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Abstract. The world has seen in recent years a somewhat social communication among people in the virtual space. In addition, it has had a great influence on political and social conditions, especially in the Middle East and North Africa. It was necessary to take advantage of the potential of these technologies in the development of the services provided by the government to its citizen. The governments in the region began to adopt the use of social networking tools, concepts of community participation and collective solutions with the aim to support the countries' development sustainability. As many countries have adopted the concepts of citizen involvement as a key element in the provision of government services, this paper presents a framework on how to use the social network to upgrade and optimize the government services. Sudan is selected as a case study as one of the least developed countries in the region where E-Government application is just beginning.

Keywords: *social media, E-Government, E-government initiative, sustainable development*

1. Introduction

The concept of Social Media is the top of the agenda for many business executives today. Decision makers, as well as consultants, try to find ways in which firms can make profitable use of applications such as Wikipedia, YouTube, Facebook, Second Life, and Twitter [1]. Since their introduction, social network sites (SNSs) such as MySpace, Facebook, Cyworld, and Bebo have attracted millions of users, many of whom have integrated these sites into their daily practices [2]. Social media has flourished recently, and government agencies across different levels are experimenting with launching government social media (GSM) to socialize government services, processes, and data [3]. Social media is increasingly being regarded as an effective tool to activate citizen participation in policy making processes because social media's properties that enable information sharing and non-discriminative participation facilitate communication and online relationships between government agencies and citizen [4]. Many government agencies are attempting to use social media tools to communicate with the public and promote citizen's trust [5]. Social media adoption changes the existing organizational technology paradigm of public sector organizations [6]. Social media enable local governments to communicate important government information, extend government services, and garner feedback and ideas about government operations with citizen [7]. The term 'Facebook revolution' had emerged along with observations that most activists participating in the recent uprisings in Arab countries have been using social media to an extent, as it was not witnessed before. Since then the role of social media usage in changing the political landscape is debated, especially in the context of the so-called Arab Spring, including many voices expressing optimistic opinions how

social media could improve the relation of citizen among each other and towards their governance system [8]. Social media in government is becoming one of the major trends in Electronic Government (E-Government) research and practice worldwide [9]. Social media include communication channels such as Facebook, Twitter, and YouTube, which have been increasingly used by governments. While the rationalities behind the adoption of social media in the public sector are still emerging, current discourses tend to underline active citizen engagement enabled by the collaborative nature of social media [10]. Government efforts to foster citizen interaction using social media platforms are increasing. Particularly in cities with enhanced ICT infrastructures (i.e., Informational World Cities) and high internet penetration rates, social media platforms are valuable tools for reaching high numbers of citizen [11].

In the era of digital, E-Government must give government information and services according to the needs of citizen and to achieve this, citizen participation in the process of improvement and development of government services is obligatory. In turn, active citizen participation contributes to the country's sustainable development. The E-participation means that ordinary citizen participates in decision-making. All government agencies should adopt a policy to share data with the aim to enhance the interaction between them and the citizen, using various means, especially the web 2.0.

The purpose of this paper is to propose a strategic framework for designing e-government systems in developing countries. The framework is based on literature research and comparison of existing frameworks.

As many countries have adopted the concepts of citizen involvement as a key element in the provision of government services, this paper presents a framework on how to utilize social networks to upgrade and optimize the government services. Sudan is selected as a case study as one of the least developed countries in the region where E-Government application is just beginning. Thus, the proposed framework may assist Sudan government in implementing an efficient E-Government system.The rest of the paper has been divided into the following sections. Section 2 provides related works. Section 3 introduces the proposed framework. Finally, a conclusion is summarized in Section 4.

