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# Opportunities and Challenges of using Web 2.0 Technologies in Government: A Conceptual Review

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**Abstract.** Public administration has endured signification transformation over the last decade enabled largely through Information and Communication Technology. In recent times, second generation web technologies (Web 2.0) such as social media and networking sites are increasingly being used by governments for its digital activities ranging from public relations to knowledge management. However, as Web 2.0 technologies are more interactive than the traditional models of information provision or creation of digital services, these technologies have brought about a new set of opportunities and challenges to those government authorities. This study draws on the extant literature to examine the opportunities that Web 2.0 technologies offer to public authorities and the challenges they may need to overcome when integrating these technologies into their work practices.

**Keywords:** Web 2.0, Social Media, Opportunities, Challenges, Digital Government

## 1 Introduction

Governments around the world have placed great emphasis on ensuring they exploit the power of rapidly evolving ICTs to transform both internal operations and the external delivery of its services [9, 23, 11]. The use of a broad class of technologies ranging from personal computers to mobile devices has enabled governments to offer convenient and enhanced accessibility to government services and information to citizens, businesses and governmental units [44]. The internet and the developments around Web in particular has been able to provide a new generation of instruments to facilitate social networking, information sharing and collaborative work [24, 31, 38]. It has opened new sets of possibilities for governments, ranging from the joint production of public services in cooperation with citizens, social organisations and businesses, from the wide distribution and re-use of government information to the introduction of new forms of democratic participation. Governments are aware of these new possibilities and have actively started exploring them. However, the use of ICT in government and public services is about far more than simply introducing new technologies and involves major changes in internal organisational structures as well as the need to convince potential users that digital government is in their interests [28]. Despite spending enormous amounts on web-based initiatives, government agencies often fail to meet users' needs online. Baumgarten and Chui [4] posit that this trend can be reversed by employing

new governance models and embracing user participation through second generation web based technologies that extend beyond one-to-one digital communication. However, in order to do this, government agencies will need to assess the business case and the requisite organisational and governance changes that a shift to Web 2.0 entails prior to adopting these modern technologies [18]. In addition, the internet itself is constantly changing as social media sites such as Facebook, Twitter, Instagram, etc. gain and lose popularity. This means that public agencies who embrace the second generation web based communication methods are facing a moving target making the decision making process regarding which channels to use challenging [41].

This paper provides a conceptual review of the opportunities and challenges that the use of Web 2.0 technologies may have for government authorities. To do so, this paper draws on the extant literature and contributes to the emerging field of Web 2.0 use by government organisations through providing a descriptive account of both opportunities and challenges of using technologies in a governmental context.

## 2 The Role of Web 2.0 in Government Organisations

Web 2.0 tools such as social media and networking sites have empowered government organisations to create, distribute and gather information outside the customary hierarchical information flow. There has been an increasing urge by public sector organisations to deliver services online and pay greater attention to Web 2.0 technologies due to the ever-increasing trend in the use of online environments by citizens and the rise in adult and younger generations involved in social networking and virtual community activities [31, 39]. Nevertheless, this is not the only reason for the growing interest in Web 2.0 technologies by these organisations. Web 2.0 facilitates the public services institutions with a key platform for citizen engagement and collaboration with the community to improve transparency and accountability [1, 29]. This new form of technology-enabled participation is becoming more accustomed as governments are investing in these technologies to enable more effective communication with their stakeholders. In effect, Web 2.0 approaches allow local government to gather feedback from citizens on the priorities and effective organisation of public services.

Governments and officials at every level are leveraging Web 2.0 technologies for various purposes [2]. The use of Web 2.0 tools in the government organisations can be categorised to two main areas of application; (a) internal use and (b) external use [37, 3]. The internal uses of these technologies facilitate government agencies and its employees to network and share internal organization and work processes using Web 2.0 technologies. Some of the internal uses of Web 2.0 tools are as follows:

**Internal Staff and Cross-Agency Collaboration:** The use of Web 2.0 technologies such as internal wikis and other collaboration tool for data sharing among their colleagues and storing work materials using sites such as DropBox [15]. In addition, Web 2.0 tools is also being used for collaboration between institutional levels, agencies, departments in order to increase efficiency and time-saving.

