A Process View of Knowledge Management: It Ain’t What you do, it’s the way That you do it

John Edwards
Operations & Information Management Group, Aston Business School, Aston University, Birmingham, UK
j.s.edwards@aston.ac.uk

Abstract: Knowledge management needs to consider the three related elements of people, processes and technology. Much existing work has concentrated on either people or technology, often to the exclusion of the other two elements. Yet without thinking about process – the way people, organisations and even technology actually do things – any implementation of a knowledge management initiative is at best risky, and at worst doomed to failure. This paper looks at various ways in which a process view has appeared, explicitly or implicitly, in knowledge management research and practice so far, and reflects on how more “thinking about process” might improve knowledge management in the future. Consistent with this overall viewpoint, the issues generally centre less on what a process view would suggest should be done, but rather on the way that it would be implemented in practice.

Keywords: KM theory, process, KM practise, KM research

1. Introduction

Knowledge management in organisations has been a well-documented activity for at least 15 years (Davenport & Prusak, 1997; Nonaka, 1994) and was being carried out for many years – probably centuries – before that. Nevertheless, many organisations - or rather their managers - still find knowledge management somewhat of an uphill struggle, especially when it comes to implementing the plans they have decided upon.

As a relatively recent field, it might be thought that this difficulty results from an absence of theory, but even a brief review of the literature makes it clear that this is no longer the case. For example, there are now some 20 journals in knowledge management or closely related fields (Bontis & Serenko, 2009); while a search on ISI Web Of Knowledge™ for articles including the phrase “knowledge management” returns over 10,000 items (Edwards, Handzic, Carlsson, & Nissen, 2003; Ruggles, 1998; Serenko & Bontis, 2004).

While it remains true that there is no one agreed "unified theory of knowledge management", our conjecture here is rather that managers do not place enough emphasis on certain parts of the established theory. A description of knowledge management as consisting of people, process and technology is well known (Edwards, 2009), but we will argue that the emphasis has been too strongly on technology and people, with insufficient attention paid to the process element.

A good analogy for trying to implement a knowledge management initiative in practice is with learning to drive a car/automobile. In the UK, and in many other countries, a learner driver has to pass a theory test before being allowed behind the steering wheel at all. However, there is a big difference between: doing the theory test, sitting in the front passenger seat while someone else drives and actually driving the car yourself. The first one is completely safe - the worst that can happen is that you fail the test and have to take it again. The second should be safe, too, as long as you have a reliable driver; the passenger does not have to concentrate on steering, clutch or gears, let alone other road users, and can sit back and enjoy the ride, and perhaps the view. But if you can recall your earliest efforts at driving you will surely remember the shock you received when you first had to do all these things for yourself - even if someone else was telling you where to turn, as usually happens with learner drivers. Becoming an accomplished driver needs practice and understanding in addition to theoretical awareness and knowledge.

Knowledge management has much the same three stages as learning to drive. Most managers are now familiar with some of the theory of knowledge management, at least, and many of those more recently qualified at university will have studied a module in knowledge management. Those thinking about implementing a knowledge management initiative in an organisation will also probably have "sat in the passenger seat"; by this we mean that they will have read articles or books about the experiences other organisations have had when implementing knowledge management. Indeed, over
the last few years the possibilities for "reading" about what others have done have expanded to include message boards, forums, and blogs such as KnowledgeBoard and the activities coordinated by David Gurteen, although we do not recall having seen any knowledge management initiatives on YouTube - yet! Nevertheless, whatever the medium, when the knowledge management initiative is in another organisation, then someone else is still doing the driving.

That third stage, implementing knowledge management initiatives yourself, presents a step change in difficulty. General awareness of knowledge management theory is one thing, but understanding is quite another. This leads to the commonly heard comment (see for example Tillian (2001), Carrillo & Chinowsky (2006), and the UK National Health Service library on knowledge management at http://www.library.nhs.uk/KNOWLEDGEMANAGEMENT/) that "we know about knowledge management as a concept, but how do we do it?" That final phrase is really the focus of this paper - how we, or they, do it.

The paper is structured as follows: we first look at knowledge management theory and explain in more detail the reasons why managers should think more about process - the way things are done, rather than what is done - when implementing knowledge management initiatives. We then go on to consider what process thinking means in knowledge management terms. Finally, we look at the implications of this process thinking for knowledge management practice and research.

2. Knowledge management theory

We will, unusually, take a somewhat backward chronological perspective in order to explain the place of process thinking in knowledge management theory. By 'backward', we mean that we will look at the present situation first and then describe how it came to be that way. Knowledge management is still a relatively young field, and despite the thousands of publications there remain many areas of disagreement between different knowledge management specialists. Nevertheless, there has long been general agreement that "doing" knowledge management is not easy (Ruggles, 1998) and that there is no "one size fits all" solution - no single way that knowledge management can be successfully implemented in an organisation. The empirical work of our own research teams at Aston over the past ten years or so bears this out. In that time we have seen:

- Organisations where knowledge management has been successful
- Organisations where an ongoing knowledge management initiative has had little or no impact
- Organisations where knowledge management has gone well for a time and then stopped
- Organisations where knowledge management can’t get started

For example, we found in Edwards (2005) that over a two-year period, of 16 organisations examined, eight had made progress in their knowledge management initiatives, four were at about the same stage, three had gone backwards and in one case all trace of the knowledge management initiative and the group in charge of it had completely disappeared. Our experience has included organisations where knowledge management has become part of the fabric of the way the organisation works, such as the Mortgage Code Compliance Board (Shaw, Hall, Baker, & Edwards, 2007) and those where it has suffered badly because of the departure of key individuals, such as the organisation referred to as Restaurants in Shaw & Edwards (2005). We have also been talking to at least one organisation about the possibility of "doing something in knowledge management" for more than five years without any concrete initiative resulting.

