

Knowledge Sharing Through E-Government Portal

Hoor Dali

The British University in Dubai, PO BOX 345015,
Dubai, United Arab Emirates
elhooor@gmail.com

Khaled Shaalan

School of Informatics, University of Edinburgh, UK
The British University in Dubai, PO BOX 345015,
Dubai, United Arab Emirates
khaled.shaalan@buid.ac.ae

ABSTRACT

The advent of technology has changed the way of government to communicate with its stakeholders by incorporating the notion of e-government based on web-portal. These web-portals whereas identified successful in communicating with the stakeholders also played a vital role in sharing and managing knowledge. Based on this notion, this article is concerned with the role of e-government portal in sharing knowledge and the way through which this portal increases the efficiency of entire public sector. In the same instance, the K-ACT model of internet portal is analyzed to identify the features that make a web-portal best and perfect. In this article, we conducted a literature review and focused our attention on analyzing the e-government portals of four countries i.e. China, Hong Kong, Beijing and Turkish Municipalities. For the analysis and comparison purposes, the checklist of K-ACT model is used. The findings revealed that the e-government portal of these countries is not fully matched with the features as described in K-ACT, which ultimately affect the knowledge management and sharing practices in the region. Therefore, recommendations are made to improve the existing portal for knowledge sharing so that citizens can take more knowledge benefits from the e-government portals.

KEYWORDS

Knowledge management; K-ACT Model; E-Government Portal;

CCS Concepts

- Knowledge Sharing →e-Government
- e-Government Portal→Dubai e-Government

1. INTRODUCTION

Like private sector, the scope of knowledge management (KM) has also been increasing in public sector. Government organizations, in this way, also require dealing with bulk of information, which encouraged them to immediately launched

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than the author(s) must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Permissions@acm.org.

KMO '16, July 25 - 28, 2016, Hagen, Germany

Copyright is held by the owner/author(s). Publication rights licensed to ACM.

ACM 978-1-4503-4064-9/16/07...\$15.00

DOI: <http://dx.doi.org/10.1145/2925995.2926009>

KM projects to manage the information easily and comprehensively [1]. Therefore, governments are now turning their attention from the notion of government to e-government to provide higher standard of quality and responsiveness to the public who are already familiar with the required technology. These efforts of government whereas make the services more comprehensive, technology oriented, and easy to access, in the same, it fosters the better relationship between government and citizens. Here, the role of KM is fundamental because it ensures that the knowledge flows efficiently between the government and community [2].

From all over the world, the governments that introduced and implemented e-government concept typically has a web portal, which works as a gateway between government and its e-services. Such web portals have lack of social cues and interpersonal interaction, which makes the knowledge quality and service delivery more effective as well as increases the importance of KM and knowledge sharing. There are numbers of studies that have been conducted on the KM and e-government topics such as significance of KM in e-government [3]; KM strategies and approaches for public sector [4]; issues of KM in public sector [5]; technological infrastructure for KM [6]; structure of e-government portal, to name a few [7].

A critical area that still needs to be addressed is to examine how this web based portals works in e-government structure to support the knowledge sharing and KM. Therefore, this article addresses the gaps in the literature by purely focusing on qualitative aspects and data.

1.1 Aim and Objectives

This article addresses two main objectives:

- To review the way through which e-government portals works for sharing and managing knowledge
- To critically review a K-ACT model of KM in web-portal and compare its findings with the state-of-the-art research to come up with the outcomes

1.2 METHODOLOGY

The article is based on qualitative methodology, in which the article reviews the previous studies and evaluates the success of e-government portals by using a K-ACT model. The article initiated with a brief background of the area that is under consideration and then stated the aim and objectives of the article.

The next section is literature review, which first presents the general overview of knowledge, knowledge sharing and knowledge management, e-government & e-government portals, link between e-government portals & knowledge sharing, and then analyze the earlier work conducted on the e-government portals in different countries. This way of analyzing literature would be effective in terms of understanding how e-government in different countries uses web-portals to sharing and transferring knowledge. In the next section,

weanalyzetherole of KM model in web-portal in terms of K-ACT modelbyexamining all the relevant aspect of the model.

Later, the discussion section comes, which compares the literature findings with the key aspects and basics of the K-ACT model, based on which appropriate conclusion and recommendations are given to furthermore improve the web-portal to make knowledge sharing more efficient.

1.3 CONTRIBUTION

This study on analyzing how the web-based e-government portals work for sharing knowledge is a significant attempt to analyze the use and benefits of having effective web-based portal for knowledge sharing. This would help the government organization to understand the value of web portal and their role in knowledge sharing as well as would help in improving their existing web portals as accordance to the suggestions and recommendations of earlier researchers. This change would also improve the flow of communication among various parties associated with e-government portals as well as would bring the fundamental changes in the way e-government performs to meet its goals.

