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# Evaluating the use and impact of Web 2.0 technologies in local government

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ABSTRACT

Second generation web-based technologies (Web 2.0) such as social media and networking sites are increasingly being used by governments for activities ranging from open policy making to communication campaigns and customer service. However, this in turn has brought about additional challenges. By its very nature, Web 2.0 technologies are more interactive than the traditional models of information provision or creation of digital services. Such technologies open up a new set of benefits, costs and risks to those government authorities who make use of these social and digital media to enhance their work. This study draws on the extant literature together with an in-depth qualitative case enquiry to propose an emergent framework for evaluating the intra-organisational use of Web 2.0 technologies and its impact on local government. The study findings identified additional four factors (i.e. benefits: *intra-marketing*, *informal engagement*, costs: *workload constraints* and risk: *integration with other systems*) as part of the evaluation criteria which have not previously been discussed in the existing literature surrounding the context of Web 2.0 use in local government. The study concludes that a combined analysis of the evaluation and impact assessment factors, rather than one particular approach would better assist decision makers when implementing Web 2.0 technologies for use by public administration employees.



## 1. Introduction

In the past, electronic communication systems such as discussion forums were examples of early forms of digital democracy which now reflect the ideas behind second generation Web (Web 2.0) technologies such as social media (e.g. Wikis, Blogs) and networking sites (e.g. Facebook, Twitter) (Anttiroiko, 2010; Grimmelikhuijsen & Meijer, 2015). According to O'Reilly (2007), Web 2.0 technologies are a simple and effective second generation of web services that provide a social and participatory virtual platform for organisations to collaborate, network and interact with stakeholders. With the widespread acceptance of electronic government (e-Government) in the public sector, government authorities have followed the private sector in implementing and exploring the use of Web 2.0 technologies (Bonsón, Royo, & Ratkai, 2015; Dadashzadeh, 2010). However, government organisations cannot afford to use the same trial and error approach adopted by commercial organisations and have an obligation to implement new technologies responsibly and in a way that does not compromise privacy and security. At the same time, there is also added stakeholder pressure on government officials to be accountable for public finances spent on information and communications technology (ICT) projects (Kinder, 2010). With the increasing demands and expectations of their stakeholders, government agencies now need to deliver more efficient and effective public services while overcoming the burden of reduced public budgets and resources. It is in this context that government leaders have recognised the opportunities that Web 2.0 technologies offer, not just for engaging with citizens, but also in helping them do a better job (Gov.uk, 2014; Lathrop & Ruma, 2010).

There is an increasing number of studies emerging on the use of Web 2.0 on various public sector domains ranging from politics to health (Anfinnsen et al., 2011; Wattal, Schuff, Mandviwalla, & Williams, 2010; Hughes et al., 2009; Ajjan and Hartshorne, 2008). From an e-Government context, existing studies have illustrated the benefits of social media by the government in terms of openness, transparency and accountability (Bertot, Jaeger, & Hansen, 2012; Stamati, Papadopoulos, & Anagnostopoulos, 2015), citizen-empowerment (Linders, 2012) and engaging with public authorities (Grimmelikhuijsen & Meijer, 2015), in crisis situations (Panagiotopoulos, Bigdeli, & Sams, 2014), as well as their use in political campaigns and presidential elections (Hong & Nadler, 2012; Jaeger, Paquette, & Simmons, 2010; Wattal et al., 2010). However, the challenge for government organisations is in evaluating the use of existing Web 2.0 applications for intra-organisational operations and exploring the extent of their impact. Although most local governments have used Web 2.0 applications for engaging with citizens (i.e. for external service contexts), the embryonic nature of Web 2.0 use for internal operations in local government means that its potential impact has not yet been fully explored empirically. Research into Web 2.0 use and its impact at local government level is

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still tentative and remains a developing area as highlighted by Ala-Mutka et al. (2013), Bertot et al. (2012) and Adams and Smith, (2010). Also, the very few studies that exist in this domain lack theoretical underpinning and the backing of empirical research.

The aim of this study is to identify the criteria which influence the use of Web 2.0 applications for intra-organisational operations in local government. To do so, an emergent framework is formulated that draws on the extant literature together with an in-depth qualitative case enquiry and classifies Web 2.0 evaluation criteria based upon benefits, costs and risks. In addition, this framework also encapsulates the impact factors associated with the use of Web 2.0 applications according to organisational, technological and social themes. In this study, intra-organisational and internal organisational use refers to employees' making use of Web 2.0 applications for work related activities in an e-Government context, rather than for external engagement with citizens. The study seeks to contribute to the emerging field of Web 2.0 use in local government, specifically by focusing on the following research questions:

- How should local government authorities approach the effective intra-organisational use of Web 2.0 technologies in the context of e-Government?
- What are the *evaluation criteria* that a local government authority can use to assess Web 2.0 technologies for internal work?
- What is the *impact* of using Web 2.0 technologies by a local government authority for internal work?

The focus of the study is not to offer prescriptive guidelines on Web 2.0 use, but rather allows others to draw parallels and relate their experiences to those reported. As a result, the outcome of the study is to offer a broader understanding of the emerging phenomenon of Web 2.0 use for internal administration and operational purposes in local government from an employees' perspective. Given the evolving nature of Web 2.0 technologies and their use in an e-Government context, establishing the evaluation criteria and impact can help government officials to understand the real value of these applications and how they can be leveraged to better engage with their stakeholders. Moreover, recognising the real value of Web 2.0 technologies may also help change government officials' existing negative perceptions associated with applications such as social networking sites being a distraction for employees (Sander, 2008; Sivarajah, Irani, & Jones, 2014).

In order to realise the study aim and answer the research questions, this paper first reviews the extant literature surrounding the use of Web 2.0 technologies in the context of e-Government. Following which, the research methodology and the case study findings are reported. This study then proposes the emergent framework for Web 2.0 use in local government and provides a research synthesis. The paper concludes by highlighting the key findings, theoretical and practical contributions, limitations and future research directions. This study will be of significant relevance to the public sector and ICT research community, policy makers, local government authorities and practitioners.

## 2. Web 2.0 use in the context of e-Government

There have been many discussions emerging in the existing literature on the potential of Web 2.0 technologies for transforming governments (Meijer & Thaens, 2010; Stamati et al., 2015). Terms such as "e-Government 2.0", "Government 2.0" and "eGov. 2.0" have been used to describe a new government paradigm which challenges traditional government and governance by incorporating Web 2.0 fundamentals in digital government environments (Drogkaris, Gritzalis, & Lambrinoudakis, 2010; Johannessen & Rohde, 2010). Mergel, Schweik, and Fountain (2009) highlighted that the use of these Web 2.0 technologies has the potential for public institutions to create transformative opportunities in relation to their key issues of transparency, accountability, communication and collaboration and to promote user engagement. Although the literature explores how governments may leverage Web 2.0 mainly for communication (Mergel et al., 2009), collaboration (Cole, 2009; Danis et al., 2009) and information dissemination (Chadwick, 2009), the literature is sparse regarding the evaluation and impact of Web 2.0 use in the digital government context.

### 2.1. Evaluating the use of Web 2.0 in e-Government

Digital government environments have seen significant transformation over the last decade and currently, they continue to evolve by embracing technologies such as Web 2.0 that will not only enhance participation, transparency and integration, but also speed up the pace of innovation (Drogkaris et al., 2010; Sivarajah et al., 2014). Web 2.0 technologies and associated applications facilitate collaboration and enable the shift from service-oriented architectures (SOAs) to Web-oriented architectures (WOAs), which has a substantial impact on the ability to transform internal government operations and services (Tsui, Lee, & Yao, 2010). This means that unlike the traditional e-Government portal systems which government institutions expect users to visit and engage in their own systems, the integration of Web 2.0 applications drives the government towards genuine engagement with the public in their own environment (Accenture, 2009). As West (2008) points out, the integration of interactive features such as innovative online consultation mechanisms (e.g. live chat) and web comment forms has enabled governments to gather the views of the public on policy options and to gather feedback on proposals by setting up simple forms that can be completed online improving the capacity to gather feedback. As both technology and expectations change, it is likely that the demand for interaction in digital government provision will increase. The use of Web 2.0 is still embryonic within government organisations and there is still much debate about whether it is a technology, a philosophy or concept (Klievink & Janssen, 2010). In this study, the authors consider Web 2.0 as a technology which encompasses the use of applications such as Facebook and Twitter in an e-Government context.

Much government activity is now focused on Web 2.0, and social media has become a central component of digital government strategies in a very short period of time (Bertot, Jaeger, & Grimes, 2010; Bonsón et al., 2015). There are various innovative examples of the use of Web 2.0 technologies for facilitating digital government. For example, Web 2.0 initiatives such as NASA's internal social networks and virtual worlds, the U.S. intelligence community's "intellipedia", etc. (Anttiroiko, 2010). Some local government authorities (LGAs) 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 (Guardian, 2011; Zissis & Lekkas, 2011). Yet, in all aforementioned cases, the use of Web 2.0 technologies is still a novel and challenging idea that it is not an integral part of the official governance policy of any government.

Although the examples highlighted above provide a clear idea of the significant role of Web 2.0 in digital government, it is too early to deduce the importance of these technologies by simply reviewing Web 2.0 experiences in government organisations. Therefore, to fully understand the real value of these technologies for government organisations, it is necessary to evaluate and articulate the impacts of Web 2.0 in the digital government domain, including its associated benefits, costs and risks. According to Freeman and Loo (2009), in any consideration of using new technology, attention must be paid to the benefits, costs and risks of its use. Revolutionary digital communications comes filled with both potential opportunities and risks and within the context of e-Government evaluating these prospects and threats are the due responsibility of government when using such ICT tools (Klischewski, 2010). Furthermore, when implementing ICT-related projects (such as e-Government), it is important for managers to better understand the

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impact of IS on organisational performance and their influence in realising the financial and social implications (Irani & Love, 2008; Weerakkody, El-Haddadeh, & Al-Shafi, 2011). Failure of such understanding can lead to disastrous consequences such as inappropriate resource allocation (Farbey, Land, & Targett, 1993). However, if managers' can better understand this, it can then help an organisation to better utilise its resources and improve its overall efficiency.

Like any other IT investment, Web 2.0 investments in government organisations also need to be planned as they require organisational change to culture, people, structure and processes to be managed in order to obtain effective results (Dadashzadeh, 2010).Therefore, a systematic evaluative approach is necessary prior to placing government information and providing services online using Web 2.0 technologies as the integration of these technologies in digital government should not be done arbitrarily. This approach will help to deliver more objective and robust arguments about the impacts of Web 2.0 use in e-Government and also enable organisations to build a strong business case for the deployment of these applications. Additionally, the factor(s) may provide a deeper understanding of Web 2.0 applications which then, in turn, may have an influence on the decision-making process for Web 2.0 use in e-Government. In this context, the analysis of various IS evaluation taxonomies such as benefits (Andresen et al., 2000; Shang & Seddon, 2002), costs (David et al., 2002; Irani & Love, 2002; Kusters & Renkema, 1996) and risks (Benaroch, 2002; Sumner, 2000; Wu & Ong, 2008) was undertaken to establish an understanding of existing IS evaluation models. A review of these taxonomies resulted in the extrapolation of appropriate dimensions to systematically categorise the identified Web 2.0 factors. Consequently, the three chosen IS evaluation approaches compromised of the benefits, costs and risks factors proposed by Shang and Seddon (2002), Irani and Love (2001), and Benaroch (2002), respectively. These taxonomies helped form the IS evaluation criteria and were used as a frame of reference to assess Web 2.0 applications prior to their implementation by government organisations.

