

New Hybrid Web 2.0 Adoption Framework for Enterprises

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Abstract

Enterprise Information Technology (IT) has become critical in supporting business sustainability and growth. The emergence of Web 2.0 and its proliferation in public organizations (Enterprise 2.0) more specifically has helped in fulfilling key organizational goals. It is shown in this research that Web 2.0 could assist organizations improve their business processes, employee's productivity, communications and information sharing. However, the pervasive use of Web 2.0 raised the need to govern such amalgamated IT infrastructure and necessitated an investigation into Web 2.0 adoption decisions. This entails developing a governing IT (ITG) framework for Web 2.0 adoption decision taking into considerations: accountability, implementation factors, organizational policies, procedures, guidelines and existing organizational ITG framework. Contributions and implications arising from the framework are addressed as well.

Keywords: IT Governance, Web 2.0 Governance model, public sector.

Introduction

It is concluded by many researchers that the discovery of Web 2.0 is considered the next generation of inter-personal communication (London, 2007). Web 2.0 supports the interaction and collaboration with social media dialogue and user-generated content that include social networking sites i.e., wikis, blogs, web applications, folksonomies, mashups, video sharing, instant messaging (IM), and hosted services (Lellinger, 2010; Shuen, 2008). Web 2.0 caused drastic changes to online technology and electronic commerce (Jordan-Meier, 2011; Randazza, 2009). Some of the widely known types of Web 2.0 used in popular web sites include Blogs, Wikis, Social Networking sites, and File Sharing (Davis, 2009; Sankar et al., 2009). What's unique about Web 2.0 is that all information is available (shareable, social) through simple, ubiquitous and functional web sites. Web 2.0 capitalizes on two main features, Web-based information sharing and voice and messaging features (Bonnin, 2009). Web-based information sharing is associated with using blogs, wikis, social networking and collaborative content portals, and syndicated feeds (Bonnin,

2009). Wikis for example allow users to access multiple information and other contents, which they can edit them online. Examples include Wikipedia, Flickr, and MySpace. Wikis are operated by 6% of IT based companies and used by about 25% of the company employees (Bonnin, 2009). Voice and messaging allows Web 2.0 connect people in various ways that are associated with certain specifications such as blending

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of voice, video which allow people see their communication partners in chat, messages, and click-to-call functionality and/or links and includes Voice over IP (VOIP), instant messaging (IM), unified communications, and video conferencing (Dwivedi, 2008). Several Web-based services and applications are laden in Web 2.0. Web 2.0 services are based on four wide types of technologies (Publication, Syndication, Collaboration, and Recombination) (Rudman, 2010). Enterprise 2.0 (E-2.0) is bringing informality and accessibility (disruptive technologies) in businesses. It allows internal and external stakeholders to communicate, collaborate, participate and contribute (Mazumde, 2008). There are a plenty of advantages for adopting E-2.0 such as increasing productivity and innovativeness, efficient project management, efficient business process management, improved organizational reputation, enhancing internal communication and collaboration. Thus, the emergence of E-2.0 provided further competitive opportunities to businesses to improve business communications with employees, customers, and suppliers. The applications of the E-2.0 are rich collaborative software platforms that integrate search and unified communications and social networks (Bonnin, 2009). The social connections capabilities allow users to share opinions, knowledge, experiences, and content trail such as opinions, ratings, discussions, postings, and comments among others. The user-generated content (UGC), which is the participatory nature of the Web 2.0 has three basic requirements (Facer et al., 2010; Tuten, 2010): Firstly, contents have to be published on Web 2.0 site (Beck, 2009); secondly, the content should portray creativity (Beck, 2009); and finally, the information should originate from external professional source (Brown, 2008). In the enterprise world, the UGC include blogs, contents developed by bloggers and multitude of Web 2.0 of the social media (Brown, 2008).