2. Related work

According to statistics issued by the International Telecommunication Union in 2016, there are more than 7 billion mobile subscriptions worldwide, up from 738 million in 2000. Globally, 3.2 billion people are using the Internet, of which two billion live in developing countries, LTE networks have spread quickly over the last three years and reach almost 4 billion people today (53% of the global population), enhancing the quality of Internet use (See Figure 1).
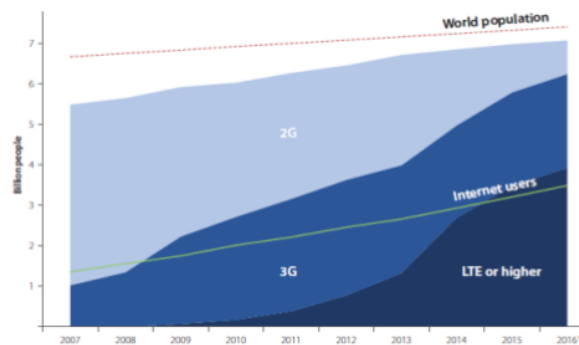

Figure 1. Mobile network coverage and evolving technologies. Source: ITU (ICT Facts and Figures 2016) [21].

A recent Pew Research Center survey (Nov 2016) found that 71% of online adults use Facebook, 23% of online adults use Twitter, 26% use Instagram, 28% use Pinterest. 28% use LinkedIn. Also, found that in May 2013, 74% of women were users of social networking sites, compared to 62% of men. Between February 2005 and August 2006, the use of social networking sites between young adult internet users age 18-29 jumped from 29% to 49% (See Figure 2).
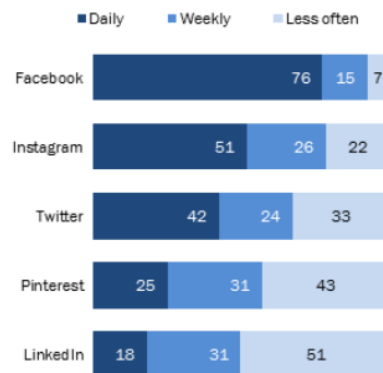

Figure 2. Frequency of use on social media sites. Source: A survey conducted during March 7-April 4, 2016: Social Media update 2016 (Pew Research Center) [22].

2.1 Social media and government

By definition, E-Government is the use of information and communication technologies (ICT) in order to improve efficiency and effectiveness, transparency and comparability of financial and information exchanges within the government, between the government and its subordinate organizations, between government and citizen, between government and the private sector [12] [13]. The E-Government is essentially a method of providing services to the citizen, to raise the efficiency of government performance and cut the red tape faced by a citizen, and the provision of information and data in an easy way by taking advantage of the digital revolution enormous. E-Government uses the Internet to send information and provide government services to the citizen so that the citizen can get the service at any time.

Social media for emergency management has emerged as a vital resource for government agencies across the globe [14]. Social Media refers to the class of technologies that enable individuals to reach out and connect with other "humans", create a relationship and build trust. Numerous studies have explored social media utilization across the public, private, and non-profit sectors, organizations that use social media to engage stakeholders, either by "sending" a message or by "listening" to comments. By sending a message, organizations seek to realize diverse positive outcomes such as increasing brand awareness or mobilizing online communities that support their activities or products [15]. While social media sites like Facebook and Twitter were originally used for personal life, increasingly they are being used to connect professional colleagues [16]. The public sector has increasingly used social media for various purposes such as facilitating government to customer (G2C) relationships and interactions, exploiting various social media tools for government information and services, and providing new channels for political participation and deliberation [17] [18] [5]. The study by [24] sought to examine the requirements for effective usability of E-Government services using a quantitative survey.

2.2 Social media and E-government in Sudan

According to the United Nations (UN) report on E-Government development index and world E-Participation index. The E-Government development index (EGDI) is a composite indicator to measure the willingness and capacity of national administrations to use information and

communication technologies to deliver public services. Until the year of 2014 Sudan still in the bottom 40 of the list in term of E-Government development [19,20]. The initiative of E-Government in Sudan started in 1992, through the electronic network visualization that introduced in the National Information. Through a National Network Conference in July 1992, the idea evolved into the establishment of the National Information Center, The E-Government project in Sudan is the responsibility of the National Information Center (NIC).

The NIC established in 2004 is in charge of all ICT related projects within government, and started some sectors and government agencies, to offer electronic services such as:

1. Ministry of Interior E-Government initiative: Interior Ministry initiates for the use of E-Government applications in their works through two projects: E-passport project and National ID project which contributes to the improvement of services provided to the citizen.