Let us see how this might have come about. Our diagnosis of “The Problem” in "doing" knowledge management is as follows. Managers seem to be happy about the basic principles of knowledge management in isolation but they have trouble in applying the ideas to their own organisation. In addition, it is not just a problem for managers: knowledge management is everyone’s problem (Edwards, Shaw, & Collier, 2003). We have, for example, found that the workforce may have difficulty in doing what the knowledge management initiative recommendations suggest that they should. In one case we were working with a manufacturing organisation referred to as ManufIndProd in Edwards et al (2005) and Edwards & Shaw (2004). This organisation had been formed by a management buy-out not long before. Previously it had been just one manufacturing site within a much larger and more diverse organisation and all major initiatives had come from head office. That head office was seen as being remote culturally as well as geographically. For example, it was very rare for managers from head office to visit the site, and the workforce were not expected to make suggestions for consideration by head office either. As a result, the response of the workforce to most new initiatives
was to report back to head office in such a way as to suggest that the initiatives were going ahead, but actually to carry on working in the same way they had always done. With a high proportion of long-service employees, this tradition of only paying lip service to what were seen as "management" ideas was very hard to shake off, even in the new climate where "management" was a visible, known presence every day who actively wanted the workforce to participate in making all new initiatives - including those in knowledge management - work successfully. This was not just a cultural change, but also one of learning and understanding: the employees had previously regarded management ideas as being only for the management, and had ignored them as much as possible.

To sum up therefore, why implementing a knowledge management initiative is difficult (borrowing an idea from Rommert Casimir which he originally applied to management science):

- There is not really much disagreement about "good knowledge management", at least in general terms
- The fatal mistake is to treat knowledge management as if it were a game of chess, where there are no practical constraints and so deciding on a move (e.g. Qa4) is effectively the same as doing it...
- ...rather than as a game of tennis, where there is only one "move" (hit the ball back into your opponent's half of the court where they cannot return it), but it is making the move – implementing it - that makes it difficult - or else we would all be as good as Rafael Nadal or Venus Williams!

### 2.1 Elements of knowledge management

Knowledge management has often been described as comprising three elements: people, processes and technology. This view almost certainly has its origins as far back as the Leavitt "diamond" model of organisations (Leavitt, 1964), although Leavitt included task and structure alongside people and technology rather than processes. It is important to stress that the term processes refers to the business processes of the organisation concerned, not just to its knowledge management processes.

Figure 1 shows how these three elements link together, each of them having a reciprocal relationship with each of the other two. For example, People help design and then operate Processes, while Processes define the roles of, and the knowledge needed by People.

![Figure 1: People, processes and technology, taken from Edwards (2009)](chart)

As well as the relationship between the three elements, Figure 1 can also be used to help conceptualise any particular knowledge management initiative, by regarding it as being positioned somewhere in the triangle with the three elements at its vertices. Examples of knowledge management initiatives near the People vertex of the triangle would be implementing directories or communities of practice. Near the Technology vertex would be implementing repositories or knowledge-based systems. Near the Process vertex would be implementing new ways to work or to build in what you want to achieve, in both cases to achieve knowledge management objectives.
We now take our backward glance at how knowledge management history has developed so far, to help understand the role of Process in knowledge management initiatives. Many authors, at least as far back as Newell, Robertson, Scarbrough, & Swan (2002) say there have been two generations of knowledge management so far (at whatever time they were writing). First generation knowledge management adopted an objective, cognitive view of knowledge, and initiatives placed a corresponding emphasis on Technology. This corresponds to the codification strategy of Hansen, Nohria & Tierney (1999). Second generation knowledge management adopted a practice-based, community view of knowledge (often described instead as “knowing”), and initiatives placed an emphasis on People, corresponding to the personalisation strategy (Hansen et al., 1999).

Other authors make a similar distinction, but from the viewpoint that both perspectives have been visible since the earliest days of knowledge management (Alvesson & Karreman, 2001; Quintas, Lefrere, & Jones, 1997; Roos & Von Krogh, 1996; Scarbrough & Swan, 2001; Sveiby, 1996). What both of these descriptions have in common is that the emphasis has been on Technology and/or People…perhaps it is time for more emphasis on Process?

A different slant on the history of knowledge management, as adopted by others, such as Mouritsen & Larsen (2005) is that there have been two waves of knowledge management. The first wave they describe as being based on knowledge in individuals, whilst the second is based on knowledge as intellectual capital. This second wave includes much more focus on Process, as is apparent in the case example of Coloplast, a company manufacturing health care products, that Mouritsen & Larsen discuss.

3. What do we need to be able to do to processes?

Space does not permit a full discussion of how to “think process” in this paper. Therefore, rather than presenting the usual theories that have emerged from the fields of systems thinking and business process reengineering, in this section we propose an action-oriented view of process thinking. This is based on what the people attempting to implement a knowledge management initiative need to be able to do while “thinking process”. We identify eight different activities:

- Identify processes
- Design/plan processes
- Implement processes
- Facilitate processes
- Monitor processes
- Analyse processes
- Mend processes
- Retire processes

The links between these activities are shown in Figure 2. The activities on the right-hand side of Figure 2 split into formal and informal, the latter being the Facilitate activity. This ensures that knowledge management continues to be seen as everyone’s problem, not just that of the team leading the knowledge management initiative. The formal activities further split into those activities relevant to existing business processes (leading down from Analyse) and those relevant to new processes (leading down from Design).

Changing a process can be especially risky, especially if it did not necessarily need “mending”. For example, the Ferrari F1 motor racing team had a very effective and well-honed process for carrying out the pit stops that are such a crucial part of F1 races. However, they decided to improve the method for telling the driver when the stop was complete and he could go. Previously, in the same way as all the other F1 teams, this had been done by a man holding a sign on a long stick, colloquially known as a “lollipop”, in front of the driver and lifting it out of the way when it was safe to go. Ferrari replaced it with a traffic light system which changed the existing lines of communication, and it was a communication breakdown that led to a spectacular accident at the Singapore Grand Prix in which a car drove away with the refuelling hose still attached (see the video at http://www.youtube.com/watch?v=msXKYgTCDec). This was a clear knowledge management failure,
in that the team had not thought carefully enough about how the person giving the driver the signal to go could be certain it was safe to do so when he was not physically in the same place as before.

**Figure 2:** Activities relevant to thinking about processes

This example leads us into the wider consideration of knowledge management and risk management, an area where we believe process thinking about knowledge management has much to offer, in the next section.