However, despite the tremendous Web 2.0 business opportunities, organizations are challenged by how to control communities, manage information sharing and protect corporate information (Sankar et al., 2009; McAfee, 2009). Like any other technological innovations adopting Enterprise 2.0 (E-2.0) is hampered with many challenges (i.e., technological, organizational, environmental, etc.) which could limit its use in organizations. Indeed, it was observed that many organizations adopted Web 2.0 minimally (Bonnin, 2009) and this could be attributed to many reasons including security concerns laden in Web 2.0 and in this regard the stakes seemed to be quite high (Cannings et al., 2007; Davis, 2009; Dwivedi, 2008; Laase, 2007). Security breaches could lead to legal complications as well (Dwivedi, 2008). For example, the anonymity of users could allow some deceitful individuals to not fulfill agreements or even commit cyber crimes and escape without trace (Deans, 2009; Fitz-Enz, 2009; Kelly et al., 2010). Similar to traditional web application development and delivery Web 2.0 inherits the same challenges including project management challenges e.g., resource availability, budgets and requirements, technology limitations. Cost of adoption and maintenance and inadequate staff skills are some of the reported impediments (Shelly et al., 2010). A more imminent challenge here is the compatibility of Web 2.0 with the corporate culture including its employees, and existing technological infrastructure. Different organizations have different cultures and ways in running its business. For example, depending on the corporate age, older organizations are less flexible in changing and in using new technologies in comparison with newer ones. Some employees may feel insecure whenever a new technology surfaces that may affect their work negatively and prefer using i.e., e-mails for collaboration and communication rather than switching to Web 2.0. Another challenge associated with Web 2.0 is the contents relevance to users (Wang, 2009). Further, Web 2.0 is still highly technical and thus, requires a very internet savvy individual to understand the concepts that are in abstract, sketches, jargon, and terminologies (Jordan-Meier, 2011). Providing Web 2.0 features over intranet could provide real time information to employees (Zubairi et al., 2011). Opt-in and opt-out “push” and “pull” services (i.e., RSS) over Web 2.0 could prove useful here. Above all, there are numerous experimentations with different Web 2.0 tools that could be used by individuals and organizations, which further bewilder the decision making process of upper management. Finally, Web 2.0 is not a magical solution to all corporate problems and indeed, it is not possible to re-

place all corporate applications with Web 2.0, however, could make use of data generated by such applications. Therefore, integration is important amongst such applications before adopting Web 2.0 (Sankar et al., 2009).

With such mounting challenges, there is a need to govern such technology. In looking for guiding theoretical frameworks which could assist in Web 2.0 adoption and diffusion in enterprises, IT Governance (ITG) emerges as a strong opponent here. Governance has a number of meanings that are all related to control and authority (Corporate Governance of IT, n.d.; Raghupathi, 2009). ITG is used for focusing on information technology systems' performance and managing various risks. It refers to organization's ability to manage and control the implementation and arrangement of IT strategy with different directions to achieve the corporation competitive advantage (Corporate Governance of IT, 2012; Raghupathi, 2009). Weill and Ross (2004) at CISR defined ITG as specifying a framework for decision rights and accountabilities for important IT decisions. It is about determining who has the decision right and who has the input right. ITG leads to real business benefits that enhance stakeholders' values such as reputation enhancements, product/market leadership, reduced costs and trust (Corporate Governance of IT, 2012; Raghupathi, 2009). Moreover, it increases business efficiency, and provides various collaboration tools, meeting space, services portal, and media sharing (Pettrassi, 2008).

Accordingly, specifying an ITG framework for Web 2.0 adoption is important and according to the above ITG definitions, should consider decision rights and accountability and implementation factors. This paper will focus in answering the following research questions: How can we govern Web 2.0 adoption in public sector organizations? That is, what are the available guiding ITG frameworks for Web 2.0 adoption? This entails an investigation into available ITG and Web 2.0-adoption frameworks.

