MAPPING THE CYCLES-KNOWLEDGE MANAGEMENT AND E-GOVERNMENT-

Duygu Saraçoğlu
METU Science and Technology Policy Studies
Scientific Programs Assistant Expert at TUBITAK
Mapping the Cycles-Knowledge Management and E-Government-
TUBITAK Başkanlık Tunus Cad. No:80 06100 Kavaklıdere/Ankara
E-mail: duygu.saracoglu@tubitak.gov.tr

─Abstract ─

Today, the ostensible fact is that rapid development of ICT is the basic factor that effects organization's structure, functioning, performance and changes both in the private and public sector . More the less, new society is gathering around knowledge, "production of knowledge" and its assets, such as Knowledge Management (KM). In this term of change, governments also transform into "e-Government" (eGov) to improve the quality of the service and performance, and diverge from the classical government understanding and bureaucracy.

Recent decades show that eGov becomes essential for base of future knowledge society and governmental structures; therefore the amount of investments and the requirement of knowledge experts increase. However, successful outcomes of eGov projects require more analysis especially on the subject of KM, since knowledge becomes essential and especially regarding rapid change of technology. Although, literature and practices show that there are common structures for both KM and eGov in use; KM only held under management phase of eGov projects, which cause partial or total failures aftermath. On the other hand, successful practices especially underline the importance of KM in eGov.

Therefore, this study is intended to show that KM and eGov phases can be and should be mapped for successful eGov outcomes. For that manner, a brief literature review combined with author's practical knowledge and some international cases are examined and as a result a pre-mature model of mapping is examined.

Key Words: *E-government, Knowledge Management, Knowledge Technologies, ICT, E-government Organization and Management*

JEL Classification: O30

1. INTRODUCTION

Today, the ostensible fact is that rapid development of ICTs is the basic factor that effects organizations' and economy's structure, functioning, performance changes; therefore ICTs change both the private and public sector. More the less, new society is gathering around knowledge, "production of knowledge" and its assets, such as Knowledge Management (KM). In this change process, governments also transform into "e-Government" (eGov) to improve the quality of the service and performance, and diverge from the classical government understanding. By the development of newer technologies, such as mobile and virtual technologies, the integration between KM and eGov requires more specialized approach to be successful. More the less, it can be underlined that both business and governments transform through e-World; which can be defined by some keywords such as knowledge; electronic-digital-virtual-online-mobile; networked-connected; social and governance.

Generally, eGov refers to the systematic use of ICTs by government agencies to provide services more effectively, to transform relations with citizens, businesses and government. (Hart-Teeter, 2000) KM on the other hand, is defined as the organizational process for acquiring, organizing, and communicating knowledge, so that others may use the knowledge to be more effective and productive and it only recently has started making an entry to the public sector which also affected by the emergence of knowledge worker and the knowledge economy. (Putzhuber, 2003:11)

KM needs for eGov systems arise basicly from the interaction with members of the public and the need to respond to users' inquiries. When the government invites interaction, or transactions, citizens and businesses ask for faster and effective solutions for their problems that need to be handled by knowledgeable people, or by a "knowledgeable information system", a knowledge management system (Misra, 2007). On the other hand, in practice, KM is required to held fro successful eGov projects. Nonetheless, KM is essesntial for govermental agencies to share, acquire, internalize and externalize knowledge through eGov projects.

In recent years, Turkish eGov initiative has got rapid development, and above the country level in most government departments have set up their own portals and online services in a relatively short term. However, from an overall point of view, current Turkish eGov structure and development is not satisfactory, which emphasis on management and implementation, and ignore knowledge management, can't meet administrative information sharing needs of the government, particularly administrative information sharing needs of the community, social efficiency is low and furthermore paperwork burden is not solved. For analysis and sharing better government services and enhancing the image of the government, it is urgent and basic necessity for eGov systems to develop and integrate knowledge management better.

In this study, it is purposed to present a pre-mature model of mapping of basic cycles of KM and eGov, which are use in common, to provide a management approach for all government knwledo resources effectively in eGov, and to make users to facilitate the retrieval of knowledge through eGov system is discussed based on literature review and author's practical acknowledgement. For that manner, each phase of KM (KM Cycle) are mapped with eGov phases (eGov Cycle) and to further this idea and need a pre-mature mapping model is examined. Furthermore, success and failure cases from Turkey and other countries such as USA, UK, S. Korea, China, are used to link up eGov and KM cycle are researched. In this study, only China and USA case is briefly explained.

