

A THEORETICAL MODEL FOR THE APPLICATION OF WEB 2.0 IN E-GOVERNMENT

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Abstract

Government organisations in many countries have started embracing modern technologies such as second generation web (Web 2.0) in an attempt to maximize on the benefits of these technologies as well as keeping up with the current trend. Nevertheless, the advancement and the adoption of these of technologies is in its initial stages in the public sector. Therefore, the research problem is that the literature surrounding the application of Web 2.0 is still highly tentative and exploratory. In particular, there is a lack of research exploring the application of Web 2.0 technologies in the context of local e-Government. This study aims to address this research problem by presenting a comprehensive decision-making tool to aid the effective application of Web 2.0 technologies amongst local government authorities (LGAs). In doing so, resulting in the development of a theoretical model that is underpinned by information systems evaluation criteria and impact factors of Web 2.0 from an internal organizational perspective. By addressing the research problem, this study will make a significant contribution to the normative literature by providing new insights of Web 2.0 technologies within the public sector. This will be of specific relevance to scholars, policy makers, LGAs and practitioners who are interested in the adoption of Web 2.0 technologies in an e-Government context. This paper presents the proposed theoretical model and is largely devoted to an explanation on the development of the model.

Keywords: e-Government, Web 2.0, Information Systems Evaluation, Impact, Local government authorities (LGAs).

1 INTRODUCTION

The continuous development of Information Communications Technologies (ICTs); particularly the internet, has been a pivotal factor for the rise in popularity and the transformation of traditional government towards electronic-government (e-Government) (Tat-Kei Ho, 2002). In the existing literature, it is well acknowledged that compared to previous IT-related changes in the public sector, e-Government is significantly more complex (Irani et al., 2009; Weerakkody et al., 2007). This is evident wherein multiple factors need to be considered when integrating new technologies in the e-Government domain. These include factors such as privacy and data issues, adherence to legalities and strict guidelines, rational use of public funds for the adoption of such technologies in addition to political pressures (Weerakkody et al., 2007; Kamal et al., 2011).

In information systems (IS) literature, terms such as “e-Government 2.0”, “Government 2.0” and “eGov. 2.0” are being used synonymously to describe a new government paradigm which challenges the traditional governments and governance by incorporating Web 2.0 fundamentals in e-Government environments (Drogkaris et al., 2010; Johannessen, 2010). According to O’Reilly (2007), Web 2.0 technologies are second generation web services that provide a social and participatory online platform for users to collaborate, network and interact with other users. These technologies are being leveraged in various domains of e-Government, beyond the better known uses in citizen engagement and political participation (Osimo, 2008; Wattal et al., 2010). Equally important is the effective use of

Web 2.0 tools by the employees within an organisation. Unless employees are also empowered with access and knowledge of these technologies, government organisations will be unable to effectively engage with its citizens and leverage these tools to improve operations (Maio, 2009).

There is an emerging phenomenon in scholarly literature where a number of studies are looking into the impact of Web 2.0 technologies on public sector domains including education, healthcare and politics (Wattal et al., 2010; Hughes et al., 2009). There are also few studies (Picazo-Vela et al., 2012; Dixon, 2010) and reports (Osimo, 2008) that have been presented by scholars and practitioners on the use of Web 2.0 technologies to enhance public service delivery. However, there is still a lack of research focusing on the application of Web 2.0 technologies in the context of e-Government and more specifically in local e-Government. Additionally, the few studies that exist lack theoretical grounding as well as the backing of empirical research.

The main objective of this research is to make a contribution to fill this gap in the current literature. Therefore, this research aims to present a comprehensive decision-making tool to aid local government authorities (LGAs) with the adoption of Web 2.0 technologies in the e-Government domain. With new technological changes, singular use of the traditional IS evaluation approaches such as analysing benefits, costs and risks is no longer sufficient. Therefore, this research merges these traditional evaluation approaches along with impact factors of Web 2.0 application to provide a more comprehensive tool. This will be achieved through the development of a theoretical model underpinned by IS evaluation criteria and impact factors from an internal organisational perspective to aid in the effective application of Web 2.0 in e-Government. In doing so, it will make a contribution to the normative literature by providing new insights of Web 2.0 technologies within the public sector. This research aims to contribute to the emerging field by focusing on the following research question: *How could LGAs approach an effective application of Web 2.0 technologies in the context of e-Government?* This paper is mainly devoted to a discussion on the development of the proposed theoretical model.

The remainder of the paper is organised as follows. Section 2 outlines the theoretical context of Web 2.0 in e-Government. Section 3 discusses the proposed theoretical model and its development and contribution to the literature. Finally, Sections 4 and 5 present the conclusions, direction of future research and limitations respectively.

2 EXPLORING THE APPLICATION OF WEB 2.0 IN E-GOVERNMENT

The incorporation of modern technologies such as Web 2.0 allow for significant progress in e-Government as it helps improve communication, transparency, integration and user participation (Drogkaris et al., 2010). Web 2.0 tools now have a much more global reach as they are being widely used by many organisations (Tucker, 2011). For example, the popular micro-blogging platform Twitter generates over 200 million “tweets” (short messages of no more than 140 characters by the user) and 1.6 billion search queries every day. These facts clearly highlight the sheer power of Web 2.0 technologies in connecting people, and the opportunity it provides for any organisation to engage with their stakeholders. Furthermore, these developments have led to a greater interest in ways in which governments can use these tools and sites to reach a variety of users with diverse goals (Kuzma, 2010). Therefore, Web 2.0 technologies are of significant importance to various domains of e-Government beyond the better known examples of their use in facilitating political participation (Osimo, 2008).

