Towards Process Modelling in 'Knowledge Management' Work

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Abstract: This paper draws from the experience of undertaking what has been termed 'knowledge management' work, and outlines the approach being taken, which has focused on the conceptual design of human processes. This paper presents a way of thinking about knowledge management as a set of processes involving (for example) (i) the human process to which human knowledge is applied (e.g. an 'operation' of some sort), (ii) the human process in which knowledge is encouraged to be developed (e.g. a course of study, application of techniques, thinking, reflection etc), (iii) a process of reviewing a the experience in problematic situation in order that learning can be derived (e.g. an 'after action review'), (iv) the integration of all the above processes which is in some way 'managed' and 'co-ordinated' through the process of undertaking work as a 'knowledge manager'. The approach being taken assumes that it is the processes that are being managed, rather than the knowledge per se. The paper outlines the approach taken which draws upon the experiences, difficulties and anxieties of taking responsibility for a knowledge management initiative associated with the EU funded MEDFORIST project.

Keywords: Knowledge, process, methodology, design, management.

1. Introduction

The MEDFORIST project is an EU funded project with the objective of helping e-business practitioners in the Mediterranean region to become more able to exploit the potential benefits of information and communications technologies (ICT) in regional organisations. An effective knowledge management process was considered by the project designers to be a key aspect in (i) enabling some key practitioners to come together to improve their knowledge, thinking, ideas, assumptions etc., about how to exploit ICT's in their own regions, and in their own organisations; (ii) disseminating new ideas through a variety of forms of training and communications programmes. The community members were chosen because of their own high profile status in their own countries in the area of ICT and initially consisted of approximately fifty people from twelve countries. One of the components of the work has been to develop a knowledge management process, and since the community members are geographically dispersed, the use of ICT is seen to be an important enabler. This component of the project was termed 'knowledge management' for want of a better description, although at the outset, there were some reservations about use of this term because early in the project it was recognised that knowledge is something that is uniquely human, and thus management of it could be conceived as being tantamount to telling people how and what to think! Nonetheless, it was also recognised that there was a potential benefit in sharing experiences, ideas, methods, techniques, approaches etc., in how to apply and use ICT in organisations in the region, because of the high potential that this new field (i.e. 'e-business') has for regional organisation development.

There has been substantial preliminary work that has been undertaken, which has involved:

(i) A highly critical 'best practice' analysis from other sectors, and

(ii) A highly critical analysis of the literature on the nature of knowledge management.

Certain conclusions from this work are drawn out in section 2 of this paper, although they are articulated in more detail in other publications (see for example Kawalek & Hart 2003, Kawalek 2004). This paper focuses on the challenges of design of the human processes in knowledge management, and in particular our search for a set of conceptual structures, which fitted with our conclusions on 'best practice' and the nature of knowledge management as detailed in section 2. It was a search, which required finding a way of thinking to help ground and guide the future work of the MEDFORIST project and its service to its community. The outline of this thinking forms the main body of the paper (section 3). The conclusions drawn are, we feel, fairly significant, in that they provide a 'process' approach to knowledge management, with some tentative ideas about guiding methodologies. Whilst the paper only outlines some preliminary work on the project, we feel that this work is sufficiently significant for publication at this early stage, because practice based organisations in the field have been searching for the practical guidance, grounded in methodology, so that serendipitous policy, designs, actions and investments can be replaced by a more grounded view of knowledge management initiatives (see for example Heisig & Iske (2003)). By being focused on human processes, we argue that it is not the knowledge that is being managed, but a set of

integrated human processes. In section 4, the paper proposes a number of these as a starting point, ready for further refinement. This refinement is considered to be a process in its own right, and is envisaged to involve 'design' type thinking and activities, and iterative process modelling. At this stage, this is envisaged to be a core aspect of methodology in knowledge management. The next stages of the MEDFORIST project is seen to be the vehicle upon which this approach, and potential methodology, is to be further refined and developed. Section 5 considers the relevance of the approach and how it fits in with other recent and current attempts to provide guidance to those responsible for implementing knowledge management initiatives.