2. KNOWLEDGE MANAGEMENT AND E-GOVERNEMENT

2.1. Dimensions and Cycles

KM is a cross-disciplinary domain and draws from a wide range of disciplines and technologies. The definition and requirements for a successful management require different kinds of system and technology integrations. However, KM is a broad term to define and argue, but eGov is predominantly an organizational term. Therefore only organizational perspective of KM is scoped in this study. Literature and practices show that, from organizational perspective KM involves the acquisition, retention, storage, distribution and use of knowledge in the organization and therefore addresses the full range of processes by which an organization deploys knowledge (Gray, 2000; Putzhuber, 2003:11).

Many factors have transformed the way in which organizations now view knowledge, but perhaps the greatest development has been the dramatically extended reach of know-how

through ICTs. In fact, ICTs continue to be applied widely, and the lessons that practitioners have learned are directly become applicable to KM. On the other hand, KM is used almost synonymous with groupware; thus, sharing and collaboration are clearly vital to KM with or without supporting technology.

As cited in the Handbook of Organizational Learning and Knowledge Management (Dierkes et al, 2001), the idea of KM only emerged in the mid 1990s and again by organizational perspectives instead of knowledge being the property of individuals it is 'possessed' by the organization (Noon and Heery, 2008). In this way, it can be said, the organization learns lessons, and this is seen as a necessary first step towards becoming a learning organization. In Table 1, basic understanding of KM is given:

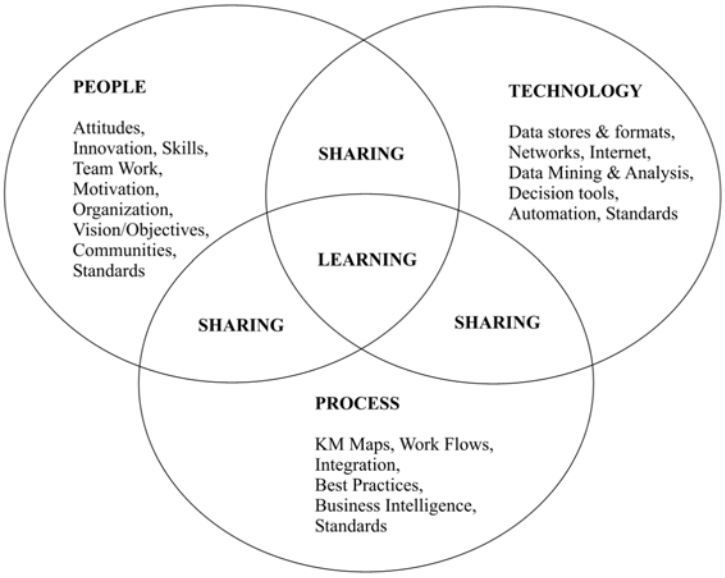
Table -1: Basic Understanding of KM*

Properties	**KM**
Interest Object	Knowledged person
Object Concept	Tacit
Focal point of Management	Human (people)
Basic Processes	Share
Organizational Purpose	Success
Application	Complex, Problematic
Enabled by	Culture of sharing information/practices Processes Newer aspects in KM that have gained by technology Organizational coordination

Source: Southern and Tood : 2008 (*Edited by author)

Furthermore, in the literature dimensions of KM given as; people, process and technology (PPT) (Gudauskas, 2003). In Figure 1, dimensions of KM, sub-elements of each dimension and intersections are shown. In this figure the essential point is the essential intersection element of all three dimensions is "learning". But also, "sharing" can be added in by binary intersections; as a result of examination above.

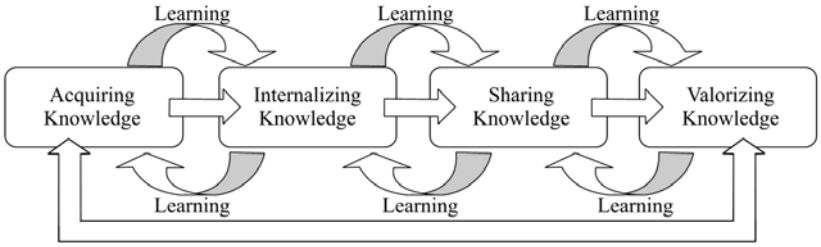
Figure -1: Dimension of KM and Sub-Elements*