### 2.1.1. Classification of the benefits of Web 2.0 technologies

There are several different models such as those proposed by Ross and Vitale (2000), Wilderman (1999) and Ward, Taylor, and Bond (1996) that exist in the academic literature to classify the evaluation of the benefits of information systems. Most of these studies concentrate on the organisational benefits ranging from operational improvements through to decision-making enhancements for organisations to support their strategic goals. 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 identifying dimensions such as operational, managerial and strategic efficiency, the value of IT infrastructure and organisational benefits were identified as important factors that could contribute to an organisation. This framework was used as it offers a comprehensive and broad perspective for analysing the benefits of IT systems due to its continuous validation made in many studies (e.g. Eckartz, Daneva, Wieringa, & van Hillegersberg, 2009; Poba-Nzaou, Uwizeyemungu, Raymond, & Paré, 2014), thus making it reliable.

According to Shang and Seddon (2002), five major classifications of benefits have been identified and each is subdivided into two or more 'factors' that set out ways in which Web 2.0 can benefit an organisation. The first dimension; *operational benefits* reflects the positive impact that a 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. The second dimension — *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. Third, *strategic benefits* deal with the potential of IS to achieve strategic benefits such as business growth, alliances, innovation, differentiation etc. Fourth, the *IT infrastructure* dimension presents the use of technology to allow for sharable and reusable IT resources that provide a foundation for present and future business applications. Finally, the *organisational* dimension entails benefits such as focus, cohesion, learning and execution of strategies for an organisation by the use of an information system. Through a review of the existing literature, the benefits of Web 2.0 have been classified against the five dimensions of Shang and Seddon (2002) into a taxonomy given in Table 1 below.

### 2.1.2. Classification of the costs of Web 2.0 technologies

The identification of the full range of costs of an information system is essential in order to complete a robust IS evaluation (Hochstrasser, 1992). According to Hochstrasser (1992), the true costs of an IS deployment can often be divided into direct and indirect cost factors. Although many cost taxonomies include directly quantifiable costs associated with IS investments, the majority fails to identify the indirect costs (Irani & Love, 2001; Love, Irani, Ghoneim, & Themistocleous, 2006). This is often due to the fact that indirect costs are difficult to quantify in monetary terms, possibly explaining their limited presence in the various cost taxonomies. However, Irani and Love (2002) explain that indirect costs cannot be avoided as their effect would appear once the implementation of the project is initiated. Hence, managers who choose to ignore indirect costs by not including them in the overall cost portfolio are only delaying the effect of those costs and are not eliminating them. Accounting for both direct and indirect costs, the taxonomy presented by Irani and Love (2001) makes it the most appropriate for this research. The authors highlight the point that the costs associated with the use of IS can be classified as having direct and indirect (human and organisational) characteristics. The *direct cost* components are those which can be attributed to the implementation and operation of new technology, and as a result are those most considered by decision-makers during the use of traditional appraisal techniques (e.g. hardware and software costs, installation and configuration etc.). *Indirect costs*, however, are those that cannot be readily identified, managed and controlled (e.g. management time, productivity loss etc.). Table 2 presents a set of costs of using Web 2.0 applications in an e-Government context.

### 2.1.3. Classification of the risks of Web 2.0 technologies

Although there is some overlap with the concept of cost, risk captures a range of non-financial factors that could either undermine the particular project or harm the overall organisation. Thus failure of a system to operate as planned can be a cost (possibly requiring more investment or to abandon existing investment) but also has a reputational risk in terms of the perceived ability to manage public funds. IS projects are renowned for their high failure rate and, it is important for organisations to improve their ability to manage their IS risks so that projects can be delivered against the objectives with which they were justified (Wilbanks, Kuhn, & Chou, 2014). Risk factors in IS projects range from issues that relate to specific internal organisational risks to external factors. Factors such as organisational fit, skill mix, management structure and strategy, software systems design, user involvement and training and technology planning have been highlighted by Sumner (2000). On the other hand, Wu and Ong (2008) present two kinds of uncertainty factors that address risks in the dynamic environment of information technology investment. While "external uncertainty" comes from outside the organisation and could include market extinction, "internal uncertainties" occur within an establishment (e.g. uncertainty about budget overspends). Essentially, the IS investment risks identified are present in two streams of IS research. The first includes risks arising in software development and the second stream focuses on IT investment risks arising outside the scope of software development.

Although Web 2.0 provides a lot of opportunities, it may also pose risks that organisations should be aware of in order to attain its full

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**Table 1**
Classification of the benefits of Web 2.0 in the context of e-Government.

| Classification | Factors | Description | References |
|---|---|---|---|
| Operational | ▪ Streamline internal operations | ▪ Collaboration applications 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 knowledge base. | Bughin & Chui (2010); Accenture (2009) |
| | ▪ 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, customised services to their users at much lower costs than the e-government's centralised provision of services. | Chang & Kanna (2008) |
| Managerial | ▪ Improvement of policy making | ▪ The tools and practices of Web 2.0 can help improve policy making by integrating online collaboration applications and interactive maps into e-government websites. This can enable governments to become more inclusive and responsive to individual users throughout the policy life cycle resulting in improved policy outcomes. | Bonsón et al. (2012); Dixon (2010); |
| | ▪ Rapid dissemination of information | ▪ The viral nature of Web 2.0 applications such as Microblogging and social networking sites can help disseminate information over the internet much faster than traditional methods (e.g. postal letters, pamphlets, static websites etc.) of information delivery. | Buchanan & Luck (2008) |
| Strategic | ▪ Enhance external transparency | ▪ Web 2.0 applications can help improve external transparency for government organisations by enriching government interactions with external stakeholders and enhancing internal knowledge management. | Bonsón et al. (2012); Meijer & Thaens (2010) |
| | ▪ Revive user engagement | ▪ Social networking sites can be powerful applications that governments can deploy to help revive user engagement and harness the wisdom of crowds. Governments can especially enlist important niche audiences, leverage their insights for policy-making and improve the user relationship. | Bertot et al. (2012); Huijboom et al. (2009) |
| IT infrastructure | ▪ Scalability of the system | ▪ Web 2.0 applications are mostly scalable allowing them to handle a growing amount of work in a capable manner | Picazo-Vela, Gutiérrez-Martínez, & Luna-Reyes (2012); O'Reilly (2008) |
| | ▪ Exploit free applications | ▪ As most major Web 2.0 applications such as Facebook and Twitter are free to use, the government organisations can exploit these applications to benefit their own services. | Picazo-Vela et al. (2012) |
| | ▪ Ease of use and greater access | ▪ Web 2.0 technologies are usually quick and easy to learn and use. They can also be accessed from multiple devices as long they are connected to the internet allowing for greater access to these technologies. | O'Reilly (2008) |
| Organisational | ▪ Efficient gathering of collective intelligence | ▪ Gathering wisdom from users for crowd-sourcing has revolutionised with the use of some Web 2.0 technologies such as internal Wikis. It has enabled government organisations to efficiently and effectively collect geographically dispersed collective intelligence from users with less effort in comparison to traditional crowd-sourcing methods such as public forums and workshops. | Nam (2012); Bertot et al. (2012) |
| | ▪ Co-production and collaboration | ▪ Governments and the public jointly develop, design, and deliver government services to improve service quality, delivery, and responsiveness. | Linders (2012); Bertot et al. (2010); Klievink & Janssen (2010) |

**Table 2**
Classification of the Costs of Web 2.0 in the context of e-Government.

| Classification | Factors | Description | References |
|---|---|---|---|
| Direct costs | ▪ Development of new service model | ▪ As the Web 2.0 model requires the use of external applications (e.g. Facebook, YouTube and Twitter), it can prove challenging to develop a new service model that integrates these Web 2.0 applications with existing e-Government systems in a manner that is secure and improves the quality of services. | Freeman & Loo (2009) |
| | ▪ Additional Staff | ▪ The need for additional staff to develop, manage and act as moderators of Web 2.0 applications | Freeman & Loo (2009) |
| | ▪ Data maintenance | ▪ Costs related to the maintenance of content generated in Web 2.0 applications as the amount of information created will be high in Web 2.0 applications | Kavanaugh et al. (2012) |
| Indirect human costs | ▪ Restricted user participation | ▪ The investment in Web 2.0 applications on the e-Government front can potentially result in restrictions to exclusive user participation. | Blank & Reisdorf (2012); de Kool & van Wamelen (2008) |
| Indirect organisational costs | ▪ 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. | Osimo, Campbell, Kerr-Stevens, Bishop, & Bryant (2009) |
| | ▪ Staff learning and training | ▪ Existing staff will require education and training to use and moderate Web 2.0 applications to be in line with the organisations policy. This often requires lot of management time and can prove to be a significant indirect cost. | Kavanaugh et al. (2012) |
| | ▪ Introducing new organisational policies | ▪ Many social media services are hosted outside government websites (e.g., Facebook, Twitter, YouTube). Therefore it is important for government agencies to establish and enforce explicit agency-wide linking policies. This can be time-consuming and costly for organisations. | Bertot et al. (2012) |

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potential in a responsible and sustainable manner (Anttiroiko, 2010). Some have pointed to the potential undemocratic features of Web 2.0 and the regressive nature of the wisdom of crowds captured by Web 2.0 (Wilson, 2008). Additionally, there have been uncertainties and concerns among experts, public sector managers and politicians about the risks of too deep an involvement in the Web 2.0 trend in the public sector due to privacy and security risks and capacity problems in public administration (Sternstein, 2006). Table 3 reports a set of potential risks that managers may need to be aware of when using Web 2.0 applications in an e-Government context.

### 2.2. Classification of the impacts of Web 2.0 use in e-Government

The influence of Web 2.0 is potentially disruptive as well as providing the means to alter the nature of digital government (Mintz, 2008). However, since the development of this kind of technology is very recent, research about the impact of Web 2.0 on the public sector is still highly tentative and exploratory (Huijboom et al., 2009). Hence, studies such as this research will be helpful to government organisations as they aim to determine the level of use of these technologies by municipalities and assess if they are relevant and necessary to their digital strategy. This will help identify areas for improvement and future action plans (Bonsón, Torres, Royo, & Flores, 2012).

One important issue in this respect is to argue that the lessons for Local Government Authorities (LGAs), in terms of Web 2.0 use, are no different to any other organisation. The identified impact factors are a combination of common factors derived 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 & Thaens, 2010). These works have been extended and adapted to the use of Web 2.0 in the area of LGAs, thus, resulting in the concept of three main categories (i.e. organisational, technological and social) with factors within these categories influencing Web 2.0 use in e-Government. Organisational, technological and social factors are argued to be important antecedents of IS success (Delone & McLean, 2003; DiMaggio, Hargittai, Neuman, & Robinson, 2001; Seddon, 1997). Other research has identified additional factors such as consumer impact (Brynjolfsson, 1996), environmental impact (Plepys, 2002), work group impact (Myers, Kappelman, & Prybutok, 1997) and inter-organisational impact (Clemons & Row, 1993). There is, however, a risk in simply producing a long list of potential factors and not addressing the question of which, probably in combination, are most important in a particular instance. Since this study has been undertaken at a stage when there is lack of theoretical research surrounding Web 2.0, it is argued that the three common classifications (i.e. organisational, technological and social) are the most relevant to articulate the impact of such technology. These classifications are based on seminal literature including Wu & Ong, 2008 and DiMaggio et al., 2001. This taxonomy was used to construct Table 4 with specific issues captured as organisational, technological or social Web 2.0 impact factors which have been extrapolated from the existing literature.