ITG Frameworks

There is a plethora of ITG frameworks that could assist enterprises in decision making and controlling business process. These frameworks vary in their features, use, benefits, requirements and quality. For the purpose of this study we will only highlight the most popular ITG frameworks concentrating on the ones used in this research.

Control Objectives for Information and Related Technology (COBIT) was actually released as an IT process and control framework, linking IT to business requirements (Brown et al., 2005; Chan, 2004; Ramos, 2004; Violino, 2006). Information Technology Infrastructure Library (ITIL) is a library that presents a set of best practices for managing IT services while focusing on how should be the IT services and processes, or in other words; focuses on the delivery of services and support considering the technical aspects of monitoring the process (TSO, 2007; Taylor et al., 2007). ITIL is organized around eight areas: service delivery, service support, application management, infrastructure management, security management, software asset management, planning to implement service management, and business perspective (Favelle, 2010; TSO, 2007). The International Organization for Standardization (ISO) is a combination of standards that specify quality management system's standards of organizations. It is a set of guidelines, requirements, and other documents to manage and improve organizations' efficiency. However, ISO 9000 does not provide guidelines for the management and control of Information system. The standards ISO 17799 is considered as the "Good practice for Information Security", it provides recommendations for information security management to who is responsible for introducing, implementing or maintaining Information Systems. Moreover, the standards ISO 27000 helps in establishing procedures to secure the management of Information Systems. In addition the standard ISO 14000 addresses different aspects of environmental management. It assists organizations in identifying and controlling their environmental impact and improving their environmental performance (Calder et al., 2006; Wiengarten et al., 2012).

COBIT is considered as the most appropriate control framework that help organizations in ensuring the alignment between use of Information Technology (IT) and its business goals. It is considered as a set of tools that are being organized into a framework which can be used by executives to ensure that their IT is helping them in achieving their goals and objectives. In addition, it ensures that IT is working as effectively as possible to maximize the benefits of technology investment and to minimize IT-related risks. COBIT supports ITG through providing a framework that ensures the alignment between business and IT, enhances and maximize business benefits, manages IT risks appropriately (Ridley et al., 2004). Generally, COBIT improves IT efficiency and effectiveness; it helps IT in understanding business needs, and assists executives in understanding and managing IT investments throughout their life cycle. There are a plenty of benefits from adopting COBIT in business, it provides a common language for management, executives and IT professionals, it assists in showing how business and IT can work together for delivering a successful IT initiatives. Moreover, it reduces operational risks, and assists in developing a clear policy. COBIT introduces an ITG framework and supporting toolset which allows IT managers to bridge the gap between control requirements, technical issues and business risks (Bodnar, 2003; Hardy, 2006; Lainhart, 2000; Williams, 2006).

COBIT assists in assigning a clear ownership and responsibilities based on process orientation which is important for ITG (Ridley et al., 2004). COBIT framework consists of three main parts which are control framework, management guidelines and implementation toolset. COBIT has 34 objectives (Bodnar, 2003; Bodnar, 2006; Brown et al., 2005; Hadden, 2002; Hardy, 2006; Lainhart, 2000; Violino, 2005). All objectives have been categorized under the following four domains (Frank, 2011; Rafeq, 2010; Rudman, 2010):

- Plan and organize (PO): which highlights the organizational and infrastructural form, it includes defining a strategic IT plan, information architecture, determining the technological directions, managing IT investments, assessing risks, ensuring compliances with external requirements, managing human resources, projects and quality.
- Acquire and implement (AI): which identifies IT requirements, acquisition and implementation of information technology within the company's current business processes. It also addresses the maintenance plan.
- Deliver and support (DS): which focuses on the delivery aspects of the information technology, including the support processes as well as security issues and training.
- Monitor and evaluate (ME): which covers company's strategy in assessing the needs of the company, whether objectives are met and whether the company complies with the regulatory requirements.

COBIT's framework also identifies which of the seven information criteria (effectiveness, efficiency, confidentiality, integrity, availability, compliance and reliability), as well as which IT resources (people, applications, technology, facilities and data) are important for the IT processes to fully support the business objective (Bodnar, 2003).