**4. Knowledge management and risk management**

Throughout the management literature, risk management has increased priority/visibility at present. There are several reasons for this, including: the recent global financial crisis; growing concerns about natural disasters such as climate change or pandemics; and increased fear of terrorism.

Early in the development of knowledge management (Marshall, Prusak, & Shpilberg, 1996), risk management was identified as an area to which knowledge management could contribute. However, even though one of those authors (Prusak) soon became recognised as a knowledge management “guru”, progress at the interface of the two fields has been relatively slow, although some articles have appeared (Atkins, Singh, & Pathan, 2008; Carasso et al., 2005; Farias, Travassos, & Rocha, 2003; Jennex & Zyngier, 2007; Jovanovic, 1999; Lengyel & Newman, 2010; Schulte, Lentz, Anderson, & Lamborg, 2004; Tah & Carr, 2001). Recently we have been working on the links between knowledge management and risk management, the two specific sectors we have been researching being financial services, especially retail banking (Rodriguez & Edwards, 2008, 2009a, 2009b) and health care, in our case a UK hospital trust (Anthropopoulou, 2005, 2010). We draw on lessons from these two sectors here.

In any large organisation, risk management is a massive task – for example, in one Directorate alone of the hospital we studied there were over 1000 open risks at any given time according to the risk register. However, our research has suggested that there are many similarities between banks and hospitals as far as knowledge about risk management goes.

The greatest similarity is that both types of organisation tend to have a silo mentality, as is surely also still true in other sectors. This mentality has long been recognised as a weakness (Fung, 2006; Hammer, 1990) and yet is practically “built in” to the standard form of organisation chart, as Figure 3 shows. The banks and hospitals we have studied still tend to have this style of organisation: risk communication has to go up the silos and “over the top” via senior management before it can go down again – if it ever does. Anthropopoulou’s hospital interviewees said that they cannot cut across the organisation at lower levels as no-one has the boundary spanning knowledge (for example...
between two different medical specialisms) to understand what is happening in two silos. In financial services, by contrast, it seems from the work of Rodriguez that different departments simply do not talk to each other, although it seems likely that in this case they could understand one another. A further similarity is that middle managers in both types of organisation focus “down” more than “up”, i.e. managing for the specific benefit of their department rather than that of the organisation. These are clear examples, in both of these very different sectors, of the limitations of thinking structure rather than thinking process.

![Figure 3: The silo mentality - built into the standard organisation chart](image)

Process thinking can reduce the silo mentality because processes naturally cut across the organisational silos (Edwards, 2009). Despite what managers say, especially in hospitals, those involved in “adjacent” or connecting activities within a process must be able to share knowledge. However, this does not mean they have to have completely the same knowledge. Rather, it means they must have enough common knowledge to communicate where their responsibilities overlap. We have discussed these issues elsewhere (Edwards, Hall, & Shaw, 2005).

There are two extremely important consequences in knowledge management terms. Firstly, there is a requirement that someone must oversee this communication: we use the term oversee because what is needed may be management, leadership or just facilitation. Secondly, there is a need for appropriate \( Ba \) (Nonaka & Konno, 1998) in which the communication can happen.

5. Process thinking successes and non-process thinking failures in knowledge management

5.1 Process successes

Several examples of the successful use of process thinking may be found in the knowledge management literature, although they are still in the minority. Bou and Sauquet (2004) well illustrate the benefits of process thinking compared to other approaches to knowledge management. The issue concerned documenting the process of helping unemployed people to find a job; taking a proper process view with an awareness of the knowledge required in each activity led to the production of very different documentation from that in use previously.
Spies, Clayton, & Noormohammadian (2005) describe a knowledge management initiative in Allianz, to implement an intelligent search engine. Successful construction and implementation required close attention to how searchers actually used a search engine, the crucial finding being that how searchers used it was different between different departments.

Apostolou, Abecker, & Mentzas (2007) explain how a system was implemented in a management consultancy using what they called a “knowledge management-enabled business process”.

Barcelo-Valenzuela, Sanchez-Schmitz, Perez-Soltero, Rubio, & Palma (2008) use a process approach at the heart of their knowledge management methodology. They stress the importance of identifying the core processes - what the business actually does (Edwards, 2009) – before attempting to implement knowledge management initiatives (“apply knowledge management strategies” as they call it). This is illustrated by applying the methodology to the international relations office of a university.

A previously unpublished example taken from our own research concerns an organisation responsible for obtaining timetabling information about public transport from the transport providers in its area and making it available to the would-be travelling public. Their original thinking was that they needed a “knowledge base” in the form of a codified system to retain the knowledge of the people who were responsible for providing the information, and that what they required was advice on the best software to choose for this.

However, a study from a process viewpoint revealed that codification would be solving the wrong problem. This group of people did not have any problems sharing their knowledge or supporting each other on a daily basis; arguably they had successfully formed a community of practice already. The major knowledge sharing issues were only about new staff; what happened when a different person took over the job of providing the information. Thus it turned out that the most effective knowledge management approach to take was one of improving the induction process for these staff, not trying to build a codified knowledge base at all. This was also substantially cheaper than the originally intended “solution”.

There are also several other knowledge management articles where a process view is implied but not made explicit (Ambos & Schlegelmilch, 2009; Firestone, 2008; Mansingh, Osei-Bryson, & Reichgelt, 2009; Shaw & McGregor, 2010; Smith, McKeen, & Singh, 2010).

5.2 Non-process thinking failure

Our own research (Edwards & Kidd, 2003) also included the example of a manufacturing company, referred to as Makelt in the paper, which had a goal of being seen as a learning organisation. Makelt’s management had a very top-down approach to knowledge management. They had identified that one knowledge management issue was a lack of knowledge sharing, and thought that better IT support, in this case in the form of groupware, was the way to address this issue. The decision to implement a groupware system was taken with little or no analysis of how knowledge sharing currently took place, or how Makelt’s workforce would like it to happen, i.e. the relevance to the business processes. Perhaps not surprisingly, only one group of staff within Makelt wanted to share knowledge using a groupware system; they were the IT staff who were responsible for implementing that system.

6. Concluding remarks

We conclude this paper by drawing together the key themes that those undertaking knowledge management initiatives need to watch for when “thinking process”, and by adding some implementation “dos and don'ts” based on the knowledge management initiatives we have observed and participated in.

