etc.
• Search, help functions

3: Interactive presence
• Downloadable forms for tax payment, applications for license renewal
• Audio and video capabilities for public information
• Ability to directly contact officials

4: Transactional Presence
• Two-way interaction
• Payment of taxes
• Applying for ID's, birth certificates, passports, licenses, etc.
• Payments for public services, fees
• Secure public vendor bids

5: Networked Presence
• Integration of G2G, G2C & C2G services
• Participatory, deliberative collective decision-making
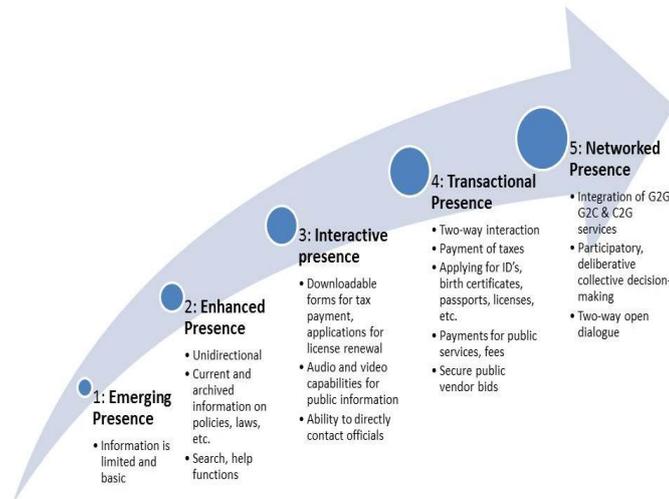• Two-way open dialogue

Figure 3: stages of e-government

III. M-GOVERNMENT

Using mobile technology, the efficacy of government is enhanced in creation of benefits and ensuring outcomes for governments, citizens, businesses, and making a positive influence on the overall economic growth. With the help of M-government, access to current services can b extended, new services are delivered, increases the contribution of citizens in government operations, and change the working procedure of public sector. Recently, M-government is becoming more popular than E-government, especially in Middle East countries, where the number of mobile-broadband subscribers reaches 2.3 billion, where 55% of them is in developing countries.
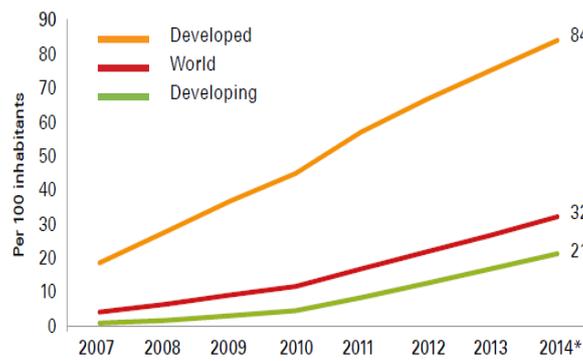
Figure 4: Active mobile-broadband subscriptions per 100 inhabitants, 2007-2014 [22]

Mobile broadband is considered emerging in both developed and developing countries. In the year 2013/2014, the growth, in comparison to developed countries, will be doubled in developing countries i.e. 26% compared with 11.5%. Moreover, in comparison to the developed country's 121% mobile-cellular penetration, will reach 90% by the end of 2014 in developing countries as shown in Figure 5:
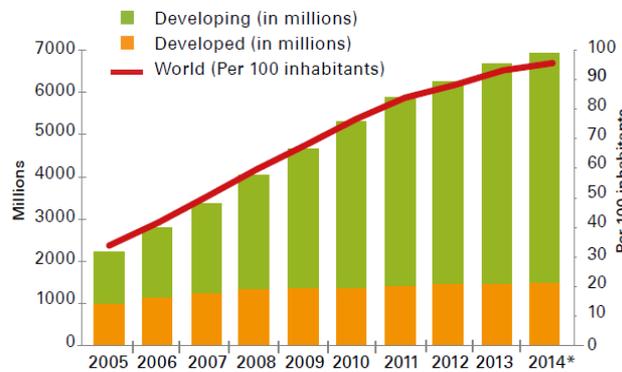

Figure 5: Mobile-cellular subscriptions, total and per 100 inhabitants, 2005-2014 [22]

Moreover, every aspect of citizen's daily life is empowered by mobile technologies, which is an improvement in the life quality of many [23]. Mobile phone is considered more affordable and user friendly if compared with personal computers. With the help of M-government, the time and energy is saved of citizens as internet and government networks can be accessed through mobile phone [24]

M-government is not different than E-government, but it is considered an advanced set of E-government. M-government endures to use the mobile wireless communication technology between the government organization and in distribution of services and information to citizens and industrial enterprises [25].

Mobile technologies provide government with significant opportunities for achieving greater cost optimization, improving communications and data coordination, expanding service delivery and much progress towards digital equality. The following are the benefits of using mobile technologies in public sector [26]:

Wider reach – Mobile phone penetration extends outreach and access to often difficult-to-reach groups, such as seniors, people with disabilities and citizens living in rural areas.

Mobility and ubiquity – Citizens have access to government information and services anytime and anywhere using wireless networks through their mobile and wireless devices.

More personalization of services – Provision of location-based government services: As mobile phones are typically personal, the possibility of locating an individual's exact physical location ensures that governments can directly provide services to each person.

Cost-effectiveness – Cost-saving results includes M-government streamlined processes, shared and coordinated data access, embedded mapping, and electronic processes, communications and transactions.

Faster information flow – Real-time and location-based processes result in quick and easily accessible data and communications, information consistency, responsive case management and information exchanges.

Better management – Mobile technology has the potential to help government officials in management of allocated financial and human resources.

Increased democracy – Public officials can stay current on public opinion and priorities from a larger group of citizens.

Enabled green government – This is the result of the environmental friendliness and paper-use reduction achieved which has been possible through the increased use of the mobile services.