Proposed Web 2.0 Adoption Governance Framework

In order to adopt Web 2.0, internal control should be implemented at different levels. COBIT framework is selected here as a control framework for Web 2.0 adoption process because of its generality and advantages, its usability to manage and control information security, and due to its suitability to a larger number of organizations. This research proposes a new hybrid adoption governance framework which consists of the most needed features extracted from leading Web 2.0 adoption frameworks (Cherinka et al., 2010; Mazumde, 2008; Sugianto, 2005; Turban et al.,

2011) which could serve enterprises' needs and at the same time, governed by COBIT framework. It is proposed here that the developed Web 2.0 adoption governance framework could assist in governing Web 2.0 adoption in enterprises (Figure 1). All shown processes are aligned with the "CIOWeb" which is a wiki that includes all guiding policies.

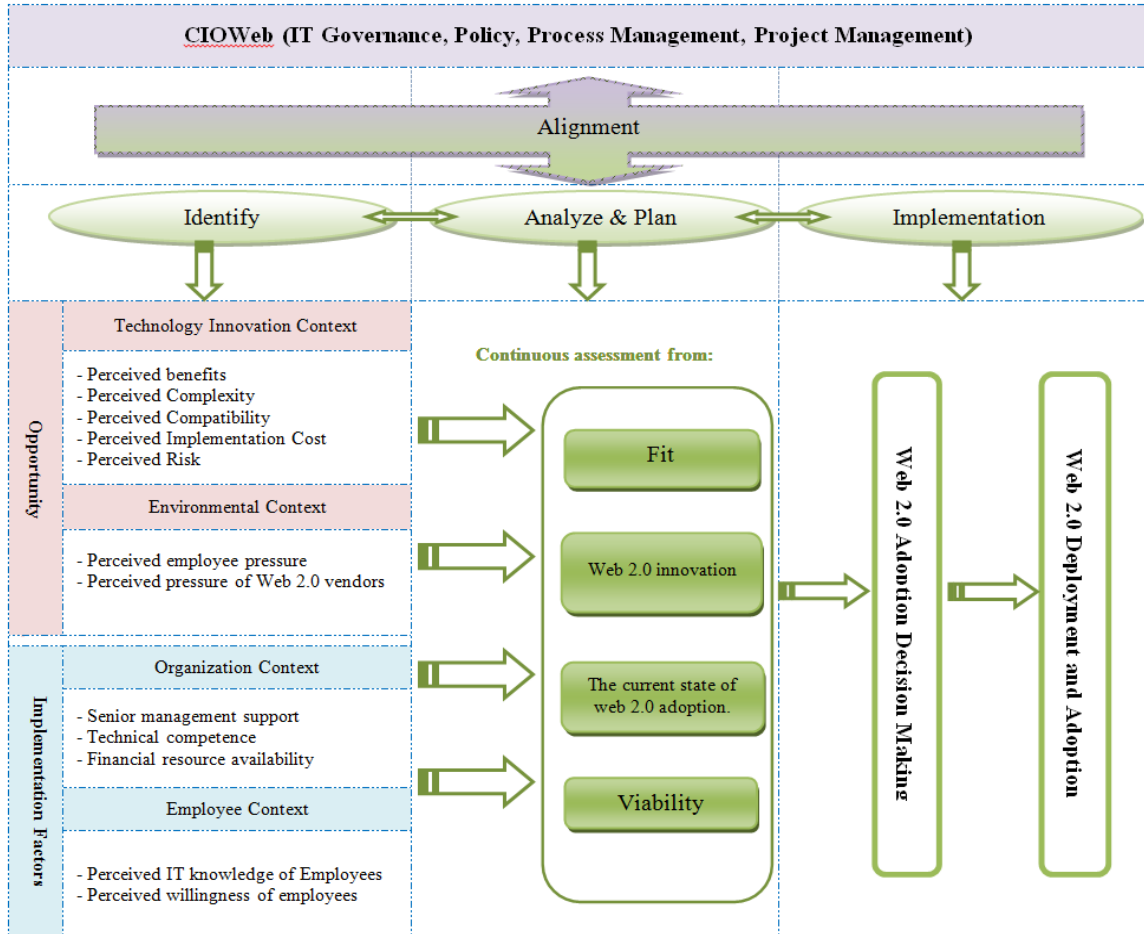


Figure 1: The proposed Hybrid Web 2.0 Adoption Governance Framework

Research Methodology

Single case study design was adopted including in-depth interviews with three interviewees working in a public organization in Abu Dhabi. Website analysis of the case was used as well. The chosen organization is the regulative body of the Healthcare Sector in Abu Dhabi that ensures excellence in Healthcare for the community by monitoring the health status of the population. It also defines the strategy for the health system, monitors and analyzes the health status of the population and the performance of the system. In addition, it shapes the regulatory framework for the health system, inspects against regulations, enforces standards, and encourages adoption of world-class best practices and performance targets by all healthcare service providers in the Emirate. Therefore the unit of analysis for this research paper is considered the chosen organization. The case study was conducted over a period of four months in Emirates of Abu Dhabi. The involved organization in the study was selected based on the availability of senior IT knowledge workers and business decision makers in this organization and due to its large popularity in Abu Dhabi. In-depth interviews were conducted using a semi-structured approach (IT GOVERNANCE Institute, 2011; Stephen, 2010; Yajiong et al., 2008). Three in-depth interviews were con-

ducted. The first in-depth interview was conducted with the IT Manager, the second and third interviews were conducted with an Application Development Officer and a System Engineer respectively. This research method was selected to obtain further insight into the extent to which businesses understand and utilize ITG frameworks and Web 2.0 adoption. In-depth interviews were also imperative to the creation of the project's case study as it provided the required enterprise information.

Findings