2. Lessons from the preliminary work

A selection of sectors and projects were analysed via cases, existing literature, and also from the experience of undertaking an action-based piece of work in the humanitarian sector. The purpose was to try to learn as much as possible about how knowledge management is practiced, and the issues, constraints and problems that are faced by practitioners. There were many learning points that came out of this work, and these are articulated in Kawalek & Hart 2003. Some key points are selected and summarised here.

(i)   Technology in ICT based learning initiatives might be considered to be a key enabler, and must always play a secondary, support role if the objective is to develop *human* knowledge. This is based on the assumption that no technology holds knowledge. Only humans hold knowledge, although human interaction with data (which may be stored and/or transmitted electronically) can form part of a knowledge development process.

(ii) In the humanitarian sector, there is a perception that it has been traditionally poor at learning from past experiences, with change being limited to narrowly defined operational activities (see for example Suhrke, 2000). Structural, political and cultural dimensions to operational effectiveness have been often ignored (Minear 1998, Van Brabant 1997). We perceive this to be a constraint that limits knowledge development and the potential for operational improvement. This also demonstrated to us that structural, political and cultural

dimensions could not be separated from human knowledge, because these have influence on what people perceive to be 'valuable' knowledge.

(iii) The military sector relies heavily on learning from the effectiveness of its operational activities. Its After Action Review ('AAR') process demonstrates how open and honest debate encourages learning about both the problems of operations, and the individuals' role in those operations (see Morrison and Meliza 1999). The after action review process also highlights the importance of the role of facilitator. For example, it is said that in the AAR process the role is very influential on the outcome. Some key recommendations are that the role must be undertaken adeptly, focussing proceedings according to the perceived intended learning outcomes, without necessarily prescribing the issues. The success of the process also depends on the extent to which all participants understand the purpose of the activities or the issues under review, and conditions that foster a culture of trust rather than blame.

(iv) Unlike the military sector, in the UK health sector there is much more ambivalence and ambiguity as certain changes have been occurring. For example, sometimes there is an assumed transition from a single, national organisation with what could be perceived to be a 'command and control' structure into a complex set of autonomous organisations, (or Trusts). Since the health services are highly focused on service targets, issues of learning and knowledge can only be justified by reference to the targets. One knowledge management initiative involves developing virtual communities of practice (see www.ecommunity.nhs.uk). However, observations of unfacilitated online discussions have shown these to be unstructured and lacking in real learning or 'knowledge' outcomes. This demonstrated to us that there was a need for facilitation, which may need defining in online situations, and may be an important consideration in defining a knowledge management role. This is not to say that discussion forums always need specific facilitators, but there is need for guidance of some sort. Otherwise the sessions can degenerate into 'pub talk' that lacks focus. Furthermore, there are other challenges because learning activities must be justified against service

targets, which is something that can be difficult given the broad nature of knowledge development activities.

(v) The construction industry is characterised by groups of technical teams coming together from a range of different organisations, (mostly small, but some big), and the workforce is often transitory, brought together for fixed-term projects. In a situation quite similar to the MEDFORIST project, the construction industry workforce also has disparate learning needs. The COLA initiative (http://is.lse.ac.uk/b-hive) attempts to bring together these learners, using ICT to form virtual communities of practice to conduct reviews of operations and practices when there is a perceived need. These processes emphasise the importance of using critical reflexive techniques in the review process, and the need for community rules for the use of information and data to engender a culture of trust within the community.

In addition to the analysis of practice, a deep critique of the literature on knowledge management was undertaken. The purpose was to evaluate what, if anything, the literature could help with in terms of furthering the objectives of the MEDFORIST project. Much of the more recent work on knowledge management offered interesting and useful insights, concepts and definitions, but was largely devoid of methodology, in the sense that it seemed to lack a focus on justifiable guidelines on how to undertake the task. Also missing was guidance on how to undertake the role of 'knowledge manager'. One explanation of this was the problematic nature of knowledge itself, and a corresponding ambiguity in the literature about its 'management' (see Kawalek & Hart 2003). In doing a literature search, we were able to develop our own ideas about the nature of knowledge management and its implications for the MEDFORIST project. We present here some a short summary of our reasoned assertions and principles:

(i) Computer databases cannot hold knowledge. They can only hold data, and it is the human interaction with it that is important;

(ii) Human knowledge is teleological (i.e. it has purpose). Questions which attempt to ascertain (a) what people say is 'knowledge'; (b) what people take knowledge to be; (c) how knowledge is applied into practice; (d) how knowledge is acquired or developed …etc, each can be analysed for their teleological characteristics;

(iii) Knowledge is considered to be largely "*tacit or rooted in tacit knowledge*" (Polanyi 1964, p.144). 'Explicit knowledge' (i.e. knowledge that is communicated, written down, expressed in some way) is only ever a limited representation of human knowledge;

(iv) From the perspective of the user, explicit knowledge might best be seen as data, because one person's explicit knowledge does not necessarily mean another can use it to guide their actions. For example, a recipe is data in particular form, which could also be considered to be explicit knowledge, (i.e. it is a representation of some sort of the knowledge of an experienced cook). However, it remains data because novice cooks may not be able to interpret the recipe as the experienced cook intended it to be interpreted. The human knowledge of the novice cook and the conditions (of the kitchen) in which they work, (e.g. availability of utensils, measuring devices, time, social-political support for the cooking activity), play a key role in guiding the actions of the novice. The 'explicit knowledge' is only a component, and can be considered to be data because it may have limited meaning and a limited role in guiding the actions of the novice.

(v) Critical reflection has a significant role to play in improving action and the knowledge required for action (see Kolb 1984, Schön 1983);

(vi) Knowledge development through sharing experiences in communities of practice depends on common understanding of the context and language used (see also Brown and Duguid 1991, Lave and Wenger 1991). Thus knowledge and the context from which it is constructed cannot be separated;

(vii) These perspectives also consider knowledge development to be a dynamic process, in which, through knowledge sharing and critical reflection, the current state of knowledge is constantly being cross-referenced with new experiences and contexts to generate new knowledge;

(viii) An environment which encourages learning through dialogue and critical reflection is not one which imposes knowledge and values, but is one in which learners learn to question the underlying values and processes of their learning (see also Freire 1972).

The constructs and ideas outlined in both the 'best practice' and literature review highlighted some very useful and interesting points, and helped to question many issues, but ultimately failed to provide 'methodological guidance' (i.e. a set of abstractions that can help guide action in range of different situations) for designing, implementing and evaluating a knowledge management process. Much of the literature focused on certain elements (e.g. technology, characteristics of knowledge), but did not see those elements as a component of a bigger human activity set (or 'process'), or their 'design'. It was almost as if the elements were not cohesively integrated as a set of human processes with a set of principles, ideas, methods etc. Instead most of the 'design' focus was on technology designs, but not on human organisational designs. The MEDFORIST project has brought with it the challenge of finding some integrating process, and some of the thinking associated with this challenge is outlined in the following sections.

3. The challenge of the design of processes in knowledge management

If we were to start try to have an intelligent discussion about the nature of knowledge management, it might be seen to be necessary to clarify (i) what we mean by 'management', and (ii) what we mean by 'knowledge'. Thus, if we take knowledge to be something, then we might be able to work out how to 'manage' it! In the following subsections, we will characterise some aspects of both of these.

3.1 Management as a process of designing organisation and intervention

If we take the activity of managing to involve monitoring, intervention and changing organisations, then it would also be reasonable to argue that managers are 'designers' of organisations to some extent. Thus, the process of design might be considered to be an aspect of the activity involved in managerial work; the work that is involved in practice can be facilitated by a stream of conscious or sub-conscious thinking that might be informed by design work in other domains. It might be possible to outline what is involved in design work, and learn by abstracting the similarities and differences in other design activities (e.g. in designing physical things such as a bridge, car, building, robot etc). For example, design work often involves some sort of 'design vision' and we might argue that this is also needed in managerial work (e.g. a 'design vision' of how

organisation works, or a 'design vision' of how to make intervention in organisation, to help make it work). The challenge in knowledge management is that unlike with the design of physical things the design involves the design of '*organisation*', including physical entities like people, technologies, machines but also including activities, tasks, attitudes, data, knowledge, power – things that are non physical, but might be considered to be of importance.