6.1 Key themes

Break the silos – ensure that the initiative is truly taking place across the organisation.

Remember to consider leadership and roles in relation to the processes concerned. From the process perspective, the unit of analysis is the role, rather than the person: one person’s job may be spread
across more than one business process. Particularly important is that where there is a business process cutting across the silos, someone has to have the overview of it as a process.

An open question is how this relates to the idea of knowledge champions (Duffy, 1998). As mentioned above, roles are really important with a process view. At one time knowledge champions were a hot topic in the knowledge management literature, but while there continues to be much discussion of roles at CKO (Chief Knowledge Officer) level, roles below that are not so evident – yet they are key to the leadership of knowledge management as an activity.

Learning by individuals must be firmly in the context of the activities that the task they are carrying out involves. Again, from the process viewpoint performance of a task relates to a role.

Knowledge management initiatives offer a fruitful way to improve the management of risk/uncertainty in a world that is perceived to be increasingly uncertain.

### 6.2 Do…and don’t…

**Do:**
- Lead from the top
- Make sure to cut across boundaries
- Think of a knowledge management initiative in terms of being part of an ongoing knowledge management activity, not as a “project” that is done and finished

**Don’t:**
- Go against the organisation’s culture
- Expect people (or processes) to change overnight
- Ignore the exceptions to the process – either make sure your process can cope with them, or ensure that they cannot happen

### References


Coopetitive Knowledge Sharing: An Analytical Review of Literature

Shahla Ghobadi and John D’Ambra
Information Systems, Technology & Management Australian School of Business, University of New South Wales, Sydney, Australia
s.ghobadi@unsw.edu.au
shahlaghobadi@gmail.com
J.dambra@unsw.edu.au

Abstract: The knowledge being shared for cooperation may also be useful for competitive purposes. Whilst this situation is acknowledged, there is no through analysis of how it has been investigated and treated in prior research studies. This paper reviews the literature on simultaneous cooperative and competitive knowledge sharing. It also contributes to this area through an analytical review that compares the literature linked to this phenomenon and identifies their strengths and limitations. The analysis of the findings suggests that efforts in this area have been undertaken independently and with little consideration of the prior studies in different but related realms. The findings suggest the benefits of integrating different bodies of literature in building on a broader platform of existing epistemological and ontological foundations.

Keywords: coopetition, knowledge sharing, coopetitive knowledge sharing, simultaneous cooperation and competition, knowledge management, co-opetition

1. Introduction

Knowledge has been viewed as a competitive advantage and a source of power for those who possess it at the right place and at the right time (Lorange, 1996, Van Der Bij et al., 2003, Yang and Wu, 2008).

The extant literature draws attention to two consequences of knowledge sharing including: cooperative and competitive benefits (Tsai, 2002). The cooperative benefits of knowledge sharing refer to the collective use of the shared knowledge in pursuing common interests, whereas the competitive benefits refer to the use of the shared knowledge to make private gains in an attempt to outperform partners (Khanna and Gulati, 1998). Therefore, those who possess specific knowledge could enjoy some benefits and unique positions, which might be lost by sharing that knowledge. Accordingly, knowledge sharing among individuals involves a social dilemma that is due to the complexity of interactions between people (Yang and Wu, 2008). These mixed characteristics indicate that knowledge is both a ‘source of’ and a ‘barrier to’ innovation (Dougherty, 1992). Specifically, knowledge can be effectively shared to facilitate innovation in collaborative contexts. At the same time, the perceived competitive value of knowledge in collaborative contexts makes individuals reserved in sharing the important knowledge, which is essential for innovation.

The ignorance or the lack of attention into the mixed characteristics of knowledge (cooperative and competitive) in constructing many knowledge management systems has resulted in their ineffectiveness (Yang and Wu, 2008). In other words, even though the best management systems are instituted and information communication techniques are put in place, the essential knowledge may still not be shared and infused into the right people (Yang and Chen, 2007, Yang and Wu, 2008).

Through an analysis of literature, prior research on Coopetitive Knowledge Sharing is classified into three groups including: (i) ‘Coopetitive Knowledge Sharing’ and ‘Game Theory’, (ii) ‘Coopetitive Knowledge Sharing’ and ‘Knowledge Management Literature’, and (iii) ‘Coopetitive Knowledge Sharing’ and ‘organisational management literature’. Each research classification is discussed, and its major characteristics, strengths, and limitations are explained. The analysis of findings reveals that the efforts in this area have been undertaken independently and with little consideration of the prior understanding on this topic in different but related realms. The paper concludes by discussing how the extant literature can be integrated in order to build upon the strengths, and to direct future research studies on the notion of ‘Coopetitive Knowledge Sharing’.

2. A background of simultaneous cooperation and competition

A research theme in organisational studies highlights the importance of incompatible structures such as cooperative and competitive structures on organisational outcomes (Beersma et al., 2003, Alavi et
The major examples of the studies in this research theme are in the pursuit of Social Interdependence Theory that categorises competing goals into cooperative and competitive goals (Tjosvold, 1998, Alper et al., 2000, Deutsch, 2000, Chen et al., 2005).

The basic premise of Social Interdependence Theory lies in three variables including: (i) interdependence, (ii) interaction patterns, and (iii) outcomes (Deutsch, 1949, Johnson and Johnson, 2006). According to this theory, the structure of interdependencies among individuals determines the degree of cooperative or/and competitive interactions among them (Johnson and Johnson, 2006). More specifically, beliefs about interdependencies affect the courses and outcomes of their interaction.

One the one hand, positive levels of interdependence induce cooperative interactions in terms of higher expectations of assistance and support, greater harmony, and more trusting and friendly relationships (Jehn, 1994, Tjosvold, 1998, Lin, 2010). On the other hand, incompatible or negative interdependencies may result in competitive interactions in terms of pursuing individual goals and win-lose rewards, increasing mistrust, and restricting information and resource exchange (Dirks and Ferrin, 2001).

Many studies highlight the superiority of cooperative structures to competitive structures and their favourable impacts on organisational performance (Pinto et al., 1993, Song et al., 1997, Tjosvold, 1998, Alper et al., 2000, Deutsch, 2000, Chen et al., 2005, Medina and Munduate, 2008). Accordingly, cooperative environments are negatively associated with task and relationship conflict, whereas competition may result in the destructive conflict that is a waste of resources. In addition, competitive structures may disrupt information exchange and destabilise decision making processes.