The mission of the IT Department is to "Establish a flexible and secure solid IT infrastructure and improve end users satisfactions by providing high quality IT service". Moreover, their Vision Statement is to "Integrates a strong ITG framework and technology to ensure access to modern, reliable, and secure IT infrastructures to support organizational vision and mission". The IT management model is considered a centralized one as there is only one central IT Department in the organization that provides services to various functions, departments and business units. The IT department consists of different IT experts with different skills, qualifications, duties and backgrounds. The case endeavored to identify the perceived benefits and advantages from adopting Web 2.0 plus identifying the expected risks, complexities, employees' readiness and willingness to use this new technology. The IT Manager (Chief Information Officer (CIO)), the Application Development Officer and the System Engineer highlighted that different employees have different roles and responsibilities. Knowing the key responsibilities of the different employees in the IT department will assist in building our view and it will help in knowing who has the decision rights at the different phases and how each employee contribute to decisions part of the ITG process. The CIO has various key responsibilities and duties in the IT Department including Managerial Role, Organizational Role, and Functional Role. In general the IT Manager's key responsibilities include Project Management, Risk Management, Financial Planning, Information Management and Team Management. The Application Development Officer has general key responsibilities including Applications Development, Data Collection and Analysis. While the System Engineer assists in updating and evaluating policies, regulations, software and hardware.

Some of Web 2.0 is being applied recently at their organization; they are applying the Aggregated Services, Blogs, Wikis, and Multimedia Sharing. Of course all of their employees' activities in these technologies are governed by organizational usage policies and Information Security Management System (ISMS) Framework. In the Blogs all employees are having privilege for creating new posts and commenting on different posts through a Blog environment. Through the provided aggregated services in the organizational portal, different business processes can be achieved easily through e-services in Business Process Management (BPM) Portal. There are a plenty of services provided by this portal such as: Transportation requests, Employee Self Services which is connected with an oracle system, Travel and Hotel Booking, Employees Time Attendance, Hospitality and Catering, etc. As there are many aggregated e-services provided by BPM Portal, each one of these services has its own flow, requirements, interfaces and access levels. Therefore they are providing the user manuals and directions for each one of these e-services to assist employees in using them easily, to save time and efforts of both employees and support services department.

