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KNOWLEDGE MANAGEMENT: A FAD OR SERIOUS INSTRUMENT FOR SUSTAINING AND IMPROVING QUALITY HEALTHCARE?

This paper uses a number of knowledge management case studies to explain (1) the concepts of knowledge management and (2) how these apply to healthcare. Then, it examines how and where knowledge management initiatives might bring benefits in healthcare organisations. To present a more complete picture, the arguments of a number of critics of the knowledge management approach are considered.

1. INTRODUCTION

There have been many claims of the benefits that knowledge management (KM) can bring to the performance of healthcare organisations. Therefore, healthcare organisations are interested to know how KM can be used in a healthcare setting. This paper presents a number of KM case studies in healthcare organisations that have different functions and different KM needs.

In contrast to these optimistic forecasts, some researchers have dismissed KM as a 'fad'. In order to examine these criticisms, the paper presents an overview of the principles of KM. Knowledge management case studies, used alongside the KM principles provide a basis for examining these criticisms to decide if the KM claims are exaggerated or if KM is the foundation for providing quality healthcare.

2. IS KM IMPORTANT?

Nowadays, KM appears to be a high topic of interest in healthcare organisations, both large and small, throughout the world. Why has KM become so important? The following reasons have been suggested [19, 20].

- Knowledge plays a major role in many public and private businesses, e.g. in healthcare [14].
- Over recent times, organisations in many countries have 'lost' staff because of redundancy, wastage and downsizing. Losing staff can mean losing knowledge.
- Organisations now realise that in a climate of rapid change, organisational improvement is dependent upon both individuals and organisations continuously learning. The basis of this learning is knowledge.
- The recognition that organisations are dependent on (1) external sources of knowledge, and (2) the merging of these external knowledge sources with internal sources of knowledge.

The above factors apply to all organisations including healthcare organisations. Consequently, healthcare organisations are looking at KM as a means of improving healthcare services.

3. RESEARCH METHOD

The paper seeks to answer the overarching question 'Is KM the foundation of quality healthcare?' To develop an answer, the concepts of KM are presented, followed by a number of KM case studies. To support the case study material, a literature review was undertaken related to the use of KM methods in healthcare for the period 2000-2008. The case studies combined with the literature review provide a sound basis for this qualitative investigation. The authors use their first-hand personal experience of KM implementations to interpret the collected data.

4. KNOWLEDGE MANAGEMENT AND RELATED TERMS

There has always been debate concerning the nature of knowledge and the related concepts of truth and wisdom [9]. Therefore, it is not surprising that there is contention regarding KM. Knowledge management includes creation, acquisition, transfer and manipulation of knowledge. These are not simple concepts. For example knowledge acquisition involves complex cognitive processes of perception, learning and communication.

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Table 1. Explanations of the terms data, information, knowledge and wisdom

Category	Explanation
Data:	<ul style="list-style-type: none"> ○ A datum is the value of an observable and measurable attribute, i.e. raw observations and measurements. ○ Data have no meaning in themselves. ○ It is in the context of the data that gives the data structure. ○ An example of a datum is an individual health symptom present in an individual patient
Information:	<ul style="list-style-type: none"> ○ Information depends on an aggregation of data. ○ Information comes from data that are selected, analysed and processed. ○ Information, processed data, becomes useful to someone. Information, as the name implies, can be seen as a message – this in turn insinuates that there is (i) a recipient or listener and (ii) a purpose from the message. Information is data plus conceptual interpretations.
Knowledge:	<ul style="list-style-type: none"> ○ Knowledge is not simply accumulating &/or processing of data and information over time. ○ Knowledge is a complex and loose pattern with its parts connected in many and various ways. ○ Information or messages are passed through this structure – some pass through without any impact, while others ‘stick’ to (i) become part of the structure or (ii) cause a re-structuring [4].
Wisdom:	<ul style="list-style-type: none"> ○ Wisdom calls upon all previous categories, levels of consciousness. ○ Wisdom is an extrapolative non-deterministic process. ○ Wisdom attempts to give understanding where previously there had been no knowledge

A common meaning of knowledge is ‘the confident understanding of a subject, combined with the capability to apply this knowledge to a particular type of problem for a specific purpose’. Knowledge is related to information, but knowledge is richer and more meaningful. Ackoff considered knowledge as one of five categories, namely:

- Data
- Information
- Knowledge
- Understanding
- Wisdom

The five categories together form the DIKUW model [1, 2, 3]. Whereas data, information and knowledge all relate to what is known or to what has occurred, the fifth category of wisdom relates to the future. For a medical student, knowledge might be seen as an accumulation of data and information without the ability to transform these data and information into wisdom, to help a patient. To move to this higher level requires cognitive and analytical ability, and the successful outcome is wisdom. Bellinger, Castro and Mills [3] argue that the five category DIKUW model of Ackoff should be reduced to a four category DIKW model, as illustrated in table 1. ‘Understanding’ is related to all the other four categories. ‘Understanding’ supports and causes the transitions from (1) data to information (through relationships), (2) data-information to knowledge (through patterns), and (3) data-information-knowledge to wisdom (through principles) [3]. Therefore, ‘understanding’ is not a category in its own right but works in and around all the other categories [3].

There are two types of knowledge, i.e. explicit knowledge and tacit knowledge. *Explicit knowledge* exists outside an individual, e.g. in documents and databases. It can be captured, codified and recorded in a structured or unstructured format. Examples of explicit knowledge are protocols and documented evidence based medicine. Explicit knowledge is relatively easily communicated and shared. *Tacit knowledge* is within an individual’s brain. This type of knowledge is an unspoken appreciation of something, and is based upon one’s experience, actions and involvement in a specific context. Tacit knowledge includes both (1) *cognitive elements* – including a person’s mental models of schemata, mental maps and viewpoints – and (2) *technical elements* – these relate to skills and ‘know-how’ that apply to a specific context. Tacit knowledge is difficult to communicate and share. Nevertheless, an underlying assumption of KM literature is the possibility of transforming tacit knowledge to explicit knowledge to enable the wider dissemination and use of tacit knowledge.

5. CRITICS AND SCEPTICS

Wilson [26] in his paper “*The nonsense of knowledge management*” is critical of the lack of distinction between information and knowledge, and the concept of tacit knowledge. He concludes that KM is not concerned with the management of knowledge, and believes that KM is simply an umbrella term for a variety of organisational methods, tools and techniques for undertaking organisational activities. Some of these methods do relate to information management, rather than knowledge management. The remainder are concerned with the management of work practices in the office. Wilson claims that the KM model implies that (1) the ‘mind’ is manageable, (2) the content of the mind can be ‘down-loaded’, and then (3) knowledge is in the database and hence retrievable at the press of a button – an accountant’s dream of people-free production. His conclusions are that KM is in large part a management fad that will fade away [26].

A different critic argues that in the KM literature the power of computer-based information systems (CBIS) is grossly exaggerated [25]. This writer argues that the proposition that CBIS can play a major role in knowledge sharing is based on an objectivist perspective of knowledge. This perspective recognises the difficulty of a CBIS managing tacit knowledge and assumes that (1) there is a distinct dichotomy between explicit and tacit knowledge and (2) the sharing of explicit knowledge

via a CBIS is uncomplicated. Based on these assumptions, the developers of KM systems put forward CBIS as appropriate for transferring explicit knowledge between individuals, where the full sense and meaning remains intact, perfect and unmodified after the transfer. The researcher argues that a subjectivist perspective might lead to a different conclusion. The subjectivist perspective (1) questions the simple dichotomy between explicit and tacit knowledge and (2) considers all knowledge as containing both tacit and explicit components. Therefore, the KM sharing model is inappropriate because all knowledge is to some degree subjective and hence possibly ambiguous. A subjectivist perspective doubts the possibility of a CBIS being successful in sharing even partially explicit knowledge [25]

A third source of criticism comes from the healthcare field, arguing that knowledge cannot be accepted in a new organisation or location until the 'new' knowledge is embedded within the processes of that new location. It is only through actual use in the new setting that the knowledge is legitimated and hence accepted [17].

6. THE KNOWLEDGE MANAGEMENT MOVEMENT

The first criticism in section 5 is that 'knowledge management' is a misleading term. This criticism is correct. KM is an all embracing term. Perhaps it is less-confusing if the term 'knowledge management movement' is used. This is a more descriptive name. Therefore, when one reads 'KM' one must translate this to mean 'KM movement' along with the wider ideas suggested by the name KM movement. KM movement allows one to include many tools and techniques – see tables 3 and 4 – which do not imply, from their name alone, the idea of KM. For example, 'Communities of practice' and 'yellow pages' do not imply KM, but these are techniques greatly favoured by KM practitioners. A second criticism concerns the nature of knowledge. This is a longstanding problem that must not deter us from evaluating the merits of employing KM techniques. The third criticism is that KM is a fad. Being a fad does not preclude KM from being a success.