Research does not imply, however, that cooperative structures are always superior, or that competitive structures are inevitably destructive (Tjosvold, 1998, Gordon et al., 2000, Ferrin and Dirks, 2003). Competitive structures can be effective means of stimulating innovation, increasing task focus, generating high-quality problem solving, and building group cohesion (Van Drew and Van De Vliert, 1997, Gordon et al., 2000, Beersma et al., 2003, Tjosvold et al., 2003, Beersma et al., 2009).

Many studies have compared the relationship between cooperative and/or competitive structures and group outcomes (e.g., task speed, task accuracy, social connectedness, and interpersonal trust) (Slavin, 1977, Beersma et al., 2003, Ferrin and Dirks, 2003, Johnson et al., 2006, Serrano and Pons, 2007, Beersma et al., 2009). Over the years, these studies have shown that the relationship between cooperative/competitive structures and their social outcomes is more complex than what previously thought (Gordon et al., 2000). For example, Lin et al. (2010) suggest that organisational outcomes under simultaneous cooperation and competition are the result of a complex process that owes both to the underlying nature of cooperation and competition, and to the ways in which their antecedents influence them. Accordingly, fostering positive organisational outcomes does not have only ‘one size fits all’ solution. For example, It has been empirically shown that intergroup competition directs individuals toward group achievement, whereas intergroup cooperation encourages interpersonal interaction and social connectedness (Bettencourt et al., 1992).

Therefore, the most appropriate choice of cooperative and competitive structures is highly dependent on the situation (Tjosvold, 1998, Chen et al., 2005). For example, competitive structures can be constructive if they can be integrated with a general cooperative context and visa versa (Gordon et al., 2000). More specifically, besides a single dominant climate, most situations are ‘comprised of’ and ‘require a mix of’ both cooperative and competitive structures at various intensities (Goldman et al., 1977, Mintzberg, 1991, Tjosvold, 1998, Jashapara, 2003).

Apart from the recent increasing research interest in the combination of cooperative and competitive structures, the extant literature points to their mixture as one important but largely unexplored area for further research (Ferrin and Dirks, 2003). This lack of research could be partly related to Deutsch (1949)’s view arguing that hybrid structures are a weaker and more unstable version of strong cooperative or competitive structures, and so do not require independent research (Gordon et al., 2000).
3. Coopetitive knowledge sharing landscape

The extant literature demonstrates a confusing profusion of overlapping terminology and meanings related to the concept of Coopetitive Knowledge Sharing. As a consequence, many referring labels can be found such as: ‘knowledge sharing under coopetition’ (Tsai, 2002), ‘knowledge sharing under social dilemma’ (Yang and Wu, 2008), ‘hoarding knowledge in collaborative contexts’ (Du Plessis, 2005), and ‘knowledge sharing under cooperative and competitive structures’ (Luo et al., 2006).

The lack of the existence of a universal definition for Coopetitive Knowledge Sharing is in part due to the way this concept has been developed. The following sections show that this concept has been studied differently (and from different points of view) in different bodies of literature. Such a multidisciplinary origin and evolution has resulted in the lack of robust conceptual frameworks for the development of theory on this concept. As a consequence, there are few and relatively limited empirical models that explain this phenomenon.

In the following sections, bodies of literature associated with Coopetitive Knowledge Sharing and different perspectives adopted by them are explained. The comparison of the reviewed literatures highlights how different literatures have contributed to this phenomenon from diverse perspectives. Three subject areas have been discussed including: (i) Coopetitive Knowledge Sharing and Game Theory, (ii) Coopetitive Knowledge Sharing and Knowledge Management Literature, and (iii) Coopetitive Knowledge Sharing and organisational management literature.

4. Coopetitive knowledge sharing and game theory

The concept of Coopetitive Knowledge Sharing was initially developed based on the insights received from the numerical Game Theory frameworks (Schrader, 1990, Loebecke et al., 1999). More specifically, these frameworks focused on the strategic costs of sharing knowledge that were derived from the work of Schrader (1990) and Von Hippel (1994). According to Schrader and Von Hippel, knowledge has two values. The first value is the basic value of knowledge (r) and the second value is value-added (v). Value-added (v) reflects the advantage of receiving the knowledge by the receiver, while the sender is not aware that it is lost by sharing (Schrader, 1990, Von Hippel, 1994). Payoff represents the desirability of an outcome and demonstrates the value people get and lose by sharing knowledge. Perceived payoffs can involve individuals in an employee’s dilemma, which make people hoard their knowledge and get payoffs. The idea of Coopetitive Knowledge Sharing gradually attracted increasing academic attention (Loebecke et al., 1999, Tsai, 2002, Levy et al., 2003, Shih et al., 2006).

Loebecke et al. (1999) studied the intention to share knowledge among competitors at the inter-organisational levels, and extended the concept of Coopetitive Knowledge Sharing by adding three dimensions into the basic game theoretical model of knowledge sharing including: (i) synergy (s), (ii) leveragability (l), and (iii) negative reverse impact (n), as shown in Table 1. Synergy (s) exists when both parties share their knowledge, and it refers to a situation in which the knowledge created by different parties exceeds the knowledge that those parties create when working independently. Leveragability (l) is defined as the potential that knowledge receiver can increase his/her value by exploiting the shared knowledge independently. Negative reverse-impact (n) refers to a situation in which knowledge receiver applies the shared knowledge in a way that weakens the original value of the sender. Loebecke et al. (1999) suggested that the optimal situation is a scenario of high synergy, high leveragability, and low negative reverse-impact.