2. LITERATURE REVIEW

2.1 Knowledge, Knowledge Sharing and Knowledge Management

In this information age, knowledge is definitely time bound and critical to survive and compete in the market. Knowledge is a fundamental aspect that any kind of organization needs to run business operations. In a wider framework, it is a valuable intangible asset for creating and sustaining competitive advantages [3,8]. According to Ndou (2004), knowledge can be defined as the facts, information, skills and understanding that a person has achieved by any kind of learning, training or practice, which improve the evaluating, decision-making and implementation capabilities of certain person [9].

In the literature, KM and knowledge sharing has been described by many researchers for decades. For instance, a basic definition of KM given by Fang (2002) defines it as a process of capturing, allocating, and effectively using knowledge or information [10]. The contrary, Fraser, et al. (2003) argued that KM is a set of different practices, which contains organized processes based on technologies and efficient techniques through which a person could become motivated toward effective creation, management, distribution, utilization and sharing of knowledge to become more knowledge-oriented [11].

Moreover, Zack (2002) explained the concept of KM by defining it as an effective learning procedure related to the discovery, utilization and sharing of knowledge which uses suitable technology and cultural environments to increase the performance of an organization [12]. Hence, all these notions concluded with that KM is a corporate oriented phenomenon, which is basically associated with the managing of knowledge within any organization's settings to achieve desire goals.

2.2 E-Government and E-Government Portals

It is observed that in the early period of 1990s, e-government was virtually unknown concept that is in the recent period is remarkably evolved. This concept is applicable to address the emerging concerns such as growing complexity of issues being faced by the government. Currently, the information and communication technologies (ICTs) are identified to have exceptional management potential that can be used to assist government in information and service delivery. Since, ICTs can assist in developing a network constitution for interconnectivity, service delivery, efficacy,

communication, transference, and responsibility. Therefore, e-government has turned out to as the famous way of public management for covering of all these functions [13].

According to Palkovits, Woitsch, & Karagiannis (2003), e-government is an association between governments and their clients, i.e. businesses, public agencies, citizens, suppliers, inter-governmental departments and so on [14]. Moreover, Ashok (2004) argued that e-government services involves several stakeholders including citizen, non citizens, business users, government employees, IT developers, public policy makers, public administrators and politicians [15]. Furthermore, the concept of e-government can be defined as the use of internet or WWW (World Wide Web) for providing government information and services to citizens [10].

Furthermore, it is observed that e-government utilize ICTs, particularly web-based applications, to improve accessibility and professionally delivering government information and services [16]. The example of such web-based application is web-portal. The use of web-portals is relatively a new phenomenon, which is introduced due to the increasing conflicts between government and broad range of stakeholders' interest. According to Koh, Ryan, & Prybutok (2005), e-services turned out to be a challenging task because of numerous aspects concerning e-government ICTs system and stakeholders since stakeholders have different interests, cost assessment, advantages and objectives that influences users contentment and service take up. Hence, the attainment of one situate of particular e-government aim for one stakeholder may outcome in the non-attainment of another set of particular e-government objectives for another stakeholders [17].

To address the specified issue, the use of web-portal identified effective since it helps the government in meeting the objectives and expectations of all stakeholders by proving them single platform. In particular, e-government portal is a web-based application that allows multiple users to access desire government services by their own as well as allow them to interact easily with government agencies [18]. These portals provides several benefits to users, including: improve and fastest access to information or service, increase collaboration with government, use of existing e-service applications, quickly interact with internal and external application or information sources, and effective integration between applications [14].

2.3 Link between E-Government Portals & Knowledge Sharing

In the literature, a great association of e-government portals and knowledge sharing has been identified [14]. Since, portals do not directly create knowledge, but they play vital role in collecting, organizing, and sharing stored knowledge. In simple words, it can be said that e-government portals works as a platform of exchanging knowledge between government and citizens. These portals are integrated with the facilities such as e-mail, chartroom, news section, search option, forums and so on, which helps in sharing and exchanging of knowledge [19].

On the contrary, Misra (2007) argued that knowledge-sharing portals are integrated with advanced knowledge representation, searching features, and supporting knowledge workers in their activities. Such portals provides methods and approaches to extract, evaluate and categorize both structured and unstructured information as well as determine the relationship between content, people, area of information, and user activities [20]. Consequently, users of such portal required knowledge that fulfils their needs [20,21,22].