Having addressed the main criticisms, the details and merits of KM are now considered as part of the process of evaluating the effectiveness of KM. The KM movement aims (a) to use a wide range of (KM) tools from many disciplines (b) to make an organisation and its members more effective, and hence (c) to provide an optimum service to its customers i.e. patients in healthcare. To do this, it integrates three components, people, processes and technology.

6.1. PEOPLE, PROCESSES AND TECHNOLOGY IN KM.

A KM initiative is dependent upon success in three areas, namely people, processes and technology, but the key component is people.

People in KM: People are expected to share knowledge. It is often argued that knowledge sharing is not a natural act [26] because people regard 'knowledge as power' or they say they do not have time to share. Others disagree suggesting that it is natural to share and that we share in all parts of our life. Sometimes people in organisations are not encouraged to share as a direct consequence of an unsupportive *organisational culture*. This may be most evident in big or old organisations where the culture will tend to be complex. If an organisational culture is poor, it can be changed but only after a large expenditure of time and effort. Although organisational change is difficult and costly, for some KM initiatives cultural change is essential.

Processes in KM: Processes are of two types (1) the 'way' an organisation does things and (2) the activities that facilitate the creation, sharing and using of knowledge to benefit an organisation. The 'way' processes can affect the 'facilitate' processes, i.e. they can help or hinder. At the beginning of a KM initiative, all processes must be analysed to see if they will help or hinder the KM 'facilitate' factors, i.e. are they 'enablers' or 'barriers'.

IT in KM: A common misconception is that KM initiatives are mainly about IT. While IT can be a crucial enabler for KM, it is NOT the solution [7]. However, IT does support KM in two ways: (1) to connect people-to-people so that tacit knowledge might be shared (e.g. through groupware) in order to help people either working in groups or alone (see table 2), and (2) to connect people-to-computers to organise, store, access and exploit knowledge and information, e.g. from libraries and databases – see table 2. While IT alone cannot cause knowledge to be shared between people, good design means that sharing is easier [7,12].

KM has associated with it many methods, as shown in table 3. Some might appear as unusual partners. These include communities of practice (CoPs), learning organisations [8]; evidence-based decision-making [18], and corporate and clinical governance [16]. All these methods are important in KM because they are associated with (1) knowledge &/or (2) organisational development.

Communities of practice and learning organisations: As organisations grow in size and complexity and become geographically dispersed, it has been found that groups of members that meet regularly to engage in sharing and learning based on common interests tend to improve (1) their own performance and (2) their organisation's performance. These groups, CoPs, are not new. People have always done this sort of thing at school, or at work or through hobbies [14,24]. CoPs are valued greatly in KM activities and the United Nations Development Programme (UNDP) has used CoPs successfully [11].

Organisations that place learning at the centre of organisational objectives are called 'learning organisations'. Initiatives concerning organisational learning are often carried out alongside KM initiatives because of their complementary nature and the way they combine to influence organisational culture [5, 8].

Evidence-based medicine (EBM) and clinical governance: EBM can be described as the meticulous, unambiguous and prudent use of current best evidence as the basis for making decisions regarding the care of individual patients. Clinical governance (CG) requires an integrated approach to quality, clinical audit, team development and learning,

and risk management combined with information systems [16]. The methods of (1) EBM, (2) its relative EB Management [18], (3) CG and (4) corporate governance are all natural and important components of KM.

KM includes a broad range of organisational methods, tools and techniques for undertaking organisational activities related to knowledge management. The KM movement does not regard this breadth as a weakness [26], but rather as a strength.

7. KNOWLEDGE MANAGEMENT IN HEALTHCARE ORGANISATIONS

7.1. BRIDGING THE GAP

There are many good examples of good use of KM in both the public and private sectors. The UNDP, for example, has used CoPs as the foundation of its KM strategy and to bridge the gap between HQ and its field operations. The UNDP concluded that CoPs are an excellent entry point for KM initiatives [11]. The World Health Organisation has also been successful with many KM applications, e.g. for bridging the gap between ‘what we know’ and ‘what we do’. The WHO has developed KM tools to bridge the gap between research knowledge and real-world applications, i.e. bridging the ‘know-do’ gap [5].

There are many examples of KM use in the NHS in the UK. A few of these are described below. These examples have been selected because they demonstrate KM principles and how KM tools can be applied (1) in both small and large implementations, and (2) in both small and large organisations.