If we consider the analogy with the design of physical entities further, the 'design vision' in knowledge management work, might be considered to be a 'model' for integrating the necessary components of the process (people, tasks, activities, technologies etc.) in order to achieve the specific purposes knowledge development or learning. As in any design vision, a model of an organised set of activities must be the product of human thinking and have the purpose of simplifying, communicating and/or summarising in some way the features of the designs that are involved. As in the design work of physical things, the process of deriving an *organisational* model might follow the consideration of alternative models, in a process of refinement of the models. By selecting from a set of alternative conceptual organisational models, it may be possible to assess their desirability in order to meet intended outcomes, in a given situation, in this case the MEDFORIST community. Organisational models may be represented as a set of explicit expressions, dialogues, arguments, prose or drawings, and can be either communicated or written down. However, they may also be implicit, remaining in the mind of a human (e.g. a 'knowledge manager'). In either situation, their purpose is to give clarity and purpose to the actions and decisions taken in everyday situations. The process of the construction, refinement and selection of models is a typical process of thought associated with teleological behaviour (i.e. it is purposeful) and, for the purposes of this paper, is termed "conceptual modelling". It is a process which:

(i) In some way describes the characteristics of an activity, or set of activities, and describes the organisation and characteristics of the elements needed to produce specific outcomes;

(ii) Attempts to distinguish (at a conceptual level) the difference between the various alternative models;

(iii) Assesses the various potential outcomes of each alternative model for a specific

situation, in order to achieve a specific purposeful objective;

(iv) Will have sufficient clarity for others to understand them;

(v) Includes an evaluative analysis of how the modelling has informed action in practice in a given situation;

(vi) Will attempt to develop general rules, abstractions or methodology, so to avoid the necessity of repeating the same thought processes when faced with similar goal seeking activities (see also Churchman 1971).

3.2 Knowledge, teleology and human processes

If we take knowledge to be humanly constructed, then it is also a reasonable assumption that knowledge has teleological characteristics. For example if we know a bit about what is needed in the human process of 'constructing a boat' then it is possible to abstract some key characteristics about the knowledge needed in order to 'construct a boat'. In this example, the purposefulness of knowledge is connected to one or more aspects of the process of 'constructing a boat'. The teleological characteristics of knowledge however, are often not quite as simple as this. For example a research process may produce knowledge, which is seen to be an explanation or re-interpretation of worldly phenomena of some sort, and in this case, the teleology of knowledge is connected to both of the following:

(i) The purposefulness of the research process and findings, (e.g. what the researchers believe[1] to be the importance of the explanation or re-interpretation); and

(ii) The knowledge that the researchers themselves possess in order to undertake the process of research.

Further, knowledge is a product of human processes, and as such, in all circumstances, must be teleological, if we assume that the processes themselves are teleological. Perhaps another way of expressing this, is that human knowledge can be seen to be derived from, and to support, one or more humans in 'doing something' (i.e. as part of a 'human process'). We are using the term 'human process' to mean a grouping of human activities, structured and organised in particular ways, in order to achieve particular outcomes.

This is not to argue that a human process is 'rationally' organised, but it does have a form, which is analysable in terms of how its components are integrated to achieve intended, unintended, known or hidden outcomes.

The link between knowledge and human process seems obvious in some ways, but from our critical analysis of the literature in knowledge management, there is often relatively scant integration between these: in much of the literature, focus tends to be on the 'knowledge' but not on the process. It is strikingly obvious that starting with the knowledge, and excluding the 'process', is tantamount to stripping something fundamental away: using the earlier example, it is as if meaningful discussion can take place on the *knowledge* needed in constructing the boat, without having any understanding of what is involved in boat construction! Thus, the starting point must be on the 'construction of the boat', or to make it more generalisible, any 'operational process'.

