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IS KNOWLEDGE MANAGEMENT NONSENSE OR THE FOUNDATION OF QUALITY HEALTHCARE?

This paper explains the concepts of knowledge management and how these apply to healthcare. It then presents a number of knowledge management case studies in order to examine how and where knowledge management initiatives might bring benefits to healthcare organisations. In order to present a more complete picture of knowledge management, the arguments of a number of critics of the knowledge management approach are presented and analysed.

1. INTRODUCTION

There have been many claims for the benefits that knowledge management (KM) can bring to the performance of healthcare organisations. Consequently, many organisations are extremely interested to know how and where KM can be used in a healthcare setting. This paper presents a number of KM applications in healthcare organisations, in which the organisations have different functions and also different KM needs.

In contrast to these optimistic forecasts, other researchers have not been convinced by the KM claims and some have dismissed KM as a 'fad'. In order to examine these criticisms, the paper presents an overview of the concepts and principles of KM. KM case studies, combined with the KM fundamentals together provide a basis for analysis of these criticisms, and then to decide if the KM claims are indeed exaggerated or if KM is the foundation for providing the provision of quality healthcare.

2. WHY IS KM IMPORTANT? WHY NOW?

KM is some 15 years old. In the early and mid 1990s, there was a sudden increase in KM conferences and KM papers. Nowadays, KM appears to be a high topic of interest in healthcare organisations, both large and small, across the world. Why have knowledge and KM become so important? The following reasons have been suggested [19, 20].

– An acknowledgement that *knowledge plays a major role* in many public and private businesses – as it does in healthcare.

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− In many countries, over recent times, organisations have 'lost' staff because of redundancy, wastage, downsizing and re-organisations. In losing staff, they have lost knowledge. Organisations have *discovered the importance of people.*

− Organisations now realise that – in the 21st century, in an organisational climate of rapid change – organisational development and improvement are dependent upon both *individuals and organisations continuously learning.* The basis of this learning is knowledge.

− The understanding that *innovation depends on knowledge.*

− The recognition that organisations are now dependent on external sources of knowledge, i.e. cross boundary knowledge transactions [20]. These external knowledge sources must be merged and managed with internal sources of knowledge.

− The acceptance of the limitations of information systems – they cannot manage knowledge [20].

All of the above factors apply to healthcare organisations. Therefore, healthcare organisations are looking at KM initiatives to provide the basis for better healthcare services for patients.

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. The major case, described in section 7, is one in which the first named author of this paper has first-hand personal experience of its implementation. To support the case study material, a literature review was undertaken of the use of KM methods in healthcare for the period 2000-2006. The case studies combined with the literature review provide a sound basis for this qualitative investigation.

4. KNOWLEDGE MANAGEMENT, KNOWLEDGE AND RELATED TERMS

Throughout the history of human thought, 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 knowledge management. KM includes creation, acquisition, transfer and manipulation of knowledge – these are not simple concepts. Knowledge acquisition, for example, involves complex cognitive processes of perception, learning and communication.

A common meaning of knowledge is 'the confident understanding of a subject, perhaps combined with the capability to apply this knowledge to a particular type of problem for a specific purpose'. (In general, this is the sense in which 'knowledge' is used in KM.) Knowledge is related to information, but knowledge is richer and more meaningful. Ackoff considered knowledge as one of five categories, namely:

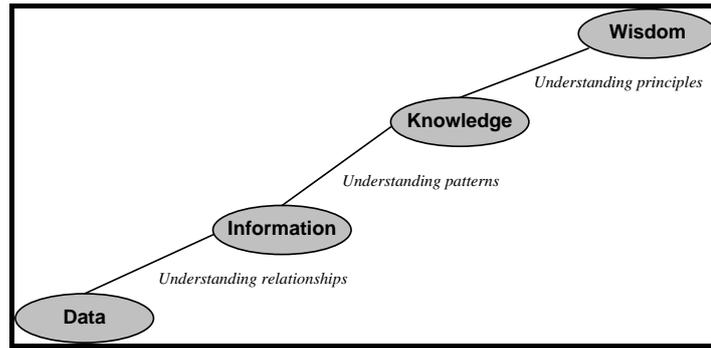| Data	Information	Knowledge
Understanding	Wisdom	

Fig.1. Relationships among data, information, knowledge and wisdom

The five categories together form the DIKUW model [1, 2, 3]. Whereas data, information and knowledge all relate to the past (i.e. to what is known or to what has occurred), the fifth category, 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.

As illustrated in table 1 and figure 1, Bellinger, Castro and Mills [3] argue that the five category DIKUW model of Ackoff should be reduced to a four category DIKW model. 'Understanding' is related to all the other four categories; and '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](Table 1).