There has been an emergence of examples of government organisations within the UK and other countries that have adopted Web 2.0 technologies in recent times. These organisations have started using a number of Web 2.0 applications in an attempt to maximise the benefits of these technologies in addition to keeping up with current trends (Charlton, 2011). Unsurprisingly, as with any ICT developments, an investment into web-based technologies such as Web 2.0 also requires organisational change to culture, people, structure and processes by the government (de Kool and van Wamelen, 2008; Dadashzadeh, 2010). According to Parston and Randle (2010), public service organisations need to have a clear Web 2.0 strategy which explores key indicators to evaluate the

success of Web 2.0 initiatives and considers the impact of the same on existing IT strategies and business processes. Therefore, in order to exploit the full potential of Web 2.0, a systematic evaluative approach and impact analysis is needed prior to integration of these technologies in e-Government.

The review of the literature presents a substandard number of studies that predominantly relates to Web 2.0 technologies within the e-Government domain in comparison to the other public sector services. In general the studies within the e-Government context only present a list of application domains of Web 2.0 tools adopted and severely lack in extensive empirical research. The literature (de Kool and van Wamelen, 2008; Dadashzadeh, 2010) reports few ambiguous arguments on Web 2.0 technologies' benefits and drawbacks for e-Government in an arbitrary manner. The potential opportunities of Web 2.0 technologies for government organisations are mostly considered to relate to strategic objectives such as making government simpler and citizen-oriented, participative and inclusive, joined-up and networked, as well as transparent and accountable (Klischewski, 2010; Ferro and Molinari, 2010). On the other hand, the challenges presented often relate to the risks of Web 2.0 with particular relevance to government's institutional role and service provision. These account to the risk of poor quality user contribution, content manipulation by extremist parties and privacy issues (Ferro and Molinari, 2010; Anttiroiko, 2010).

Although these discussions present a general analysis of these tools, very few studies articulate a systematic evaluation criteria and impact analysis that will aid government organisations in their decision-making process surrounding Web 2.0 adoption. This is an essential stage of a robust technology adoption strategy in any organisation. Furthermore, the study of Web 2.0 technologies is an emerging phenomenon in the government context and as already highlighted it's still at the early stages. As a result there still remains a weak body of literature surrounding this topic. Against this backdrop, it is now essential for the public sector, especially in the local governmental context to evaluate and understand the impact of Web 2.0 tools. In doing so, enabling these organisations to identify the challenges and the value added when leveraging these technologies for the delivery of e-Government services.

3 DEVELOPING A THEORETICAL MODEL FOR WEB 2.0 APPLICATION IN E-GOVERNMENT

There is certainly a need to further evaluate Web 2.0 technologies and understand its impact, particularly in the context of e-Government. Therefore, a systematic evaluative approach and an impact analysis are necessary prior to providing services and placing government information online using Web 2.0 technologies. Below is an outline of the evolution of the novel theoretical model for Web 2.0 application in e-Government presented in the following subsections.

First, the complete proposed model is presented in Section 3.1 by merging two key segments which results in the theoretical model for the application of Web 2.0 in e-Government. The first top segment comprises of three IS evaluation criteria namely *benefits*, *costs* and *risks* which have been used to assess Web 2.0 technologies. The reasoning behind the choice of these approaches and example factors of Web 2.0 evaluation are discussed in detail in Section 3.2. Subsequently, Section 3.3 presents the bottom segment of the model which articulates the impact factors of Web 2.0 which have been categorised into *organisational*, *technological* and *social*. This section also discusses the categorisation process and some of the Web 2.0 impact factors in more detail. Finally, Section 3.4 presents the contribution of the theoretical model to the existing literature.

3.1 The Theoretical model - Web 2.0 application in e-Government: An Organisational perspective

A review of the existing literature on e-Government and IS highlights that there is a lack of a comprehensive model on the application of Web 2.0 in e-Government. According to Wilson et al. (2011) and Dixon (2010) the development of theory on this subject is also quite disjointed. Taking these findings into consideration, this research study presents a novel theoretical model which

incorporates significant factors derived from existing research on IS evaluation approaches and Web 2.0 impact factors.

Until now, the individual research studies have only been seen in isolation. These have now been brought together to develop a single model together with additional factors within this study thus providing a more comprehensive understanding of the factors to be considered in adoption of Web 2.0 technologies. The theoretical model aims to assist in the application of Web 2.0 technologies in e-Government with specific relevance to LGAs. Figure 1 depicts the proposed model which consists of two key segments:

1. *Evaluation of Web 2.0 on Local Government* - An evaluation of Web 2.0 using traditional IS evaluation approaches highlighting the benefits, costs and risks of Web 2.0 for LGAs.
2. *Impact of Web 2.0 on Local Government* - A set of Web 2.0 impact factors that have been categorised into organisational, technological and social implications.