Table 2. Technologies to assist knowledge management

Technology for people-people collaboration		Technology for people to access information	
○ Groupware	○ Intranet	○ Content management	○ Document management
○ Discussion boards	○ Videoconferencing	○ Mining – data & text	○ Thesauri
○ Project support tools	○ E-mail	○ Data warehousing	○ Search Engines

7.2. A KM STRATEGY IN A LARGE HEALTHCARE ORGANISATION - CASE STUDY 1

Mersey Care NHS Trust is a large organisation in north-west England. Its KM strategy is a large development and required a significant investment. The Trust is a specialist health service providing community and secondary specialist healthcare services and there are only four such Trusts in the whole of England and Wales. The Trust employs some 4,700 staff in 50 locations including 10 hospitals and 6 smaller organisations that provide general practice (GP) healthcare services. At any one time the Trust has 10,000 patients. Clearly it is (1) a large organisation and (2) geographically dispersed. It is ideal for a KM approach.

The overall aim of the Trust is to use KM and information management developments to improve the organisation’s healthcare services to patients and carers [15]. The Trust’s KM strategy is described in a concise 16 page document. It is a comprehensive strategy with reference to:

- Improving quality of care by and through the development of staff, i.e. it aims to be a ‘learning organisation’, and
- Learning from past events – both good and bad events – using a questioning and learning approach in order to improve services for carers and patients, e.g. using after-action reviews.

The Trust, in order to improve care, uses many KM tools to optimise services, e.g. CoPs and virtual communities, storytelling, arranging regular and frequent good practice events, and using IT mechanisms to disseminate details of success stories. The Trust also strives to support the development of new knowledge and innovation [15].

Mersey Care NHS Trust’s KM strategy is a comprehensive KM plan for a large organisation, and it demonstrates how KM concepts can be applied in an acute medical setting.

MEDICAL KNOWLEDGE BASES

Table 3. A KM toolbox – IT and non-IT tools for knowledge and learning [21]

FOR STRATEGY DEVELOPMENT	COLLABORATION MECHANISMS	KNOWLEDGE - SHARE & LEARN
1. Knowledge audit tools	1. Mind maps	1. Story telling
2. Social network analysis	2. Teams – virtual face-to-face	2. Peer assists & mentoring.
3. Most significant change	3. Communities of practice	3. After-action reviews
4. Scenario testing & visioning		4. Intranet strategies
	COMMON IT TOOLS	5. E-mail guidelines
	Text mining	6. Sharing best practice.
	Data-mining & data warehousing software	CAPTURING & STORING KNOWLEDGE
	Groupware, e.g. Lotus Notes	1. Document management
	Content & Document Management Systems	2. Content management
	Intranets	3. Staff profile pages; yellow pages
	E-Learning platforms; E-Publishing	4. Exit interviews
	Discussion boards	
MANAGEMENT TECHNIQUES		
1. Blame versus gain		
2. Force field analysis		
3. Knowledge mapping		
4. Succession planning.		

7.3. HOSPITALS, LIBRARIANS AND KM - CASE STUDY 2

The problems of using KM in a hospital are similar to those that have been outlined above in section 7.2. At a hospital level, the task and the organisation are both large. Since every hospital has some cultural differences, the task of designing a KM strategy for one hospital must be easier than designing a strategy for six hospitals [15]. For successful use of KM in hospitals, a hospital's KM strategy must be matched with the unique characteristics and needs of that specific hospital [22]. As communication between individuals is always important, CoPs have been employed in many organisations [11, 15, 22, 24].

One group of staff, that contributes to KM in hospitals, and is not often recognised as important, is librarians. Librarians have a prime role to play in hospitals' KM because librarians are in a central and key position between (1) the hospital community and (2) many KM resources including information resources, NHSWeb, and many external knowledge partners. The potential of librarians to help the hospital in general and individual members of the hospital is often undervalued [13]. Keeling says that librarians must be proactive in KM growth. Librarians might assess the need for a KM initiative by using the questionnaire outlined in table 4. The questionnaire related to the content of table 4, which is a useful KM tool in many organisational settings

Keeling concludes that (1) in a hospital setting, KM is an ideal partner to drive clinical governance, and (2) it is essential that funds are made available if KM is to be nurtured and grow in hospitals.