**Knowledge Management:** Though traditional knowledge management systems are applied to structured knowledge, Web 2.0 applications (social software, folksonomies, and wiki) are particularly effective in enabling the sharing of informal and tacit knowledge internally, among employees [37].

**Facilitating Policymaking:** policy makers have launched Web 2.0 applications such as YouTube channels and other applications to communicate with its constituency and facilitate a platform to encourage citizens to participate in policymaking [15]. This kind of engagement enhances the government's effectiveness and improves the quality of its decisions [22].

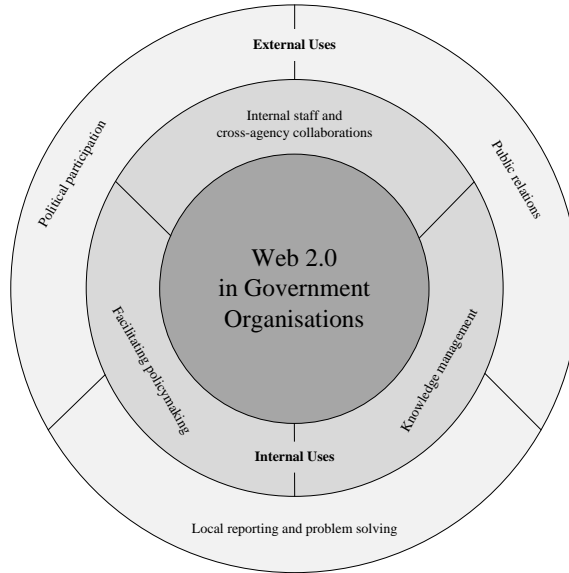
On the other hand, the external uses of Web 2.0 tools by the governments have been to better facilitate better service provision, external governance and stakeholder relations [3]. Some government organisations are developing a presence on Web 2.0 applications recognising its interactive potential in order to strengthen the relationship with citizens and solicit their feedback [44]. The following is a list of the external uses of these technologies:

**Local Reporting and Problem Solving:** government agencies especially local councils facilitating the citizens who want to engage or report issues that affect their neighbourhood, community, region, or county by either adopting or partnering with Web 2.0 integrated websites such as FixMyStreet.com (e.g. road repair, graffiti removal, traffic concerns, etc.) Web 2.0 technologies such as Twitter, Facebook and other similar applications make this possible with unprecedented speed and efficiency [6].

**Political Participation:** the most drastic change in the government organisations occurring is the utilisation of social networking for the purpose of elections. Through the use of applications such as Facebook, YouTube, Blogs and various other tools; Web 2.0 has been actively used for political campaigns and debates especially during the times of elections for all emerging public officials [2]. In this respect, convincing potential users that note will be taken of electronic interaction in terms of policy formulation is important [20] or there is a risk of cynicism undermining any engagement.

**Public Relations:** the most prevalent Web 2.0 tools adopted by among government agencies have been communication and information sharing tools, such as Twitter and RSS feed which facilitate quick communication or short messaging for keeping the general public constantly informed with its activities [3].

The list of uses is not comprehensive by any means as Web 2.0 philosophy is far from mature, and its future development and adoption is difficult to envisage [37]. However, they do indicate the key uses of these technologies in government organisations. Nonetheless, it is important to recognise that the success in any online services depends on strategic use of ICT together with an organisation's ability to reorganise its back-office and internal processes effectively [16]. Therefore, the use of Web 2.0 technologies for public service delivery by the organisations requires not only technological innovation but also organisational, legal and social innovation in order to successfully embrace and reap the benefits from these technologies [18]. The aforementioned uses of Web 2.0 technologies in government organisations are illustrated in figure 1.