IV. CLOUD COMPUTING

According to Leavitt [27], the definition of cloud computing is "a business model which delivers IT applications and resources as a service which can be accessed remotely over the internet. While, in the traditional model, IT resources and applications are considered products which are sold or licensed from a vendor and then exploited locally on a local computer infrastructure [28]. Figure 6 depicted the stages that led to the access of Cloud Computing:
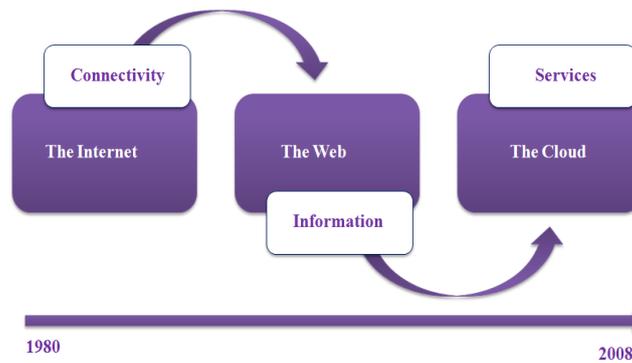

Figure 6: Stages of the shift to the Internet to cloud

Generally, in cloud computing, the user purchases remote access via internet instead of purchasing software and hardware. Figure 7 shows the levels of cloud computing [29] [30] [31].
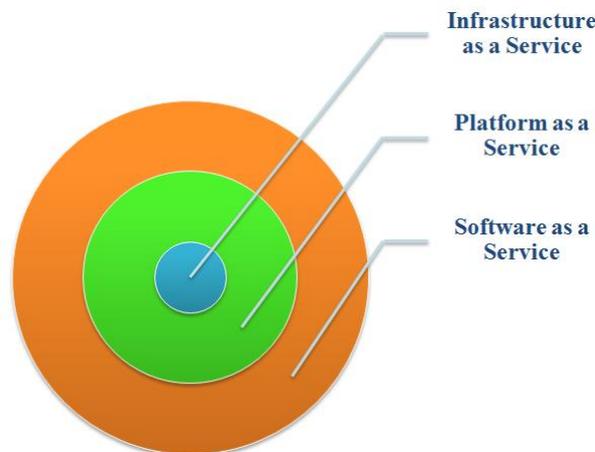

Figure 7: The cloud computing levels

1. **Infrastructure as a service**: the computer infrastructure is provided as a service which is comprised of servers, storage space, network equipments, and system software like OS (operating system) and database systems.
2. **Platform as a service**: the application development environment is provided which support the life cycle of designing, implementation, testing, and deployment of web applications and services.
3. **Software as a service**: in this stage, a complete application like customer relationship management and ERP (Enterprise Resource Planning) is provided.

The essential benefit of cloud computing, particularly in software as a service, comes from aggregation that permits to eliminate redundancy. According to Cellary and Strykowski [28], there are two levels of aggregation, as illustrated in Figure 8:
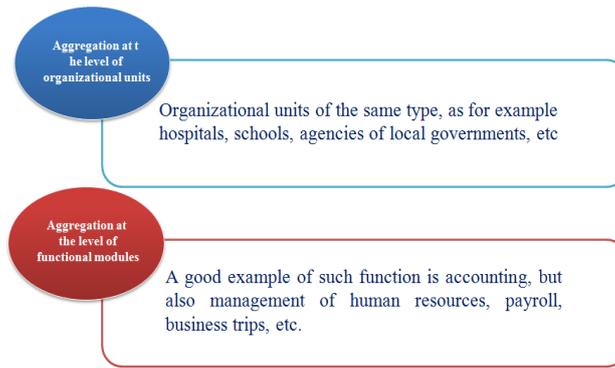
Figure 8: Aggregation Levels

Table 2 illustrates previous studies that deal with cloud computing in various disciplines:

Table 2: Cloud computing with different disciplines

Area	Year	Authors
E-learning	2009	Pocatilu, Alecu & Vetrici [32]
	2010	Pocatilu, Alecu & Vetrici [33]
	2012	Ghazizadeh [34]
	2014	Selviandro, Suryani & Hasibuan [35]
E-health	2014	De and Mukherjee [36]
	2010	Guo, Chen, Chen & Tang [37]
	2012	Shih, Fan, Chiu, Shih & Wang [38]
	(2011).	Chowdhary, Yadav & Garg [39]

Moreover, for enabling cloud computing and realizing its potential, there are total eight core element as shown in Figure 9:

Universal connectivity – users must have ubiquitous access to the Internet.

Open access – users must have fair, non-discriminatory access to the Internet.

Reliability – the cloud must function at levels equal to or better than current stand-alone systems.

Interoperability and user choice – users must be able to inter operate among cloud platforms.

Security – users' data must be safe.

Privacy – users' rights to their data must be clearly defined and protected.

Economic value – the cloud must deliver tangible savings and benefits.

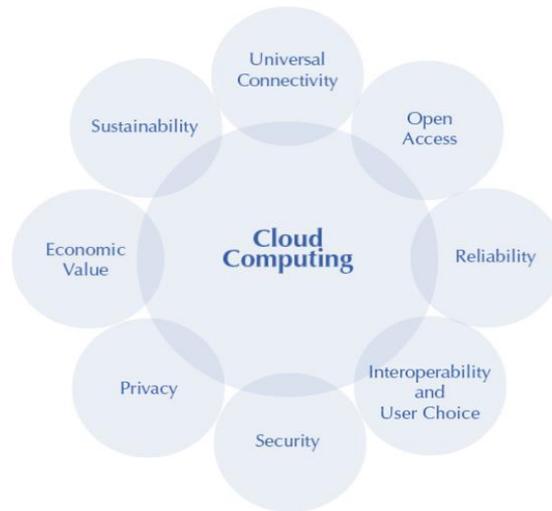**Sustainability** – the cloud must raise energy efficiency and reduce ecological impact.