Source : Bhatt : 2001(*Edited by author)

Furthermore, an effort percentage can be applied in Figure 1, which is an analyze of an KM expert, G. Bhatt (2001); who underlines in all three dimensions "people" is the dimension that would require the most effort in all (people 70%, process 20%, technology 10%). But, of course these percentages can change according to the practice. Nonetheless, practices also show that "people" dimension should require more effort than other dimensions; since it's the most unpredictable dimension of all three. In Figure 2, the organizational perspective of KM Cycle is examined. According to the author's practical acknowledgement, learning and relative technologies (e.g. e-Learning) are the most common tools that are using for all four steps of KM in organizations. Because, in practice it is all possible to acquire, internalize, share and valorize both internal and external knowledge by e-Learning and every phase a learning process should have been realized for learning from lessons.

Figure – 2: Organizational KM Process and Learning*



Source: Kalkan : 2006 (*edited by author)

On the other hand, e-Government (eGov) is a general concept in the world, referring to the government's effective use of modern ICTs, through various information services (such as mobile phones and the internet, even virtual worlds and game consoles, etc.) the government department, enterprises, and civil society organizations in its more convenient time, place and manner, the provision of automated information and other services consisting of a responsive, efficient and accountable, with a higher quality of service the government. (Lovelock and Cartledge, 1999)

In a general and as a basic concept, eGov is defined as using ICTs and especially internet as tools in the process of developing a better governmental structure: (OECD, 2003:1; Heeks, 2010)

- eGov is often defined as “e-business of the state”. This is justifiable by the fact that both e-government and e-business use the same infrastructure, hardware and also generally same software.

- eGov is the application of ICT to transform the efficiency, effectiveness, transparency and accountability of informational and transactional exchanges within government, between governments and government agencies at federal, municipal and local levels, citizens and businesses; and to empower citizens through access and use of information and knowledge.(Gudauskas, 2003)

eGov framework of the general structure is generally composed of supporting systems and layers, supporting systems can be supporting policies and supporting technical standards, and layers can be knowledge infrastructure layer, knowledge management layer and knowledge technologies as services layer. Supporting policies, identify that the government is enacting within all existing policies. It is also fundamental to build eGov processes and standards. Also, The workflow of eGov needs a knowledge standardization and reliable security technology standards. Technical standards including e-signatures, network security standards, etc. can be counted as supporting technical standards system. From the definition of eGov, it can be easily seen that there is a requirement for knowledge flow in every eGov project, since eGov is established based on ICTs and knowledge. Thus, knowledge infrastructure layer can include network technology, multimedia technology, internet technology, security control, database, data warehouse, data mining and online analytical processing technology, collaborative work skills, information exchange cross-platform technology, system integration technology, electronic payment technology, etc. However, knowledge management layer should include office automation management systems, collaborative systems, decision support systems, and information resources agency. This layer is mainly internal network work. On the other hand, knowledge technologies as services layer is built on knowledge management layer, through the establishment of common external site on the internet, belonging to the external internet of the eGov. Knowledge technologies as services layer includes: information and online information collection, electronic procurement and tendering, electronic benefits payments, electronic tax, e-business, e-declaration, etc.

Furthermore, in literature dimensions of eGov come forward such as; technological, legal-political, organizational, socio-economic and democratic. (Jakish, 2000) From author's practical knowledge a basic cycle of eGov is given as such; that includes 4 basic phases:

PHASE 1: Content Reorganization: In this phase existing knowledge is under consideration for reorganization. But this phase is generally held manually, thus it is a costly phase and takes time. This phase is, generally handled manual, it is expensive and timely and requires filing.

PHASE 2: Digitalization: In this phase, reorganized knowledge is under consideration for digitalizing for electronically use. This phase is a phase of forming eGov system and it can be handled by simple deploying digital captures; storing and retrieving capabilities.

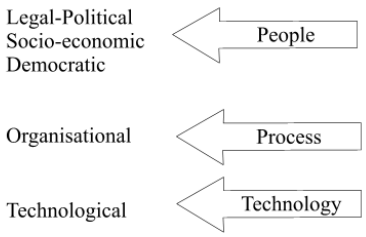
PHASE 3: Management: Management comes after reorganization and digitalization in practice. But every phase, actually, should be considered as a management process overall. In this phase digitalized content for back-office automation is generally under concept. All kinds of management phases can be implemented in this phase as well as KM.