If this view of knowledge is considered to be reasonable, then the process of knowledge management must involve the integration between knowledge, its purposefulness *and* one or more human processes. Further, since human processes can be subjected to 'design' thinking, in order to implement the designs, or change current processes by comparing the conceptual designs with 'real-world' human processes, then it follows that the process of knowledge management involves careful consideration about the design of the human process in which knowledge is (or is potentially) applied. We will term this human process an 'operational process' for want of a better term. However, the careful consideration that is involved has its own challenges, because in the design of any one operational process, there are often very different viewpoints, interpretations and priorities of what that process is (or could or should be). It is also a challenge because an 'operational process' might involve non-physical things, and often human processes are not 'designed' consciously in quite the same way as physical things. Despite such difficulties, it remains that the knowledge and the operational process cannot be meaningfully separated[2]. As such, design thinking, conceptual modelling, or thinking carefully and with precision about the operational process is a starting point for

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[1] There is a difference of course between what an individual or social group 'believe' and what they say they believe.

[2] Hence the assertion that both human actions and human knowledge can be considered to be 'teleological' (i.e. they will be purposeful).

undertaking the work in knowledge management.

4. A process modelling approach to knowledge management

The preparatory work highlighted a number of potential challenges for a knowledge management process for the MEDFORIST community. For example, since the community is widely distributed around the Mediterranean area, technology enables the members to participate in the process, but it must be carefully designed to support the human processes that result in the development of human knowledge that enables that human to improve their role in operational activities. Of course, the technology needs to be designed, but it needs to be integrated into the design of the human processes, and this required developing further conceptual clarity.

The development of human knowledge occurs in many forms and in many ways. However, there are structures and activities (or 'human processes') that might be purposely designed to help people develop their knowledge. We will term these 'knowledge development' processes. In a school for example, children are taught a foreign language, using a range of techniques, methods and technologies etc. The children are being prepared for some potential human activity (an 'operational process') in which they might operationalise their knowledge (communication in a different language). The techniques, methods and technologies used in a process of developing children's capabilities at using a foreign language are components of a human process, but are not in themselves the designed process because it involves other additional components or elements. For instance, in order to achieve desired outcomes the process needs other things such as appropriate attitudes, beliefs, and behaviours, of the human groups involved. Such a human process can be subjected to design thinking, modelled, developed and changed, and can be considered to be one of many different possible knowledge development process designs. Hence, if a knowledge manager designs a process by which humans come together to develop their knowledge (in order to undertake a role in an operational process), this can be considered to be a 'knowledge development' process. Modelling the operational process, and the interlinked models of development is seen to be fundamental to design, implementation *and* evaluation in the process of knowledge management.

There are a number of points that might be derived from this:

(i) In many circumstances there are significant challenges involved in modelling the (a) 'operational process', (b) the 'knowledge development' process, or (c) the integration of the two. It is recognised that there will often be very different perspectives on how these should or could be designed and operated. As such, the process of modelling is itself problematic.

(ii) In designed processes that are supported by technology, the available technologies may place constraints and give opportunity to undertake the process in a particular way, but are not themselves 'the process'.

From the discussion about processes, and how they might be conceived, constructed, designed etc., we could tentatively consider a range of different process models in order to commence a debate about how they might help in the thinking that is necessary to undertake the human process of knowledge management in practice. An example is given in figure 1.