Figure 9: eight elements of Cloud Computing [40]

A-Cloud Computing and E-government

With the advancement in cloud computing, public and private sector agencies can access software, services, and data storage through remote file services [9]. The cloud computing model is depicted in Figure 10:
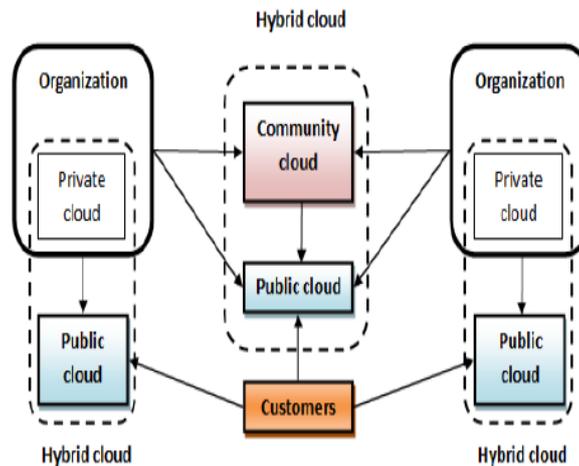

Figure 10: Cloud computing deployment models [31]

According to previous studies, cloud computing can enhance the way of government providing services to the citizens and institutions and also its cooperation with other governments [31] [41] [42] [43] [44]. Recently, different barriers to E-government are:

- With the changes in demand over a period of time, resources cannot be changed as it may cause redundancy or insufficiency in resources.
- Software and hardware must be frequently upgraded and maintained which cost time and money.
- New software needs purchase of license.
- The 24/7 availability of the system is needed.
- Data storage and recovery is limited.
- Secure environment with authentication and access control is needed.
- Lack of accountability.

According to Youssef [41], the issues in E-government can be resolved with cloud computing. With the help of elastic, scalable, customized and highly available environment, cloud computing can address these issues [31]. Moreover, it also provides relief from maintenance, upgrading, licensing and making the focus of government on the basic work. Moreover, it also helps in providing cost efficient data storage and file replication and multiple installations in geographically separated locations can be used for data recover in case of disasters. Similarly, for prevention of malicious behavior and protection of data integrity and confidentiality, security approaches and techniques are deployed on cloud computing [45] [46] [47]. The E-governance cloud services are illustrated in Figure 11:
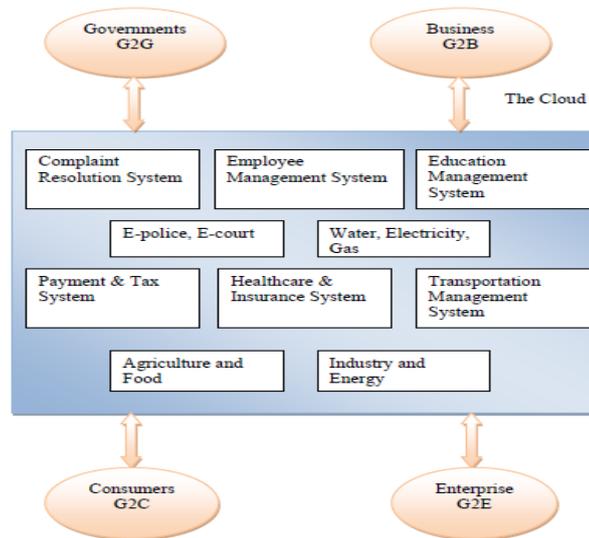
Figure 11: Services Provided By an E-Governance Cloud

B- The advantages of cloud computing

The advantages of cloud computing is listed below [28] [48] [49]:

1. **Dynamic load of resources.** Cloud computing permits a customer to purchase the needed amount of hardware and software resources in a given moment and dynamically increases or decreases the amount of it in accordance to the changes in environment.

2. **Professional maintenance and administration**.

   The professional maintenance and administration needs highly trained staff which is costly and affording it can be an issue for small government offices. Often, such individuals are not willing to work for a small countryside government offices. Cloud computing model eliminate this problem.

3. **Timely software updates.**

   The provider and administrator of cloud computing keep the software updated and upgraded. In case of software as a service model, the cloud computing provider also instantly updates the software to adjust it according to the changes in legal regulations.

4. **Higher security.** In cloud computing, the professional staff ensures higher security of software and hardware in comparison to the employed staff small unit's multitude.

5. **Higher performance.** Cloud computing can offer higher performance scalable to customer's changing needs.

6. **Shift from investment cost to operational costs.**

   Purchasing hardware and software are considered costly as it needs a huge sum of investment. However, in cloud computing, monthly paid services are purchased by organizations. A shift from initial high investment towards operational cost is noted, which are considered for a longer period of time.

7. **Dissemination of good practices.** Cloud computing contributes to dissemination of modern software and more generally – good organizational and managerial practices. As well as, Table 3 illustrates countries using Cloud computing in their governments.

Table 3: countries used cloud computing in public sector

Country	Years	Author (s)
USA	2010	Wyld [50]
UK	2009	Glick [51]
Japan	2009	Hicks [52]
China	2009	Hicks [53]
Thailand	2009	Hicks [54]
Vietnam	2009	Babcock [55]
New Zealand	2009	Strecker [56]

V. SOCIAL MEDIA

Social media includes social networking applications i.e. Facebook and Google+, micro blogging services i.e. twitter, blogs, wikis, and media sharing sites i.e. YouTube and Flickr [57]. Most governments in the world strive to use social media as transparency enhancement tool [58]. Where, transparency and accountability have been highlighted as key elements of good governance [59]. The effort for new governance approaches promotes higher level of transparency and the contribution of citizens is considered as an enhancement of citizen's trust on government. On the other hand, many researchers referred to the potential contribution of the internet to enhance the transparency and openness of public sector entities and to promote new forms of accountability [60] [61] [62].