PHASE 4: Integration-Implemention: To make the eGov system run an integration and implementation phase is used in practice. In this phase agencies can be implemented for extended automation; for example by self-service portals; thus self-service government. So, this is the phase that an interaction between government, business and citizen is held, thus it should be open, secure and electronic.

2.2. Mapping the Cycles

So far, a brief literature review combined with practical knowledge has been presented. As mentioned above, both KM and eGov have different dimensions; thus before mapping the cycles a mapping of dimensions come to forward. It can be easily seen that dimensions intersect with each other; as shown in Figure 3.

Figure-3: Mapping Dimensions of KM and eGov



Source: Author: 2010

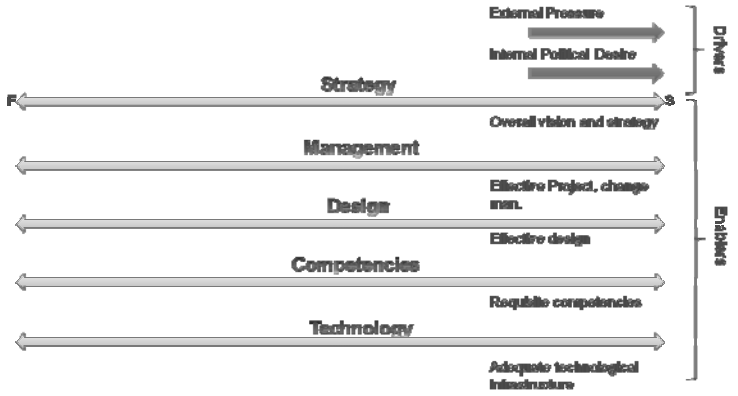
Then, why do we need a "cycle mapping" process? In every project, there should be considered an outcome, regarding requirements and further analyses. Main outcomes of eGov projects can be classified basicly as "total failure", "partial failure" and "success". Below, some country base examples are given regarding their eGov outcomes. From literature and cases the most important outcome comes forward as "KM is not optional but essential in successful eGov projects". Public and private sector KM, supported by ICTs, is an important element of knowledge economy. For an institution or company to manage knowledge well, there needs to be a systematic alignment of overall management and knowledge management policies and processes, mindsets and cultures, organizational structures, technologies, budgets, and worker skills (World Bank Assessment, 2003):

Main outcomes of eGov projects (Heeks, 2010; UNPAN, 2010):

- Total Failure! (35%) (e.g.Thailand)
  (initiative never implemented or immediately abandoned)
- Partial Failure… (50%) (e.g.China)
  main goals could not be achieved, partly achieved with undesirable outcomes
- Success ☺ (15%) (e.g.USA, UK, Korea, Brazil, etc)
  main goals achieved successfully and no significant undesirable outcomes

There are some models in practice that being implemented for successful eGov outcomes. For example, a common model called "factor model" is given in Figure 4; which simply shows that for successful outcomes from a eGov project there are external pressure and internal political care as drivers and five basic enablers; which are strategy, management, design, competencies and technology. For successful eGov projects five enablers should be effective and adequate as possible.