2. MOHE E-Government initiative: The Ministry of Higher Education presented two initiatives, they are: Ministry of Education of Sudan Official Portal, Student Electronic admission, and the Sudanese universities information network. The initiatives contribute to achieving some of the goals of the ministry in linking public universities and provide electronic services to meet the needs of the citizen.

3. NEC E-Government initiative: National Electricity Corporation has provided electricity demand through his mobile phone service, through ATMs or bank websites. This service is easy, quick and contributes to saving a lot of time to the citizen.

4. EBS E-Government initiative: The Central Bank of Sudan Established (e-Bank system) to give technological solutions to the banking and provision of electronic payment services. Causing a major development in the banking services provided.

5. Establishment of the electronic payment services platforms, which with these services people are able to pay government fees, increasing the number of beneficiaries of government services without having to stand in long queue and save time.

6. The government of Sudan Portal (www.esudan.gov.sd): is a comprehensive center for all E-Government services, the main channel through which to give all kinds of services for people, businesses, as well as visitors.

The portal of the Government of Sudan, which was launched in 2015, is the most important E-Government project, expected to contribute to the localization of E-Government services in the sprawling country. The government needs to use information technology extensively to gain control of resources and the government's performance. Furthermore, the National Telecommunication Corporation confirmed that the number of Internet users in Sudan amounted to 11 million (November 2015).

Though IT infrastructures are available with their limitations and E-Government was already implemented in Sudan, the existing E-Government is not optimum yet, due to the poor design. Therefore, this paper attempts to fill the gap by proposing a framework for designing an optimum E-Government system by taking into consideration the people participation thru social media usage.

3. The framework of social media use in government institutions

In this paper, the authors follow the methodology used by the works in [23], [24] and [25]. The proposed framework is designed by adopting the requirements for effective usability of E-Government services in developing countries [24]. The key requirements for E-Government service usability include: provision of a noise free E-Government platform, articulation of E-Government goals and objectives to users, support for and prediction of future trends affecting E-Government initiatives, E-Government services being transferable across different contexts of application, support for system representation of strategic agendas and implementation efforts, provision of a functional representation of E-Government objectives and support for reusability and expandability of E-Government platforms. The proposed framework uses a social media network model as shown in Figure 3. The framework has factors that figure the extent to which the use of social networks in E-Government applications, through the degree of control, which is used as a criterion, to distinguish between the elements of

social networking and the elements of the environment. Elements that must have a high level of control, seen as a system environment. The framework consists of 3 components:

- The Social media environment consist of 3 parts: ICT, Infrastructure, Regulation body.
- The Social media factors: Provided service, Strategies for Social Media, Social activity and Personal behaviors factors that affect decision making in the government agency.
- The Players: citizen and government, use and control the social media networks.

A social network is an open system as such interaction with the environment is essential for its survival and sustainability. In the proposed framework, the authors examine social media networks within the factors influencing the behavior of citizen, and that determines to what extent Sudanese government agencies can anticipate and take advantage of social media network in promoting E-Government services.

3.1 Social media environment

The social media environment is the most influential element on the key players in a social network (Government and citizen).

1. ICT: the ICT is one of the most powerful elements of influence on social media environment. The importance of ICTs lies as a new ground for greater access to information and communication for the citizen of the least developed countries, supported entirely by new media technology. When looking to the situation of Sudan, despite the economic bottlenecks and the US sanctions on Sudan it is found that ICT is one of the fastest growing areas. This growth encourages the adoption of the use of information and communication technology in the delivery of government services; also, it gives a good indication for the use of the social network as a tool for delivering better government services to the citizen.

2. Infrastructure: It is considered the most important elements of the social media environment. The most important conditions for the success of E-Government in any country is the availability of infrastructure facilities. The infrastructure represents the greatest challenge facing the Sudanese government; the most important of these challenges include lack of internet access, lack of physical control of the data, the poor country infrastructure, technology/equipment breakdowns, and technological illiteracy. The faith of decision-makers about a necessity to increase the budget for building infrastructure facilities is considered the first step in the provision of electronic services, down to effectiveness in meeting the needs of government institutions and citizen.