Moreover, it is studied that an ideal portal is one that provides one-stop solution to all users in terms of acquiring knowledge. As such, portals directly improve the delivery of information and services. It is because such portal allows e-government to share both internal and external knowledge by providing a single gateway [23]. Similarly, Yildiz (2007) and McNabb (2006) supported that one-stop e-government portals offers several features such as spontaneous categorization of information, fastest information search, information subscription, knowledge support, collaboration facility to share knowledge, security, privacy, customization, personalization, information directories, various knowledge sharing and delivery channels, easy to access, connectivity with different government departments through single access, and so on [24,25].

Thus, it can be said that the KM and knowledge sharing e-government portals helps in delivering miscellaneous services and information to the users and facilitates them by providing numbers of features, which ultimately lead to the success of the government as well as ensure the best delivery of the knowledge and services.

2.4 Related Work on Knowledge Sharing by Using Web-Portal

In the literature, there are numbers of studies have been conducted that confirm the use of web-based portals by government in numbers of countries from all over the world [26,27,28]. This section of the article provides the discussion and analysis of some of these studies in order to understand how portal works within respective environment for sharing knowledge.

Staab & Maedche (2001) conducted a study on Hong Kong e-government portal and analyzed it carefully. In result, the authors found that the e-government portal of the country is supported by advertising revenue and pay-per-use revenue generation model, while such KM portal is still at early development stage and no leading technology is integrated with it specifically in the context of awareness and absence of intelligent search engine feature. Authors further recommended that the e-government structure of Hong Kong still require considerable technical support to make it efficient [29].

Moreover, Ozlen (2013) analyzed the KM system of Turkish Municipalities by using quantitative survey approach and analyzed survey results with regard to KM literature. The survey was conducted from the 158 KM system users of Turkish Municipalities and results were analyzed using statistical analysis approach. The findings of the study has been summarized with that the KM system has lack of technical tool integration. However, the system identified easy to use for all users [30]. Thus, this study identified with lack of focus on other aspects of the existing KM system, which indicates its weaknesses in terms of making KM system efficient.

In contrast, Wagner, Cheung, Lee, & Ip (2003) discussed the Beijing Government portal and stated that the portal provides various facilities to the citizens for sharing knowledge, including: e-services, information about laws & regulations, news centre, links to other public departments e-mail section, suggestion, complaints or feedback facility, and electronic forum, which facilitates two-way communication between government and public. Thus, it indicates that the portal system of Beijing government is efficient and covers various aspects of K-ACT models [31]. Therefore, the success of the portal can be seen in the government portal of Beijing.

Zhou & Gao (2007) studied the KM e-government portal of China by using e-government framework based on various components, i.e. Policies system, Technical standard system,

Information infrastructure, Information management infrastructure, and Information application service layer. The findings revealed that e-government in China have logical state of KM system based on internet and web-based activities, which helps in the economic and social development of the country. It allows government to effectively share and exchange knowledge by developing effective communication between government and its stakeholders (See Figure 1) [18].

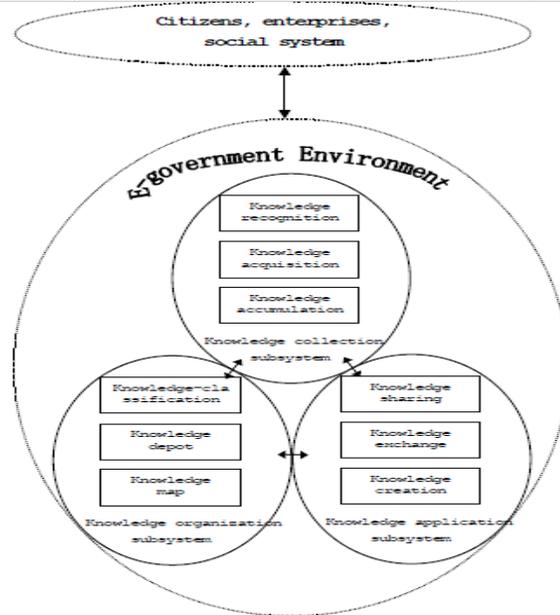


Figure 1: E-Government KM System of China [18]

Hence, this section summarized that throughout the world, the KM systems are integrated with online facilities but these portals are efficiently working as well as not accordance to the features as described by K-ACT Model in next section.

2.5 K-ACT Model for Knowledge Management in Web-Portal

With the advent of the notion e-government portal for knowledge sharing, several KM models for the internet have been introduced and implemented by different organization to improve their KM and sharing processes and activities. The example of these models may include Acquisition, Organization, and Distribution (AOD) model [32,33], Internet-based Customer Knowledge Management model [34] and K-ACT (Knowledge Access, Creation and Transfer) model [35]. However, this section only analyses the K-ACT model of internet to access the research outcomes because the earlier models are mainly applicable for e-commerce web-portal where the notion of e-government portal is relatively absent.