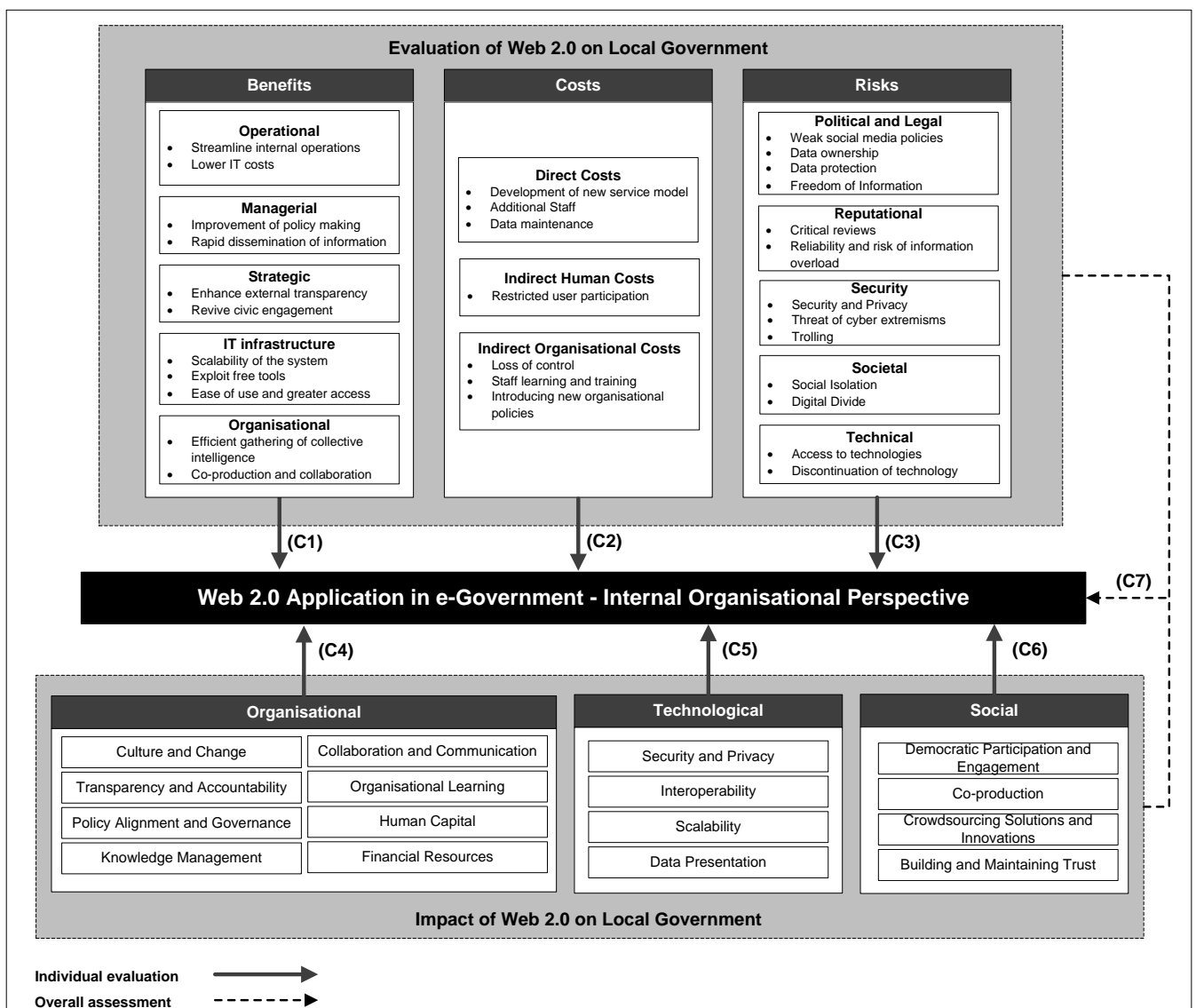


Figure 1. Proposed Theoretical Model for Web 2.0 application in e-Government including research conjectures

As illustrated in the theoretical model, this research presents seven conjectures to study the application of Web 2.0 in an e-Government setting, with the aim of testing this model in the practical arena. The research conjectures are as follows:

- **(C1, C2, C3):** Evaluating the benefits (C1), costs (C2), and risks (C3) of Web 2.0 will aid the effective application of Web 2.0 in the e-Government context.
- **(C4, C5, C6):** Exploring the organisational (C4), technological (C5), and social (C6) impact of Web 2.0 will aid the effective of Web 2.0 in the e-Government context.
- **(C7):** Evaluating Web 2.0 and exploring the impact of Web 2.0 together will provide a cohesive tool to aid the effective of Web 2.0 in e-Government.

The proposed theoretical model provides a descriptive account of the evaluation and impact factors thus presenting itself as a frame of reference when adopting Web 2.0 technologies in an e-Government setting. It aims to provide a deeper understanding of factors that may encourage or hinder the application of such technologies, which is of significant relevance to government organisations such as LGAs. It will not only provide them with a decision-making tool for implementation of such technologies but will also help facilitate formulation of reasonable and scientific strategies for the enhancement of e-Government. Furthermore, it may help government officials to understand the real effects of these tools to the government organisations. The next section presents a discussion on the chosen Web 2.0 evaluation approaches and its factors which form the top segment of the model.

3.2 IS Evaluation: A Web 2.0 perspective

Web 2.0 technologies are being rapidly embraced in the e-Government domain not only to meet the demands of citizen expectations and provide them with a social web experience, but also for other benefits that these technologies offer to the internal operations of local government organisations (Sander, 2008). Nonetheless, cutting edge digital communication comes with both potential opportunities as well as risks. Therefore, the implications of such new digital frontiers and opportunities from an e-Government perspective are now on the governmental agenda (Klischewski, 2010).

In order to evaluate these technologies, some of the IS evaluation taxonomies have been analysed and the appropriate classifications that are necessary to evaluate the Web 2.0 tools are presented along with the relevant factors. This approach will help to deliver more objective and robust arguments towards the implications of Web 2.0 use in e-Government and will also enable organisations to build a strong business case for the deployment of these tools. Additionally, the factors may provide a deeper understanding of Web 2.0 tools which in turn may have an influence on the decision making process for Web 2.0 application in e-Government.

The analysis of various traditional IS evaluation taxonomies such as benefits (Andresen et al., 2000; Shang and Seddon, 2002), costs (Kusters and Renkema, 1996; Irani and Love, 2002) and risks (Osman et al., 2011; Evangelidis, 2004) was initially undertaken to establish an understanding of the existing IS evaluation models. Thus, in cumulating the normative literature in the area of IT/IS evaluation, Table 1 presents a summary of the benefits, costs and risks dimensions in the form of a taxonomy to help evaluate the application of Web 2.0 in e-Government.