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

Category	Explanation
Data:	o A datum is the value of an observable and measurable attribute, i.e. raw observations and measurements. o Data have no meaning in themselves. o It is in the context of the data that gives the data structure. o An example of a datum is an individual health symptom present in an individual patient
Information:	o Information depends on an aggregation of data. o Information comes from data that are selected, analysed and processed. o 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:	o Knowledge is not simply accumulating &/or processing of data and information over time. o Knowledge is a complex and loose pattern with its parts connected in many and various ways. o 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:	o Wisdom calls upon all previous categories, levels of consciousness. o Wisdom is an extrapolative non-deterministic process. o Wisdom attempts to give understanding where previously there had been no knowledge

Knowledge can be classified into two types, i.e. explicit and tacit. *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

While the KM ideas presented in the sections above have generally received universal support, there have been criticisms. The author of the paper *"The nonsense of knowledge management"* identifies problems in the KM area with the lack of distinction between information and knowledge, as well as the concept of tacit knowledge. He examined the KM concepts in numerous journals, on Web sites of management consultancies, and as presented through courses at business schools. He concluded that KM is not concerned with the management of knowledge. KM is an umbrella term for a variety of organisational methods, tools and techniques for undertaking organisational activities. Some of these do actually relate to information management – but not to knowledge management – and the remainder are concerned with the management of work practices in the office [26]. This researcher presents a strong case and makes many interesting points concerning KM. He questions the KM model that he claims 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; and the probability is that the KM fad 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. The objectivist perspective assumes that there is a distinct dichotomy between explicit and tacit knowledge; acknowledges the difficulty of a CBIS managing tacit knowledge; but regards the sharing of explicit knowledge via a CBIS as relatively uncomplicated. On this basis, 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 is sceptical and 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 and questions the proposition that KM can prevent 're-inventing the wheel'. This study argues that knowledge cannot be accepted in a new organisation or location until the 'new' knowledge is embedded within the processes of that new location; and that it is only through actual use in the new setting that the knowledge is legitimated and hence accepted [17].

6. THE KNOWLEDGE MANAGEMENT MOVEMENT & KM IMPLEMENTATION

The main criticisms discussed in section 5 are now addressed. The first criticism is that 'knowledge management' is a misleading term. This criticism is correct. KM is an all embracing concept and perhaps it is less-confusing if the term *'knowledge management movement'* is used. In many ways, this is more appropriate and a more descriptive label. Consequently, when one reads 'KM' one must translate this to mean 'KM movement' and the wider ideas suggested by the term 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 management of knowledge. 'Communities of practice' and 'yellow pages', for example, 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 dilemma 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. It might be a highly successful fad when applied in the business environment.

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 (i) aims to use a wide range of (KM) tools from multi-disciplines (ii) to make an organisation and its members more effective, and hence (iii) to provide an optimum service to its customers i.e. in healthcare its patients. 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.

In organisations were the principles of KM are new, then people will need to be educated and encouraged to incorporate their skills of finding, using, creating, sharing and

communicating knowledge into their daily routines, i.e. to share their own knowledge with others and to learn from other people's experiences. The *behaviour of people* is affected by the organisational culture. If effort is made to change the behaviour of individuals then for this change to be sustained effort must be made to ensure that there is an organisational culture that is both complementary and supportive. Organisational culture and individuals' behaviour are inextricably related. There are numerous ways of encouraging change to human behaviour, such as giving recognition to knowledge 'heroes' (financial reward can be counter productive), encouraging the development of relationships among people (e.g. through communities of practice, peer assists and mentoring), demonstrating the 'value' of knowledge sharing, and creating KM champions.

It is unwise to believe that KM alone can instigate cultural change. A better approach is to combine the efforts and resources of various initiatives that are impinging upon organisational cultural change. A combined attack is more likely to be successful than the KM initiative alone. It is common to combine the resources from KM and organisational learning. However, organisational culture and individuals' behaviour cannot be changed easily. Change is time and resource consuming and costly.

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.

Technology is most effective when it is designed for organisational needs and the requirements of people. In these circumstances, knowledge sharing by people is technically straightforward. While IT alone cannot cause knowledge to be shared between people, good design means that the people and the processes are integrated with the technology and sharing is easier [7,12].

Table 2: Technologies to assist knowledge management

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

KM has associated with it many methods. Some might appear as unusual partners. These include communities of practice (CoPs), see table 3; learning organisations [8]; evidence-based decision-making [18]; and corporate and clinical governance [16]. All of 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 because people have always done this sort of thing at school, 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].

Additional and special learning can be achieved through learning activities in one's organisation, but as discussed earlier local culture can inhibit (or foster) the learning process. Learning organisations attempt to improve both (1) team-learning and (2) individual capabilities [5,8]. 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.

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.

In this section, it has been demonstrated that KM includes a broad range of organisational methods, tools and techniques for undertaking organisational activities related to the management of knowledge. The KM movement does not see this as a weakness [26]. It is a strength.

In the next two sections, a number of real-world KM implementations – all except one from UK healthcare projects – are described in order to demonstrate the relationship between theory, as described above, with real-world practice.

7. A CASE STUDY – FROM CONCEPTUALISATION TO DESIGN REALISATION

The first case study is the KM implementation in the Overseas Development Institute (ODI). This is the UK's leading independent think-tank for international development and humanitarian policy. Although not a healthcare organisation, its type of work has many similarities with healthcare, including being knowledge-intensive. This KM development is selected because it covers all stages of KM implementation from conceptualisation to design realisation. For this study, tools and techniques were used similar to those shown in table 3 [21].