K-ACT model determines the three key dimensions of KM portal (See Table 1), which are applicable to various domains including e-government [35].

Table I: Dimensions of K-ACT Model

K-ACT Model Elements	Dimensions	Sub-Dimensions
Knowledge Access	Access to portal	
	Search	Query & Result Display
	Browse	
	Personalization	User & System Driven personalization
Knowledge Creation	Accessibility	
	Information Presentation	
	User information acquisition	
	Domain data acquisition	
Knowledge Transfer	Feedback	
	Online collaboration	Organization-to-user & user-to-user collaboration
	Information alerts	
	User support	
	Resource sharing	

2.5.1 Knowledge Access

It allows users to have access to the knowledge portal. It gives emphasis to the methods that support the acquirement of knowledge by individuals from certain portal and change the distribution and sharing elements into a mix of portal-to-individual and individual-to-individual-via-portal approaches for sharing knowledge. Furthermore, it helps in searching, browsing, personalization and delivery of varied information. It has following dimensions and sub-dimensions [35]:

- Access to portal–It helps in locating the portal suing foremost search engines. Therefore, a good portal is one that receives maximum hitn key search engines.
- Search –It evaluates the ability of a portal in terms of retrieving information. Therefore, a good portal is one that quickly searches the appropriate service or information as per users’ need. It further has following two dimensions:
 - a. *Query*–it refers to the type of querying system integrated with portal, in terms of advanced search
 - b. *Result Display*–it refers to the sorting and refinement options availability inweb-portal
- Browse– it facilities content exploration; so the best portal is one that include sitemaps or keyword indices
- Personalization –it facilitates users to personalize portal content by creating accounts or profiles for targeted information. Therefore, best portal allow user to create account and select & organize information accordingly. It has following two sub-dimensions:
 - c. *User-Driven Personalization* –it allow users to personalize content according to need
 - d. *System-Driven Personalization*–it refers to the capability of portal to personalize content according to anticipated user type. For instance, content is only available for government officials
- Accessibility– It refers to the extent to which portal allow the people with special needs. Since, a best portal is one that support all people needs including people with

disabilities to perceive, understand, navigate and interact with the web. The example may include the facility of audio-visual information access.

- Information Presentation– It refers to the way through which the information is presented to the users i.e. text style, graphics, video or audio. Thus, a best portal is one, which allows user to gain knowledge via different multimedia types.

2.5.2 Knowledge Creation

It includes acquisition of knowledge from both perspectives, about the user and from the user. Besides, access mechanism maintains a flow of knowledge from portal-to-user and user-to-portal. The knowledge creation has following dimensions and sub-dimensions [36]:

- User Information Acquisition – it examines the features of portal effective for obtaining information from and about the portal. So, a good portal is one which allows options such as Membership Sign-up to provide convenient and secure way of capturing information.
- Feedback – This feature allows users to give feedback about the portal in terms of e-mail, online form, etc. This helps in improving the portal performance and efficiency. Hence, a good portal is one that integrates with these features.
- Domain Data Acquisition–It evaluates the capability of portal to obtain specific information from users. This example includes online polling or survey.

2.5.3 Knowledge Transfer

It supports user-to-user flow knowledge sharing process by focusing on the knowledge sharing tools adopted by both organization and individual who have access to the portal. The dimensions and sub-dimensions of knowledge transfer are [19]:

- Online Collaboration– It evaluates the support of portal in terms of making interaction and sharing knowledge with users. It has following sub dimensions:
 - *Organization-to-User Collaboration*–it includes the feature of chat or e-mail, which could assist the users by the involvement of organization representatives.
 - *User-to-User Collaboration*– it includes the features such as forum, wikis, or blogs that allow the users to interact with each other to share ideas and knowledge.
- Information Alerts– It refers to the system that keeps portal users up-to-date about the latest information or services as per accordance to their need and interest. It may include subscription facility via e-mail.
- User Support– It refers to the integral features of a portal that allow users to take online assistance whenever any problem takes place. The example may include FAQs, help desk support, tutorial, etc.
- Resource Sharing – It refers to the availability of external or internal sources (web-links) in the portal that could contribute in increasing users’ knowledge.