With the development of Web 2.0 with the help of new technologies like RSS, podcasting and widgets [64], social media has been developed. According to Hearn, Foth and Gray [64], companies can develop relationship with new stakeholders with the help of social media. The main benefit to government from second-generation web is the transparency and participation of citizens. According to Magro, Ryan, Sharp and Ryan [65], social media is considered to be a part of the second-generation (Web 2.0) movement, which is characterized by user-generated content, online identity creation, and relational networking. Moreover, Bertot, Jaeger and Grimes [67] said that:

> "Social media has four major potential strengths: collaboration, participation, empowerment, and time. Social media is collaborative and participatory by its very nature as it is defined by social interaction. It provides the ability for users to connect with each [other] and form communities to socialize, share information, or to achieve a common goal or interest. Social media can be empowering to its users as it gives them a platform to speak. It allows anyone with access to the Internet the ability to inexpensively publish or broadcast information, effectively democratizing media. In terms of time, social media technologies allow users to immediately publish information in near-real time"

New Web generation supports citizen-created content that enriches socio-political debates and that increases the diversity of opinions, the free flow of information and freedom of expression [58]. According to OECD [68], second-generation (web 2.0) can be used for engaging citizens, exchanging opinions, provoking debate and sharing information about social and political problems. In addition, the public sector can take advantage of the heyday of this new participative culture that is developing in many citizens in order to improve government-to-Citizens (G2C) interactions. Unfortunately, the research about the impact of social media on the public sector, especially local government is still highly tentative and exploratory [69]. Moreover, Bonsón, Torres, Royo and Flores [58] stated that, social media with public sector is still in its infancy.

Improvement of public sector transparency:

for example, by using content syndication and social media platforms to bring the public sector agenda and activities closer to citizens and provide news and information in the platforms preferred by citizens

Improvement of policy making

new forms of participation, enabled by the use of ICTs, which improve social consciousness and citizen engagement.

Improvement of public services:

more innovative mechanisms for service delivery.

Improvement of knowledge management:

transformation of relationships within the organizations and between different public entities.
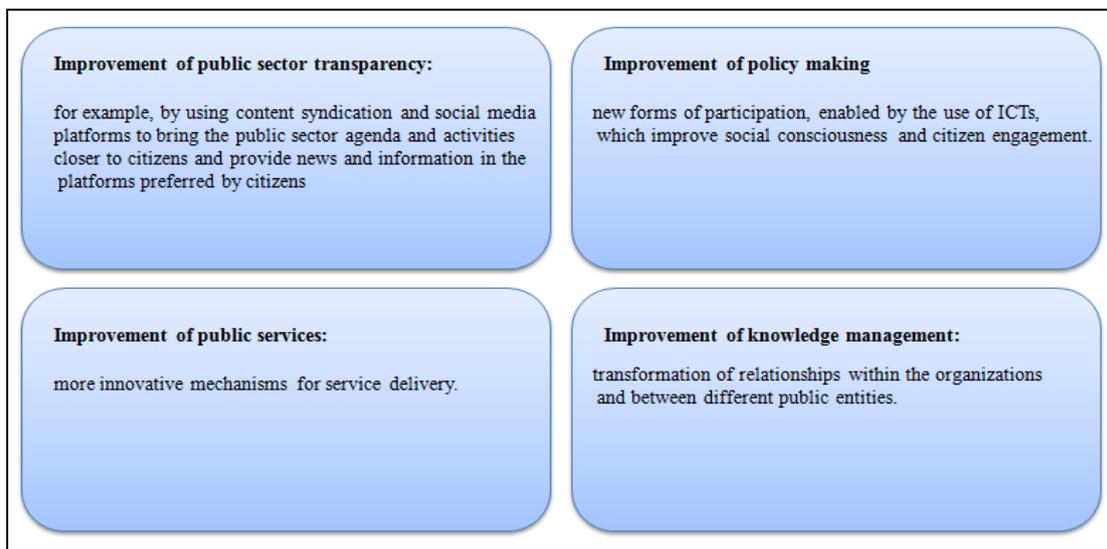
Figure 12: illustrates the impact of second-generation Web on the public sector

Moreover, multimedia and second generation (Web 2.0) is different from one another. When government provide web TV and Video, this is known as webcasts, while, new generation (Web 2.0) can help improve policy-making and service delivery by enriching government interactions with external stakeholders and enhancing internal knowledge management [70].

A-Essential core elements of a social media policy

Eight basic elements related to social media policy were identified by Hrdinová, Helbig and Peters [70], as shown in Figure 13. Where, every element deals with an issue which must be adequately addressed in any successful policy related to social media of government agencies. The benefits of core elements are explained as:

- **Employee Access:** At work employees can use social media sites for the purposes of carrying out official business, professional development, or any personnel interests.
- **Account Management:** Account management in an agency is not only required to keep record of social media accounts created, maintained and closed by its employees for work or professional use, but also to define procedures for creation of such accounts.
- **Acceptable Use:** Acceptable use policy governs not only the use of social media, but also the use of the Internet and other technologies by employees. It may quantify online hours, usage monitoring, penalties for policy violation, etc.
- **Employee Conduct:** Employee's conduct policy governs employee's online ethics, behavior and penalties awarded for violation of the policy.
- **Content:** Content policy controls permission to employees for posting and managing on l social media official pages.
- **Security:** government data and technical infrastructure, related with social media technological and behavioral risk, is protected with the help of security guidelines. Social media, in E-governance, is comprised of new security and privacy related concerns which must be adequately addressed in a successful policy.
- **Legal Issues:** with the legal guidelines, while using social media, the employees of government are abide by laws and regulations. Recently, governments have created laws and regulations.
- **Citizens Conduct:** Since social media integration with e-governance makes it possible to have a public citizen-government communication, therefore, rules for citizen engagement with the government are created.
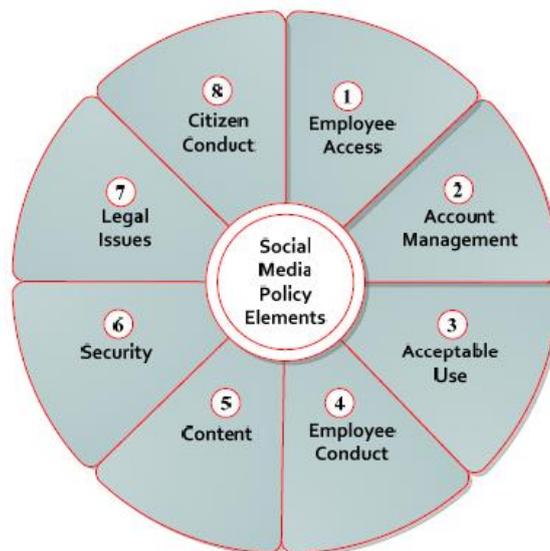