## 3. Research methodology

A case study strategy that uses qualitative research methods for theory testing was chosen for this research on account of its originality and exploratory nature; see for example, Hakim (1987) and Yin (2009). There are a multitude of reasons behind the use of such a strategy, for example it is considered suitable to describe a phenomenon, build theory or test theoretical concepts or relationships, or a combination of all three (Yin, 2009). In this instance, it was used with the objective of describing a phenomenon of the use of Web 2.0 applications in a local

**Table 3**
Classification of the risks of Web 2.0 in the context of e-Government.

| Classification | Factors | Description | References |
|---|---|---|---|
| Political and legal | ▪ Weak social media policies | ▪ 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 in their infancy. Immature policies might prove to be a risk for government organisations. | Bertot et al. (2012) |
| | ▪ Data ownership | ▪ The technique of application mashups and content syndication on to existing e-Government platforms can also be an issue leading to loss of ownership control and authenticity of the final products. | Osimo et al. (2009) |
| | ▪ Data protection | ▪ Rise in responsibility for government organisations to handle personal information about individuals sensitively as most Web 2.0 technologies require this information to use the applications. | Osimo (2008) |
| | ▪ Freedom of information | ▪ The use of Web 2.0 technologies can present challenges in appropriately responding to Freedom of Information legalities. It can raise significant issues for an organisation with regards to open access and the publishing of information. | Huijboom et al. (2009) |
| Reputational | ▪ Critical reviews | ▪ 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 image of people and organisations without good reason. This is because it is difficult to ascertain if assessments are fair or the result of personal resentment | de Kool & van Wamelen (2008) |
| | ▪ Risk of information overload and reliability | ▪ There is a risk of information overload and poor quality content shared with public users when using some Web 2.0 applications such as blogs and wikis, as concerns can be raised about their reliability, accuracy and authority | Huijboom et al. (2009) |
| Security | ▪ Security and privacy | ▪ The open nature of Web 2.0 presents significant challenges to the traditional enterprise approach to controlling intellectual property over information shared and security of these applications. | Bin Al-Tameem, Chittikala, & Pichappan (2008) |
| | ▪ 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 with each other | Chen, Thoms, & Fu (2008) |
| Societal risks | ▪ 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 to the use of the internet | de Kool & van Wamelen (2008) |
| | ▪ Digital divide | ▪ There could be a risk of inequality between different groups of users in terms of access to, use of or knowledge of Web 2.0 applications. Some users may be hesitant of using Web 2.0 technologies and may not be interested in using the applications at all. This could indirectly result in the exclusion of these users and not allowing for equity of access. | Osimo et al. (2009) |
| Technical | ▪ Access to the technologies | ▪ The need for minimum requirements such as a device and internet access at a speed sufficient to support social media content | Bertot et al. (2012) |
| | ▪ Discontinuation of technology | ▪ The risk of the continuity of existing Web 2.0 applications. For example Yahoo announced the discontinuation of its Delicious tagging service. | Bertot et al. (2012) |

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**Table 4**
Classification of the Impacts of Web 2.0 use in e-Government.

| Classification | Factors | Description | References |
|---|---|---|---|
| Organisational | ▪ Culture and change | ▪ The use and implementation of Web 2.0 technologies requires government organisations to embrace innovation, transparency, collaboration, open communication and user-generated content. They need to be open to the changes this brings and adapt to a Web 2.0 friendly working culture thus leading to an open government culture. | Parycek & Sachs (2010) |
| | ▪ Transparency and accountability | ▪ Web 2.0 applications can make user demands and government products and processes more transparent thus increasing accountability | Bonsón et al. (2012); Bertot et al. (2010) |
| | ▪ Policy alignment and governance | ▪ As authorities move towards more democratic and open government practices with the use of Web 2.0 technologies, there is a need for organisations to tightly align policies against practice to minimise risk from issues such as confidentiality, propriety etc. | Meijer & Thaens (2010) |
| | ▪ Knowledge management | ▪ Web 2.0 technologies allow for effective knowledge management. They facilitate collection of both implicit and explicit knowledge in order to create a knowledge base which can then be used by organisations. | Traunmuller (2010); Osimo (2008) |
| | ▪ Collaboration and communication | ▪ The internal and external collaboration and communication within an organisation is better facilitated by Web 2.0 applications. Collaborative editing applications such as Wikis make the process of collection and sharing of information more efficient. It also improves communication by breaking down traditional organisational hierarchies. | Schweik, Mergel, Sandfort, & Zhao (2011) |
| | ▪ Organisational learning | ▪ Web 2.0 applications such as blogs and wikis facilitate information sharing thus assisting social learning within organisations. | Baxter, Connolly, & Stansfield (2010) |
| | ▪ Human capital | ▪ Organisations will need to train existing staff or hire new personnel (e.g. social media managers) who have the skills and capabilities to operate and manage Web 2.0 applications. This will require a necessary investment in human capital. | Mintz (2008) |
| | ▪ Financial resources | ▪ Cloud computing and Web 2.0 technologies such as SaaS platforms can bring about financial savings to organisations as the need for specific software and infrastructure is reduced. | Paquette, Jaeger, & Wilson (2010); Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi (2011) |
| Technological | ▪ Security and privacy | ▪ Government organisations will need 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 etc. A balance between tight security without stifling creativity and communication needs to be achieved. | Osimo (2008); Chen et al. (2008) |
| | ▪ Interoperability | ▪ Web 2.0 applications (e.g. RSS) allow for interoperability wherein the government can publish information and services over different platforms including mobile phones thus giving them a wider reach. | Osimo (2008) |
| | ▪ Scalability | ▪ Web 2.0 technologies, particularly in the form of SaaS platforms, provide a scalable system such that it can cope with and accommodate growth of the organisations. | O'Reilly (2008) |
| | ▪ Data presentation | ▪ Information can be shared and presented in a variety of new ways beyond traditional methods with the aid of Web 2.0 applications. For example, mashups allow the presentation of Google maps, knowledge maps and presentation of videos on YouTube on a single platform. | Meijer & Thaens (2010) |
| Social | ▪ Participation and engagement | ▪ Social media technologies within Web 2.0 allow the government organisations to interact with the public by engaging them in dialogue over issues such as policy development and implementation. | Bertot et al. (2012) |
| | ▪ Co-production | ▪ Government organisations can use Web 2.0 applications work with the public to get their involvement in design, development and delivery of their services thus building a two way relationship. | Bertot et al. (2010) |
| | ▪ Innovations and Crowdsourcing solutions | ▪ Web 2.0 technologies pave the way for innovation through sharing of knowledge. It facilitates crowdsourcing, thus allowing the government to share information internally as well as with the public thus providing a platform from which innovation can occur. | Bertot et al. (2010) |
| | ▪ Building and maintaining trust | ▪ The role of trust in Web 2.0 suggests that continuous interactions and positive experience in social networking sites will enhance the initial trust of the user. This factor highlights the impact that Web 2.0 technologies such as social networking sites can have on trust among its users in government organisations. | Grabner-Krauter (2009) |

government context. Dyer and Wilkins (1991) argues that findings from a single study can be more useful than an approach in which multiple studies are used for data collection as proposed by Eisenhardt (1989) and Gable (1994). A single case study prioritises richness of data over the ability to compare multiple instances and wide explanatory power. This research follows the work of Dyer and Wilkins (1991) in the way that it selects the research approach and case study. Moreover, the use of Web 2.0 applications by LGAs for internal operational purposes is still not extensive among local government authorities in the UK. These applications are mainly used by local authorities to engage with citizens as highlighted in the introduction and such interaction is not the focus of this study. Therefore access to organisations using these applications for the same purpose was very limited. As a result, a single in-depth case approach was pursued similar to the works of Dyer and Wilkins (1991), Reinwald and Kraemmergaard (2012) and Whitmore (2014). The case organisation used for this research was selected on the basis that employees of this UKLGA had been using Web 2.0 applications for intra-organisational work purposes for several years.

### 3.1. Data collection

The primary method used for data gathering at UKLGA was semi-structured interviews. This was complemented with observations of the work environment during several visits to the UKLGA premises (Atkinson & Hammersley, 1994; Myers et al., 1997). The interview agenda and questions were influenced by the normative literature and classification of Web 2.0 factors. A pilot case study involving a trial interview was initially conducted with a senior manager from another local government authority in the UK. The main purpose of this pilot was to

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help eliminate any ambiguity and vagueness in the interview questions that were to be used for the main case study. The improved interview agenda was then used with the chosen UKLGA to facilitate the collection of rich, relevant case study data. The agenda allowed the researchers to maintain focus during the interview process from selected interviewees who were identified prior to the research based on their roles in UKLGA. Additionally, informal conversations, policy documents, corporate strategy reports, minutes from meetings and consultancy reports etc., allowed one to gather multiple supporting evidences. This allowed the triangulation of data, thus contributing towards the reliability and validity of the findings (Yin, 2009). The field notes taken during the interviews were later transcribed into MS word format and passed on to the interviewees to approval thus helping with further validation of the results. The interview protocol underwent the standard university process to obtain ethical approval for data collection methods and mode of collection.

### 3.2. Interview process

Interviews were conducted with those who were considered to be independent and most knowledgeable when it came to the human, organisational and technical factors associated with the use of Web 2.0 technologies within the case environment. Only senior and experienced users of Web 2.0 technologies were interviewed. Table 5 summarises the list of both formal and informal interview participants from the case study (UKLGA). Due to confidentiality reasons, the case organisation in this study is referred to as "UKLGA".

Furthermore, all interviews took place away from the normal office environment and possible disruption (interviews were conducted in a bookable meeting room). The authors acted as a neutral medium through which questions and answers were transmitted in an endeavour to eliminate bias. As part of the interview agenda, interviewees were asked to also indicate the level of significance of the factors (for benefits, costs, risks and impacts) using a 7 point Likert scale represented by (1) *less important*, (2) *fairly important*, (3) *moderately important*, (4) *important*, (5) *highly important*, (6) *extremely important* and (7) *not important*. The responses were then grouped into three categories to graphically represent *less important* to *fairly important* as (○), *moderately important* to *important* as (◉) and *highly important* to *extremely important* as (●) and where the interviewees said *not important*, the "x" symbol is used. Grouping the 7 point Likert scale into these 3 categories allowed for a broader representation and discussion of the findings.

### 3.3. Case study validity and data analysis

The authors believe that the procedures followed in conducting the study and use of triangulation for data collection (see, for example, Jick, 1979) contributed to the reliability and validity of the study, while conforming to the prescriptions of Pan and Tan, (2011). Therefore, the researchers have full confidence in the veracity of the research process and findings. The data derived from the case study was triangulated and then analysed to draw empirical conclusions. This study adopted a qualitative data analysis technique and used NVivo software (Qualitative analytical tool) to support the development of the coding system used for data analysis. The process of data analysis involved examining the meaning of people's words and actions (e.g. Ramanathan, 2009). In effect, data analysis and synthesis was an iterative process as concepts emerged and common themes were identified and formed into a coherent analysis (Corbin & Strauss, 2008). These findings were used to develop the empirical evidence reports that support the framework for the use of Web 2.0 technologies in e-Government.