K-ACT model has a checklist, which works as a tool that can be used for evaluating the performance of web-based portals. This checklist is based on the dimensions and sub-dimensions of the model, which is given in Appendix A. Thus, this checklist is analyzed in the context of different countries and other e-government portals for knowledge sharing in order to understand whether their portals are up-to-date and to provide the best platform of sharing knowledge.

3. ANALYSIS AND DISCUSSION

This section presents the analysis and discussion on the literature findings. In this section, the aspects of KM and knowledge sharing portals are analyzed by using K-ACT Checklist. In this section, the e-government portals of China, Hong-Kong, Beijing, and Turkish Municipalities are analyzed based on literature findings and compared with the checklist of K-ACT model. This would help in understanding how different portals are working for sharing features and whether these portals are integrated with latest technologies and features, which could play effective role in making these portal best. The analysis is summarized in Table 2, in which the right symbol indicates the presence of certain dimension while wrong sign indicates the absence of certain dimension in e-government portals of different countries.

Most initially with respect to ‘Knowledge Access’, it is found that the portals of Beijing, Hong Kong, China and Turkish Municipalities are listed on the first page of the search engine, which means that ‘Access to Portal’ dimension is integrated with all chosen countries e-government portals. Besides, in terms of ‘Search’ dimension China identified with both ‘Query’ and ‘Result Display’ dimensions while Beijing, Hong Kong have only ‘Query’ dimension. In contrast, Turkish Municipalities have neither ‘Query’ nor ‘Result Display’ dimensions are integrated with their portals. Furthermore, no e-government portal of each country has been identified with ‘Browse’ dimension. It means that there is lack of facilities like sitemap or glossary on the portal. Concerning to personalization, only Beijing and Hong Kong portals are integrated with user-driven personalization incorporated with the membership and registration facilities. Besides, all of them has lack of system-driven personalization, which means that knowledge or information on these portals are scatter, which takes time in searching or obtaining required information. Moreover, all four countries portals have lack of accessibility since the people with disabilities cannot use portal to access knowledge, while information is presented on these portals in various forms including pictures, graphics, and so on.

About Knowledge Creation mechanism of K-ACT model, it is found that no anyone e-government portals of each country acquire ‘User Information’ i.e. personal and contact information of the users, which somehow highlights the lack of security on these portals. Furthermore, the e-government portals of China, Hong-Kong, Beijing, and Turkish Municipalities are identified with lack of ‘Domain Data Acquisition’ facilities i.e. polling, survey, etc. while these portals facilitate users by offering ‘Feedback’ facility through e-mail.

Finally, concerning to ‘Knowledge Transfer’ mechanism of K-ACT Model, it can be seen in Table 2 that the e-government portals of China, Hong-Kong, Beijing, and Turkish Municipalities have lack of online collaboration tools including ‘Organization-to-User’ and ‘User-to-User’ collaboration. Moreover, it is found that except Turkish Municipalities web-portal, all other countries web-portal offers the facility of ‘Information Alerts’ such as e-mail alerts or newsletters. ‘User Support’ is also available in the portals of each country, but it is limited to FAQs. Besides, no ‘Resource Sharing’ facility has been identified on these portals.

Table II: Evaluation of E-Government Portals of Different Countries using K-ACT Checklist

Dimensions/Sub-Dimensions	China	Beijing	Turkish Municipialities	Hong Kong
1. Knowledge Access				
1.1. Access to portal	√	√	√	√
1.2. Search				
1.2.1. Query	√	√	X	√
1.2.2. Result Display	√	X	X	X
1.3. Browse	X	X	X	X
1.4. Personalization				
1.4.1. User-Driven	X	√	X	√
1.4.2. System-Driven	√	√	√	√
1.5. Accessibility	X	X	X	X
1.6. Information Presentation	√	√	√	√
2. Knowledge Creation				
2.1. User information acquisition	X	X	X	X
2.2. Domain data acquisition	X	X	X	X
2.3. Feedback	√	√	√	√
3. Knowledge Transfer				
3.1. Online collaboration				
3.1.1. Organization-to-user	X	X	X	X
3.1.2. User-to-user	X	X	X	X
3.2. Information alerts	√	√	X	√
3.3. User support	√	√	√	√
3.4. Resource sharing	X	X	X	X

4. FUTURE PROSPECT

The article has several areas that future research needs to be improved. First, the research is only analyzed the government portals of four countries (China, Hong-Kong, Beijing, and Turkish Municipalities), due to which global e-government portal system for sharing knowledge is not clear. Therefore, future research would analyze the e-government portal of other countries too so that globally accepted features of knowledge sharing e-government could be recognized.