Shih at al. (2006) categorised knowledge sharing into four major groups including: (i) job-guarantee (a prisoner’s dilemma with no performance appraisal and reward systems), (ii) individual performance (an employee’s dilemma with performance appraisal and reward systems for individuals only), (iii) team performance (a cooperative game with performance appraisal and reward systems for team only), and (iv) team learning (a coopetitive game with performance appraisal and reward systems for both individual and team). Table 2 depicts the payoff matrix of knowledge sharing between two parties. In Table 2, r= basic value of knowledge, s= synergy, l= leveragability, n= negative reverse impact, ap= reward for sharing knowledge, bp= punishment for hoarding knowledge. If both parties share their knowledge simultaneously, their payoffs are equal to \((2r + s + l - n + ap, 2r + s + l - n + ap)\). If they both adopt a non-cooperative strategy, their payoffs are \((r + v - bp, r + v - bp)\). From the perspective of Coopetitive Knowledge Sharing, value of \((2r + s + l - n + ap)\) should be greater than \((r + v - bp)\) for knowledge sharing to occur. If one party shares his/her knowledge and the other one does
not, sender gets \((r - n + ap)\) and receiver gets \((2r + v + l - bp)\). In this situation, sender perceives that the value of \((r - n + ap)\) is far less than \((2r + v + l - bp)\), so s/he will not share her/his knowledge. Both Table 1 and Table 2 are under this assumption that \(r, s, v, l, n, ap,\) and \(bp\) have same values for both players of A and B.

**Table 1:** Payoff matrix for knowledge sharing between two players

<table>
<thead>
<tr>
<th>Player A</th>
<th>Share knowledge</th>
<th>Not share knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share knowledge</td>
<td>(2r + s + l - n)</td>
<td>(r - n)</td>
</tr>
<tr>
<td>Not share knowledge</td>
<td>(2r + v + l)</td>
<td>(r + v)</td>
</tr>
</tbody>
</table>

\(r = \text{basic value of knowledge} \); \(v = \text{value-added} \); \(s = \text{synergy} \); \(l = \text{leveragability} \); \(n = \text{negative reverse impact} \)

**Table 2:** The extended matrix for knowledge sharing between two players

<table>
<thead>
<tr>
<th>Player A</th>
<th>Share knowledge</th>
<th>Not share knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share knowledge</td>
<td>(2r + s + l - n + ap)</td>
<td>(r - n + ap)</td>
</tr>
<tr>
<td>Not share knowledge</td>
<td>(2r + v + l - bp)</td>
<td>(r + v - bp)</td>
</tr>
</tbody>
</table>

\(r = \text{basic value of knowledge} \); \(v = \text{value-added} \); \(s = \text{synergy} \); \(l = \text{leveragability} \); \(n = \text{negative reverse impact} \); \(ap = \text{reward for sharing knowledge} \); \(bp = \text{punishment for hoarding knowledge} \)

The Game Theory recognition of cooperative and competitive interests has had a productive impact on studying Coopetitive Knowledge Sharing. However, a number of factors may inhibit the applicability of Game Theory in such contexts (Zeng and Chen, 2003, Aitken-Turff and Jackson 2006). Aitken-Turff and Jackson (2006) suggest that descriptive aspects of Game Theory such as its conceptual framework may be effective at modelling cooperation and competition. However, the numerical Game Theory matrix might be of limited use (Aitken-Turff and Jackson 2006). In addition, a vast proportion of existing research on Game Theory has focused on computer-based laboratory experiments that analyse participants’ favoured strategies (Aitken-Turff and Jackson 2006). This body of research may reinforce the notion that Game Theory does not apply to the complex realities of social situations. According to Aitken-Turff and Jackson, Game Theory does not account for personal relationships, which are believed to significantly affect collaborative behaviours (Luo, 2005). This fact is believed to restrict the applicability of Game Theory in predicting cooperative and competitive patterns (Aitken-Turff and Jackson 2006). For example, Gächter et al. (2010) used Game Theory to predict knowledge sharing behaviours in open source software development context. The results showed that knowledge sharing is a coordination game with multiple equilibriums, which is not only affected by material incentives, but also by social preferences such as fairness.

5. **Coopetition knowledge sharing in knowledge management literature**

Knowledge sharing is considered as a set of behaviours regarding knowledge transfer, which involve actors, knowledge characteristics, knowledge transfer channel, organisational concerns, and environmental climate (Lee and Al-Hawamdeh, 2002, Yang and Chen, 2007).

Knowledge Management Literature has investigated the impact of factors such as organisational culture, management support, interpersonal relationships, IT infrastructure, motivation, prior experience, and knowledge ambiguity on knowledge sharing behaviours (Hendriks, 1999, Lee and Al-Hawamdeh, 2002, Bock et al., 2005). However, investigation on knowledge sharing under simultaneous cooperative and competitive situations is limited to socio-economic theories of knowledge (e.g., resource-based theory, altruism, and agency based theory) (Davenport and Prusak, 1998, Bock et al., 2005, Yang and Chen, 2007, Yang and Wu, 2008).

According to the economic theory of knowledge, scarcity of knowledge is the main determinant of knowledge sharing. In other words, knowledge sharing is dependent on the economic value of knowledge, which is perceived to be lost by sharing. There are, however, three economic
perspectives toward knowledge sharing that expand on this idea: (i) Resource-based Theory, (ii) Transaction Cost Theory, and (iii) Agency Perspective (Shin, 2004).

Resource-based Theory (Grant, 1996) views both knowledge and resource interchangeably. According to this theory, distinctive organisational resources lead to different outcomes, and consequently, to gaining scarcity rents (Shin, 2004). Resource-based Theory helps identify circumstances that are necessary for obtaining benefits from knowledge sharing.

Transaction Cost Theory (Davenport and Prusak, 1998) views knowledge sharing in line with three major characteristics that make knowledge supplier & demander agree on the exchange of information (Lin, 2008). According to this theory, one of these three characteristics is required for the knowledge sharing to occur. First, knowledge supplier share knowledge if s/he perceives s/h can obtain tangible benefits from sharing knowledge (Shih et al., 2006). Second, knowledge supplier might decide to share knowledge if s/he could gain higher reputation from the other party (Wasko, 2005). Third, knowledge supplier might decide to share knowledge if s/he could gain social benefits of sharing knowledge (Piliavin and Charng, 1990). Transaction Costs Theory focuses on the associated costs of knowledge sharing. However, Agency Perspective focuses on the individuals’ opportunistic behaviours. When agencies have incongruent goals and different risk preferences (e.g., regarding the implementation of information systems for automation), an agency problem arises. Agency Perspective helps find methods of organizing knowledge sharing in order to reduce the costs associated with the opportunistic behaviour of agents.