## 4. Use of Web 2.0 in e-Government: evidence from a local government authority in the UK

The case study conducted was in a Local Government Authority (hereafter referred to as UKLGA) which has been established since 1995 to provide a range of public services, including Education, Social Services and Highways. The UKLGA has a Corporate IT strategy which outlines the improvement and Service Innovations Plans. The decision to implement Web 2.0 technologies was a natural choice as the IT department and the wider organisation wanted to keep up with technological changes and maintain their reputation. In particular, the customer-facing services carried out by several business units in the UKLGA (e.g. Leisure Centre, Web team) benefitted from the use of these applications. In addition, it was evident that the IT department was keen to implement Web 2.0 as part of their ICT innovation strategy, to maintain its knowledge of ICT developments and to keep up with developments in central government as well as the wider business (industry) community. This resonates with the view of Charlton (2011) who highlights the fact that some public sector organisations are jumping on the 'bandwagon' to keep up with technological changes and maintain reputation. Interestingly, though there was still some resistance in the UKLGA to exploit these applications to improve respective service areas as illustrated by the lack of take-up by important departments such as Highways and Finance. One reason for such poor take-up can be attributed to issues such as the level of priority given to such Web 2.0 applications among other day-to-day responsibilities that needed to be administered and the UKLGA's policies related to access restrictions for social media. The Service Improvement manager, who was not from the IT department, reported: "*For the majority of UKLGA staff (apart from around 300) social media was blocked. It is often used by us to disseminate information, which we cannot access except by special arrangement…*" (*SIM*). This clearly highlighted the fact that ultimately, the use of Web 2.0 applications was under the jurisdiction of the Head of ICT and the IT management in the UKLGA and also that its implementation was initiated and constrained by the opinions of senior staff. Although there were clearly access restrictions to these applications for some staff, the informal interviews and conversations with most of the non-IT departments indicated that in this case the organisation was far more liberal than other local authorities in the UK. Some of the employees reported that this was one of the few LGA's in the UK that

**Table 5**
List of interview participants in the case study (UKLGA).

| Who | Where | How |
|---|---|---|
| Head of ICT (SJ)<br>Corporate e-Government Manager (SD)<br>Website Manager (RSJ)<br>IT Systems Manager (RJB)<br>IT Services Manager (PU)<br>IT Support Manager (NP) | UKLGA IT Department | Formal interview<br>–Semi-structured Interview Agenda<br>–90 minutes (approximately) each participant<br>–One-to-one basis |
| Finance Manager (FM) | UKLGA Finance Department | Informal interview |
| Social Services Information Manager (SSIM) | UKLGA Social Services Department | –Open-ended questions |
| Service Improvement Manager (SIM) | UKLGA Community Services Department | –30 minutes (approximately) each participant<br>–One-to-one basis |

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allowed employees to use Web 2.0 applications for intra-organisational business-related activities as majority of the LGAs in the UK only allowed their employees to use it for citizen engagement.

### 4.1. Evaluation of the benefits, costs and risks of Web 2.0 in the UK LGA

Interviews with UKLGA staff reiterated the significance given to IS evaluation in the literature (e.g. by Remenyi, 1999; Farbey et al., 1993). However, it was interesting to note that while they signify IS evaluation as an important procedure to follow, there was no formal evaluation that was conducted prior to the use of Web 2.0 technologies. One of the key reasons for this neglect was reported as due to the belief that these technologies came with no initial direct costs and therefore did not require a formal evaluation. The head of ICT said: "*…We haven't done it, probably because it was an obvious thing to do and as it is mainly used as a communication tool. It's difficult to calculate things like efficiencies and cost savings on a tool. Although normally we will do it on a system, we haven't done it on Web 2.0…*" (SJ). The above statement made by the Head of ICT in the UKLGA clearly highlighted the point that as the majority of Web 2.0 technologies were free, only an informal discussion about the benefits, costs and risks was conducted prior to its implementation. The importance of evaluation was stressed further by the e-Government manager when suggesting that, "*Yes, I think this is the area where you got to look at risk management and we did largely ignore costs because the biggest cost would have been the technology and that was free, the fact that we are now diverting staff resource at this even though it is only a small percentage of your day job. We are spending some time on this and time is money*. (*SD*)" These views clearly show that the UKLGA was aware of the need for evaluation, but did not apply any criteria for evaluating the use of Web 2.0 applications.

#### 4.1.1. Benefits evaluation of Web 2.0 technologies

The dimensions proposed by Shang and Seddon, (2002) and mapped in Section 2.1.1 earlier were used to evaluate the benefits of Web 2.0 as the classifications covered a broad spectrum of functions surrounding an organisation. Table 6 provides an analysis of the importance of Web 2.0 benefit factors for its effective use in the UKLGA based on the views from the interviewees using a 7-point Likert scale of *less important* to *fairly important* (○), *moderately important* to *important* (◉) and *highly important* to *extremely important* (●) and where the interviewees said *not important*, the "x" symbol is used.

The findings from the empirical data as depicted in the table above highlight the benefits of Web 2.0 such as *rapid dissemination of information*, *enhancing external transparency*, *reviving user engagement*, *exploiting free applications* and *ease of use and greater access* were considered by the interviewees to be highly important factors for the effective use of Web 2.0 applications in the case organisation.

Within the *operational benefits* dimension, *lowering IT costs* and *streamlining internal operations* were both regarded as important factors by the UKLGA senior management team. The Website Manager highlighted the point that the use of Web 2.0 applications (where one-stop collaboration platforms such as Yammer) helped streamline processes by making it easier to access and share information and facilitate project management within departments. The manager believed that this would help reduce the traditional chain emails which are sent to update the progress of or any amendments to a project to all related employees. Most managers also believed that one of the main benefits of Web 2.0 was cost-saving in terms of implementation and take-up (compared to a traditional IT system such as a payroll or logistics system). In addition, for UKLGA, *rapid dissemination of information* was extremely important. In this respect, the use of applications such as Twitter was useful for them as it was far more efficient in getting out information to a vast number of users at a greater speed compared to other methods of communication such as a static website or a printed newsletter. However, on the other hand, the benefit of using Web 2.0 applications to *improve policymaking* was not believed to be of great importance by most of the managers. The e-Government manager stated that it was not important at all and the Website Manager said: "*In principle it makes perfect sense but in reality I think it tends to be rather a self-selecting group, so people that are affected by the policy aren't actually part of the consultation group*" (RSJ). In addition, enhancing external transparency and reviving user engagement were deemed highly important *strategic benefits* of using Web 2.0 applications by the senior management team; The Web Manager reported: "*I know this will be extremely important because you are not giving the pre-chewed data*" (*RSJ*).

Among the other benefits cited, the Head of ICT and the IT Systems Manager both added that *intra-marketing* and *informal engagement* were two other important *strategic* areas that could benefit from the use of Web 2.0. The IT Systems Manager highlight that the use of Facebook for *intra-marketing* of UKLGA's existing services among the internal employees seemed quite a prominent and an effective use of these applications in the case organisation. Thus indicating the ability to use Web 2.0 applications such as social media sites for *intra-marketing* opportunities was a key strategic benefit for UKLGA. In terms of *informal engagement*, this was considered to be an important factor, mainly by the Head of ICT, as it was believed that the use of Web 2.0 applications such as blogs would help disseminate strategic messages to the council's employees quickly and in a conversational tone rather than sending formal newsletters or emails. The Head of ICT also highlighted the fact that some employees such as the Chief Executive and other senior managers already employed such methods and were regular 'bloggers'. The key benefits of this method was that the employees had the freedom to visit the blogs in their own time and also allowed for interaction by allowing them to comment on blog posts. Moreover, the zero take-up cost associated with Web 2.0 meant that it

**Table 6**
Importance of Web 2.0 technology benefits.

| Classification | Benefits of Web 2.0 technologies | Head of ICT | Corporate e-government manager | Website manager | IT systems manager | IT support manager | IT services manager |
|---|---|---|---|---|---|---|---|
| Operational | ▪ Streamline internal operations | ● | ◉ | ◉ | ● | ◉ | x |
| | ▪ Lower IT costs | ● | ◉ | ◉ | ◉ | ● | x |
| Managerial | ▪ Improvement of policy making | ○ | ○ | ○ | ○ | ● | x |
| | ▪ Rapid dissemination of information | ● | ● | ● | ● | ● | x |
| Strategic | ▪ Enhance external transparency | ● | ● | ● | ● | ● | ○ |
| | ▪ Revive user engagement | ● | ● | ● | ◉ | ● | ◉ |
| | ▪ Other: Intra-marketing | ● | ● | ● | ● | ● | ◉ |
| | ▪ Other: Informal engagement | ● | ● | ● | ● | ● | ◉ |
| IT infrastructure | ▪ Scalability of the system | ● | ● | ◉ | ● | ● | ◉ |
| | ▪ Exploit free applications | ● | ● | ● | ● | ● | ◉ |
| | ▪ Ease of use and greater access | ● | ● | ● | ● | ● | ◉ |
| Organisational | ▪ Efficient gathering of collective intelligence | ● | ● | ● | ● | ● | ◉ |
| | ▪ Co-production and collaboration | ◉ | ● | ◉ | ● | ● | ○ |

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**Table 7**
Importance of Web 2.0 technology costs.

| Classification | Cost of Web 2.0 technologies | Head of ICT | Corporate e-government manager | Website manager | IT Systems Manager | IT Support Manager | IT Services Manager |
|---|---|---|---|---|---|---|---|
| Direct | ▪ Development of new service model | ● | ◉ | ◉ | ◉ | ◉ | ◉ |
| | ▪ Additional Staff | ● | ○ | ● | ● | ◉ | ◉ |
| | ▪ Data maintenance | ● | ◉ | ● | ◉ | ● | ◉ |
| Indirect Human | ▪ Restricted user participation | ● | ◉ | ◉ | ◉ | ◉ | ◉ |
| | ▪ Other: Workload constraints | ● | ● | ● | ◉ | ◉ | ◉ |
| Indirect Organisational | ▪ Loss of control | ● | ◉ | ◉ | ● | ◉ | ◉ |
| | ▪ Staff learning and training | ● | ◉ | ● | ◉ | ◉ | ◉ |
| | ▪ Introducing new organisational policies | ● | ◉ | ● | ● | ◉ | ◉ |

was an easy decision for senior management to implement these applications in the UKLGA. Finally, the ability of Web 2.0 applications to facilitate *collaboration* and *co-production* and *efficient gathering of collective intelligence* were regarded as significant factors by the managers for use. The IT Systems Manager asserted that efficient gathering of collective intelligence often occurred in the UKLGA when using interactive Web 2.0 survey applications. He added, "…*when using such applications there wasn't an issue of scalability when compared to traditional means of collecting data*" (RJB). Furthermore, according to the IT Services Manager, digital platforms that facilitate collaboration enabled the UKLGA to carry our formal consultations with different departments regarding local development plans without the need for physical meetings.

*4.1.2. Costs evaluation of Web 2.0 technologies*

In line with the mapping of literature in Section 2.1.2, the management at the UKLGA were asked to indicate their initial views on the important costs when using Web 2.0 applications. Table 7 depicts the analysis of the important costs of Web 2.0 for its effective use in the UKLGA based on the views of the interviewees. It uses a 7-point Likert scale of *less important* to *fairly important* (○), *moderately important* to *important* (◉) and *highly important* to *extremely important* (●) and where the interviewees said *not important*, the "x" symbol is used.

As the above table illustrates, cost factors such as data maintenance, restricted user participation and introducing new organisational policies are some of the factors that the senior management team believed to be important considerations to have prior to the use of Web 2.0 applications. One of the key direct *costs* of Web 2.0 technologies that the interviewees highlighted was *data maintenance*. The e-Government manager indicated that they were "*generally good at putting information out but not as good when it comes to tidying up the data once it becomes outdated*" (SD). This can have a detrimental impact on the image of the organisation and indicates an inability to maintain accurate and reliable information for the users of these channels. High-quality information is vital when it comes to Web 2.0 applications as users expect up-to-date data through mediums such as Twitter which sends information out in real-time. However, using such applications can also mean employing new staff to implement and manage them and often the public sector is reluctant to invest in additional human resources particularly in times of budget restrictions. This always means that existing staff are put under pressure to manage these applications and have a disruptive effect on their daily jobs.