**Fig. 1.** External and Internal Uses of Web 2.0 in Government Organisations

### 3 The Significance of Web 2.0 technologies for Government Organisations

Much government activity is now focused on Web 2.0, and social media has become a central component of digital government context in a very short period of time. In this respect, social media are applications that enable the sharing of information including wikis, blogs and social networks [9]. There are various innovative examples of using Web 2.0 technologies by government organisations. The Web 2.0 initiatives such as NASA’s internal social networks and virtual worlds, and the U.S. intelligence community’s “intellipedia” are just a few of the recent efforts launched within central government. Table 2 presents these examples in a systematic manner by first highlighting the government organisation and at which level (i.e. central, regional and local) these tools are being utilised within. Secondly, the type of Web 2.0 technologies adopted is mapped against these organisations and finally, an application scenario of a Web 2.0 technology used by the organisation is presented.

**Table 2.** Government organisations adopting Web 2.0 Technologies

Government Organisation (Domain)	Web 2.0 Technologies											Example Web 2.0 Application Scenario	Reference(s)	
	Blogs	Microblogging	Wikis	Social Networking	Social Bookmarking	Video Sharing Sites	Picture Sharing Sites	RSS	Deliberation Platforms	Virtual Worlds	Mashup			SaaS Platforms
Her Majesty's Armed Forces (UK – Central Government)	✓	✓		✓		✓							British army utilises Facebook to provide latest news and other information (i.e. photos, videos etc.) to the public.	[26]
Westminster City Council (UK – Local Government)		✓				✓		✓			✓	✓	The council uses YouTube channel to raise awareness of services and shape policy developments	[13]
Open Town Hall (US – Regional Government)		✓		✓					✓				The Open Town Hall platform gathers public input to help government agencies make better decisions. It encourages widespread and inclusive citizen participation in deliberation.	[36]
Central Intelligence Agency (US - Central Government)			✓			✓	✓	✓					Uses wiki system for collaborative data sharing among the US Intelligence Community (e.g. Intellipedia)	[15]
Washington State Department of Transportation (US - Regional Government)	✓	✓		✓		✓	✓	✓					Utilises Twitter to broadcast up-to-date urgent news feeds and other relevant information of the department to the public.	[45]
Data.gov (US - Central Government)								✓			✓		Data.gov utilises mashup techniques to provides citizens access to congressional calendars and voting records, political district maps, etc.	[42]
Front National (French Political Party) (France – Central Government)		✓		✓		✓	✓	✓		✓			Front national Party set up virtual headquarters in SecondLife for promoting their presidential campaigns	[37]

As illustrated by table 2, the most popular Web 2.0 tools that has been adopted by the government organisations have been social networking sites (i.e. Facebook), Microblogging (i.e. Twitter), online video and photo sharing sites (i.e. YouTube and Flickr) and RSS feeds. Some local government authorities are also leveraging cloud computing services (e.g. Google Apps for business) in an effort to provide public services while using fewer resources, reducing carbon emissions, and thus producing financial savings for the organisations [25]. Although table 2 presents a clear idea of the significant role of Web 2.0 in governments, it is too early to deduce the importance of these technologies by only reviewing the Web 2.0 experiences in the government organisations. Therefore, to fully understand the real value of these technologies for government organisations, it is necessary to evaluate and articulate the implications of Web 2.0 in the digital government context.

## **4 Discussion: Opportunities and Challenges of Web 2.0 in Government**

In any consideration of adopting new technology, attention must be paid to the opportunities and challenges of such adoption [43, 21]. The emergence of Web 2.0 and the rise of social networks have opened up both new perspectives and challenges for the public institutions [44]. Nevertheless, cutting edge digital communication comes filled with both potential opportunities and risks. As a result, the implications of these new digital frontiers and opportunities are also on the governmental agenda [30]. The following sections therefore presents a review of the potential opportunities and challenges that the government organisations might face when using Web 2.0 technologies.