Moreover, the case has all its strategies, policies, procedures, regulations, guidelines, and directions aggregated in a wiki based environment they called it as Electronic Business Management System (EBMS). It is accessible and reachable by all employees in a simple environment which is governed by their usage policies and Information Security Management System (ISMS) Framework. ISMS framework mission is to assess specific risks as applicable to services offered by the organization in terms of information security and take reasonable steps to protect information from misuse, loss, and from unauthorized access, modification or disclosure to ensure business continuity, minimize business damage and maximize return on investments. All these usage poli-

cies and guidelines are compliance with Abu Dhabi System and Information Centre (ADSIC) strategies, regulations and standards.

In addition, they are applying multimedia sharing such as video-sharing and image-sharing, all organizational events videos and images are being shared with all employees and some of these videos are being shared with different stakeholders. Multiple related media news is shared through using the multimedia sharing feature. Moreover, the organization is having different pages in different social networks such as Facebook, YouTube and Twitter; they are applying “Follow-us” links for all their social networks in their organizational website. Through these social networks different organizational activities, events and initiatives can be shared with stakeholders and it assists in communicating with others externally and internally. These technologies are being used effectively to govern marketing and promotional process.

From the currently added Web 2.0 features the case got numerous measurable business benefits including more innovative initiatives and services, more effective knowledge management and sharing, better retrieve and access to knowledge, organizing knowledge, managing relationships, collaboration and communication management, and lower cost of doing business. The case is considered as one of the successful organizations in the public sector as it tightly integrates Web 2.0 with the workflow of its employees and creates a “networked company,” linking such services to customers and suppliers through the use of Web 2.0 tools.

The adopted Web 2.0 shows employees the flow of different business process. For example, the adopted wiki helps employees in knowing who has the decision right at different levels of their different process, it is also being used to define roles, responsibilities and knowing the whole followed procedures and regulations. Therefore, all process are governed by their procedures, policies, regulations and ITG for Web 2.0.

The case had a strategy and a plan for the coming three to five years to implement its own formal Web 2.0 adoption framework which is aligned to the ITG framework. Worthy of noting here is that the case is still developing its own IT policies, standards, guidelines, regulations, procedures and governance. Hence, Web 2.0 adoption framework does not exist as such but of course, have an agreed on process for adopting any new technology including Web 2.0. Currently they are adapting Abu Dhabi Systems & Information Centre’s (ADSIC) standards and guidelines which are based on ITIL and ISO. As a committee, ADSIC’s role is to develop, drive and support various initiatives within the Government to transform government services in the Emirate. A key objective of this transformation is to establish a modern, efficient and citizen-centric e-Government platform to match the best in the world. The case is assessed periodically by ADSIC and is ranked the second best governmental organizations in Abu Dhabi.

The processes involved in adopting Web 2.0 can be summarized in the following steps:

1. Identifying Business needs and requirements.
2. Proposing different choices for the requirements, these choices are being proposed by all the IT department team, all the choices should be aligned with the organizational strategies, regulations, procedures, policies and cultures.
3. Analyzing each choice whether it fits the available financial and technological organizational resources.
4. According to the analysis results, they make the initial choice for the technology. They build its own IT policies and regulations for its uses and the security procedures.
5. All these built and implemented procedures, regulations, strategies and policies should be aligned and consistent with generic ADSIC’s guidelines and procedures. Their standards

are based on ISO 9001, ISO 14001, and they are using ITIL. These standards are amendable according to Abu Dhabi public sector needs.