3. Regulation body: All of the E-Government projects in Sudan are the responsibility of the National Information Center (NIC) with this regulation, there are no legal or regulatory barriers preventing government institutions for providing electronic services to the citizen, and other government institutions.
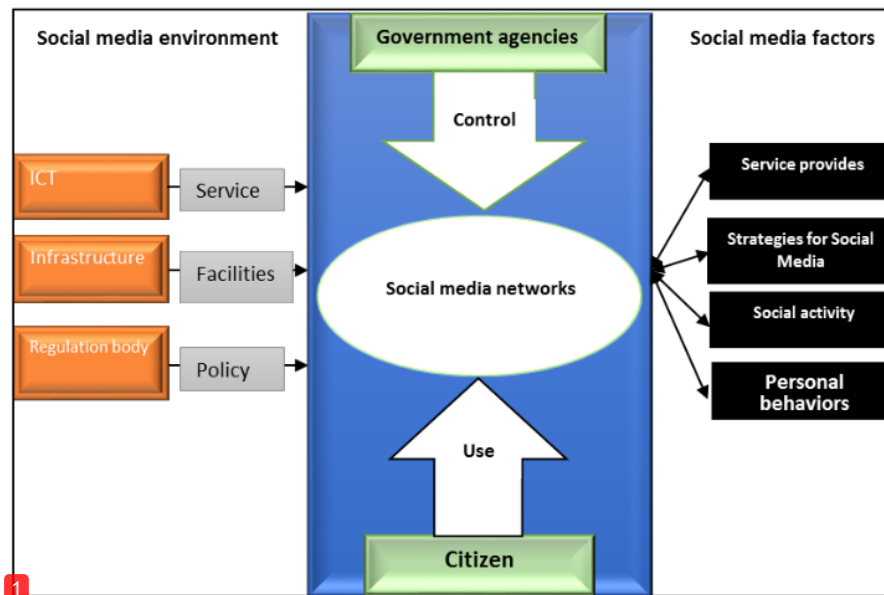
Figure 3. The framework to optimize the E-Government service by the use of social media.

3.2 Social media factors
The use of social media by the government is determined by several factors including provided services, personal behaviors, strategies for social media, social activity, and privacy. Thus, researchers are interested to investigate how social media factors affect government agencies and Citizen.
There can be many different factors that will make a big impact on how the community use of social mediator depending on the service provided to the citizen. These factors are considered to be more fundamental than the original factors, in accordance with the current situation under study.
The factors can affect the quality of the service, personal behaviors and content type, for example, those without economic means often have a poor quality of the service; Table 1 shows the effect of the main factors for government agencies and citizen.

Table 1. The effect of the main factors.

Factors	Government agencies	Citizen
Provided service	Dependent	Independent
Content type	Dependent	Independent
Social activity	Independent	Dependent
Personal behaviors	Independent	Dependent

3.3 Social media networks between government agencies and citizen
Government agencies pages in the social media networks focus on how to use the Internet to activate the communication and interaction between government agencies and citizen. At the same time, government agencies are turning to social media as a new way to potential by improving the relationship between government and citizen. The impact of a citizen on the quality of government services become more powerful using social media. Figure 4 illustrates the interaction between government agencies and citizen.
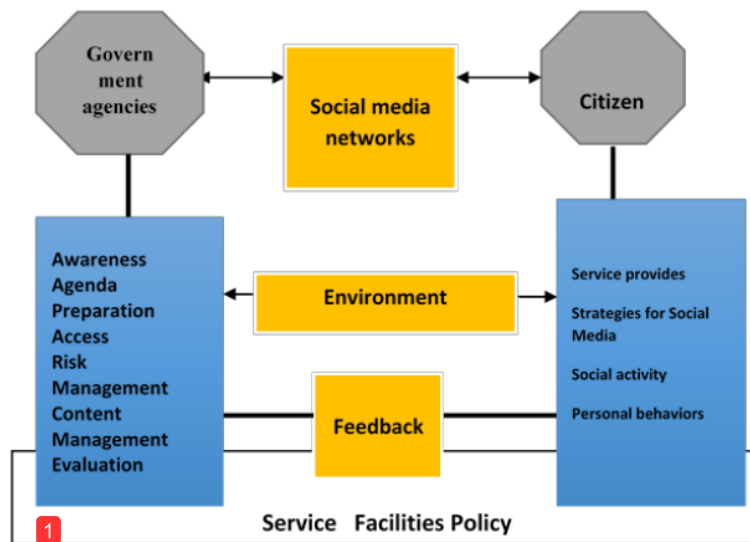
Figure 4. Interaction between government agencies and citizen.