Secondly, the literature is purely qualitative; therefore, future research would be conducted by incorporating quantitative aspects i.e. conducting survey so that the real image of government portals could be justified in the light of real facts. Here, it is impossible to include all the countries and their e-government portal users, due to which random and online survey would be preferred in order to avoid biasness and gain authentic results.

Third, there are still numbers of studies that could be use or analyze to gain the insight about research phenomena under consideration. However, due to time and word count limitations, the researcher do not incorporated and analyzed those studies. Therefore, future research would include more articles and studies to understand the research phenomena more deeply.

5. CONCLUSION & RECOMMENDATIONS

The aim of the article was to review the way through which e-government portals works for sharing and managing knowledge and critically analyze the K-ACT model of KM in web-portal and compares its findings with the literature review to come up with the outcomes. The aim of the article has been accomplished successfully since the analysis revealed that the

notion of e-government web-portal is common throughout the world, but these portals are not playing efficient role in sharing and managing knowledge. Since, most of the countries have been identified with lack of key features as described by K-ACT model, which helps in making e-government portals efficient. The countries are also failed in providing one-stop solution of acquiring and sharing knowledge, which highlights the need of improving those portals.

Furthermore, it has been depicted that the role of e-government portals is significant in managing and sharing knowledge effectively between government and its stakeholders i.e. citizens, government representatives etc. Therefore, it is recommended that the government of the countries must evaluate their e-government portal by using K-ACT dimensions and sub-dimensions because these dimensions covers all the aspects that could make an ideal web-portal of knowledge sharing. Hence, this would improve the service of the government as well as increase the trust of citizens on the government, which ultimately develop the strong relationship and interaction between them.

REFERENCES

- [1] D. S. Carstens, L. Bean, and J. Barlow, "Knowledge Management in E-Government," 2009.
- [2] S. Y. Hung, C. M. Chang, and T. J. Yu, "Determinants of user acceptance of the e-Government services: The case of online tax filing and payment system," *Government Information Quarterly*, vol. 23, no. 1, pp. 97-122, 2006.
- [3] K. Metaxiotis and J. Psarras, "A conceptual analysis of knowledge management in e-government," *Electronic Government - An International Journal*, vol. 2, no. 1, pp. 77-86, 2005.
- [4] S. H. Liao, "Knowledge management technologies and applications—literature review from 1995 to 2002," *Expert systems with applications*, vol. 25, no. 2, pp. 155-164, 2003.
- [5] X. Cong and K. V. Pandya, "Issues of knowledge management in the public sector," *Electronic Journal of Knowledge Management*, vol. 1, no. 2, pp. 25-33, 2003.
- [6] M. Alavi and D. E. Leidner, "Knowledge management systems: issues, challenges, and benefits," *Communications of the AIS*, vol. 1, no. 2, p. 1, 1999.
- [7] Z. Ebrahim and Z. Irani, "E-government adoption: architecture and barriers," *Business Process Management Journal*, vol. 11, no. 5, pp. 589-611, 2005.
- [8] R. Silcock, "What is e-government," *Parliamentary affairs*, vol. 54, no. 1, pp. 88-101, 2001.
- [9] V. Ndou, "E-government for developing countries: opportunities and challenges," *The electronic journal of information systems in developing countries*, p. 18, 2004.
- [10] Z. Fang, "E-government in digital era: concept, practice, and development," *International journal of the Computer, the Internet and management*, vol. 10, no. 2, pp. 1-22, 2002.
- [11] J. Fraser et al., "Knowledge management applied to e-government services: the use of an ontology," *Knowledge management in electronic government*, pp. 116-126, 2003.
- [12] M. H. Zack, "Developing a knowledge strategy," *The strategic management of intellectual capital and organizational knowledge*, 2002.
- [13] D. Asoh, S. Belardo, and R. Neilson, "Knowledge management: issues, challenges and opportunities for governments in the new economy," in *Proceedings of the 35th Annual Hawaii International Conference on System Sciences*, 2002, p. 17.
- [14] S. Palkovits, R. Woitsch, and D. Karagiannis, "Process-Based Knowledge Management and Modelling in E-government—An Inevitable Combination," *Knowledge Management in Electronic Government*, pp. 213-218, 2003.
- [15] J. Ashok, *Knowledge Management, an integrated approach.*: Pearson Education Limited, 2004.
- [16] R. M. Davison, C. Wagner, and L. C. Ma, "From government to e-government: a transition model," *Information Technology & People*, vol. 18, no. 3, pp. 280-299, 2005.
- [17] C. E. Koh, S. Ryan, and V. R. Prybutok, "Creating value through managing knowledge in an e-government to constituency (G2C) environment," *The Journal of Computer Information Systems*, vol. 45, no. 4, p. 32, 2005.
- [18] Z. Zhou and F. Gao, "E-government and Knowledge Management," *International Journal of Computer Science and Network Security*, vol. 7, no. 6, pp. 285-289, 2007.
- [19] D. Hoe-LianGoh, A. Yeow-Kuan Chua, B. Luyt, and C. Sian Lee, "Knowledge access, creation and transfer in e-government portals," *Online information review*, vol. 32, no. 3, pp. 348-369, 2008.
- [20] D. C. Misra, "Ten guiding principles for knowledge management in e-government in developing countries," in *Proceedings of the First International Conference on Knowledge Management for Productivity and Competitiveness*, 2007.
- [21] C. Wagner, "Knowledge Management in E-government," in *AMCIS 2003 Proceedings*, 2003, p. 105.
- [22] E. Wenger, "Knowledge management as a doughnut: Shaping your knowledge strategy through communities of practice," *Ivey Business Journal*, vol. 68, no. 3, pp. 1-8, 2004.
- [23] M. A. Wimmer, "Knowledge Management in Electronic Government," in *5th IFIP International Working Conference*, Austria, 2004, pp. 17-19.
- [24] M. Yildiz, "E-government research: Reviewing the literature, limitations, and ways forward," *Government Information Quarterly*, vol. 24, no. 3, pp. 646-665, 2007.
- [25] D. E. McNabb, *Knowledge management in the public sector: A blueprint for innovation in government.*: ME Sharpe, 2006.
- [26] M. Wimmer, "Knowledge Management in e-government," in *Proceedings KMGov*, 2003.
- [27] M. Wimmer and R. Traunmuller, "Trends in electronic government: managing distributed knowledge," in *Proceedings of 11th International Workshop on Database and Expert Systems Applications*, 2001, pp. 340-345.
- [28] R. Sandoval-Almazan and J. R. Gil-Garcia, "Are government internet portals evolving towards more