6. Before implementing the technology, ADSIC should assess the entire basic plan and the applied strategy whether it is aligned with their strategies and guideline or not. After ADSIC assessment and feedback for specific amendments, they should follow their directions and feedbacks until their final approval. The organization can start in the implementation phase, during the implementation phase ADSIC should assess it again and the organization is required to amend according to the assessment feedback. In addition, after implementation and before piloting the new technology ADSIC should assess it again and changes should be made according to their feedback. Once ADSIC give the final approval, the organization can deploy the technology. Moreover, ADSIC is conducting a mid-year and end of year assessment for the adopted Web 2.0; checking whether they are following their strategies, policies, governance or not.

It was found that the organization is currently following COBIT framework for ITG and they are customizing it according to their business needs and according to ADSIC's guidelines and feedback. The case chose COBIT because it represents an integrated platform of other major frameworks, resources, and standards including ITIL and ISO. Furthermore, COBIT is an effective framework to comply with organizational laws, regulations, policies, and procedures, achieving strategic goals, achieving operational excellence, maintaining IT-related risk, optimizing IT services cost, and supporting business decisions.

Discussions and Recommendations

It was clearly evident from the case that COBIT was followed and it was customized according to its needs (i.e., policies, regulations) and in accordance with ADSIC's guidelines. This is an interesting exercise at the case's side which led to the adoption of COBIT as an effective ITG framework. Moreover, this governmental organization adopted several Web 2.0 technologies for internal (employees) and external (customers and suppliers) purposes (Intranet (portal) and extranet (website)). The case has successfully put steps for Web 2.0 adoption and specified a usage policy for users. However, there was no obvious strategic framework for Web 2.0 adoption. For example, the third interviewee commented "We are having a strategy and a plan to implement our own formal Web 2.0 adoption framework which aligns and complies with our ITG framework within the coming three to five years. However, we are starting initially to have our own IT policies, standards, guidelines, regulations, procedures and governance put in place but still we didn't implement the formal Web 2.0 adoption framework. We are having an agreed on process for adopting any new technology including Web 2.0". The case highlighted that this strategic step for Web 2.0 governance will be implemented within three to five years which of course, will be aligned with ADSIC's guidelines and COBIT. This is contingent upon the availability of resources and expertise in Web 2.0.

After analyzing the case's findings, there was a need to slightly modify the proposed framework to be customized in a way making the whole Web 2.0 adoption framework aligned and compatible with the overall organizational ITG framework.

The case study used a wiki environment called Electronic Business Management System (EBMS) that includes all its strategies, policies, procedures, regulations, guidelines, and directions. For example, the first interviewee commented about EBMS as "...we are having it accessible and reachable by all employees in a simple environment which is governed by their usage policies and Information Security Management System (ISMS) Framework. All these usage policies and guidelines comply with ADSIC's strategies, regulations and standards". Accordingly, CIOweb should be replaced with EBMS.

This research has implications for both theory and practice. Web 2.0 has matured and is evidently becoming an essential business tool in the world and in UAE more specifically as Web 2.0 is being identified as a strategic building block. Policy makers could capitalize on this issue and provide policy that entice Web 2.0 adoption and integration in the public sector and provide specific frameworks (this research's model) and guidelines for Web 2.0 adoption where governance emergences as a comprehensive framework. Further, the decision to adopt Web 2.0 is considered an important IT decision which entails putting significant investments and expertise. Specifying an appropriate governance framework for Web 2.0 adoption process in organizations is important and should address its unique characteristics and integrate with the overall ITG portfolio i.e., policies, procedures, guidelines and the overall organizational ITG framework including accountability and considering specific implementation factors. As highlighted in this research Web 2.0 provide further opportunities for professional to provide training and more innovative Web 2.0 solutions to organizations.

At the theoretical level, this research adopted ITG as guiding theories and endeavored to develop Web 2.0 governance framework. The developed model proved its usefulness and it was slightly modified to cater for the case's specific needs. Future research could introduce more cases to further validate the importance of the proposed framework.

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