Classification	Dimensions	Description	References
Benefits	<ul style="list-style-type: none"> ▪ Efficiency Benefits ▪ Effectiveness Benefits ▪ Performance Benefits 	Framework provides three distinctive types of benefits based on the principle that benefits realisation must be managed by: planning for strategic alignment and business-driven exploitation, managing the process of predicting benefits, and by measuring resulting benefits after a system or innovation is implemented.	(Andresen et al., 2000)
	<ul style="list-style-type: none"> ▪ Strategic Benefits ▪ Tactical Benefits ▪ Operational Benefits 	Classifies three main benefits as a frame of reference for decision makers that embrace <i>ex-ante</i> information systems evaluation.	(Irani and Love, 2001)
	<ul style="list-style-type: none"> ▪ Operational ▪ Managerial ▪ Strategic ▪ IT infrastructure ▪ Organisational 	The model identifies an extensive list of benefits dimensions suitable for assessing the benefits of an enterprise system post implementation.	(Shang and Seddon, 2002)
Costs	<ul style="list-style-type: none"> ▪ Financial Activities ▪ Non-financial Activities 	These costs are classified according to the activities causing them, thus emphasising a causal relationship. Hence, reactive in nature	(Kusters and Renkema, 1996)
	<ul style="list-style-type: none"> ▪ Acquisition Costs ▪ Administration Costs <ul style="list-style-type: none"> ○ Control ○ Operations 	Identifies set of cost factors that constitute Total Cost of Ownership of information technology	(David et al., 2002)
	<ul style="list-style-type: none"> ▪ Direct Costs ▪ Indirect Costs <ul style="list-style-type: none"> ○ Indirect human costs ○ Indirect organizational costs 	The direct cost element is assigned to the information technology component, whereas the indirect element relates to the effect of the information systems on the organization and the people	(Irani and Love, 2001)
Risks	<ul style="list-style-type: none"> ▪ Privacy risk ▪ Financial Audit risk ▪ Time and technology risk ▪ Social risk 	This risk constructs form part of a holistic (COBRAS) evaluation framework to evaluate e-Government services from a citizen centric perspective.	(Osman et al., 2011)
	<ul style="list-style-type: none"> ▪ Societal ▪ Technical ▪ Economical ▪ Political and Legal Risks ▪ Security 	A high-level classification of e-Government risk factor as part of a risk assessment framework for e-services.	(Evangelidis, 2004)
	<ul style="list-style-type: none"> ▪ Reputation 	A reputation risk refers to the potential negative effects that could have on an organisation's image.	(Schwartz, 2000)

Table 1. Benefits, Costs and Risk Taxonomies

A critical review of these taxonomies resulted in the extrapolation of appropriate factors to help form the foundation of the IS evaluation segment of the conceptual model. Consequently, the chosen IS evaluation approaches consisted of benefits, costs and risks factors proposed by Shang and Seddon (2002), Irani and Love (2001), Evangelidis et al. (2004) and Schwartz (2000) respectively. The rationale and descriptions of the chosen IS evaluation approaches have been discussed below along with some examples of Web 2.0 benefits, costs and risk factors. These factors form the IS evaluation segment as illustrated in Figure 2 and helps LGAs to understand the real benefits, costs and risks of using Web 2.0 applications in the context of e-Government prior to its implementation by these organisations.