interaction, participation, and collaboration?
 Revisiting the rhetoric of e-government among municipalities," Government Information Quarterly, vol. 29, 2012.

- [29] S. Staab and A. Maedche, "Knowledge portals: Ontologies at work," AI magazine, vol. 22, no. 2, p. 63, 2001.
- [30] M. K. Ozlen, "Comparison of the Adoption of Knowledge Management Systems among the Employees of a Turkish Municipality," Jurnalul Practicilor Comunitare Pozitive, vol. 1, pp. 112-129, 2013.
- [31] C. Wagner, K. Cheung, F. Lee, and R. Ip, "Enhancing e-government in developing countries: managing knowledge through virtual communities," The Electronic Journal of Information Systems in Developing Countries, p. 14, 2003.
- [32] D. G. Schwartz, M. Divitini, and T. Brasethvik, "On knowledge management in the Internet age," Internet-based organizational memory and knowledge management, pp. 1-19, 2000.
- [33] J. Chang, B. Choi, and H. Lee, "An organizational memory for facilitating knowledge: an application to e-business architecture," Expert Systems with Applications, vol. 6, no. 2, pp. 203-215, 2004.
- [34] F. F. H. Nah, K. Siau, and Y. Tian, "Knowledge management mechanisms of financial service sites," Communications of the ACM, vol. 48, no. 6, pp. 117-123, 2005.
- [35] J. Zhang, S. S. Dawes, and J. Sarkis, "Exploring stakeholders' expectations of the benefits and barriers of e-government knowledge sharing," Journal of Enterprise Information Management, vol. 18, no. 5, pp. 548-567, 2005.
- [36] R. Traummuller and M. Wimmer, "Directions in e-Government: Processes, portals, knowledge ," in Proceedings of 12th International Workshop on Database and Expert Systems Applications, 2001, pp. 313-317.

APPENDIX A – K-ACT MODEL CHECKLIST

Checklist Items	Score
1 Knowledge Access	
1.1 Access to Portal	
1.1.1 Portal is listed on the first page of results listings of search engines and directories (e.g. Yahoo, Google and MSN)	<input type="checkbox"/>
Dimension sub-total	<input type="text"/>
1.2 Search	
1.2.1 Query	
1.2.1.1 Free text search provided	<input type="checkbox"/>
1.2.1.2 Advanced search provided	<input type="checkbox"/>
1.2.1.3 Search recommendations provided	<input type="checkbox"/>
Sub-dimension sub-total	<input type="text"/>
1.2.2 Results Display	
1.2.2.1 Search results can be sorted	<input type="checkbox"/>
1.2.2.2 Users can search within results	<input type="checkbox"/>
Sub-dimension sub-total	<input type="text"/>
Dimension sub-total (1.2.1 + 1.2.2)	<input type="text"/>
1.3 Browse	
1.3.1 Glossary provided	<input type="checkbox"/>
1.3.2 Sitemap provided	<input type="checkbox"/>
1.3.3 Index provided	<input type="checkbox"/>
Dimension sub-total	<input type="text"/>