There were also several indirect costs that were identified by managers. For instance, UKLGA policies on restricted user participation were seen as an important *indirect human cost* factor that managers had to take into consideration when implementing Web 2.0 technologies. In addition, the Website Manager highlighted that use of personal time for monitoring and brokering Web 2.0 applications was a highly significant *indirect human cost* for the LGA which resulted in *workload constraints* for employees. The manager stated "…*the fact is that I have to keep checking my work related social media accounts several times a day means that I have to stop doing some of my routine duties for certain periods of time during the day*" (RSJ). This statement clearly highlights that there was no dedicated role (e.g. social media officer) in the council to manage these channels. As such, the indirect organisational costs relating to the *introduction of new organisational policies* relating to social media have to be considered when introducing Web 2.0. Furthermore, the management team also felt that *loss of control* when using social media was another significant consideration when using Web 2.0 applications as they could potentially have an impact on indirect organisational costs to manage and moderate external comments. However, the Web Manager stated that though this drawback might not stop the use of applications such as Facebook, it does raise concerns regarding trust as UKLGA has limited control over third party information that can be posted on social media.

*4.1.3. Risks evaluation of Web 2.0 technologies*

The risk dimensions that were evident in the literature were broadly political and legal, reputational, security, societal and technical themes in Section 2.1.3. 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 the reputation of the organisation. The e-Government Manager asserted that a risk evaluation was extremely significant and considered reputational issues as something that they needed to be more aware of than any other factors when dealing with social media. Table 8 provides the analysis of the importance of Web 2.0 risk factors for its effective use in the UKLGA based on the views of the interviewees. It uses the same 7-point Likert scale of *less important* to *fairly important* (○), *moderately important* to *important* (◉) and *highly important* to *extremely important* (●) and where the interviewees said *not important*, the "x" symbol is used.

As the above table illustrates, risk factors such as *data ownership, risk of information overload and reliability* and *security and privacy* were some of the factors that the senior management team believed to be important in the use of Web 2.0 applications. In particular, weak social media policies, data ownership and protection and freedom of information were all considered to be significant risks that needed to be considered within the *political and legal* context. For instance, the Website Manager asserted that *data protection* is significant due to the social nature of Web 2.0 tools and usually users have their personal details stored on these applications. Similarly, with regard to *data ownership*, some managers raised concerns about information being placed in social media applications by third party organisations whose views may not always be in line with UKLGA's own policies. On the other hand, *reputational risks*, *information overload and reliability* were highlighted as significant risks that had to be taken into account before implementing these applications. The IT Support Manager also agreed that there is certainly a risk of keeping the data presented on the social media applications accurate. The manager claimed that "*internally UKLGA's intranet sites were not maintained as well as they should have been, so the more information there is, the more difficult it is to maintain accurate information*" (NP). Furthermore, *critical review comments* by employees were another key factor that the management had referred to as an important reputational risk that UKLGA had to be aware of as it was another case of managing its public image. However, on the other hand, the IT Systems

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**Table 8**
Importance of Web 2.0 technology risks.

| Classification | Risks of Web 2.0 technologies | Head of ICT | Corporate e-Government Manager | Website Manager | IT Systems Manager | IT Support Manager | IT Services Manager |
|---|---|---|---|---|---|---|---|
| Political and Legal | ▪ Weak social media policies | ● | ● | ◉ | ● | ◉ | ◉ |
| | ▪ Data ownership | ● | ◉ | ◉ | ● | ● | ◉ |
| | ▪ Data protection | ● | ● | ◉ | ● | ● | ◉ |
| | ▪ Freedom of information | ● | ● | ◉ | ● | ◉ | ◉ |
| Reputational | ▪ Critical reviews | ● | ● | ● | ◉ | ○ | ● |
| | ▪ Risk of information overload and reliability | ● | ● | ● | ● | ○ | ● |
| Security | ▪ Security and privacy | ● | ● | ● | ◉ | ● | ● |
| | ▪ Threat of cyber extremisms | ● | ● | ◉ | ◉ | ● | ● |
| | ▪ Trolling | ● | ● | ◉ | ◉ | ◉ | ● |
| Societal | ▪ Social isolation | ● | ● | ◉ | ● | ◉ | ◉ |
| | ▪ Digital divide | ● | ● | ◉ | ● | ◉ | ◉ |
| Technical | ▪ Access to the technologies | ● | ● | ◉ | ◉ | ● | ◉ |
| | ▪ Discontinuation of technology | ● | ◉ | ◉ | ○ | ○ | ◉ |
| | ▪ Other: integration with other systems | ◉ | ◉ | ◉ | ● | ● | ● |

Manager stated that although there may be instances when negative reviews are posted by users, "*this could also mean the council isn't providing a good service*" (NP). So it is up to UKLGA to investigate these types of reviews and embrace any valuable feedback to improve their services.

The statements made by the UKLGA management unsurprisingly highlight *security and privacy* as the most significant *security* risk factors of Web 2.0 applications that needed consideration before using these technologies. The manager commented that there were two key reasons for this tight control:

- *Moderation and security* — to take control of a social media account immediately in case of an unauthorised security breach. This would avoid having to waste crucial time getting in touch with multiple users to shut down a social media channel.
- *Operational continuity* — to be able to continue to use and transfer social media applications in cases where existing staff managing a social media account leave the UKLGA.

In addition, social isolation and digital divide were both regarded as highly significant *societal* risk factors for the UKLGA by a majority of the management. For instance, the IT Support Manager believed that digital divide was certainly an issue as some of the younger workforce had questioned the lack of use and access to some of the systems in the organisation which had somewhat restricted their ability to perform their job. Similarly, the e-Government Manager reported: "*When you talk about traditional web services, you have to think about somebody having a PC at home, access to broadband and all of that. With mobile phones and mobile devices that whole area or debate is just opened right up and we knew that the people that we are engaging with on social media are on mobile devices and that made it affordable. So if we weren't in that market we were going to miss those people so it's extremely significant.*" (SD).

Similarly, in relation to *social isolation*, the Web Manager stated that although they consider this risk as significant, it was never the intention that social media applications would be a full replacement for the traditional means of communication such as using the phone or face-to-face meetings. However, this manager thought it was important for the UKLGA to consider these risks as the employees become more drawn into these technologies, especially the younger workforce. According to the e-Government Manager, Web 2.0 applications are a supplement to the other methods they use traditionally, so it would not be an issue for the LGA if they were to discontinue. Apart from the Web 2.0 risks derived from the existing literature, the IT Support Manager noted that *integration with other systems* was an additional technical risk of the use of Web 2.0 applications. This manager believes that integrating some Web 2.0 applications with the existing systems in the organisation could prove challenging at times as well as time-consuming.

### 4.2. Organisational, technological and social impact of Web 2.0

Since the key focus within this study is the use of Web 2.0 for local government authorities to facilitate their internal operations, as outlined in Section 2.2, the three classifications that articulate the impact of such technology were *organisational*, *technological* and *social*. When the interviewees were questioned regarding the impact of Web

**Table 9**
Importance of Web 2.0 technology impacts.

| Classification | Impact factors | Head of ICT | Corporate e-Government Manager | Website Manager | IT Systems Manager | IT Support Manager | IT Services Manager |
|---|---|---|---|---|---|---|---|
| Organisational | ▪ Culture and change | ○ | ○ | ○ | ○ | ○ | ○ |
| | ▪ Transparency and accountability | ◉ | ◉ | ○ | ○ | ○ | ○ |
| | ▪ Policy alignment and governance | ○ | ○ | ○ | ○ | ○ | ○ |
| | ▪ Knowledge management | ◉ | ○ | ○ | ◉ | ○ | ○ |
| | ▪ Collaboration and communication | ◉ | ◉ | ○ | ○ | ◉ | ◉ |
| | ▪ Organisational learning | ○ | ○ | ○ | ○ | ● | ○ |
| | ▪ Human capital | ◉ | x | ○ | ◉ | ○ | x |
| | ▪ Financial resources | ○ | x | ○ | ○ | ◉ | ○ |
| Technological | ▪ Security and privacy | ● | ○ | ○ | ○ | ◉ | ◉ |
| | ▪ Interoperability | ○ | ◉ | ○ | ○ | ○ | ◉ |
| | ▪ Scalability | ○ | ○ | ○ | x | ◉ | ○ |
| | ▪ Data presentation | ○ | ◉ | ○ | ○ | ◉ | ○ |
| Social | ▪ Democratic participation and engagement | ○ | ◉ | ○ | ○ | ◉ | ○ |
| | ▪ Co-production | ○ | ◉ | ○ | ◉ | ○ | ◉ |
| | ▪ Crowdsourcing solutions and innovations | x | x | ○ | ○ | ○ | ○ |
| | ▪ Building and maintaining trust | ● | ◉ | ◉ | ○ | ◉ | ● |

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2.0 technologies on UKLGA, most anticipated an impact in each of these areas. The e-Government Manager stated that the social and organisational impact was one of the key drivers for implementing Web 2.0 technologies and an assessment on whether this could be achieved would affect the decision-making process.

Table 9 provides an analysis of the Web 2.0 impact factors based on the views of the interviewees. It uses the 7-point Likert scale of *less important* to *fairly important* (○), *moderately important* to *important* (◉) and *highly important* to *extremely important* (●) and where the interviewees said *not important*, the "x" symbol is used.

The table highlights the fact that Web 2.0 technologies have had the most significant impact on *collaboration and communication*, *security and privacy* and *building and maintaining trust* elements of the UKLGA. From an organisational dimension, the impact of Web 2.0 on *collaboration and communication* was considered as the most significant implication. For instance, the head of ICT emphasised the importance of communication within different departments by stating "*I think communication and collaboration is highly significant within departments. Because departments know what they are doing and we have got separate departments knowing a bit more than others and they have been able to talk to each other via this media is a lot better, so it's important*" (SJ). Managers also highlighted that collaborative editing applications such as Wikis made the process of collection and sharing of information more efficient. The interviewees stated that communication and collaboration within departments have been more efficient using collaborative applications such as Google's 'Apps for Business' and Yammer. The management asserted that it helped improve communication by breaking down the traditional organisational hierarchy.

Surprisingly, the implication of Web 2.0 technologies on *culture and change* was considered to have a less significant impact on UKLGA by a majority of the interview participants. The Head of ICT and the IT Support Manager both believed that Web 2.0 technologies had not had a substantial effect on UKLGA within this context, as the staff were open to the change. The senior managers believed that this was because UKLGA operates an 'open culture' policy for embracing change. This view was also echoed across senior managers from non-IT departments such as Highways and Finance departments when these managers were interviewed on an informal basis to crosscheck the results and avoid any bias. For instance, the Information Manager stated: "*In general, I think it's an open culture, I don't think it is particularly autocratic, I think it also has a culture of allowing people to develop and try things. They want results at the end of the day but to get those results, certainly in the department that I work in, we are not afraid to try something that doesn't work because sometimes it doesn't always work and then you go back and say well ok what didn't work? Why didn't it work? And you try something else. So I think it's a fair assessment.*" (SSIM). Such an open culture was seen to be significant in the light of the level of risks posed by new ICT. The Head of ICT stated that some Web 2.0 technologies were more risky than others. For instance, according to SJ, using Wikis was not high risk as they were mainly used for information research but if they were to send "tweets" using Twitter, then there is a high risk of damage to reputation. The interviewees considered the potential of Web 2.0 applications to allow *data presentation* in various methods as not posing any significant implications for UKLGA. In fact, interviewees echoed the point that regular interaction with users via social media technologies helped build and maintain trust. For instance, the IT Systems Manager mentioned "*… I think trust is significant just because even if we are not delivering at full capacity, you know the experience, the full interactive one where someone's always there online helping. If people can't trust or even look at it, obviously the channel is going to die*" (RJB). Although the above views suggest that there are some positive effects of Web 2.0 on UKLGA, as indicative in table X, the overall conclusions are of a mixed nature. This can be attributed to the fact that UKLGA have only recently adopted Web 2.0 technologies and thus interviewees felt that it was too early to assess its real value and impact.