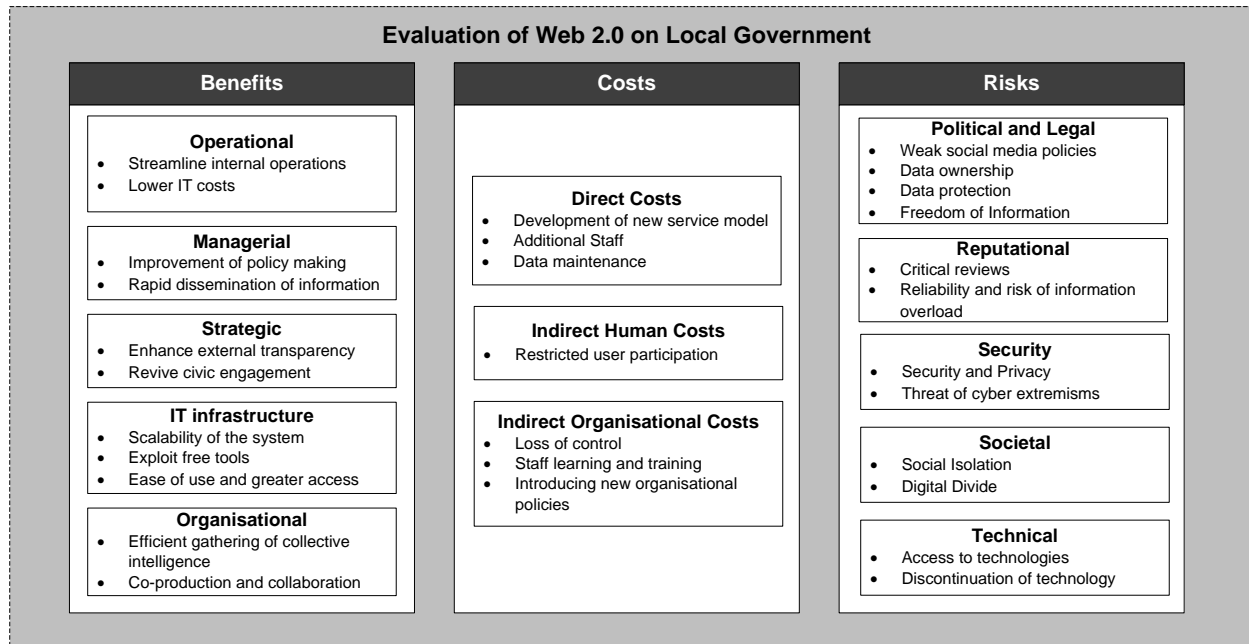


Figure 2. IS Evaluation – A Web 2.0 perspective

3.2.1 Benefits evaluation of Web 2.0:

The IS benefits discussed in most studies tend to vary from either depicting a very specific outlook or a general overview of IS benefits and in addition lack a long-term perspective of benefits needed for a rigorous IS evaluation. However, building on the existing research into IT benefits, Shang and Seddon (2002) propose a five dimension benefit framework for assessing enterprise systems in a more broad and objective manner. In addition to dimensions such as operational, managerial and strategic efficiency, the value of IT infrastructure and organizational benefits were also identified as important factors that could contribute to an organisation. These dimensions were used to evaluate the benefits of Web 2.0 as the classifications covered a broad spectrum of functions surrounding an organisation. Furthermore, these were best suited to this research due to the continuous validation made in many studies, thus making it reliable. The classifications and examples of Web 2.0 benefits are presented below.

- Operational benefits:** reflects the positive impact that technology has on organisational operational activities that are usually repeated periodically. These benefits could consist of streamlining and automation of processes that could result in cost reduction, improved productivity and better customer service. In the context of Web 2.0, the use of 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 (Accenture, 2009).

- *Managerial benefits*: explores the benefits of IS on activities involving allocation and control of an organisation's resources and facilitating strategic decisions. For example, benefits such as the ability of an IS to provide real time information may help an organisation to achieve better resource management and improved decision making and planning. For example, the viral nature of Web 2.0 tools such as micro-blogging and social networking sites can facilitate *rapid dissemination of information* over the internet compared to traditional methods (e.g. postal letters, pamphlets, static websites etc.) of information delivery. This can draw a larger pool of audience and promote awareness of existing e-government services to the public (Buchanan and Luck, 2008).
- *Strategic benefits*: this deals with the potential of IS in achieving strategic benefits such as business growth, alliance, innovation, differentiation etc. For example, Web 2.0 applications can help *improve external transparency* for government organisations. The integration of online collaboration tools and interactive maps into e-Government websites can enable governments to become more inclusive and responsive to individual citizens throughout the policy life cycle resulting in improved policy outcomes (Meijer and Thaens, 2010).
- *IT infrastructure benefits*: this dimension presents the benefits from the use of technology to allow for sharable and reusable IT resources that provide a foundation for present and future business applications. Web 2.0 applications are mostly *scalable* which allows handling a growing amount of work in a capable manner (O'Reilly, 2007).
- *Organisational benefits*: entails benefits such as focus, cohesion, learning and execution of strategies for an organisation by the use of an information system. Gathering wisdom from the citizens for crowdsourcing has revolutionarily changed with the use of some Web 2.0 technologies such as Wikis. It has enabled *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 (Nam, 2012).

Therefore, the above analysis provides sufficient justification for this research to consider benefits as an influential evaluation criterion for Web 2.0 application in e-Government.

3.2.2 Costs evaluation of Web 2.0:

The cost implications of an IS project is a significant consideration in order to have a robust IS evaluation (Irani et al., 2003). As per Hochstrasser (1992), the real costs of any IT/IS implementation can be divided into direct and indirect cost factors. Although many cost taxonomies include direct quantifiable costs associated with IT investments, the majority fail to identify the indirect costs apart from Irani and Love (2001). Indirect costs are difficult to quantify in monetary terms, possibly explaining their limited presence in the various cost taxonomies. However, Irani and Love (2002) explains that indirect costs cannot be avoided as their effect would appear once the implementation of the project is initiated. Accounting for both direct and indirect costs, the taxonomy presented by Irani and Love (2001) makes it the most robust and appropriate for this research. The authors highlight that the cost associated with the adoption of IT/IS can be classified as having direct and indirect (human and organizational) characteristics. The classifications and examples of Web 2.0 costs are presented below.

- *Direct costs*: are those which can be attributed to the implementation and operation of new technology, and as a result are the most considered by decision-makers during the use of traditional appraisal techniques (e.g. hardware and software costs, installation and configuration etc.). As the Web 2.0 model requires the use of external platforms (e.g. Facebook, YouTube and Twitter), it can prove a challenge to *develop new service models* that integrates these Web 2.0 platforms with existing e-Government systems in a manner that is secure and improves the quality of services to citizens (Freeman and Loo, 2009).

- *Indirect costs*: are those that cannot be readily identified, managed and controlled (e.g. management time, productivity loss etc.). These costs can be further classified into human and organizational indirect costs. In terms of *Indirect human costs*, the investment on Web 2.0 applications on the e-Government front can potentially result in *restriction to exclusive user participation*. For example, there is the risk of older individuals being unlikely to participate in the use of Web 2.0 technologies due to a lack of confidence or the lack of technical ability (Blank and Reisdorf, 2012). In terms of *indirect organisational costs*, LGAs 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 (Osimo et al., 2009 p.43).

This research therefore considers costs as another important evaluation criterion for Web 2.0 application in e-Government.