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
MANAGEMENT TECHNIQUES	Text mining	6. Sharing best practice.
	Data-mining & data warehousing software	**CAPTURING & STORING KNOWLEDGE**
1. Blame versus gain	Groupware, e.g. Lotus Notes	
2. Force field analysis	Content & Document Management Systems	1. Document management
3. Knowledge mapping	Intranets	2. Content management
4. Succession planning.	E-Learning platforms; E-Publishing	3. Staff profile pages; yellow pages
	Discussion boards	4. Exit interviews

The investigation started from (1) a KM strategy that came from and complemented the corporate strategy. Then (2) a knowledge audit was undertaken; and finally (3) the KM design ideas were built and put into operation. This comprehensive development, started with a 6 month audit of knowledge that identified (a) all organisational knowledge and (b) gaps in the knowledge or knowledge management. The audit was used as the basis for integrating people activities, processes and IT. In addition, the audit uncovered problems and barriers that are common in organisations of knowledge-professionals, and similar to those found in healthcare organisations. Those found in this particular study included: lack of time; knowledge sharing hindered by internal processes and absence of good incentives; and a culture of individualism encouraged by physical conditions. The problems were all addressed in the KM strategy. These responses included: use of peer assistance; changes to manual systems and improved IT to provide easier access to information; the promotion of the principles and activities concerned with knowledge-sharing and learning, and the importance of these activities to the future success of the organisation; changes to the office and work areas to nurture a knowledge-sharing and learning culture; and last but not least, the commitment of sufficient resources, both financial and human, to ensure a successful KM implementation and to overcome all barriers and problems [21].

8. KNOWLEDGE MANAGEMENT IN HEALTHCARE ORGANISATIONS

8.1. 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 (1) as the foundation of its KM strategy and (2) 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.

8.2. A KM STRATEGY IN A LARGE HEALTHCARE ORGANISATION

Mersey Care NHS Trust (MC Trust) is an extremely 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 (i.e. Primary Care Trusts) that provide general practice 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 virtually every KM tool, technique and method 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 an impressive, comprehensive KM plan for a large organisation, and it demonstrates how KM concepts can be applied in an acute medical setting.

8.3. HOSPITALS, LIBRARIANS AND KM

In many ways, the task and the solution for the use of KM methods in a hospital are similar to those that have been outlined above in section 8.2. At a hospital level, the task and the organisation are both large – but perhaps the size is more manageable. Since every hospital has some cultural differences, the task of designing a KM strategy for one hospital must, in general, be easier than designing a strategy for six hospitals [15]. For successful use of KM in hospitals, researchers have stressed the importance of matching a hospital's KM strategy with the unique characteristics and needs of that individual hospital [22] and that successful implementation requires better communication between individuals. This is the reason for CoPs being adopted in so many organisations [11, 15, 22, 24].

One group of staff, that contributes to KM in hospitals and is not often referred to, is librarians. It has been suggested that 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 (1) the hospital in general and (2) individual members of the hospital community is often under valued [13]. Keeling says that this situation must be corrected and that librarians must be proactive in KM growth. Librarians might indicate the need for new KM initiatives by using the questionnaire outlined in table 4 to analyse the status of their current organisation. Irrespective of whether or not the questionnaire is used in this way, a questionnaire related to the content of table 4 is a useful KM tool in many organisational settings.

Table 4. Questions for discussions with managers [13]

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

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.

8.4. COMMUNITY HEALTHCARE, PRIMARY HEALTHCARE AND KM

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 practice? This is an interesting 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 GP's tacit knowledge; the limitations of explicit knowledge; and the benefits of 'networking' and therefore the need to foster CoPs for GPs [10].

8.5. A NURSE'S PERSPECTIVE – FROM A RESEARCH CENTRE

The final example is that of a nurse working in a research centre, namely the Centre for the Development of Health Care Policy and Practice. The 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. 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 managing knowledge [6]. This third proposition is supported and illustrated by the case studies provided in this paper from organisations in the UK and further afield..

9. CONCLUSIONS

The lessons to be learned from the KM examples presented in sections 7 and 8 are:
- The KM strategy discussed in section 8.2 is a model for any large organisation to follow e.g. a hospital. It must be remembered that any implementation would need to take special care to ensure that any strategy developed at the centre permeates (1) accurately and (2) to every corner of the organisation.
- The example of section 8.1 illustrates the need (1) to recognise that a KM strategy is not a separate activity but a complementary and integrated partner of the larger corporate/hospital strategy and (2) for special funds and separate resources for all stages of the implementation.
- The case in section 8.4 shows the benefits of CoPs with GPs – GPs have been strong users of networking for decades in knowledge-sharing. It also highlights a question that is relevant to many KM initiatives: Does over-formalisation of knowledge processes have disadvantages? [20]
- Finally 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. In the future there will be wider use of KM which will result in improved healthcare services for patients.

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