Figure 1 outlines some example human processes that might help structure the thinking about the processes that are involved in knowledge management. For example, if we are considering the design features of a 'knowledge development' process, we are also concerned with the 'operational' process in which and with which the human knowledge is connected. That is to say, if we are concerned with knowledge development, we are also concerned with the purposefulness of the human process that it might be considered to serve or derived from. Human knowledge development processes can take on many different forms, and therefore their designs require particularly creative and conceptual thinking. For example, a process of knowledge development might be in a form similar to that of an 'after action review' as discussed in section 2 (see process 3 in figure 1). We have termed this a process of an 'after action review' where there is knowledge that is developed from the reflexive analysis of experience. There are many different forms and designs of an 'after action review' process, but they serve the purpose of improving knowledge about certain aspects of operational activities, and the individual's own role in them. It is a form of knowledge development in order that future problems in situations can be dealt with, and that the designs of operations fit their purpose.
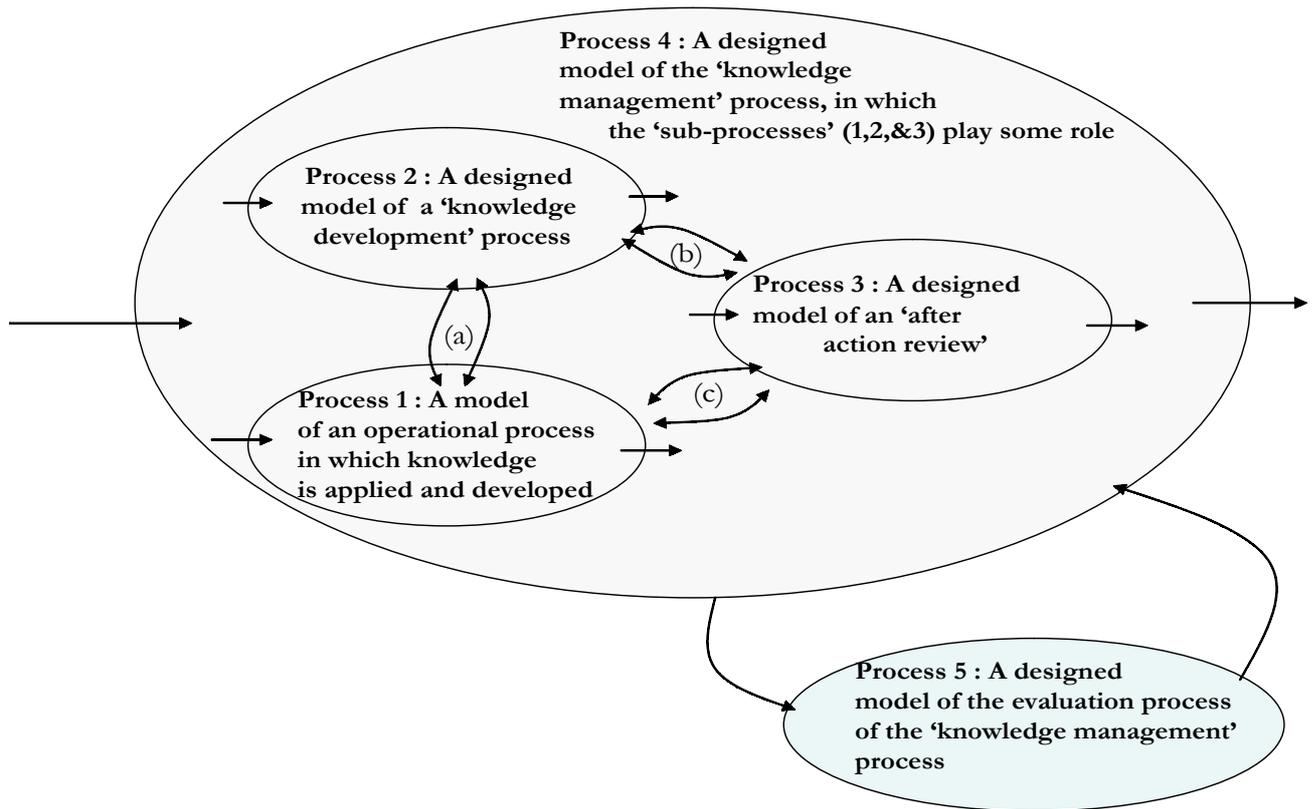
Figure 1: Some examples of potential conceptual process models that are integrated in some way

There are some very important points to make about the example process models in figure 1. Firstly, that the models outlined are conceptual, in that they are a product of thinking (they exist in the mind). As such they are not representations of reality, but might be considered to be useful for structuring the thinking about reality (e.g. the undertaking of the task of 'managing knowledge' in the MEDFORIST project). At first sight, this may appear pedantic, but it has some significant implications. For instance, if the models are taken to 'represent' the real world, then both the models and the process of modelling will have little meaning, because they could be taken to be 'in the world' as opposed to 'in the mind': as such, the process of modelling will be taken to be 'organising the real world' rather than organising the mind to tackle the 'real world', and these two are significantly different. Secondly, the tentative examples given in figure 1 are not designs as yet. There are many design features that might be considered important in the refinement of them. For example, it is possible to conceptually apply a variety of alternative constructs that are drawn from other literatures (e.g. the systems literature, or from the process modelling literature). For example, it is possible to think carefully about things such as:

(i)   Inputs, outputs and the transformations that are potentially made in each of these human processes (i.e. the process that is 'doing something');

(ii)   What would be expected in terms of content of each of the human activities (how the 'transformation' is achieved);

(iii)   The nature of control, communication and feedback that would need to be in place to make them work;

(iv)   What would the humans who are involved in each of these 'activity sets' need (e.g. a given set of motives, attitudes, knowledge, trust, security, incentives, skills etc);

(v)   How can integration of the different models be seen to be interconnected to the others, e.g. how might output of one human activity be linked to another activity (the undertaking of an 'after action review' might feed into other 'knowledge development' activities for instance), or how a 'high level' view of one process might be linked to lower level processes in a hierarchical structure;

(vi)   Evaluation of the usefulness of process modelling techniques such as 'role activity diagrams' or IDEF for assisting design and implementation;

(vii) Evaluation of the operationalisation of one or more process designs which may bring with it (a) purposely designed outcomes, and (b) other outcomes which were not purposely designed;

(viii) The inclusion of the socio-political context in which the work of operationalising the different human processes is being undertaken.

Thirdly, the constructs that are being used are to help "clarify" in an area of work, (i.e. 'knowledge management') which seems to be problematic in that there is relatively little guidance regarding the practicalities of undertaking the task. It is the next stage that will involve design work of different conceptual process models which may or may not fall into the 'categories' of (i) the operational process to which knowledge is applied or used in some way (process 1), (ii) the designs of the various knowledge development processes (represented in figure 1 as processes 2 and 3), (iii) the designs of the human process of knowledge management as might be undertaken by a 'knowledge manager' (process 4), and (iv) the design of the evaluation process as depicted in 'process 5' in figure 1.

5. The importance of a 'process' in knowledge management

In our preliminary work (see Kawalek & Hart 2003), we identified a number of major problems in knowledge management and concluded that whilst there were many useful ideas in the field, and there seemed to be an increasing need to take advantage of the opportunities afforded by new ICT technology, there was at the same time, poor focus on guiding principles on how to undertake the task. It means that knowledge management would have no credibility, because there is no way of guiding practice. These conclusions fit with the findings of others. For example Rubenstein-Montano *et al* (2001) note that there has not yet been a holistic approach for developing a methodology for designing and implementing knowledge management initiatives. In their review of many existing frameworks, they note that they are not consistent with systems thinking because they do not holistically "*consider the entire knowledge management process*" (p.8) e.g. purpose, knowledge, technology, learning, people, and culture etc., but instead fall into one of two classifications, either:

(i) Prescriptive, i.e. that certain actions should be undertaken, (for example 'acquire',

'store', 'share' knowledge). The majority of frameworks fall into this category;

(ii) 'Descriptive', i.e. they select and describe the necessary attributes of good practice in knowledge management.

They also note that although some frameworks had recognised the importance of the learning process, this had not been adequately addressed. They recommend that a framework should integrate both prescriptive and descriptive elements, and include processes that allow both single-loop and double-loop learning as defined by Argyris and Schön (1978).

The problem of a lack of adequate methodological guidance is also recognised by those responsible for setting standards. The British Standards Institute is of the opinion that it is too early in the stage of knowledge management as a discipline to impose rigid standards, but recognises that development and adoption of knowledge management in a variety of sectors, without a reference framework, "*has caused unnecessary and avoidable lack of clarity*" (see Farmer 2002 p5). Its preferred approach is to build on earlier work (BSI, 2001) in identifying common approaches and understandings in good practice leading to a "KM Framework of Good Practice and Analysis". It is also working closely with CEN/ISSS in developing the "European guide to good practice in knowledge management" (see Heisig and Iske, 2003). This guide currently outlines a three-layer framework consisting of:

(i) The organisational operational context in which the knowledge is to be applied (i.e. its purposes, processes);

(ii) The knowledge processing activities (e.g. identify, store, share, apply);

(iii) The knowledge capabilities within an organisation (at individual and organisational level, including issues such as motivation, culture, knowledge, skills, strategy, IT infrastructure).