3.2.3 Risks evaluation of Web 2.0:

It is vital for government organisations to better its ability to manage IS risks, particularly with IS projects being renowned for their high failure rates. This would ensure that the initial objectives behind their implementation are justified (Irani and Love, 2008). Since IS projects in government organisations have a broad scope, risks can be found in many diverse areas ranging from issues that relate to specific internal organisational risks to external factors. In terms of internal organisational factors, this includes areas such as the technological foundations of an information system, financial implications, social aspects or even political and legal decisions leading to significant risks for organisations (Evangelidis, 2004). In addition, within IS literature factors such as privacy, financial audit, time and technology and social risk have also been highlighted (Osman et al., 2011). Evangelidis (2004) and Osman et al. (2011) present significant risk factors from an e-Government perspective and these have therefore been incorporated within the theoretical model as they are most suited given the context of this research. Beyond these factors, reputational risks are also a noteworthy factor for government organisations. Reputation has been included in the proposed model from Schwartz (2000) as it addresses a significant risk factor from a general organisational perspective. As Web 2.0 technologies are a social platform, they allow users to discuss any matters openly which could potentially have a direct impact on reputation. Therefore the consideration of reputation as a risk dimension in the model is vital. All the dimensions of risks incorporated in the theoretical model have been outlined below in detail:

- *Political and legal* – these risks highlight the implications that government policies or decisions could have on the government organisation (Evangelidis, 2004). It has to be stressed here that legal-related risks are also included under the ‘political’ risk umbrella. As Web 2.0 is an emerging phenomenon in government organisations, some of the organisational policies governing the use of social media applications may still be at its infancy. The *immature or weak policies* might prove to be a risk for governmental organisations (Bertot et al., 2012).
- *Reputational risks* – this refers to the potential reputational damage to a government organisation by the use of online tools that allow for open access. For example, while the advent of Web 2.0 technologies has played an important role in 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 reputation* of people and organisations without a fair reason. This is because it is difficult to find out if assessments are fair or whether they are the result of personal resentment (de Kool and van Wamelen, 2008).
- *Security risk* - In IS literature, the two prominent risks which have a significant impact on e-Government service adoption are security and reliability of the system (Evangelidis, 2004). The open nature of Web 2.0 presents significant challenges to the traditional enterprise approach in 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. *Security and privacy* is for that reason an important point of concern when using Web 2.0 applications as most individuals share a lot of personal information on the internet (Bin Al-Tameem et al., 2008).

- *Societal risk* – this refers to risks that usually affect the way individuals live and interact in society with the use of technology (Evangelidis, 2004; Osman et al., 2011). 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 addicted to the use of internet (de Kool and van Wamelen, 2008).
- *Technical risk* – these are risks that the use of ICT has on the technological infrastructure of an organisation (Evangelidis, 2004). There could be potential risk of the *discontinuation* of some existing Web 2.0 tools as they have not been successfully embraced by the users of such technologies. For example, Yahoo announced the discontinuation of its ‘Delicious’ tagging service due to lack of user uptake (Bertot et al., 2012)

The above discussion provides sufficient justification for considering risks as an influencing evaluation criterion for Web 2.0 application in the e-Government context.

The overall IS evaluation criteria for Web 2.0 provide a synthesis of previous research involving IS evaluation approaches and turn this into a more coherent body of knowledge. However, as mentioned in the Introduction section, with the new technological changes, singular use of the traditional evaluation approaches is no longer sufficient. Therefore, this research merges these along with impact factors of Web 2.0 application to provide a more comprehensive tool. The next section will discuss the impact of Web 2.0 which represents the bottom half segment of the proposed model.

3.3 Impact of Web 2.0

The influence of Web 2.0 on governments is not an isolated phenomenon as the new internet-enabled technologies continue to have an increasingly disruptive impact on all organisations (Mintz, 2008). It is therefore vital for these authorities to understand the effects of these emerging technologies. In terms of the impact of Web 2.0 on e-Government, the lessons for LGAs are often no different to those for any other organisation. Drawing on literature from information systems and public sector research, there are some key factors that need to be considered. The proposed constructs are a combination of common factors identified from previous studies on the impact of Web 2.0 technologies on organisations (Osimo, 2008; Wattal et al., 2010) and with other specific factors from the public sector domain (Meijer and Thaens, 2010). These works have been extended and adapted to the use of Web 2.0 in the area of the LGAs, thus resulting in the conception of three main categories (i.e. organisational, technological and social) with factors within each of these categories influencing Web 2.0 application in e-Government.

Organisational, technological and social implications have been classed as important antecedents of IS success and have been envisaged to contribute greatly to the IS success of an organization by many scholars (DiMaggio et al., 2001; Delone and McLean, 2003; Seddon, 1997). While additional “impact” categorisations such as consumer impacts (Brynjolfsson, 1996), environmental impact (Plepys, 2002), work group impacts (Myers et al., 1997) and inter-organisational impact (Clemons and Row, 1993) have been suggested by researchers, it is important to choose the relevant impact classification depending on the system that is to be evaluated and its specific purposes. Although such finer granularity may be appropriate for some studies, this is not directly relevant to this research. The main focus within this study is the use of Web 2.0 for local governments and to facilitate their internal operations. Therefore the chosen three classifications were considered most relevant to articulate the implications of such technology. This has been the main motivator and rationale for systematically categorising the Web 2.0 impact factors within these classifications. The proposed factors have been depicted in Figure 3 and further discussed in the subsequent subsections.