1.4 Personalisation	
1.4.1 User-Driven Personalisation	
1.4.1.1 Membership sign-up provided	<input type="checkbox"/>
1.4.1.2 Registered users can create profiles	<input type="checkbox"/>
1.4.1.3 Registered users can create a collection of favorites	<input type="checkbox"/>
1.4.1.4 Registered users can specify types of information to be displayed	<input type="checkbox"/>
Sub-dimension sub-total	<input type="text"/>
1.4.2 System-Driven Personalisation	
1.4.2.1 Information tailored for specific users (e.g. seniors, working professionals, media, etc.)	<input type="checkbox"/>
Sub-dimension sub-total	<input type="text"/>
Dimension sub-total (1.4.1 + 1.4.2)	<input type="text"/>
1.5 Accessibility	
1.5.1 Portal supports different versions of the same interface (e.g. text only, low graphics, etc.)	<input type="checkbox"/>
1.5.2 Multilingual support available	<input type="checkbox"/>
1.5.3 Portal supports visually impaired	<input type="checkbox"/>
1.5.4 Portal support hearing impaired	<input type="checkbox"/>
Dimension sub-total	<input type="text"/>
1.6 Information Presentation	
1.6.1 Images used as information aids	<input type="checkbox"/>
1.6.2 Video used as an information aids	<input type="checkbox"/>
1.6.3 Audio used as an information aids	<input type="checkbox"/>
1.6.4 Animation used as an information aids	<input type="checkbox"/>
Dimension sub-total	<input type="text"/>
Mechanism total (1.1 + 1.2 + 1.3 + 1.4 + 1.5 + 1.6)	<input type="text"/>
Dimension sub-total (3.1.1 + 3.1.2)	<input type="text"/>
3.2 Information Alerts	
3.2.1 Newsletters available	<input type="checkbox"/>
3.2.2 "What's New" information available	<input type="checkbox"/>
3.2.3 Events calendar provided	<input type="checkbox"/>
3.2.4 E-mail alerts provided	<input type="checkbox"/>
3.2.5 Mobile alerts available	<input type="checkbox"/>
3.2.6 Update frequency of documents indicated	<input type="checkbox"/>
3.2.7 RSS feeds available	<input type="checkbox"/>
Dimension sub-total	<input type="text"/>
3.3 User Support	
3.3.1 FAQs available	<input type="checkbox"/>
3.3.2 Helpdesk support available	<input type="checkbox"/>
3.3.3 Online help provided	<input type="checkbox"/>
3.3.4 Search tips provided	<input type="checkbox"/>
3.3.5 Tutorials or demos provided	<input type="checkbox"/>
Dimension sub-total	<input type="text"/>
3.4 Resource Sharing	
3.4.1 Portal contains its own repository of information	<input type="checkbox"/>
3.4.2 Links provided to other web sites for more information	<input type="checkbox"/>
3.4.3 Information contributed by other users are accessible to user	<input type="checkbox"/>
Dimension sub-total	<input type="text"/>
Mechanism total (3.1 + 3.2 + 3.3 + 3.4)	<input type="text"/>
Total score (1 + 2 + 3)	<input type="text"/>

2 Knowledge Creation

2.1 User Information Acquisition

- 2.1.1 Portal acquires contact information
- 2.1.2 Portal acquires personal information

Dimension sub-total

2.2 Feedback

- 2.2.1 Users can provide feedback electronically

Dimension sub-total

2.3 Domain Data Acquisition

- 2.3.1 Surveys are conducted on portal features
- 2.3.2 Surveys are conducted to elicit opinions on specific topics
- 2.3.3 Polls provided to rate documents

Dimension sub-total

Mechanism total (2.1 + 2.2 + 2.3)

3 Knowledge Transfer

3.1 Online Collaboration

3.1.1 Organisation-to-user collaboration

- 3.1.1.1 Ask-an-expert (or similar) feature available

Sub-dimension sub-total

3.1.2 User-to-user collaboration

- 3.1.2.1 Social tagging supported
- 3.1.2.2 Discussion forums available
- 3.1.2.3 Blogs available
- 3.1.2.4 Wikis available
- 3.1.2.5 Instant messaging available
- 3.1.2.6 Mailing lists provided

Sub-dimension sub-total