### **4.1 Opportunities of Web 2.0 technologies for Government Organisations**

One way to evaluate Web 2.0 technologies is to consider them to be a ‘disruptive technology’ for government, creating ‘disruptive innovation’ in the digital government as well as augmenting digital government with better services and management [15]. Implications of these new technologies and opportunities from the perspective of administrations are now also on the governmental agenda [30] especially as there is the potential for Web 2.0 tools to create a change in public sector processes. The following is a list of some of the opportunities that Web 2.0 technologies have to offer for government organisations.

**Revive Civic Engagement:** Web 2.0 tools such as social networking sites and deliberation platforms can be powerful tools that the governments can deploy to help revive civic engagement and harness the wisdom of crowds. The government can especially enlist important niche audiences, leverage their insights for policymaking and improve the citizen-government relationship [27].

**Enhance External Transparency:** Web 2.0 applications can help improve external transparency for government organisations. The integration of online collaboration

tools and interactive maps into government websites can enable governments to become more inclusive and responsive to individual citizens throughout the policy life cycle resulting in improved policy outcomes [33].

**Rapid Dissemination of Information:** The viral nature of Web 2.0 tools such as Microblogging and social networking sites can help disseminate information over the internet much faster compared to traditional methods (e.g. postal letters, pamphlets, static websites etc.) of information delivery [10]. This can draw a larger pool of audience and promote awareness of existing government services to the public.

**Efficient Gathering of Collective Intelligence:** Gathering intelligence from the citizens for crowdsourcing has revolutionarily changed with the use of some Web 2.0 technologies such as Wikis [35]. It has enabled the government organisations efficient and effective collection of geographically dispersed collective intelligence from the citizens with less effort in comparison to traditional crowd-sourcing methods such as public forums and workshops.

**Lower IT Costs:** As the model of Web 2.0 at times requires the use of intermediaries especially mashup applications, these intermediaries can enable governments to provide enhanced, customized services to their citizens at much lower costs than the government's centralized provision of service [12]. In addition, they provide a means for public service organizations to disseminate information about public services, to educate citizens about matters that affect their quality of life, to solicit people's feedback and to enrol them as co-producers in a timely and cost effective way.

**Streamline Internal Operations:** The collaboration tools such as wikis can streamline internal operations within government agencies especially among disparate teams and across agencies enabling individuals to engage in open discussions leading to a potential build-up of knowledgebase [1].

It seems that the advent of the emerging web technologies creates an unexpected dilemma for governments. On one hand, governments seek to use the new opportunities to deliver services but on the other hand governments have significant problems embracing these emerging web technologies due to many challenges and risks.

## 4.2 Challenges of Web 2.0 Technologies for Government Organisations

Despite the potential opportunities of Web 2.0 not all government agencies have explored the possibilities of these technologies [32, 19]. Most public services organisations find it difficult to overcome the perception that some Web 2.0 technologies such as social networking sites (e.g. Facebook) have limited business value and are more a distraction to employees than a means to deliver digital government services [40]. Moreover, government models for leveraging internet technologies is rather different from that of commercial enterprises [21], especially as government agencies are more cautious and slow in adopting new emerging technologies in comparison to commercial organisations. The following are a list of potential challenges that government organisations could face by adopting Web 2.0 technologies.



**Development of New Service Model:** As the Web 2.0 model requires the use of external platforms (e.g. Facebook, YouTube and Twitter), it can prove as a challenge to develop a new service model that integrates these Web 2.0 platforms with existing digital government systems in a manner that is secure and improves the quality of services to citizens [21].

**Additional Staff:** Once Web 2.0 tools such as blogs have been adopted by government organisations, it may require some level of moderation to ensure that comments and contributions do not turn out to be a platform where the public discussions are monopolised by a vocal minority or extremist activists groups. This level of moderation may be costly in terms of time and effort spent by the organisations where additional staff might be required to be moderators of content [21].

**Loss of Control:** Government organisations can face loss of control due to excessive transparency using Web 2.0 applications such as blogs. For instance, blogging by ministers and civil servants has led to release of sensitive information in an incorrect and sometimes illegal manner [38]. In addition, the technique of application mashups and content syndication on to existing government platforms can also be an issue leading to loss of ownership control and authenticity of the final products.