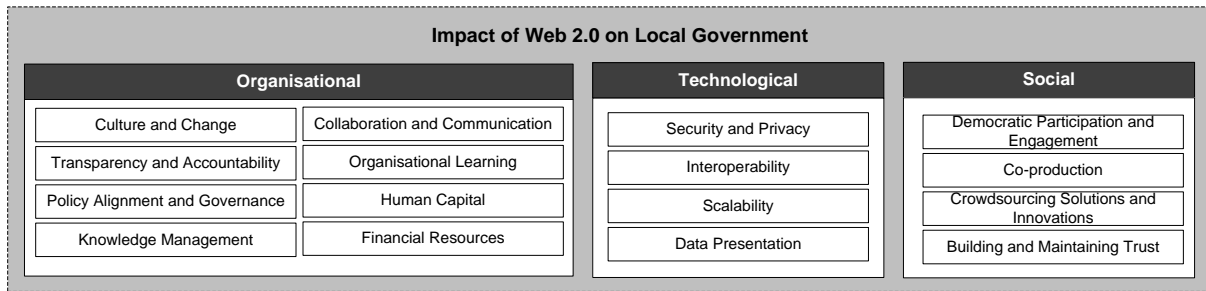


Figure 3. Web 2.0 Impact Factors

3.2.4 Organisational impact of Web 2.0:

Web 2.0 technologies have a significant impact on the existing organisational culture of participation, openness and transparency (Balutis, 2009). It is fundamentally different from the traditional government bureaucracy in that online communities providing public value are open instead of closed, horizontal instead of hierarchical and informal instead of formal (Huijboom et al., 2009). Within the organisation, Web 2.0 facilitates many interpersonal functions with implications, such as internal teaming, problem solving, collaboration, and knowledge management and transfer (Parycek and Sachs, 2010; Schweik et al., 2011). Such interactions lie at the core of meeting growing government demands to improve communications, enhance collaboration and encourage innovation throughout the organization (Osimo, 2008).

Within the organisational dimension, there are various factors such as *culture and change*, *transparency and accountability*, *policy alignment*, etc. (Bonsón et al., 2012; Meijer and Thaens, 2010). These highlight the effects of Web 2.0 technologies on the internal operations and process of a government organisation. For example, *culture and change* indicates that the adoption of Web 2.0 technologies requires government organisations to be ready to embrace changes that these technologies may bring and adapt to a Web 2.0 friendly working culture. In essence, it compels organisation leaders to swiftly adapt to such changes and embrace innovation (Kobza, 2008). On the basis of these arguments, this research highlights that organisational impacts are important considerations to be made in the application of Web 2.0 in e-Government.

3.2.5 Technological impact of Web 2.0:

The delivery of Web 2.0 technologies has been driven by the widespread development of web programming languages such as Ajax (Asynchronous Javascript and XML) and Application programming interface (Anderson, 2007). Key technical Web 2.0 features such as these, has resulted in various technological implications for the delivery of e-Government. They have enabled Web 2.0 technologies to be developed rapidly, interoperable and have facilitated the creation of mash-ups of data from various sources allowing for new presentations of information (O'Reilly, 2007). The technological dimension therefore reflects the influences of Web 2.0 tools on the technical front of a LGA. It is therefore important for government organisations to understand the technical implications of these developments (Delone and McLean, 2003; Myers et al., 1997).

This dimension includes factors such as *security and privacy*, *interoperability*, *scalability* and *data presentation* (Osimo, 2008; O'Reilly, 2007; Meijer and Thaens, 2010). For example, the *security and privacy* factor highlights the need for government organisations to be aware of security and privacy concerns as Web 2.0 technologies leave organisations more vulnerable to issues such as loss of information, hacking and cyber extremism to name a few (Osimo, 2008; Chen et al., 2008). However, there is also a need for a balance between tight security without stifling creativity and communication by these organisations if they are to fully exploit these technologies. The above-mentioned findings provide sufficient justification to consider technological impacts as significant for Web 2.0 application in e-Government.

3.2.6 Social impact of Web 2.0:

One of the main features of Web 2.0 is that it allows for user generated content and this is often perceived to have a major social implication in view of the social responsibilities associated with the implementation of such technologies (OECD, 2007). This category encompasses factors that reflect the societal implications of Web 2.0 use in e-Government for the government authorities.

Social dimension comprises of factors such as *participation and engagement*, *co-production innovations and crowdsourcing solutions*, and *building and maintaining trust* (Bertot et al., 2012). For example, the *innovations and crowdsourcing solutions* factor discusses the use of Web 2.0 tools to spark innovation through sharing of knowledge. As Web 2.0 tools help support crowdsourcing (i.e. distributed problem solving and production model outsourced to group of people), it allows for the government to share information internally as well as with the public providing a base platform off which innovation can occur (Bertot et al., 2012). Moreover, the *building and maintaining trust* factor highlights the impact that Web 2.0 technologies such as social networking sites can have on trust amongst its users in government organisations. As social networking sites provide an ideal platform for participation to occur among employees and public, government organisations need to be mindful that the user's first impressions and experience in these platforms can have a significant impact on building and maintaining trust (Grabner-Krauter, 2009). The above discussion therefore provides sufficient justification to consider social impacts as an influential factor for Web 2.0 application in e-Government.

3.4 Contribution of the theoretical model

The proposed model highlights that the IS evaluation segment can potentially influence the decision-making process surrounding Web 2.0 application in e-Government. Thus signifying the importance of a systematic analysis of these emerging technologies by using thorough IS evaluative approaches. This in turn facilitates government organisations in developing a business case that can be used when deciding to adopt Web 2.0 technologies for enhancing e-Government services.

Similarly, the proposed impact factors of Web 2.0 segment can help organisations to understand the implications of such technologies on LGAs. Nevertheless, both the model segments are yet to be evaluated in the practical arena. In doing so, the proposed factors may: (a) extend the current research in Web 2.0 within the public sector by combining existing and new factors (b) enhance the level of Web 2.0 evaluation and impact assessment (c) support decision makers in their decision-making process surrounding Web 2.0 application.

The theoretical model proposed in this paper makes an important contribution to the emerging literature of e-Government and Web 2.0 by presenting a synthesis of factors from the existing literature. The incorporation of these factors together in one model seeks to contribute to new knowledge by:

- combining the Web 2.0 evaluation factors that have previously been studied and observed to be important in a number of disparate research studies into one model.
- providing a comparative evaluation of the impact factors of Web 2.0 found to be significant in a number of different studies and literature
- proposing new dimensions for the investigation and analysis of this phenomenon (e.g. classification of factors)

The formulation of this model is therefore significant as it can facilitate LGAs and researchers in making robust decisions surrounding Web 2.0 application in e-Government.