Taken together the discussed three economic perspective, hoarding knowledge among individuals is natural, especially under conditions of economic competition where knowledge has a competitive advantage (Wah, 2000). In order to facilitate knowledge sharing in simultaneous cooperative and competitive situations, the extant research suggests employing different strategies such as creating long-term commitments, developing trust, increasing reciprocity and longevity in relationships, employing incentives and reward structures, and increasing gratifying relationships among individuals (Shih et al., 2006).

Knowledge Management Literature has a number of limitations in studying Coopetitive Knowledge Sharing. First, it has much focused on organisational and individual factors that contribute to knowledge sharing. Yang and Chen (2007) posit that few studies have investigated the impact of the economic value and scarcity of knowledge on knowledge sharing process, which is the subject of studies based on Game Theory. Second, it appears that Knowledge Management Literature investigates the impact of factors such as individual, personal, organisational, cultural, and knowledge-related factors on knowledge sharing, rather than studying the direct impact of cooperation and competition that was the subject of Game Theory. Third, Knowledge Management Literature has mainly focused on the occurrence of knowledge sharing, rather than the transfer of the required and useful knowledge. Recent research in Knowledge Management Literature has questioned the simple notion that knowledge sharing is good for organisations (Argote and Ingram, 2000, Carlile, 2004, Kane et al., 2005, Kane, 2010). It has been widely highlighted that knowledge-intensive processes could be plagued by information quality problems, such as incorrect information and irrelevant information (Gorla et al., 2010, Steinel et al., 2010). Therefore, a mere consideration of the extent of knowledge sharing without considering whether the shared knowledge was useful or applicable might bias the realistic results.

6. Coopetitive knowledge sharing in organisational management literature

The limited Organisational Management Literature has studied the phenomenon of Coopetitive Knowledge Sharing through the conceptualisation of simultaneous cooperation and competition, and investigating their impacts on knowledge sharing behaviours (Tsai, 2002, Lin et al., 2010).

This body of literature treats coopetition with two separate constructs including: (i) cooperation and (ii) competition (Tsai, 2002, Luo et al., 2006, Lin, 2007, Lin et al., 2010). This research stream suggests a more complex situation, compared to the other two streams, in which a synergy between cooperation and competition might occur. For example, Tsai (2002) investigated the existence of simultaneous social interaction (a facet of cooperation) and competition on market share across functional units’ representatives. The empirical results of Tsai revealed the synergic impact of cooperation and competition for driving knowledge sharing behaviours. Tsai argued that this finding is because members of functional units often have a strong incentive to understand their competitors and
discover what other parties think & know, so that they can benchmark themselves. Accordingly, competition is not always unfavourable, and it can generate positive outcomes (Anderson and Narus, 1990, Lado et al., 1997, Goncalo et al., 2010).

Lin (2007), sought to understand the relationship between coopetition across functional units and New Product Development (NPD) performance. Lin conceptualised cross-functional coopetition with two constructs including: (i) cross-functional cooperation and (ii) cross-functional competition. The results of Lin confirmed a significant positive relationship between cooperation and NPD performance, which is mediated by knowledge management processes. The findings also showed the significant positive impact of competition on NPD performance; however, the mediating role of knowledge management processes in the relationship between competition and NPD performance was not confirmed. Lin argued that the positive impact of competition on performance might be due to two reasons. Firstly, the lengths of the NPD processes in the sample were approximately short- less than 12 months. Secondly, the Chinese collectivist culture of the sample might have resulted in positive outcomes.

Lin et al. (2010) established a model to explain the formation of perceived job effectiveness in virtual team collaboration. Lin et al. proposed that perceived job effectiveness is directly influenced by knowledge sharing behaviours. Knowledge sharing is then influenced by coopetitive behaviours. Coopetition was conceptualised with two constructs including: (i) cooperative attitudes and (ii) competitive conflict. Lin et al. measured ‘cooperative attitude’ and ‘competitive conflict’ with three separate reflective indicators. Cooperative attitude was measured with the following three items: (i) team members encourage a ‘we are in it together’ attitude, (ii) team members do their best to work collaboratively, and (iii) team members combine the best of positions to obtain the goal of our collaboration. Competitive conflict was measured with the following three items: (i) team members want others to make concessions but do not want to make concessions themselves”, (ii) team members treat conflict as a win-lose contest, and (iii) team members state their position strongly to dominate our teamwork. These three indicators point to the existence of overall competitive feelings and attitudes among team members.

In summary, the three studies of Tsai (2002), Lin (2007), and Lin et al. (2010) have conceptualised Coopetitive Knowledge Sharing with three separate components including: (i) cooperation (ii) competition, and (iii) knowledge sharing. There are, however, two major differences in these studies that constitute the limitations of this body of literature in studying Coopetitive Knowledge Sharing.

First, cooperation and competition in each study convey different meanings and have different indicators. In other words, research in this area is hamstrung by the inconsistent treatment and conceptualisation of the related constructs of cooperation and competition. For example, cooperation in Tsai (2002) was about social interaction among people, whereas Lin (2007) measured cooperation with coordination and integrated activities among individuals. Competition in Tsai was about competition for internal resources and market share, whereas competition in Lin was about competition for both tangible and intangible resources. Tsai conceptualised competition as having a moderating impact on the relationship between cooperation and knowledge sharing, whereas Lin and Lin et al. (2010) studies the separate impacts of cooperation and competition on knowledge sharing behaviours.

Second, simplistic measurement methods have been applied to conceptualise both cooperation and competition, and so there is a potential of statistical bias in terms of misspecifying formative measures in studies such as Luo et al. (2006) and Lin (2007). Petter et al. (2007) argue that formative constructs basically occur when the items describe and define the construct rather than vice versa. For example, the two dimensions of competition for tangible & intangible resources form the competition rather than reflecting it. Having a closer look at Lin (2007), it can be realised that competition for tangible and intangible resources were conceptualized with reflective indicators. This implies a statistical bias that refers to misspecifying formative measures as reflective ones, and it is considered as a common source of statistical bias in the interpretation of results (Petter et al., 2007, Cenfetelli and Bassellier, 2009).