**Restricted User Participation:** The investment on Web 2.0 applications on the government front can potentially result in restriction to exclusive user participation. Web 2.0 applications are mostly used by well-educated young and adult generation in the developed part of the world which can lead to wider societal divides by giving more voice to those that already have it or use it [17]. In addition there is also the risk of older people not likely to participate in Web 2.0 because of the lack of Web 2.0 confidence or because of the lack of technical ability [8].

**Social Isolation:** Though Web 2.0 can stimulate social interactions and communication between different individuals, there is also the risk of people isolating themselves from the real world as they become too addicted the use of internet [17].

**Risk of Information Overload and Reliability:** There is a risk of information overload and poor quality of content shared by public users when using some Web 2.0 applications such as blogs and wikis, as concerns can be raised against their reliability, accuracy and authority of information [27].

**Security and Privacy Threat:** The open nature of Web 2.0 presents significant challenges to the traditional enterprise approach to controlling intellectual property over information shared and surety of these applications. The increase in functionality and interactivity has increased the ways in which an application can be attacked successfully by hackers and viruses and therefore proves to be a security concern for organisations. There are also risks when sharing information using social networking sites where it could lead to possible abuse of personal information, hacking and stalking [7].

**Threat of Cyber Extremisms:** These new, interactive, multimedia-rich forms of communication provide effective means for extremists to promote their ideas, share resources, and communicate among each other [14].

**Critical Reviews:** While the advent of Web 2.0 technologies has played an important role in the providing people with useful assessments of products and services, it has

also meant that there is now a greater risk of these assessments damaging the image of people and organisations without a fair reason. This is because it is difficult to find out if assessments are fair or the result of the personal resentment [17].

In spite of the abovementioned challenges, some government agencies still want to harness the collaborative power of Web 2.0 and many scholars believe the opportunities that the Web 2.0 developments can offer cannot be ignored by the public sector as it can take the evolution of digital government agenda in new directions [34]. Instead of avoiding these new technologies, governments should develop an overall strategic plan for agencies at all levels to participate in social networks, and develop a coordinated effort to develop and implement these tools. In this context, being clear why Web 2.0 is being introduced is important. This clarity will help ensure that any development meets a stated goal and this will assist in ensuring an effective adoption across the organisation [5]. More importantly, whether governments are initiating small-scale pilot projects or contemplating a larger roll-out of Web 2.0 technologies, it is essential for them to be aware of the impact of these tools in order for successful implementation [12].

## **5 Conclusions**

Based on a conceptual review, this paper has contributed to the existing knowledge of Web 2.0 use by governments by articulating a descriptive account of the opportunities and challenges of Web 2.0 technologies that need to be considered when adopting these tools by governments. Through this review, several salient opportunities were identified that would significantly enhance both internal and external business process in public administration. These ranged from reduced cost of operations and streamlined internal work practices to increased transparency and civic engagement. However, the review also exposed several challenges that need to be considered when implementing Web 2.0, such as, exclusion of certain user groups or communities, security and privacy risks and capacity to deal with large volumes of information. These factors suggest that government authorities already using and/or planning to use Web 2.0 technologies as part of their digital transformation journey need to have in place the necessary strategies to deal with the challenges posed by the technologies while embracing the opportunities they present. This study is of significant relevance to public sector and the IS research community, policy makers, local government authorities and practitioners as it provides them with a deeper better understanding of the factors that encourage and hinder adoption of Web 2.0 technologies in government. In doing so, this conceptual review of the opportunities and challenges offer a foundation for management when taking decisions regarding the adoption of Web 2.0 technologies in government organisations for internal work purposes and external engagement and service delivery to citizens. The next stage of this study will be to contextualise these opportunities and challenges by empirically examining the influence they have on the ICT enabled transformation efforts across both central and local government authorities.

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