Figure 13: Eight elements of social media policy

B- Strategic Use of Social Media in Government

According to Dadashzadeh [72], the decision related to investment in technologies and applications of social media must be considered in the planning efforts of organization's enterprise architecture. The essential steps related to strategic use of social media in government are identified in the figure 14:
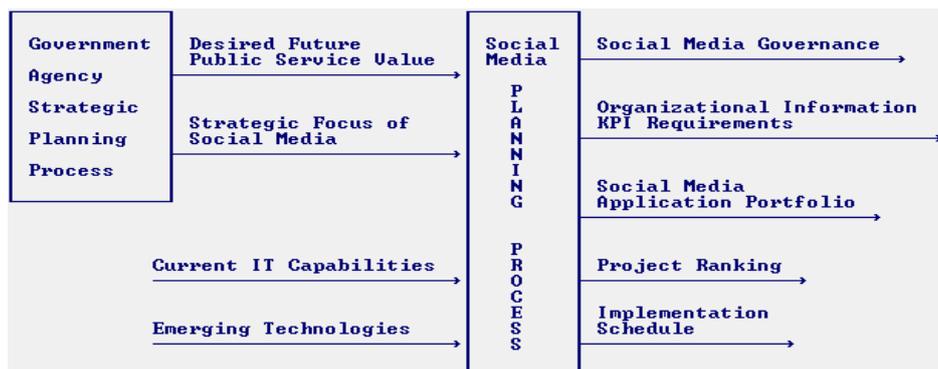

Figure 14: Steps for strategic use of social media in government [72]

According to Dadashzadeh, strategic planning process of government agency must define the desired value of future public services and the strategic focus of social media must be realizing it. According to various researchers, social media benefits government in terms of increase participation of citizens, solicit innovative ideas from the masses, and improve decision making and problem solving [73][74][75]. Further, according to Accenture [76], the desired value of public service must be defined and the role of social media in realizing it must be guided by four principles:

- **Outcomes-Based Focus**: it generates tangible improvements in the social and economic conditions of the citizens;
- **Balanced to Ensure Fairness**: it serves as the common good by providing access for all citizens;
- **Engagement to Co-Produce Public Value**: it increases the participation, education, and also help citizens to improve their life quality through tapping into their experience; and
- **Improving Government Accountability:** it makes government to provide transparent reports related to cost efficient initiatives and encourage citizens to criticize the failure of government which will meet the expected public value.

The articles, explaining the applications of social networking and activities of social media which are used by government and citizens for interaction and communication with each other, are explained in Table 4:

Table 4: examples for researches about social media in public sector

Author (s)	Year	Title
Shi [77]	2007	The accessibility of Chinese local government web sites: An exploratory study.
Shin [78]	2007	A critique of Korean National Information Strategy: Case of national information infrastructures.
Couldry [79]	2008	New Media for Global Citizens-The Future of the Digital Divide Debate
Bélanger and Carter[80]	2008	Trust and risk in e-government adoption
Alonso, Ambur, Amutio, Azañón, Bennett, Flagg and Sheridan [81]	2009	Improving access to government through better use of the web.
Molinari and Ferro [82]	2010	Framing Web 2.0 in the process of public sector innovation: Going down the participation ladder
Ghannam [83]	2011	Social Media in the Arab World: Leading up to the Uprisings of 2011
Bonsón, Torres, Royo and Flores [58]	2012	Local e-government 2.0: Social media and corporate transparency in municipalities.
Levy, Bagby and Trauth [84]	2013	E-government evolution in small municipalities in Pennsylvania in web 2.0 social environment: a poster.
Lee and Park [85]	2014	Introduction to the special issue: social media interaction between public and government in Asia-Pacific

VI. SMART GOVERNMENT

The use of Smart Government defines new principles for governance system that ensure the resolution of the issues related to citizens, businesses, and government and hence pursue equal and sustainable prosperity. In fact, "Smart government" focuses the important elements of good governance such as, simple, moral, accountable, responsive and transparent government [86] [87]:

- **Simple:** Citizen expects a user friendly government with simple laws, rules, regulations, processes, and procedures developed by government;
- **Moral:** In smart government, a new system of governance based on moral values is emerged.
- **Accountability:** The civil service is considered accountable for the design of strategies, action plan developed for the implementation of particular programs, and the system and performance achieved.
- **Responsiveness:** It refers to the attentive need of the common man and timely response to the particular need is focused.
- **Transparency:** Transparency brings some of the essential virtues into public life, such as equity, level playing field, the rule of law. The components of smart government are shown in Figure 15:
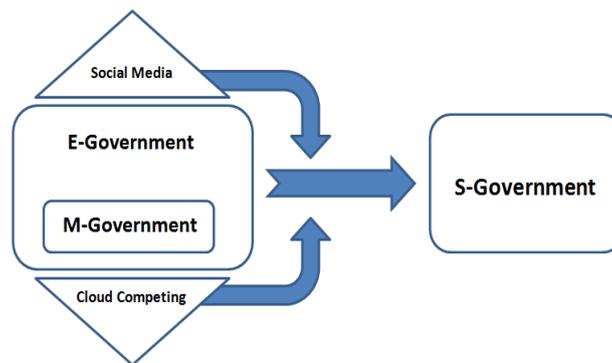