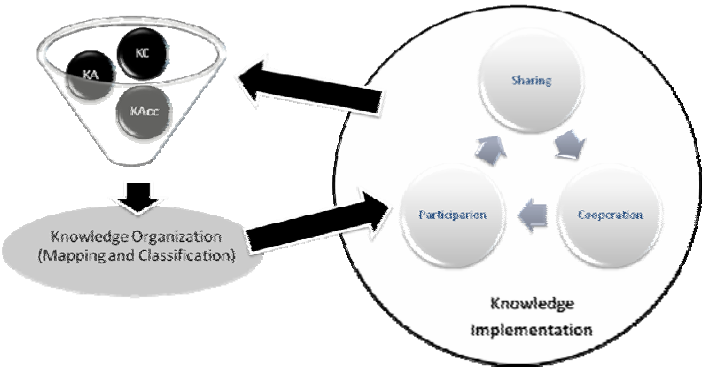
Figure – 4: Factor Model



Source: Heeks: 2010

However, implementation of factor model would process success in eGov projects because for successful eGov vision, political will, common frameworks, co-operation, citizen-user centric approaches responsibility are all essential (OECD, 2003:3). On the other hand the model and many other guidelines only scope a linear approach. Also, it can be seen that there is no identified intersections between enablers, which makes the model does not mesh with cycle based approaches of KM and eGov. For that manner, idea of mapping eGov and KM cycles comes forward to avoid failures. But both in literature and practice there has not been found a similar KM mapping process within eGov projects. Thus, in this study a pre-mature model has been implemented by author because a need of this kind of mapping model has been seized both from literature research and practice. In the basic cycle of eGov that have been given before; KM had been considered as an element of overall management phase of an eGov project. Thus, in factor model, KM also can be implemented under management as a sub-enabler. But in practice, KM is an overall management process itself; therefore should be considered as an enabler itself.

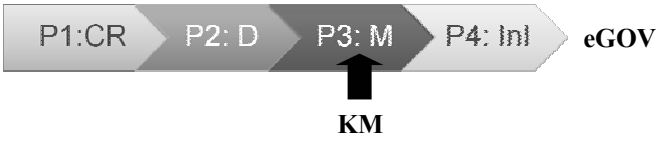
Figure – 5: KM Cycle*



Source: (*Edited by author)
KC: Knowledge Creation, KA: Knowledge Acquisition, KAcc: Knowledge Accumulation

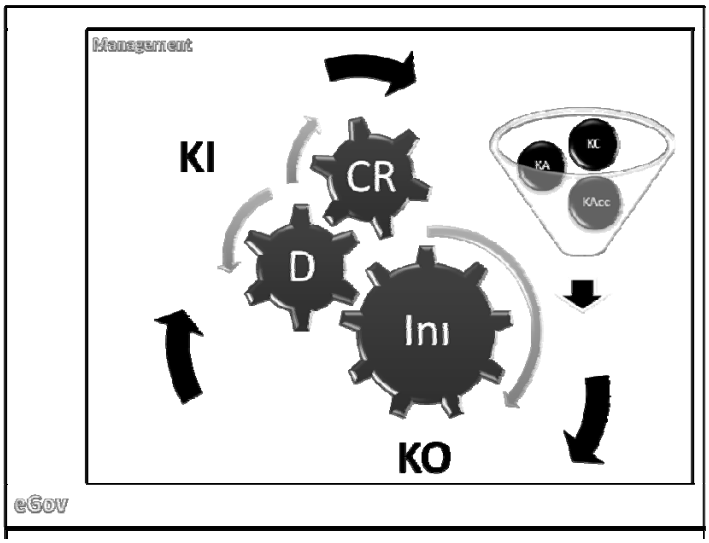
As seen from Figure 5 and Figure 6, KM has a cycles inside its cycle; but eGov is actually practiced as a linear process which should be implemented as cycles because of the outputs of each phases. Especially, KM is only fulfilled under third phase, which is management, as all other types of management. Bu from the author's practical knowledge, management is an overall process and KM itself is an overall management process; therefore a further analysis has been required.

Figure – 6: eGov Cycle and KM



Source: Author : 2010
CR: Content Reorganization, D: Digitalization, M: Management,
InI: Integration and Implementation

Figure- 7: Pre-mature KM-eGov Mapping Model



Source: Author : 2010
KC: Knowledge Creation, KA: Knowledge Acquisition, KAcc: Knowledge Accumulation
CR: Content Reorganization, D: Digitilization, M: Management,
InI: Integration and Implementation
KO: Knowledge Organization , KI: Knowledge Implementation

As can be seen from the mapping model, KM cycle and eGov cycle have been integrated with each other. An important point in this model is, underlines the fact that "knowledge already exists" in the organization or in the environment. Thus first of all, it has to be reorganized. Furthermore, by every process it should be remembered that another cycle starts to run or triggered; thus gears are especially used to show that there is actually no order in the cycle but an interactive triggering mechanism can be implemented. Also, it can be seen that management is an overall process and should not be considered as in only phase of an eGov project, but should be implemented as a whole; but knowledge as an essential element and the only element that have an effect on all phases as a whole; KM should be considered as an overall process as well.