## 5. Research synthesis: an emergent framework for evaluating the use and impact of Web 2.0 in the context of e-Government

The literature review conducted in this study identified several important factors which need to be considered when using new ICT such as Web 2.0 which we categorised under three main themes for the purpose of evaluation and a further three for impact based on seminal literature including (Benaroch, 2002; DiMaggio et al., 2001; Irani & Love, 2002; Shang & Seddon, 2002; Wu & Ong, 2008). This section draws together the existing literature as well as the empirical data from the case study conducted and moulds them into a framework based around these themes (benefits, costs and risks for evaluation and organisational, technological and social for impact assessment). The framework is presented in Fig. 1 and discussed in the section that follows.

The case study findings suggest that a majority of the factors that were identified as important in the literature, both for evaluation and impact assessment, were relevant in practice. From an evaluation criteria perspective, this study identified four additional factors (i.e. benefits: *intra-marketing*, *informal engagement*, costs: *workload constraints* and risks: *integration with other systems*) as part of the evaluation criteria which were not previously discussed in the extant literature surrounding the context of Web 2.0 use in a local government context. Moreover, one benefit evaluation factor was found irrelevant (i.e. *improvement of policy making*) from the UKLGA perspective. Within the impact assessment, four factors (i.e. organisational: *culture and change*, *policy alignment and governance*, technological: *scalability* and social: *crowdsourcing solutions and innovations*) that were reported in the existing literature as important were found irrelevant in the UKLGA context.

### 5.1. Benefits evaluation of Web 2.0 technologies

This study confirms that a comprehensive and systematic evaluation of the benefits of Web 2.0 is essential before using or launching any such initiative. In addition to the benefits of Web 2.0 derived from the literature, marketing of services to employees was highlighted as an important strategic benefit of Web 2.0 that the UKLGA believed was of significance for the decision-making process for its use. This activity in this study is referred to as *Intra-marketing*. Though marketing is quite clearly the primary purpose of using these applications in the private sector, it is interesting to note that the promotion of UKLGA's existing services with the internal employees was a prominent and an effective use of these applications in the case organisation. *Informal engagement* was also considered to be another important factor that was not indicated in the existing literature. UKLGA noted that Web 2.0 applications such as blogs were also very useful for disseminating information to staff quickly and in a more collegiate manner compared to formal communications. The Head of ICT noted that this helped improve the communication style of senior staff into something less stentorian. Interestingly, in the existing literature, Dixon (2010) and Bonsón et al. (2012) note that *improvement of policy making* can be achieved through the use of Web 2.0 technologies, notably through things such as online collaboration and mapping applications. This allows a greater level of inclusion and responsiveness throughout the policy process. However, the practical experience of managers in the case study organisation went against this, noting that it looked fine on paper, but would actually just come down to a small group of self-selectors.

### 5.2. Costs evaluation of Web 2.0 technologies

Understanding the benefits of Web 2.0 has to be married to an understanding of the costs associated with it. As with the benefits, the majority of cost-related factors identified in the literature were seen to be important in UKLGA. Apart from the existing costs derived from the literature, the senior management in the case study organisation

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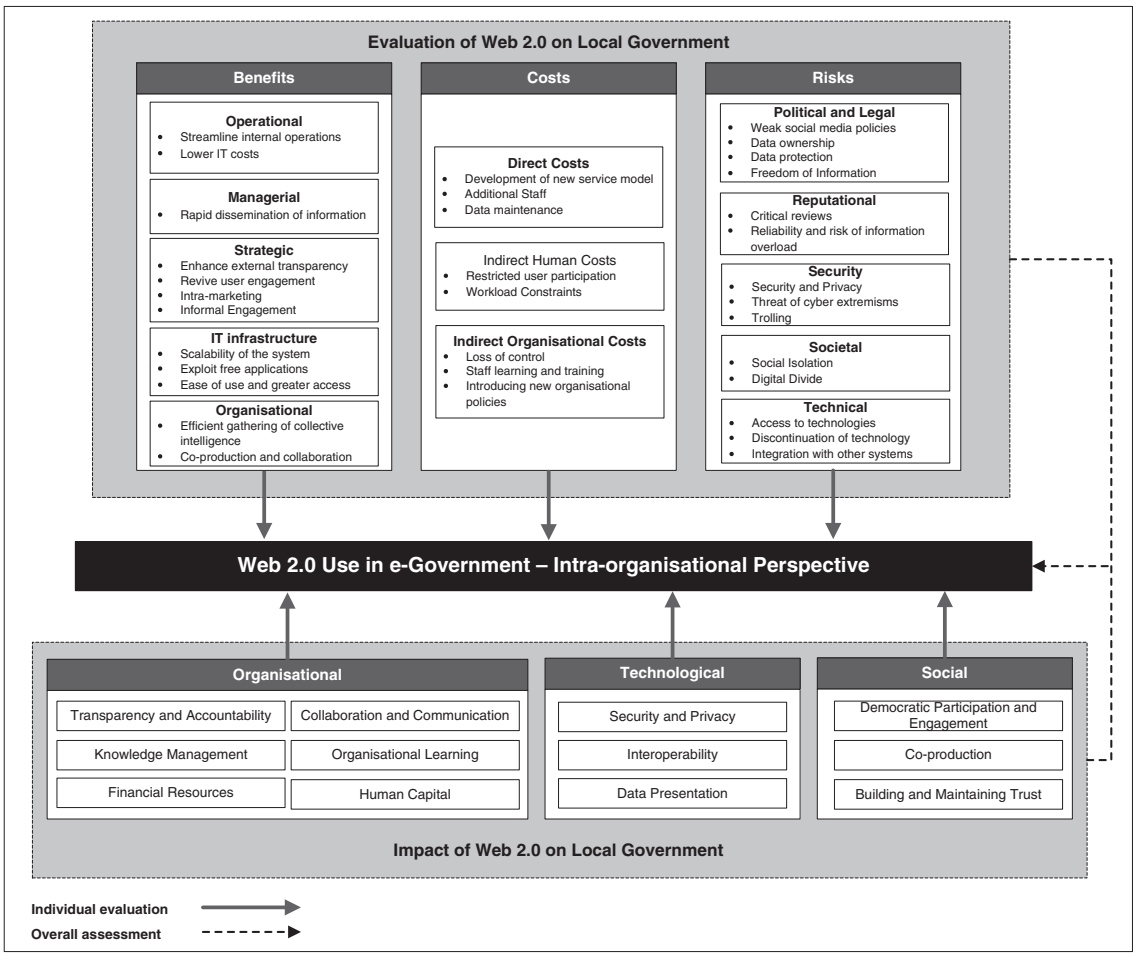


**Fig. 1.** An emergent framework for evaluating the use and impact of Web 2.0 in e-Government.

indicated that a significant indirect cost associated with Web 2.0 was monitoring and brokering these applications in the organisation. This was currently done in a highly inefficient manner by employees who should have been doing the normal work routine related activities. This indirect cost factor is defined in this study as *workload constraints* which refereed to employees voluntarily using their normal work routine time to manage and engage in Web 2.0 technologies for work related activities. The time spent by an employee who was not mainly responsible for moderating Web 2.0 applications was seen as an additional indirect cost for UKLGA which was not reported in the extant literature. This was mentioned in parallel with the cost base of new staff required for investing in new technology cited in the literature.

### 5.3. Risks evaluation of Web 2.0 technologies

The findings of the case study and literature support the importance of conducting a systematic risk evaluation of Web 2.0 as part of a comprehensive IS evaluation for the organisation. The empirical evidence confirmed that all risk factors identified in the literature were relevant in practice, and also identified the risk of *integrating Web 2.0 with other existing systems* as an important consideration. *Integration and interface with other systems* was a clear technical risk identified in the case study organisation, in that any Web 2.0 applications would need to integrate and interface with existing systems. The senior management of the UKLGA believed that this was not only technically difficult, but immensely time-consuming. Not only that, but there may be a need to bring in external consultants if they lack the technical skills for all or part of such an integration.

### 5.4. Impact analysis of Web 2.0 on the UKLGA

A majority of the factors identified in the literature as important when analysing the impact of Web 2.0 were seen as relevant in practice as illustrated in Fig. 1. However, in an organisational context, *culture and change*, *policy alignment and governance* were not considered to be relevant by UKLGA. Similarly, from a technological perspective, *scalability* and from a social perspective, *crowdsourcing solutions and innovations* were seen as irrelevant for UKLGA at the time of the study.

The implications of Web 2.0 technologies on *culture and change* were considered to be of least consequence in the case study organisation. From the literature, Parycek and Sachs (2010) note that successful use of Web 2.0 strategies requires a culture of innovation, collaboration, user-generated content and transparency. The case study managers felt that this had not changed their organisation much, as they had already adopted many of these characteristics, which was endorsed both within and beyond the ICT department. In terms of p*olicy alignment and governance*, Meijer & Thaens (2010) argues that Web 2.0 strategies make it essential for LGAs to make sure their internal policies are tightly aligned against practices to minimise risk from issues such as confidentiality, propriety etc. However, the IT managers in UKLGA did not support this, arguing that they already had highly robust systems in place and also had a social media policy for employees to follow, so Web 2.0 did not represent a major task. In the existing literature, O'Reilly (2007) argues that some variants of Web 2.0, notably cloud computing technologies, offer fast and efficient *scalability*. The case study managers noted that while there was theoretical support for this, many of the applications that are specifically scalable – file sharing for example – are not particularly relevant to or prevalent in local

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government yet, so these had little impact. With regards to *crowdsourcing solutions and innovations*, Bertot et al. (2012) note that one of the key features of Web 2.0 approaches is knowledge sharing (particularly crowdsourcing), both internally and externally, potentially allowing for new forms of innovation. However the case study managers felt that, as yet, innovation and crowdsourcing had very little impact. This is perhaps best explained by noting that the existing use of Web 2.0 is more in terms of public administration rather than policy formulation. It may be that the more interactive aspects of Web 2.0 are better suited to wider, more open-ended, consultations rather than the use so far made by the UKLGA.

Overall, it is evident that the UKLGA's proposed approach to Web 2.0 evaluation is a close match to the framework. In particular, there is evidence that identifying factors such as benefits, costs and risks and for these to be appraised through consideration of organisational, technological and social impact factors is an effective approach. In addition to corroborating the literature findings, the interviews supported the majority of the more specific factors that were identified in Fig. 1. In effect, the data gathered from the UKLGA contributes to the normative literature by:

- Combining and extending existing research in Web 2.0 in e-Government.
- Improving the quality of Web 2.0 assessment and evaluation.
- Providing increased insight for decision makers and senior managers surrounding Web 2.0 applications.

Additionally, the proposed framework 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 which is now grounded in empirical data. Importantly, this study supports the validity of the existing research and issues identified as important for Web 2.0 in other settings are valid in the context of local governments. This means the framework has been developed by:

- Synthesising a wide variety of research studies and factors of Web 2.0 evaluation into a single holistic framework.
- Providing a comparative evaluation of a wide range of Web 2.0 impacts with management experience producing a more robust result.
- Developing a new set of potential research trajectories for exploration in the future.

The proposed framework, therefore, has clear and specific theoretical and practical implications for e-Government projects in local government as well as the research community. These are further discussed as part of the conclusions of this study.

## 6. Conclusions, limitations and future research

The findings drawn from the literature on the benefits, cost, and risks of Web 2.0 and its impact on LGAs illustrate how Web 2.0 applications can have a significant effect (i.e. both positive and negative) on such organisations. Therefore, a systematic assessment of these applications would be useful and strengthen the ex-ante evaluation process prior to Web 2.0 use, thus justifying the need for the proposed emergent framework in this study. An important conclusion from the support of the framework is that traditional ICT evaluation criterion and techniques do apply to Web 2.0 innovations in e-Government. The use of Web 2.0 technologies is clearly a major transformation in how governments can operate and enhance their existing intra-organisational work practices but should be treated in the same way as any other major ICT development. The findings from this study offer several insights to both the theoretical and practice context of e-Government and Web 2.0 use in this domain.