Figure 15: Smart government components

VII. CONCLUSION

In 21 century, the idea of administration and governance has been radically transformed and has adopted new tools which will help the government to enhance their services. Information and communication technologies are now practiced in various public sectors. Where, Information and communication technologies (ICTs) are considered as a cost-effective and convenient means to promote openness, transparency, and to reduce corruption. Social media has focused on openness and transparency. The use of social media in E-government has created a new way of transparency and facilitation. For quick interaction, the use of social media by government is considered emergent. Social media is a considered an important tool for communication of high numbers of citizens. Moreover, clouds computing permits also to considerably cut costs of IT in the public sector which are often considered one of the main obstacles to the deployment of e-government solution, as well as, cloud computing enhance the possibilities of providing electronic services both in the public and the private sector. Where the system of E-government needs entities such as software, hardware, services, management, network, business, policy and security to survive and function properly. Unfortunately, the current technologies and approaches are not considered enough for management of all mentioned entities. Cloud computing, which treats all these entities as a service, can be used in the E - government system. Cloud computing helps in the management of the above mentioned entities and hence addresses the global issues related to the system of E-government. Moreover, the use of mobile technologies can make public information and government services available "anytime and anywhere" to both citizens and officials. Furthermore, M-government is considered suitable for the areas where the access rate to internet is low in comparison to the emerging mobile penetration. Therefore, all the discussed components are considered important for government to provide services to its citizens, and this will institute a new concept known as S-Government (Smart government). In the future work, we will seek to understand the factors that effect on the electronic commerce in developing countries. Where, there is a paucity of the researches in this area.

REFERENCES

[1] L. Guo, "Study on path evolution and strategy of e-government in China," in *Emergency Management and Management Sciences (ICEMMS), 2011 2nd IEEE International Conference on*, 2011, pp. 700-703.

[2] C. R. McClure and J. C. Bertot, "The chief information officer (CIO): assessing its impact," *Government Information Quarterly,* vol. 17, pp. 7-12, 2000.

[3] V. J. Bekkers and S. Zouridis, "Electronic service delivery in public administration: Some trends and issues," *International Review of Administrative Sciences,* vol. 65, pp. 183-195, 1999.

[4] T. M. La Porte*, et al.*, "Public organizations on the World Wide Web: Empirical correlates of administrative openness," in *Proceedings of the 5th National Public Management Research conference, College Station, TX*, 1999.

[5] R. Heeks, *Understanding e-governance for development*: Institute for Development Policy and Management Manchester, UK, 2001.

[6] G. Marchionini*, et al.*, "Digital government," *Communications of the ACM,* vol. 46, pp. 25-27, 2003.

[7] M. A. Wimmer and E. Tambouris, "Online one-stop government," in *Information Systems*, ed: Springer, 2002, pp. 117-130.

[8] United Nations, *United Nations e-government survey 2008: From e-government to connected governance*: UN, 2008.

[9] D. M. West, "E-Government and the Transformation of Service Delivery and Citizen Attitudes," *Public administration review,* vol. 64, pp. 15-27, 2004.

[10] T. Almarabeh and A. AbuAli, "A general framework for e-government: definition maturity challenges, opportunities, and success," *European Journal of Scientific Research,* vol. 39, pp. 29-42, 2010.

[11] R. Schware, *E-development: From excitement to effectiveness*: World Bank Publications, 2005.

[12] S. Bhatnagar, *E-government: From vision to implementation-A practical guide with case studies*: Sage, 2004.

[13] K. Siau and Y. Long, "Synthesizing e-government stage models–a meta-synthesis based on meta-ethnography approach," *Industrial Management & Data Systems,* vol. 105, pp. 443-458, 2005.

[14] O. Olatubosun and K. M. Rao, "Empirical study of the readiness of public servants on the adoption of e–government," *International Journal of Information Systems and Change Management,* vol. 6, pp. 17-37, 2012.

[15] B. Gupta, S. Dasgupta, and A. Gupta, "Adoption of ICT in a government organization in a developing country: An empirical study," *The Journal of Strategic Information Systems,* vol. 17, pp. 140-154, 2008.

[16] R. Heeks, "E-government for development, institute for development policy and management," *University of Manchester, UK,* 2008.

[17] T. Deloitte, "The citizen as customer," *CMA Management,* vol. 74, p. 58, 2001.

[18] K. Layne and J. Lee, "Developing fully functional E-government: A four stage model," *Government Information Quarterly,* vol. 18, pp. 122-136, 2001.

[19] J. S. Hiller and F. Belanger, "Privacy strategies for electronic government," *E-government,* vol. 200, pp. 162-198, 2001.

[20] M. J. Moon, "The Evolution of E-Government among Municipalities: Rhetoric or Reality?," *Public administration review,* vol. 62, pp. 424-433, 2002.

[21] UN/ASPA. (2001). *United Nations and American Society for Public Administration (2001)*. Available: www.unpan.org/egovernment2.asp

[22] ITU, "ICT Facts and Figures 2014," 2014. http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx.

[23] D. Vogel, "Mobile Government: How to Improve Fairness in Public Administration Management," 2014.

[24] A. Alsenaidy and T. Ahmad, "A review of current state m-government in Saudi Arabia," *Department of Biochemistry, King Saudi University,* 2012.

[25] A. S. Nava and I. L. Dávila, "M-Government for Digital Cities: Value Added Public Services," in *The Proceedings of the First European Mobile Government Conference, Brighton, UK*, 2005.

[26] OECD, M-Government. Mobile Technologies for Responsive Governments and Connected Societies, Paris 2011.

[27] N. Leavitt, "Is cloud computing really ready for prime time?," *Computer,* vol. 42, pp. 15-20, 2009.