For further analysis a case of KM and eGov integrations have been researched. For this matter five countries have been chosen according to the success and partial failure cases. Korea, USA and UK as being the most successful cases regarding UNPAN Knowledge Base annual analysis of eGov (UNPAN, 2010). Furthermore, China and Turkey are considered as partial failure cases and analyzed as such. In this study only China and USA cases are briefly given. For example, as a partial failure, in China's case, need for KM is underlined as; "E-Government in China is following the logic found everywhere the State recognizes the potential of the Internet and of web-based activities to assist the development of the economy and society. E-Government with 'Chinese characteristics' means a much more prominent role for the State in the diffusion of Internet access and commercial usage. Internet access has been driven by State-sponsored investment in the telecommunications network and in the Golden Projects, China's information infrastructure, and now by the Government Online Project, and the Enterprise and Family Online Projects. In the early stage of these projects the focus is inevitably on the Government Online Project, which stretches from backend procurement to front-end e-citizenry. Ultimately, effective government is seen largely to depend upon the ability of knowledge management." (Zhou and Gao, 2007)

In success cases that have been researched, it has been seen that new technologies, such as eGov services through virtual worlds and game console, are also implemented for better services and according to the rapid change of technology. But regarding KM, most remarkably, in USA's case, NASA KM Team's studies can be referenced for requirement of a mapping model. Because, mainly sharing and learning are given as key factors for success, as given in this study. Other than that, KM has been changed in NASA from 2003 to 2010 drastically, from basis of sharing knowledge and integrated distributed knowledge to capturing knowledge. For example, it is stated that after KM principles have been integrated into NASA public portal in 2007, by the end of this approach, nearly 240 million people have been reached. For that manner, a study of modeling expert knowledge approach is targeted through 2025s which stated as will lead a requirement of a mapping process between KM and eGov projects as well.

3. CONCLUSION

As intended by this study, it has been acknowledged that sharing and learning are key elements for successful projects, and this doesn't change in eGov projects as well. Furthermore, as given above dimensions and cycles of KM and eGov are similar and intersectable, and because they are driven by rapid change they maintain interactive to each other. They can be integrated with each other, but not easily because cycles are neither linear nor simple. And in practice regarding outputs every cycle can trigger itself repeatedly. Therefore, further analysis should be required especially in practice. Investment in ICT as well as infrastructure is not enough, thus technology and change management also should be implemented. For further studies IT Governance principles can be considered for mapping model.

For further developments of technology it would require further analysis and different mapping approaches.

BIBLIOGRAPHY

Bhatt, G.D. (2001), *Knowledge Management in Organizations: Examining the Interaction between Technologies, Techniques, and People*, Journal of Knowledge Management, p.3

Gray, P. (2000), Knowledge Management Overview. *CRITO Working Paper*, University of California, Irvine.

Gudauskas R. (2003), *Lithuenia: Knowledge management in E-government – World Bank Group Study*, http://info.worldbank.org/etools/docs/library/114235, [Accessed: 12. 2010]

Dierkes M. et al (2001), Handbook of Organizational Learning and Knowledge Oxford; New York : Oxford University Press, pp.45-80.

Hart-Teeter (2000), *E-Government: The Next American Revolution*.

Heeks, R. (2010), Success and Failure in e-Government Projects, http://www.egov4dev.org/egovdefn.htm, [Accessed: 11. 2010]

Jakisch G., (2000), *E-Signature Versus e-Identity: The Creation of the Digital Citizen,* 11th International Workshop on Database and Expert Systems Applications (DEXA'00), pp.312

Kalkan, V. D. (2006), *Örgütsel Öğrenme ve Bilgi Yönetimi, Kesişim ve Ayrılık Noktaları*, http://www.e-sosder.com, [Accessed: 01. 2008]

Lovelock, P. and Cartledge, S. (1999), *Special Subject: E-China*, China Economic Quarterly,vol.3,no.1,pp.19-35.

Misra, D.C. (2007): Ten Guiding Principles for Knowledge Managementin E-government in Developing Countries, First International Conference on Knowledge Management for Productivity and Competitiveness-2007

Noon, M and Heery, E. (2008), A Dictionary of Human Resource Management, Oxford University Press, Oxford Reference Online

OECD (2003), *E-Government Imperative: Main Findings*, http://www.oecd.org/dataoecd/60/60/2502539.pdf [Accessed: 12.2010]

Putzhuber, W. (2003), *From eLearning to Knowledge Management-Bridging the Gap*, Graz University of Technology, pp. 1-11.