In terms of *theoretical contribution*, this research has allowed for the development of an emergent framework for Web 2.0 evaluation and this contributes to the existing body of knowledge on e-Government and ICT. The framework articulates a descriptive account of ICT evaluation through the classification of benefits, costs and risks as well as impact factors that may be considered useful for evaluating intra-organisational use of Web 2.0 in local government authorities. The empirical results in the study revealed several criteria (i.e. benefits: *intra-marketing, informal engagement*, costs: *workload constraints* and risks: *integration with other systems*) which were not previously discussed in the extant literature relating to the use of Web 2.0 in a local government context. Conversely, within impact assessment, four factors (i.e. *culture and change*, *policy and governance*, *scalability* and *crowdsourcing solutions and innovations*) that were previously reported in the existing literature as important were found to be irrelevant in the empirical study. The case findings also indicate that Web 2.0 applications were not being fully exploited within local government contexts. Although, it should be noted that Web 2.0 use for intra-organisational work purposes within LGAs in the UK is still at its early stages. As a result, Web 2.0 does not appear to have had a big impact on the intra-organisational activities of local governments yet. Overall, this study leads to two main contributions at a conceptual level. First, linking both the literature and empirical findings allowed the creation of a useful framework for evaluating new Web 2.0 use strategies in a local government context. The need for appropriate frameworks when evaluating new ICTs is widely recognised in existing literature. Second, the framework offers a reference point for public sector and ICT researchers to build upon and further investigate the criterion that influence Web 2.0 applications within the evolving field of e-Government.

With regard to *contributions to practice and management*, this study is of significant relevance to public sector policy makers, local government authorities and ICT practitioners as it provides them with a deeper understanding of knowledge factors that encourage or hinder use of Web 2.0 applications. In doing so, the framework can be used as a frame of reference to support management when taking decisions regarding the use of Web 2.0 applications in government organisations for internal work purposes. The empirical findings of this study indicated that Web 2.0 applications were being mainly used for public administration purposes and citizen engagement (i.e. marketing and dissemination related activities) in the UKLGA rather than for improving the intra-organisational processes and work activities. Finally, the study findings highlight that a combined approach using ICT evaluation criteria (i.e. benefits, costs and risks) and impact factors (i.e. organisational, technological and social) would better assist the decision-making process and lead to the effective use of Web 2.0 applications by local governments. The framework offers practitioners a holistic view of the nature and context of Web 2.0 use allowing them to assess it from multiple perspectives. Therefore, this study supports the development of a more robust ex-ante evaluation process for practitioners and decision makers in local government when decisions are made to use Web 2.0 applications for intra-organisational purposes.

This study has some *research limitations* which should be taken into account when interpreting the results. The study relied on a single, in-depth case study to extrapolate its findings. As a result this creates issues in terms of generalising from the findings; but this could not be avoided due to the lack of structured Web 2.0 use in LGAs for internal organisational purposes at the time of conducting this study. However, the relatively close fit of the empirical findings to the themes which emerged from the literature review suggests that this study has classified the core criteria in its proposed framework that need to be considered when using Web 2.0 technologies for intra-organisational work purposes. Yet, like any research, there are several angles in which this research can be further developed. In particular, the framework can be validated by applying it in different LGA contexts within the UK as well as in other national contexts where Web 2.0 is being used or planned to be used as part of Local e-Government strategy. In addition,

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quantitative studies can be conducted to further validate and rank the different criteria identified in the proposed framework as Web 2.0 applications become more widely used within a local government context. Finally, the research process used in the study can be applied to identify and apply criteria for the inter-organisational use of Web 2.0 applications in local government within an e-Government context.

## References


Accenture (2009). *Web 2.0 and the next generation of public service, Accenture, United States.*

Adams, M.O., & Smith, L.D. (2010). Changing the face of public affairs: A look at how social networking is impacting the business of the public sector. *National Social Science Journal*, *34*(1), 10–16.

Ajjan, H., & Hartshorne, R. (2008). Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests. *The internet and higher education*, *11*(2), 71–80.

Ala-Mutka, K.D., Broster, R., Cachia, C., Centeno, C., Feijóo, A., Haché, S., et al. (2013). The impact of social computing on the EU information society and economy (EU report. Available at http://is.jrc.ec.europa.eu/pages/EAP/SC.html (Accessed: 12 Dec 2013).

Andresen, J., Björk, B., Betts, M., School, H.O., Carter, C., Lecturer, A.H., et al. (2000). A framework for measuring it innovation benefits. *ITcon*, *5*, 72.

Anfinnsen, S., Ghinea, G., & De Cesare, S. (2011). Web 2.0 and folksonomies in a library context. *International Journal of Information Management*, *31*(1), 63–70.

Anttiroiko, A. (2010). Innovation in democratic E-Governance: Benefitting from Web 2.0 applications in the public sector. *International Journal of Electronic Government Research*, *6*(2), 18–36.

Atkinson, P., & Hammersley, M. (1994). Ethnography and participant observation. In N.K. Denzin, & Y.S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 248–261). Thousand Oaks, CA, USA: Sage Publications.

Baxter, G.J., Connolly, T.M., & Stansfield, M.H. (2010). Organisational blogs: Benefits and challenges of implementation. *The Learning Organization*, *17*(6), 515–528.

Benaroch, M. (2002). Managing information technology investment risk: A real options perspective. *Journal of Management Information Systems*, *19*(2), 43–84.

Bertot, J.C., Jaeger, P.T., & Grimes, J.M. (2010). Crowd-sourcing transparency: ICTs, social media, and government transparency initiatives. *Proceedings of the 11th Annual International Digital Government Research Conference on Public Administration Online: Challenges and Opportunities Digital Government Society of North America* (pp. 51).

Bertot, J.C., Jaeger, P.T., & Hansen, D. (2012). The impact of polices on government social media usage: Issues, challenges, and recommendations. *Government Information Quarterly*, *29*(1), 30–40.

Bin Al-Tameem, A., Chittikala, P., & Pichappan, P. (2008). A study of AJAX vulnerability in Web 2.0 applications. *Applications of Digital Information and Web Technologies, 2008. ICADIWT 2008. First International Conference on the* (pp. 63).

Blank, G., & Reisdorf, B.C. (2012). The participatory web. *Information, Communication & Society*, *15*(4), 537–554.

Bonsón, E., Royo, S., & Ratkai, M. (2015). Citizens' engagement on local governments' Facebook sites. An empirical analysis: The impact of different media and content types in Western Europe. *Government Information Quarterly*, *32*(1), 52–62.

Bonsón, E., Torres, L., Royo, S., & Flores, F. (2012). Local e-government 2.0: Social media and corporate transparency in municipalities. *Government Information Quarterly*, *29*(2), 123–132.

Brynjolfsson, E. (1996). The contribution of information technology to consumer welfare. *Information Systems Research*, *7*(3), 281–300.

Buchanan, E., & Luck, E. (2008). The electronic village: The digital challenges in communication strategies for sporting organization. *International Journal of Business Environment*, *2*(2), 258–279.

Bughin, J., & Chui, M. (2010). The rise of the networked enterprise: Web 2.0 finds its payday. *McKinsey Quarterly*, *4*, 3–8.

Chadwick, A. (2009). Web 2.0: new challenges for the study of e-Democracy in an era of informational exuberance. *I/S: A Journal of Law and Policy for the Information Society*, *5*(1), 9–41.

Chang, A., & Kanna, P.K. (2008). *Leveraging Web 2.0 in government.* Washington, DC: IBM Center for The Business of Government.

Charlton, J. (2011). Wed, 06 Apr-last update, *Public sector use of social media takes off* [Homepage of Guardian News & Media Limited], [Online]. Available http://www.guardian.co.uk/public-leaders-network/2011/apr/06/public (2011, July, 06).

Chen, H., Thoms, S., & Fu, T. (2008). Cyber extremism in Web 2.0: An exploratory study of international Jihadist groups. *Intelligence and Security Informatics, 2008. ISI 2008. IEEE International Conference on Taipei, Taiwan* (pp. 98).

Clemons, E.K., & Row, M.C. (1993). Limits to interfirm coordination through information technology: results of a field study in consumer packaged goods distribution. *Journal of Management Information Systems*, *10*(1), 73–95.

Cole, R. (2009). Social media: What does it mean for public managers? *Public Management, International City/County Management Association, Washington, DC, USA.*

Corbin, J., & Strauss, A. (2008). *Basics of qualitative research* (Third ed.). Thousand Oaks: Sage.

Dadashzadeh, M. (2010). Social media in government: From eGovernment to eGovernance. *Journal of Business & Economics Research (JBER)*, *8*(11).

Danis, C., Bailey, M., Christensen, J., Ellis, J., Erickson, T., Farrell, R., et al. (2009). Mobile applications for the next billions: A social computing application and a perspective on sustainability. *2nd Workshop on Innovative Mobile Technology and Services for Developing Countries (IMTS-DC 09) in conjunction with International Conference on Computing and ICT Research (ICCIR), 30–31 July, 2009 ICCIR, Kampala, Uganda.*

David, J. S., Schuff, D., & St Louis, R. (2002). Managing your total IT cost of ownership. *Communications of the ACM*, *45*(1), 101–106.

de Kool, D., & van Wamelen, J. (2008). Web 2.0: A new basis for E-Government?, information and communication technologies: From theory to applications, 2008. ICTTA 2008. *3rd International Conference on* (pp. 1).

Delone, W.H., & McLean, E.R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, *19*(4), 9–30.

DiMaggio, P., Hargittai, E., Neuman, W.R., & Robinson, J.P. (2001). Social implications of the internet. *Annual Review of Sociology*, *27*, 307–336.

Dixon, B.E. (2010). Towards e-Government 2.0: An assessment of where e-Government 2.0 is and where it is headed. *Public Administration and Management*, *15*(2), 418–454.

Drogkaris, P., Gritzalis, S., & Lambrinoudakis, C. (2010). Transforming the Greek e-government environment towards the e-Gov 2.0 era. *Proceedings of the First international conference on Electronic government and the information systems perspective* (pp. 142). Berlin, Heidelberg: Springer-Verlag.

Dyer, W.G., Jr., & Wilkins, A.L. (1991). Better stories, not better constructs, to generate better theory: A rejoinder to Eisenhardt. *The Academy of Management Review*, *16*(3), 613–619.

Eckartz, S., Daneva, M., Wieringa, R., & van Hillegersberg, J. (2009). *A conceptual framework for ERP benefit classification: A literature review.* University Twente.

Eisenhardt, K.M. (1989). Building theories from case study research. *The Academy of Management Review*, *14*(4), 532–550.

Farbey, B., Land, F.F., & Targett, D. (1993). *How to assess your IT investment: A study of methods and practice.* Oxford: Butterworth-Heinmann.

Freeman, R.J., & Loo, P. (2009). Web 2.0 and e-Government at the municipal level. *Privacy, Security, Trust and the Management of e-Business, 2009. CONGRESS '09. World Congress on* (pp. 70).

Gable, G.G. (1994). Integrating case study and survey research methods: An example in information systems. *European Journal of Information Systems*, *3*(2), 112–126.

Gov.uk (2014). Social media guidance for civil servants: October 2014 — GOV.UK. [online] Available at https://www.gov.uk/government/publications/social-media-guidance-for-civil-servants/social-media-guidance-for-civil-servants (Accessed 20 Apr. 2015).

Grabner-Krauter, S. (2009). Web 2.0 social networks: The role of trust. *Journal of Business Ethics*, *90*(4), 505–522.