Table 4. Questions for discussions with managers [13]

<input type="checkbox"/> Can we transfer knowledge easily to new employees?	<input type="checkbox"/> Do we learn from mistakes?
<input type="checkbox"/> Is ours an information /knowledge sharing culture?	<input type="checkbox"/> Do we reward knowledge-sharing?
<input type="checkbox"/> Do we know what and where our knowledge assets are?	<input type="checkbox"/> Are we exploiting knowledge effectively and strategically?
<input type="checkbox"/> Is knowledge organized and easy to find?	<input type="checkbox"/> Does our knowledge walk out of the door as staff leave?
<input type="checkbox"/> Do we capture and share best practice?	

7.4. COMMUNITY & PRIMARY HEALTHCARE AND KM - CASE STUDY 3

Healthcare at the community level in the UK is provided through smaller organisations. In these smaller organisations, general practitioners (GPs) are provided with explicit knowledge in the form of protocols and guidelines which they use in their professional clinical work. Therefore, they are frequent users of explicit knowledge. Experienced GPs also have tacit knowledge. Some researchers and clinicians feel that this is not simply a case of EBM. They ask is tacit knowledge undervalued? Is it possible that (1) too little importance is being given to tacit knowledge owned by the GP because of (2) the importance given to explicit knowledge through the promotion of prescriptive guidelines, i.e. a 'cookbook type' of medical practice? This is a strange reversal of the situation in business KM where there is great emphasis on trying to harvest tacit knowledge [10].

One study of the use by GPs of knowledge in their clinical work found that (1) GPs do not simply use explicit knowledge alone, but tend to use a mix of both tacit and explicit knowledge, and (2) the explicit knowledge that they use is not only from guidelines but also from other sources including those from GPs groups, i.e. the GPs operate CoPs [10]. The study

recognised the importance of a GP's tacit knowledge, the limitations of explicit knowledge, and the benefits of 'networking' leading to the need to foster CoPs for GPs [10].

7.5. A NURSE'S PERSPECTIVE – CASE STUDY 4

The final case study is that of a nurse working in a research centre, namely the Centre for the Development of Health Care Policy and Practice. Cowell in his paper "*KM – Essential, not optional*" describes the experience of an experienced nurse acting as a high level information officer given the task to find, filter and disseminate knowledge to other healthcare professionals in the research centre [6]. He concludes that (1) one simple way of improving knowledge-sharing is to concentrate resources on removing or reducing obstacles and improving communication between staff, (2) there are massive benefits to be gained from CoPs, and (3) in modern healthcare services, that are continually subject to change, there is not one simple and standard model for KM [6]. This third proposition is supported and illustrated by the wide range of case studies in this paper.

8. CONCLUSIONS

The lessons to be learned from the KM case studies presented in section 7 are listed below.

- The KM strategy discussed in section 7.2 is a model for any large organisation to follow e.g. a hospital. Any implementation would need to take care that any strategy developed at the centre permeates (1) accurately and (2) to every corner of that organisation.
- The case study of section 7.2 illustrates the need (1) to recognise that a KM strategy is a complementary and integrated partner of the larger corporate/hospital strategy and (2) for special funds and separate resources for all stages of the KM implementation.
- The case study in section 7.4 shows the benefits of CoPs. GPs have been strong users of networking for decades in knowledge-sharing. The case study also highlights a question that is relevant to many KM initiatives, i.e. does over-formalisation of knowledge processes have disadvantages? [20]
- The case studies collectively demonstrate that KM has many uses and advantages in both small and large healthcare settings, and for both small and large implementations. KM offers great opportunity for improving healthcare services for patients.

Returning to questions posed earlier in the paper. KM is certainly 'nonsense' in the manner that it has been hyped up in some sections of the computing industry. This has perhaps been a frequent and recurring problem in the IT industry in an attempt to sell new technologies. KM is in some way 'nothing new'. There are many ideas within KM that are time-honoured, if not old - but that might be an advantage. KM enthusiasts are asking us to look again at some old ideas to see if the benefits from these well-understood ideas can be optimised. KM combined with other current health care initiatives, such as patient safety and clinical governance [14, 16], are an ideal foundation for improving quality patient care.