3.4 Steps of the social media use in the government agencies

Strategy to adopt social media to promote E-Government consist of five main steps: awareness, agenda preparation, access, content management, and evaluation. These steps have been identified, as the most important components according to the availability of official statistics and information about the social media environment in Sudan (services, facilities, and policies).

1. Awareness of the decision-maker using social networks: This stage begins with a sense of the decision-maker to utilize the importance of social networking, their contribution to policy development and increase satisfaction of citizen, thus contributing to enhancing the chances of success. The awareness stage is for understanding what the social networks are. The first step for the creation of active participation between government and citizen.
2. Agenda Preparation and Task Distribution: Creating an effective agenda as a guide to introducing social media and E-Participation tools by government agencies. This stage depends on the understanding of alternatives and priorities, comparisons with other alternatives and best/worst practices.
3. Task Distribution is a planning process. This stage will come up with a series of goals, priorities, challenges, and activities to help government agencies to set measurable goals that are realistic and achievable in a shorter period.
4. Access to social networking sites: This step relates to the service, which provided by government agencies to people. Should have a clear vision about who the citizen is going to be reached, find the social interaction that leads to the required service and what the type of tools will do the best support to this interaction.
5. Content Management: start of production of content used in various activities, what published in the accounts on social networking sites. Take responsibility for publishing by the government agency responsible and manage the contents of their pages on social networking sites. The privacy policy must be clear and comprehensive.
6. Evaluation: In this step, the authors specify the performance measurement indicators, divided into two type's indicators: 1- detailed indicators: which measure the level of public reaction. 2- Total indicators: measure the success and feasibility of the activities undertaken by social networking sites. Evaluation reports, through evidence-based findings and thorough analysis, will be produced. Evaluations also provide important findings and

2nd Forum in Research, Science, and Technology

IOP Conf. Series: Journal of Physics: Conf. Series **1167** (2019) 012062

IOP Publishing

doi:10.1088/1742-6596/1167/1/012062

recommendations, which point out positive and negative aspects of the activities by undertaking evaluation and following its recommendations.

4. Conclusions

This paper provides evidence about the evolution of the use of social media tool by the citizen, leading to the need to take advantage of this situation to build applications that support the concept of E-Government. The growing use of information and communication technologies (ICTs) has a significant impact on how the governments work and how to do their functions. Decision-makers in government should think carefully about how they can benefit from joining social networking site.

Based on the studies reviewed in this paper and the results of the U N surveys it is found that Sudan still needs more works to carry out on E-Government projects. However, the good news is that the use of social media can be in the process of E-Government projects. Adoption of budgets for E-Government in countries such as Sudan is a kind of luxury. It is regarded, as the use of social media is one of the cheapest technology solutions. While Sudan needs to adopt E-Government to promote and make service delivery thus easier to the citizen, social media networks adoptions can rebuild relation among the government and citizen, enhancing the transparency and increasing government capacity and integrity. The success of the project that uses social media in government agencies in countries such as Sudan that classified into least developed countries needs to make sure that the decision-maker has reached the conviction that adoption of this project is to benefit the government as well as the citizen.

The Sudan government should cooperate with universities and research centers to launch new initiatives to give more training information technology, which in turn could result in building information-based society which in turn, help the country to achieve sustainable development. The government should establish standards for the use of social media, exchange of data and managing data. Without a proper approach, it will be very hard to reap the benefits of E-Government. The authors recommend strongly to adopt the proposed framework for further implementation of E-Government system in Sudan. The authors believe that adopting the proposed framework will boost the improvement of E-Government services in Sudan.

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