[28] W. Cellary and S. Strykowski, "E-government based on cloud computing and service-oriented architecture," in *Proceedings of the 3rd international conference on Theory and practice of electronic governance*, 2009, pp. 5-10.

[29] A. Tripathi and B. Parihar, "E-governance challenges and cloud benefits," in *Computer Science and Automation Engineering (CSAE), 2011 IEEE International Conference on*, 2011, pp. 351-354.

[30] A. Bhisikar, H. P. Singh, and J. Singh, "Innovative ICT through Cloud Computing," *The IUP Journal of Computer Sciences,* vol. 7, pp. 37-52, 2013.

[31] A. E. Youssef, "Exploring Cloud Computing Services and Applications," *Journal of Emerging Trends in Computing and Information Sciences,* vol. 3, pp. 838-847, 2012.

[32] P. Pocatilu, F. Alecu, and M. Vetrici, "Using cloud computing for E-learning systems," in *Proceedings of the 8th WSEAS International Conference on DATA NETWORKS, COMMUNICATIONS, COMPUTERS (DNCOCO'09)*, 2009, pp. 7-9.

[33] P. Pocatilu, F. Alecu, and M. Vetrici, "Measuring the efficiency of cloud computing for e-learning systems," *WSEAS Transactions on Computers,* vol. 9, pp. 42-51, 2010.

[34] A. Ghazizadeh, "Cloud Computing Benefits and Architecture in E-Learning," in *Wireless, Mobile and Ubiquitous Technology in Education (WMUTE), 2012 IEEE Seventh International Conference on*, 2012, pp. 199-201.

[35] N. Selviandro, M. Suryani, and Z. A. Hasibuan, "Open learning optimization based on cloud technology: Case study implementation in personalization e-learning," in *Advanced Communication Technology (ICACT), 2014 16th International Conference on*, 2014, pp. 541-546.

[36] D. De and A. Mukherjee, "Femtocell based economic health monitoring scheme using mobile cloud computing," in *Advance Computing Conference (IACC), 2014 IEEE International*, 2014, pp. 385-390.

[37] L. Guo, F. Chen, L. Chen, and X. Tang, "The building of cloud computing environment for e-health," in *E-Health Networking, Digital Ecosystems and Technologies (EDT), 2010 International Conference on*, 2010, pp. 89-92.

[38] F.-J. Shih, Y.-W. Fan, C.-M. Chiu, F.-J. Shih, and S.-S. Wang, "The Dilemma of "To Be or Not To Be": Developing Electronically e-Health & Cloud Computing Documents for Overseas Transplant Patients from Taiwan Organ Transplant Health Professionals' Perspective," in *Transplantation proceedings*, 2012, pp. 835-838.

[39] S. K. Chowdhary, A. Yadav, and N. Garg, "Cloud computing: Future prospect for e-health," in *Electronics Computer Technology (ICECT), 2011 3rd International Conference on*, 2011, pp. 297-299.

[40] J. F. Rayport and A. Heyward, "Envisioning the cloud: the next computing paradigm," *Int. J. Database Manage. Syst.(IJDMS),* vol. 1, 2009.

[41] A. Youssef, "Towards pervasive computing environments with cloud services," *International Journal of Ad hoc, Sensor & Ubiquitous Computing (IJASUC),* vol. 4, pp. 1-9, 2013.

[42] F. Mohammed and O. Ibrahim, "Refining E-government Readiness Index by Cloud Computing," *Jurnal Teknologi,* vol. 65, 2013.

[43] T. Dillon, C. Wu, and E. Chang, "Cloud computing: issues and challenges," in *Advanced Information Networking and Applications (AINA), 2010 24th IEEE International Conference on*, 2010, pp. 27-33.

[44] S. Ramgovind, M. M. Eloff, and E. Smith, "The management of security in cloud computing," in *Information Security for South Africa (ISSA), 2010*, 2010, pp. 1-7.

[45] K. Popovic and Z. Hocenski, "Cloud computing security issues and challenges," in *MIPRO, 2010 proceedings of the 33rd international convention*, 2010, pp. 344-349.

[46] W. Jansen and T. Grance, "Guidelines on security and privacy in public cloud computing," *NIST special publication,* vol. 800, p. 144, 2011.

[47] N. Robinson, L. Valeri, J. Cave, T. Starkey, H. Graux, S. Creese, and P. P. Hopkins, "The Cloud: understanding the security, privacy and trust challenges," *Privacy and Trust Challenges (November 30, 2010),* 2010.

[48] A. Schmietendorf, A. Fiegler, C. Wille, R. R. Dumke, and R. Neumann, "COSMIC Functional Size Measurement of Cloud Systems," in *Software Measurement and the 2013 Eighth International Conference on Software Process and Product Measurement (IWSM-MENSURA), 2013 Joint Conference of the 23rd International Workshop on*, 2013, pp. 33-37.

[49] D. C. Wyld, *Moving to the cloud: An introduction to cloud computing in government*: IBM Center for the Business of Government, 2009.

[50] D. C. Wyld, "The Cloudy future of government IT: Cloud computing and the public sector around the world," *International Journal of Web & Semantic Technology,* vol. 1, pp. 1-20, 2010.

[51] B. Glick, "Digital Britain commits government to cloud computing," *Computing,* 2009.

[52] R. Hicks, "The future of government in the cloud," *FutureGov,* vol. 6, pp. 58-62, 2009.

[53] R. Hicks, "Chinese city builds public cloud to aid innovation," *FutureGov, September,* vol. 29, 2009.

[54] R. Hicks, "Thailand hatches plan for private cloud," *FutureGov, May,* vol. 25, 2009.

[55] C. Babcock, "IBM talks up cloud computing:'Cloud computing is a new way of consuming IT,'" *InformationWeek,* 2009.

[56] T. Strecker, "Govt IT procurement in for shake-up," *The Dominion Post,* 2009.