Grimmelikhuijsen, S.G., & Meijer, A.J. (2015). Does Twitter increase perceived police legitimacy? *Public Administration Review*, *75*(4), 58–607.

Guardian (2011). 19/12/2011-last update, *Hillingdon goes for Google Apps* [Homepage of The Guardian], [Online]. Available http://www.guardian.co.uk/government-computing-network/2011/dec/19/hillingdon-council-google-apps/print (2012, 03/08).

Hakim, C. (1987). *Research design: Strategies and choice in the design of social research.* London, UK: Allen and Unwin.

Hochstrasser, B. (1992). Justifying IT investments. *Conference Proceedings: Advanced Information Systems; The New Technologies in Today's Business Environment* (pp. 17–28).

Hong, S., & Nadler, D. (2012). Which candidates do the public discuss online in an election campaign?: The use of social media by 2012 presidential candidates and its impact on candidate salience. *Government Information Quarterly*, *29*(4), 455–461.

Huijboom, N., Broek, T., Frissen, V., Kool, L., Kotterink, B., Nielsen, M.M., et al. (2009). *Public Services 2.0: Impact of social computing on public services.* Luxembourg: European Communities.

Hughes, B., Joshi, I., Lemonde, H., & Wareham, J. (2009). Junior physician's use of Web 2.0 for information seeking and medical education: a qualitative study. *International journal of medical informatics*, *78*(10), 645–655.

Irani, Z., & Love, P.E.D. (2001). The propagation of technology management taxonomies for evaluating investments in information systems. *Journal of Management Information Systems*, *17*(3), 161–177.

Irani, Z., & Love, P.E.D. (2002). Developing a frame of reference for ex-ante IT/IS investment evaluation. *European Journal of Information Systems*, *11*(1), 74–82.

Irani, Z., & Love, P.E.D. (2008). Information systems evaluation: A crisis of understanding. In Z. Irani, & P.E.D. Love (Eds.), *Evaluating Information Systems: Public and Private Sector* (pp. 20) (1st ed.). UK: Butterworth-Heinemann.

Jaeger, P.T., Paquette, S., & Simmons, S.N. (2010). Information policy in national political campaigns: A comparison of the 2008 campaigns for President of the United States and Prime Minister of Canada. *Journal of Information Technology & Politics*, *7*(1), 67–82.

Jick, T.D. (1979). mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*, *24*(4), 602–611.

Johannessen, M., & Rohde (2010). Different Theory, different result: Examining how different theories lead to different insights in Government 2.0 research. *Proceedings of the 1st Scandinavian Conference of Information Systems and the 33rd Information Systems Research in Scandinavia (IRIS) Seminar IRIS, Skørping, Denmark* (pp. 17).

Kavanaugh, A.L., Fox, E.A., Sheetz, S.D., Yang, S., Li, L.T., Shoemaker, D.J., et al. (2012). Social media use by government: From the routine to the critical. *Government Information Quarterly*, *29*(4), 480–491.

Kinder, T. (2010). E-Government service innovation in the Scottish Criminal Justice Information System. *Financial Accountability and Management*, *26* (21–41(21)).

Klievink, B., & Janssen, M. (2010). Simulation gaming as a social development instrument: Dealing with complex problems. *Information Polity*, *15*(1.2), 153–165.

Klischewski, R. (2010). Drift or shift? propositions for changing roles of administrations in e-Government. *Proceedings of the 9th IFIP WG 8.5 International Conference on Electronic Government* (pp. 85). Berlin, Heidelberg: Springer-Verlag.

Kusters, R.J., & Renkema, T.J.W. (1996). Managing IT investment decisions in their organizational context: The design of 'local for local' evaluation models. *Conference*


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*Proceedings of the 3rd European Conference for IT Evaluation Bath University School of Management, Bath University, Bath, UK.*
Lathrop, D., & Ruma, L. (2010). *Open government.* Sebastopol, CA: O'Reilly.
Linders, D. (2012). From e-government to we-government: Defining a typology for citizen coproduction in the age of social media. *Government Information Quarterly*, *29*(4), 446–454.
Love, P.E., Irani, Z., Ghoneim, A., & Themistocleous, M. (2006). An exploratory study of indirect ICT costs using the structured case method. *International Journal of Information Management*, *26*(2), 167–177.
Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J., & Ghalsasi, A. (2011). Cloud computing — The business perspective. *Decision Support Systems*, *51*(1), 176–189.
Meijer, A., & Thaens, M. (2010). Alignment 2.0: Strategic use of new internet technologies in government. *Government Information Quarterly*, *27*(2), 113–121.
Mergel, I.A., Schweik, C.M., & Fountain, J.E. (2009). The transformational effect of Web 2.0 technologies on government. *Social Science Research Network Working Paper Series* http://ssrn.com/abstract=1412796 or http://dx.doi.org/10.2139/ssrn.1412796.
Mintz, D. (2008). Government 2.0—Fact or fiction? *Public Manager*, *36*(4) (21–21–24).
Myers, B.L., Kappelman, L.A., & Prybutok, V.R. (1997). A comprehensive model for assessing the quality and productivity of the information system function: towards a theory for information systems assessment. *Information Resources Management Journal*, *10*(1), 6–25.
Nam, T. (2012). Suggesting frameworks of citizen-sourcing via Government 2.0. *Government Information Quarterly*, *29*(1), 12–20.
O'Reilly, T. (2007). What is Web 2.0: Design patterns and business models for the next generation of software. *International Journal of Digital Economics*, *65*, 17–37.
O'Reilly, T. (2008). 26/10/2008-last update, Web 2.0 and Cloud Computing [Homepage of O'Reilly radar], [Online]. Available http://radar.oreilly.com/print/2008/10/web-20-and-cloud-computing.html (2012, 03/07).
Osimo, D. (2008). *Web 2.0 in government: Why and how?* Luxembourg: European Communities.
Osimo, D., Campbell, D., Kerr-Stevens, J., Bishop, C., & Bryant, L. (2009). *Public services 2.0: Web 2.0 from the periphery to the centre of public service delivery.* Brussels: European Commission Information Society and Media.
Pan, S.L., & Tan, B. (2011). Demystifying case research: A structured–pragmatic–situational (SPS) approach to conducting case studies. *Information and Organization*, *21*(3), 161–176.
Panagiotopoulos, P., Bigdeli, A.Z., & Sams, S. (2014). Citizen–government collaboration on social media: The case of Twitter in the 2011 riots in England. *Government Information Quarterly*, *31*(3), 349–357.
Paquette, S., Jaeger, P.T., & Wilson, S.C. (2010). Identifying the security risks associated with governmental use of cloud computing. *Government Information Quarterly*, *27*(3), 245–253.
Parycek, P., & Sachs, M. (2010). Open government–Information flow in Web 2.0. *European Journal of ePractice*, *9*(1), 1–70.
Picazo-Vela, S., Gutiérrez-Martínez, I., & Luna-Reyes, L.F. (2012). Understanding risks, benefits, and strategic alternatives of social media applications in the public sector. *Government Information Quarterly*, *29*(4), 504–511.
Plepys, A. (2002). The grey side of ICT. *Environmental Impact Assessment Review*, *22*(5), 509–523.
Poba-Nzaou, P., Uwizeyemungu, S., Raymond, L., & Paré, G. (2014). Motivations underlying the adoption of ERP systems in healthcare organizations: Insights from online stories. *Information Systems Frontiers*, *16*(4), 591–605.
Ramanathan, T. (2009). *The role of organisational change management in offshore outsourcing of information technology services: qualitative case studies from a multinational.* USA: Universal Publishers.
Reinwald, A., & Kraemmergaard, P. (2012). Managing stakeholders in transformational government—A case study in a Danish local government. *Government Information Quarterly*, *29*(2), 133–141.
Remenyi, D. (1999). *IT investment: Making a business case.* Woburn, MA: Butterworth-Heinemann.
Ross, J.W., & Vitale, M. (2000). The ERP revolution: Surviving versus thriving. *Information Systems Frontiers*, *2*(2), 233–241.
Sander, T. (2008). *Government 2.0: Building communities with Web 2.0 and social networking.* California, US: e.Republic, Inc.
Schweik, C.M., Mergel, I., Sandfort, J.R., & Zhao, Z.J. (2011). Toward open public administration scholarship. *Journal of Public Administration Research and Theory*, *21*(Suppl. 1), i175–i198.
Seddon, P.B. (1997). A respecification and extension of the DeLone and McLean model of IS success. *Information Systems Research*, *8*(3), 240–253.
Shang, S., & Seddon, P.B. (2002). Assessing and managing the benefits of enterprise systems: the business manager's perspective. *Information Systems Journal*, *12*(4), 271–299.
Sivarajah, U., Irani, Z., & Jones, S. (2014). Application of Web 2.0 technologies in E-Government: A United Kingdom case study. *System Sciences (HICSS), 2014 47th Hawaii International Conference on* (pp. 2221).
Stamati, T., Papadopoulos, T., & Anagnostopoulos, D. (2015). Social media for openness and accountability in the public sector: Cases in the Greek context. *Government Information Quarterly*, *32*(1), 12–29.
Sternstein, A. (2006). 20/11/2006-last update, Web 2.0 for feds — Federal Computer Week [Homepage of Federal Computer Week], [Online]. Available http://fcw.com/articles/2006/11/20/web-20-for-feds.aspx (2012, 1/18/2012).
Sumner, M. (2000). Risk factors in enterprise-wide//ERP projects. *Journal of Information Technology*, *15*(4), 317–327.
Traunmuller, R. (2010). Web 2.0 creates a new government. *Proceedings of the First international conference on Electronic government and the information systems perspective* (pp. 77). Berlin, Heidelberg: Springer-Verlag.
Tsui, H., Lee, C., & Yao, C. (2010). E-government, politics and Web 2.0. *New Trends in Information Science and Service Science (NISS), 2010 4th International Conference on* (pp. 687).
Ward, J., Taylor, P., & Bond, P. (1996). Evaluation and realisation of IS/IT benefits: An empirical study of current practice. *European Journal of Information Systems*, *4*(4), 214–225.
Wattal, S., Schuff, D., Mandviwalla, M., & Williams, C. (2010). Web 2.0 and politics: the 2008 U.S. presidential election and an e-politics research agenda. *MIS Quarterly*, *34*(4), 669–688.
Weerakkody, V., El-Haddadeh, Ramzi, & Al-Shafi, Shafi (2011). Exploring the complexities of e-government implementation and diffusion in a developing country: Some lessons from the State of Qatar. *Journal of Enterprise Information Management*, *24*(2), 172–196.
West, D.M. (2008). *Improving technology utilization in electronic government around the world, 2008.* Washington, DC: The Brookings Institution.
Wilson, C. (2008). Digg, Wikipedia, and the myth of Web 2.0 democracy. *Slate Magazine* Retrieved 21 July 2015, from http://www.slate.com/articles/technology/technology/2008/02/the_wisdom_of_the_chaperones.html.
Whitmore, A. (2014). Using open government data to predict war: A case study of data and systems challenges. *Government Information Quarterly*, *31*(4), 622–630.
Wilbanks, L., Kuhn, R., & Chou, W. (2014). IT risks. *IT Professional*, *16*(1), 20–21.
Wilderman, B. (1999). *Enterprise resource management solutions and their value.* Stanford, CT: MetaGroup.
Wu, L., & Ong, C. (2008). Management of information technology investment: A framework based on a real options and mean–variance theory perspective. *Technovation*, *28*(3), 122–134.
Yin, R.K. (2009). *Case study research: Design and methods* (Fourth ed.). California: Sage Publications.
Zissis, D., & Lekkas, D. (2011). Securing e-Government and e-Voting with an open cloud computing architecture. *Government Information Quarterly*, *28*(2), 239–251.

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