4 CONCLUSIONS

Web 2.0 technologies are now increasingly being adopted in the public sector in view of which government organisations are also embracing such technologies to leverage its full potential. This paper has examined the literature on e-Government and information systems and found a lack of research surrounding the application of Web 2.0 in the e-Government domain. Therefore, this study addressed this void in the literature by presenting and articulating a comprehensive theoretical model for Web 2.0 application in the context of e-Government from an internal organisational perspective. The proposed theoretical model underpins information systems (IS) evaluation criteria (i.e. benefits, costs and risks) and impact factors (i.e. organisational, technological and social) to aid the effective application of Web 2.0 in e-Government. Consequently this facilitates the decision makers in local government organisations with a comprehensive decision-making tool. Additionally, the paper also highlighted several preliminary insights into the effects of Web 2.0 adoption in LGAs. Some of the main conclusions elicited from this research are highlighted below:

- A number of government organisations have rapidly embraced notable Web 2.0 technologies such as networking sites (e.g. Facebook), Microblogging (e.g. Twitter), online video and photo sharing sites (e.g. YouTube and Flickr) and RSS feeds to enhance e-Government services.
- A need clearly exists for high quality theory-building in the field of e-Government, particularly in the adoption of web based technologies such as Web 2.0, as there is a scarcity of theory development and use in this domain.
- The findings drawn from the literature on the evaluation of Web 2.0 technologies and its impact on LGAs highlighted that Web 2.0 tools can have significant effects (i.e. both positive and negative) on these organisations. Therefore a systematic assessment of these tools is needed prior to its adoption, thus justifying the need for the proposed theoretical model.

The contribution of this research is to open a black box that encapsulates the role of Web 2.0 technologies in e-Government and communicates the implications associated with Web 2.0 application in the UK local government. It seeks to contribute at both a theoretical and empirical level towards the enhanced understanding of the significance of using Web 2.0 technologies in government organisations as detailed below.

- **Theoretical:** The development of a theoretical model as a *frame of reference* that will seek to contribute to the existing knowledge of e-Government and IS literature by articulating a descriptive account of IS evaluation and impact factors that need to be considered when adopting Web 2.0 technologies to facilitate e-Government.
- **Practical:** This study will be of significant relevance to public sector and IS researchers, policy makers, local government authorities and practitioners as it aims to provide them with a deeper understanding of knowledge factors that encourage or hinder adoption of Web 2.0 technologies. In doing so, supporting the management when taking decisions regarding the adoption of Web 2.0 technologies for enhancing government organisations.

This research is a work in progress and requires further theoretical and empirical backing to develop and explore the proposed theoretical model. The next section proposes the research methodology to be used to gather empirical data and the limitations of this study.

5 DIRECTION OF FUTURE RESEARCH AND LIMITATIONS

The model presented in this paper provides a coherent framework for further empirical research on the phenomenon of Web 2.0 application in the context of e-Government. This empirical data can be used to test the research conjectures which will allow for refinement of the proposed model. As a result, the next stage in this study is to choose a suitable research strategy which will then be followed by a decision regarding the research approach, objective(s) and epistemological stance, and research methods. The rapid development and prominence of the use of Web 2.0 technologies by government

organisations and the need to capture rich data to answer the research question greatly influences the choice of research methodology. Therefore, this research will require involvement and participation of government organisations and their staff so that their experiences and knowledge on the adoption of Web 2.0 technologies can be exploited. In doing so, this will allow for the development of effective IS evaluation and impact criteria for Web 2.0 application in the e-Government domain.

A case study strategy will be used for this research in account of its originality and exploratory nature; see for example, Hakim (1987) and Yin (1994). According to Yin (2009), there are a number of justifications behind the use of a case study strategy. These include describing a phenomenon, building a theory, testing theoretical concepts or relationships or a combination of all three. In this research, it will be used with the objective of achieving a combination of all of the above stated purposes. Case studies are believed to have an established tradition of description and theory building, with major advocates such as Remenyi (1991) supporting this objective because of its inductive characteristics. However, a case study is also believed to be a suitable strategy for testing theoretical propositions using its deductive characteristics where data is collected in relevance to theoretical conjectures. This approach of the deductive use of a case study for theoretical testing is strongly advocated by Benbasat et al.(1987; 1988), Lee (1989) and, Yin (1994). Therefore, this study will adopt characteristics from both inductive and deductive research approaches.

In the context of this research, the data relating to the issues under investigation are soft, confidential and subjective. Therefore, the research methods need to be able to account for such factors in light of different government organisations being guided by individualised circumstances. As rich empirical data is needed for this study, interpretivism is the most appropriate epistemological stance thus indicating the use of qualitative research methods (Remenyi and Williams, 1996). Empirical data is primarily to be gathered by participant observation (Atkinson and Hammersley, 1994; Myers, 1997) and conducting semi-structured interviews with local government authorities. In doing so, gathering their insights into the use of Web 2.0 technologies and its impact on the authorities in the context of e-Government. The use of multiple methods will also ensure data triangulation, thus contributing towards the reliability and validity of the findings for this study.

In addition, once the proposed model has been refined, this will be presented to the case organisation to ascertain the impact of the model to gain further feedback. This will provide invaluable insight on the application of the proposed model in the practical arena. These findings will then be reported as part of the study.

The main limitation of this study is the research context being restricted to the local government authorities in the UK. The structure of LGAs varies in different parts of the UK and the organisational structure, nature and size of each authority vary among themselves, from city to city and even country to country. Therefore, it may be difficult to generalise the results of this research to other parts of the UK and other countries. However, the limitation of such a situation will be overcome by drawing on other literature and case materials. This study seeks to deliver significant empirical evidence on the evaluation and impact of the application of Web 2.0 technologies by local government organisations in an e-Government context.

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