[57] M. J. Magro, "A review of social media use in e-government," *Administrative Sciences,* vol. 2, pp. 148-161, 2012.

[58] E. Bonsón, L. Torres, S. Royo, and F. Flores, "Local e-government 2.0: Social media and corporate transparency in municipalities," *Government Information Quarterly,* vol. 29, pp. 123-132, 2012.

[59] P. S. Kim, J. Halligan, N. Cho, C. H. Oh, and A. M. Eikenberry, "Toward participatory and transparent governance: Report on the sixth global forum on reinventing government," *Public administration review,* vol. 65, pp. 646-654, 2005.

[60] C. C. Demchak, C. Friis, and T. M. La Porte, "Webbing Governance: National Differences in Constructing the Face of Public Organisations," *GARSON, G. David. Handbook of public information system. Nova York: Marcel Dekker,* 2000.

[61] T. M. La Porte, C. C. Demchak, and M. De Jong, "Democracy and bureaucracy in the age of the web empirical findings and theoretical speculations," *Administration & Society,* vol. 34, pp. 411-446, 2002.

[62] H. Drüke and A. Shah, "Can E-Government Make Public Governance More Accountable?," *Performance Accountability and Combating Corruption, Washington, World Bank,* 2007.

[63] T. O'reilly, "What is Web 2.0: Design patterns and business models for the next generation of software," *Communications and Strategies,* vol. 65, pp. 17-37, 2007.

[64] G. Hearn, M. Foth, and H. Gray, "Applications and implementations of new media in corporate communications: An action research approach," *Corporate Communications: An International Journal,* vol. 14, pp. 49-61, 2009.

[65] M. J. Magro, S. D. Ryan, J. H. Sharp, and K. A. Ryan, "Using social networking for educational and cultural adaptation: an exploratory study," 2009.

[67] J. C. Bertot, P. T. Jaeger, and J. M. Grimes, "Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies," *Government Information Quarterly,* vol. 27, pp. 264-271, 2010.

[68] S. Wunsch-Vincent and G. Vickery, *Participative web and user-created content: Web 2.0, wikis and social networking*: OECD, 2007.

[69] N. Huijboom, T. van den Broek, V. Frissen, L. Kool, B. Kotterink, M. M. Nielsen, and J. Millard, "Public Services 2.0: the impact of social computing on public services," *Institute for Prospective Technological Studies, Joint Research Centre, European Commission. Luxembourg: Office for Official Publications of the European Communities,* 2009.

[70] OECD, *OECD Studies on Public Engagement Focus on Citizens: Public Engagement for Better Policy and Services*: OECD Publishing, 2009.

[71] J. Hrdinová, N. Helbig, and C. S. Peters, *Designing social media policy for government: Eight essential elements*: Center for Technology in Government, University at Albany, 2010.

[72] M. Dadashzadeh, "Social media in government: From eGovernment to eGovernance," *Journal of Business & Economics Research (JBER),* vol. 8, 2010.

[73] J. C. Bertot, P. T. Jaeger, and D. Hansen, "The impact of polices on government social media usage: Issues, challenges, and recommendations," *Government Information Quarterly,* vol. 29, pp. 30-40, 2012.

[74] L. L. Rice, K. W. Moffett, and R. Madupalli, "Campaign-related social networking and the political participation of college students," *Social Science Computer Review,* p. 0894439312455474, 2012.

[75] W. Zhang, T. J. Johnson, T. Seltzer, and S. L. Bichard, "The revolution will be networked: The influence of social networking sites on political attitudes and behavior," *Social Science Computer Review,* 2009.

[76] Accenture. (2010). *Accenture Public Service Value Governance Framework*. Available: http://www.accenture.com/Global/Research_and_Insights/Institute_For_Public_Service_Value/AccentureFramework.htm.

[77] Y. Shi, "The accessibility of Chinese local government web sites: An exploratory study," *Government Information Quarterly,* vol. 24, pp. 377-403, 2007.

[78] D.-H. Shin, "A critique of Korean National Information Strategy: Case of national information infrastructures," *Government Information Quarterly,* vol. 24, pp. 624-645, 2007.

[79] N. Couldry, "New Media for Global Citizens-The Future of the Digital Divide Debate," *Brown J. World Aff.,* vol. 14, p. 249, 2008.

[80] F. Bélanger and L. Carter, "Trust and risk in e-government adoption," *The Journal of Strategic Information Systems,* vol. 17, pp. 165-176, 2008.

[81] J. Alonso, O. Ambur, M. A. Amutio, O. Azañón, D. Bennett, R. Flagg, D. McAllister, K. Novak, S. Rush, and J. Sheridan, "Improving access to government through better use of the web," *World Wide Web Consortium,* 2009.

[82] F. Molinari and E. Ferro, "Framing Web 2.0 in the process of public sector innovation: Going down the participation ladder," *European Journal of ePractice,* vol. 9, pp. 20-34, 2009.

[83] J. Ghannam, "Social Media in the Arab World: Leading up to the Uprisings of 2011," *Center for International Media Assistance,* vol. 3, 2011.

[84] A. Levy, J. W. Bagby, and E. M. Trauth, "E-government evolution in small municipalities in Pennsylvania in web 2.0 social environment: a poster," in *Proceedings of the 14th Annual International Conference on Digital Government Research*, 2013, pp. 273-274.

[85] Y.-O. Lee and H. W. Park, "Introduction to the special issue: social media interaction between public and government in Asia-Pacific," *Asian Journal of Communication,* vol. 24, pp. 1-4, 2014.

[86] D. Punchihewa, "E-Governance as A Development Strategy: The Viability and Issues in Sri Lankan Perspective," in *Proceedings of International Conference on Business Management*, 2013.

[87] A. S. Kulkarni, "A study of public services provided under e-Governance in Maharashtra: with special reference to'Sankalp', Pune Collectorate office," 2012.