Southern, G. and Tood, R. (2001), Library and Information Professionals and Knowledge Management: Conceptions, Challenges and Conflicts, http://www.alia.org.au/alj/50.3/full.text/conceptions.challenges.html, [Accessed: 01. 2008]

UNPAN (2010), *2010 E-Government Survey*, http://unpan.org/egovkb,[Accessed: 12. 2010]

World Bank Assessment (2003), *Lithuenia: Knowledge management in E-government – World Bank Group Study*, Gudauskas R. (2003), http://info.worldbank.org/etools/docs/library/114235, [Accessed: 12. 2010]

Zhou, Z and Gao F. (2007), "E-government and Knowledge Management", *IJCSNS International Journal of Computer Science and Network Security*, VOL.7 No.6, June 2007, Institute of Policy and Management of Chinese Academy of Science, Beijing, China.

FURTHER READINGS

Brun, C. (2005), *KM toolbox: inventory of tools and techniques***,** Knowledge Management Specialist Library**,** National Library of Health, National Health Service, United Kingdom**,**http://www.library.nhs.uk/knowledgemanagement/ViewResource.aspx?resID=93792&tabID=288&catID=12417, [Accessed: 11.2009]

Castells, M. (2001), *The Internet Galaxy*. Oxford University Press.

Cong, X.and Kaushik V. P. (2004), Issues of Knowledge Management in the Public Sector, *Electronic Journal of Knowledge Management,* 1 (2) 25-33, http://www.ejkm.com/volume-1/volume1-issue-2/issue-2-art-3-cong-pandya.pdf, [Accessed: 11.2009]

Curley, K.F. and Kivowitz, B. (2001), *The Manager's Pocket Guide to Knowledge Management*, Amherst, MA, HRD Press

Grönlund, Å. (2002), *Electronic Government – Design, Applications and Management*. Idea Group Publishing.

Hislop, Donald (2005), *Knowledge Management in Organizations: A Critical Introduction*, New York, Oxford University Press

Hughes, A. and Michael S.S.M. (2005), *ICT and Productivity Growth – The Paradox Resolved?* Cambridge, MA, MIT Sloan School of Management, Working Paper, http://ssrn.com/abstract= 881797, [Accessed: 11.2009]

Klischewski, R. and Martti,J. (2004), *Semantic Web Technologies for Information Management within e-Government Services*, Proceedings of the 37th Hawaii International Conference on System Sciences – 2004 http://csdl2.computer.org/comp/proceedings/hicss/2004/2056/05/205650119b.pdf, [Accessed: 12.2009]

Krogh, G.V., Kazuo, I. and Nonaka, I. (2000), *Enabling Knowledge Creation: How to Unlock the Mystery of Tacit Knowledge and Release the Power of Innovation*, New York, Oxford University Press

NZ (2000), *E-Government - A Vision for New Zealanders*. E-government Unit of the State Services Commission, http://www.govt.nz/evision/index.php3, [Accessed: 11.2009]

Polanyi, M. (1966): *The Tacit Dimension*, in Prusak (ed.) (1997) (q.v.), Chapter 7, pp 135-146

Prusak, L. (ed.) (1997), *Knowledge in Organizations*, Oxford, United Kingdom, Butterworth-Heinemann. Reprinted 2001

Riley,T. B. (2003), *Knowledge Management and Technology*, International Tracking Survey Report, http://www.electronicgov.net/pubs/research_papers/tracking03/IntlTrackingRptJune03no2.
Pdf, [Accessed: 11.2009]

Ruggles, R. (1998), The State of the Notion: Knowledge Management in Practice, *California Management Review*, 40/3:80-9, as quoted by Hislop (2005) (q.v.)

SIMS (School of Information Management and System), University of California (UC),

Berkeley (2003), *How much information? 2003 Executive Summary*, http://www2.sims.berkeley.edu/research/projects/how-much-info-2003/execsum.htm, [Accessed: 11.2009]

Wimmer, M. A. (2002), Integrated service modelling for online one-stop government, *EM - Electronic Markets*, Special issue on e-Government, http://taylorandfrancis.metapress.com/link.asp?id=vwn5hblfn8uh1egd, [Accessed: 12.2009]

Wagner, C., Karen, C., Fion, L., and Ip, R. (2003), *Enhancing Egovernment in Developing Countries: Managing Knowledge through Virtual Communities*, Electronic Journal on Information Systems in Developing Countries, http://www.ejisdc.org/ojs2/index.php/ejisdc/article/download/89/89, [Accessed: 11.2009]