BIBLIOGRAPHY

- [1] ACKOFF, R. L. (1989) From data to wisdom. *Journal of Applied Systems Analysis*, 16, 3-9.
- [2] BELLER, S. (2001) The DIKUW model, New York, National Health Data Systems
- [3] BELLINGER, G., CASTRO, D. & MILLS, A. (2004) Data, information, knowledge, and wisdom - 4 Nov. 2004: <http://www.systems-thinking.org/dikw/dikw.htm> Accessed September 2006.
- [4] CHOO, C. W. (2006) *The knowing organization: How organizations use information to construct meaning, create knowledge, and make decisions*, Oxford, Oxford University Press.
- [5] CHUNHARAS, S. (2006) An interactive integrative approach to translating knowledge and building a 'learning organization' in health services management. *Bulletin of World Health Organisation*, 84, 652-657.
- [6] COWELL, R. (2006) Knowledge management - Essential not optional. *Nursing Management*, 13, 11-13.
- [7] CURRIE, G. & KERRIN, M. (2004) The limits of a technological fix to knowledge management: Epistemological, political and cultural issues in the case of intranet implementation. *Management Learning*, 35, 9-29.
- [8] DAVIES, H. T. O. & NUTLEY, S. M. (2000) Developing learning organisations in the new National Health Service. *British Medical Journal*, 320, 998-1001.
- [9] FIRESTONE, J. M. (2001) Key issues in knowledge management. *Knowledge Management Consortium International - Knowledge Innovation*, 1, April 15th, 8-38
- [10] GABBAY, J. & LE MAY, A. (2004) Evidence based guidelines or collectively constructed 'mindlines'? *Ethnographic study of knowledge management in primary care*. *BMJ*, 329, 10130-1016.
- [11] HENDERSON, K. (2006) The knowledge sharing approach of the United Nations Development Programme. *Nonprofit Online News Journal*, February, 14-26.
- [12] KANKANHALLI, A., TANUDIDJAJA, F., SUTANTO, J. & TAN, B. C. Y. (2003) The role of IT in successful knowledge management initiatives: *Communications of the ACM*, 46, 69-74.

- [13] KEELING, C. & LAMBERT, S. (2000) Knowledge management in the NHS: positioning the healthcare librarian at the knowledge intersection. *Health Libraries Review*, 17, 136-143.
- [14] LANE, V.P., SNAITH, J., & LANE, D.C. (2007) E-Health – Essential and eagerly awaited? *International Journal of Information Technology and Management*, 6(2/3/4), 170-187
- [15] MERSEY CARE NHS TRUST (2004) Knowledge management strategy: Liverpool: Mersey Care NHS Trust.
- [16] Available at: <http://www.library.nhs.uk/knowledgemanagement/ViewResource.aspx> Last accessed: Sept. 2006
- [17] NAO (2003) Achieving improvements through clinical governance: A progress report on implementation by National Health Service Trusts, London, The Stationery Office.
- [18] NEWELL, S., HOLLOWAY, R., SCARBOROUGH, H., SWAN, J., ROBERTSON, M. & GALLIERS, R. (2002) The importance of process knowledge for cross project learning: Evidence from a UK hospital. IEEE Computer Society.
- [19] PFEFFER, J. & SUTTON, R. I. (2006) Evidence-based management. *Harvard Business Review*, January, 63-74.
- [20] PRUSAK, L. (2001) Where did knowledge management come from? *IBM Systems Journal*, 40, 1002-1007.
- [21] QUINTAS, P. (2002) Managing knowledge in a new century. In: LITTLE, S., QUINTAS, P. & RAY, T. (Eds.) *Managing knowledge: An essential reader*. London, Sage Publications.
- [22] RAMALINGAM, B. & AREVUO, M. (2004) Quest for knowledge in a Think-Tank - Overseas Development Institute experience, *Knowledge Management Journal*, 8, 1-6.
- [23] RUSS, M. & Jones, J.K. (2005) A Typology of knowledge management strategies for hospital preparedness. *International Journal of Emergency Management*, 2, 319-342
- [24] TRINGALI, M., POLLA, D. & SURACI, S. (2003) A clinically rooted approach to knowledge management in a large Italian Community Hospital. *AMIA Annual Symposium Proceedings*, 1034.
- [25] WENGER, E. (1998) Communities of practice: learning as a social system. *The Systems Thinker*, 9, 1-8.
- [26] WILSON, F. A. (2005) Computer-based information systems and knowledge management: Contrasting the objectivist and subjectivist perspectives. *PACIS*, Bangkok, Thailand.
- [27] WILSON, T. D. (2002) The nonsense of knowledge management. *Information Research*, 8, Paper No: 144
- [28] Available at <http://InformationR.net/ir/8-1/paper144.html> Last accessed September 2006

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