This framework attempts to integrate both prescriptive and descriptive elements, prescribing the knowledge processing activities required (identify, create, store, share, and use knowledge), and describing those characteristics perceived as enablers to the processes (e.g.skills, behaviour, tools, culture). It also goes as far as attempting to provide some step-by-step guidance for SME's when using the framework to implement knowledge management initiatives.

In this respect the draft framework provides some useful insights into the necessary processes of a knowledge management initiative. Perhaps what is still not adequately addressed in this draft are the learning processes necessary for enabling those who use the framework to *know how* to identify, create, store, share and use the knowledge that is identified as appropriate to improving their operations.

The CEN/ISSS draft framework bears some resemblance to the dynamic model proposed by Nonaka et al (2000) for creating, maintaining and exploiting knowledge. This consists of three main elements:

(i)   Knowledge creation processes (through didactic interaction between tacit and explicit knowledge);

(ii)   Shared context for knowledge creation;

(iii)   Knowledge assets (inputs, outputs, moderators of the knowledge creating process- e.g. trust).

In this model, the context for knowledge creation to which Nonaka et al (2000) refer, is the context in which interaction takes place to develop knowledge. This 'place' is not a concept associated with a particular time or space, and has an affinity with the concept of communities of practice. The main difference is considered to be that in communities of practice "*members learn knowledge that is* _embedded_ *in the community, ba is a living place where* _new_ *knowledge is created* (p15)". They also consider that the boundary of a community of practice is firmly defined by the shared purpose, culture and history. This perspective of a community of practice is consistent with the work of those in the field (see Lave and Wenger, 1991). However, it is not clear where an emerging community of practice such as MEDFORIST fits in to such a perspective, since it has no history and its domain of interest, e-business, is also an emerging discipline, the nature of which is itself not yet clearly defined. The Nonaka model (e.g. Nonaka, 1994) has in any case been recently challenged as a model for knowledge creation (Gourlay, 2003), but notwithstanding this the model does not consider the context in which the knowledge created is to be applied.

6.   Conclusion

We have presented what we believe to be some fundamental and exciting ideas on methodology for knowledge management, based on 'process' thinking. Whilst the research is far from complete, we hope that some of the foundational ideas, concepts and

thinking have been explained. The approach recommended for the MEDFORIST project is around process thinking and modelling, and the research aspect to this is focused on a generalisible methodology for knowledge management. The work intends and attempts to take an holistic and integrative view of the set of human activities involved in knowledge management, which is both relevant and important, as recognised by others (see section 5). The conceptual structure in figure 1, and the thinking that it is based upon, allows the integration of many useful ideas from the knowledge management literature, and in particular enables a process whereby the assumptions about the teleology of knowledge are integrated into a debate about the nature of the operational activities that it is assumed to serve. This linkage is strong in much of the classic literature where experience, learning and reflection are integrated (see for example Kolb, 1984, or perhaps even more fundamentally Singer, 1959). The knowledge management initiative for the MEDFORIST project is being undertaken as an action based piece of research, in a manner akin to 'mode 2' in which the researcher is not simply observing and documenting, but is engaged in an everyday sense, in the challenge of undertaking a particular role within the project (see Starkey and Madan, 2001). This enables the testing of methodology, ideas, principles, concepts, frameworks etc., to critique and inform action that can maximise the chances relevance and realism to the research process. It means that the work can be both intellectually rigorous, but it has also the possibility of a highly practical and relevant outcome, which is of course, required in disciplines such as Management, which has an 'applied' component.

** Please note **
We would be very pleased to hear from the readers of this paper. Questions, comments, critical or otherwise would be kindly welcomed. Please e-mail us d.hart@sheffield.ac.uk, or J.Kawalek@sheffield.ac.uk.

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