The third limitation of this body of literature in studying Coopetitive Knowledge Sharing is similar to the previous discussion on the Knowledge Management Literature. Specifically, the notion of knowledge sharing under coopetition is limited to investigating the extent and/or frequency of knowledge sharing or transfer, rather than the effectiveness of the knowledge being shared.
7. Integration of the literature (game theory, knowledge management, organisational management)

In the previous sections, three bodies of literature associated with Coopetitive Knowledge Sharing were studied. In this section, these three bodies of literature are integrated through an analysis of their strengths and limitations. In the following, a high-level model for future research on Coopetitive Knowledge Sharing is presented.

Table 3 demonstrates an overview of the three discussed bodies of literature, their major characteristics (C), strengths (+), and limitations (-).

**Table 3: Overview of literature**

<table>
<thead>
<tr>
<th>Literature</th>
<th>Characteristics (C)</th>
<th>Strengths (+)</th>
<th>Limitations (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Game Theory</td>
<td>Focus on the perceived payoff associated with knowledge sharing (economic value of knowledge)</td>
<td>Promising conceptual framework (rather than numerical framework) <em>(covered in OM literature)</em></td>
<td>The ignorance of attention to organisational &amp; personal factors <em>(covered in KM Literature)</em>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attention to the strategic costs of sharing knowledge (payoffs).</td>
<td>The predominance of laboratory experiments.</td>
</tr>
<tr>
<td>Knowledge Management (KM) Literature</td>
<td>Focus on the organisational &amp; individual &amp; knowledge factors.</td>
<td>Lack of attention to the strategic costs of sharing knowledge <em>(covered by Game Theory)</em>.</td>
<td>The ignorance of the importance of the effectiveness of knowledge sharing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Treatment of coopetitive knowledge sharing with the personal and organisational factors that affect knowledge sharing behaviours, rather than cooperation and competition <em>(covered by OM Literature)</em>.</td>
</tr>
<tr>
<td>Organisational Management (OM) Literature</td>
<td>Focus on the separate conceptualisation of cooperation, competition, and knowledge sharing-with different constructs</td>
<td>More systematic conceptualisation of coopetitive knowledge sharing compared to the other two bodies of literature. Attention to the personal and organisational factors affecting knowledge sharing <em>(overlap with the strength of KM Literature)</em>. Attention to the strategic costs of sharing knowledge *(compete for intangible and tangible resources) <em>(overlap with the strength of Game Theory)</em>.</td>
<td>Inconsistent treatment of cooperation and competition. Simplistic measurements for cooperation and competition. The synergic impact of coopetition is not well-supported. The ignorance of the importance of the effectiveness of knowledge sharing</td>
</tr>
</tbody>
</table>

The next step is then to integrate the discussed perspectives, and to build on a broader platform of existing epistemological and ontological foundations. For this, this study first draws upon the somewhat systematic conceptualisation of coopetition in the Organisational Management Literature. The separation of cooperation and competition seems as an appropriate way of modelling coopetition, which is consistent with the previous studies in this area. More specifically, the extant literature indicates several pieces of evidence that emphasise the distinct nature of two constructs of cooperation and competition. For example, Molleman (2009) argues that people might develop simultaneous positive and negative attitudes at their works. For example, a person may like to help a heavily loaded colleague while, at the same time, feel territorial competitive attitudes (Molleman, 2009). Such pieces of evidence draw attention into the distinctive differences between the two constructs of cooperation and competition.
Second, this study incorporates the strengths of the conceptual framework of Game Theory & Organisational Management Literature, as they consider the impact of the strategic costs of knowledge sharing behaviours (perceived payoffs & competition for tangible and intangible resources).

Third, this study draws upon the strengths of the Knowledge Management Literature & Organisational Management Literature, as they suggest the impact of organisational, individual, and knowledge-related factors on predicting cooperative and competitive knowledge sharing patterns.

Fourth, this study suggests considering the importance of the effective knowledge sharing, rather than the mere transfer of knowledge in studying Coopetitive Knowledge Sharing. This targets covering the last limitation of each of the three bodies of literature.

The first three limitations of the Organisational Management Literature are left for future theoretical and empirical studies. Based on this discussion, Figure 1 presents the proposed high-level conceptualisation for modeling Coopetitive Knowledge Sharing.

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**Figure 1**: Proposed model of coopetitive knowledge sharing

### 8. Conclusion

This paper sets out to provide a review of literature on the concept of Coopetitive Knowledge Sharing, in order to (i) classify and analyse the research in the field & (ii) and provide a framework that integrates the identified research streams and builds upon their strengths and limitations.

This study explored the development of the phenomenon of Coopetitive Knowledge Sharing in three bodies of literature. The literature review demonstrated the relative lack of integrative work in different fields related to Coopetitive Knowledge Sharing. In the following, a high-level conceptualisation was proposed. The proposed model combined the discussed three complementary perspectives. Therefore, this study recognises that developments in our understanding of Coopetitive Knowledge Sharing require multi-disciplinary areas (e.g., knowledge management, organisational management, game theory) that address different viewpoints. Of significance, there is a need for researchers to be aware of the complementary studies outside of the discussed literature in order to build on our
understanding, especially in terms of theory building and conceptualisation of cooperation and competition.

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Knowledge Transfer Procedures From Consultants to Users in ERP Implementations

Przemysław Lech
University of Gdańsk, Poland
Przemyslaw.lech@lst.com.pl

Abstract: This paper focuses on the issue of knowledge transfer from consultants to the final users of the ERP system during its implementation. For a long time, the knowledge transfer has been recognized as one of the key success factors of the implementation projects of any type. Basing on the literature, two alternative approaches to the knowledge transfer were identified: an exploration oriented one, assuming users’ active participation in the implementation process and another one, i.e. instruction oriented knowledge transfer, depending on the users’ training provided by the consultants after the implementation has been completed. A study of 10 ERP implementation projects is presented to determine how enterprises solve the knowledge transfer issue in real-life environment. At the end the paper presents the evaluation of the amount of external workload from the consultants needed to accomplish the knowledge transfer process with the use of the two alternative approaches. It is based on the field study in two comparable enterprises. The main value of the research is that it presents the generalization of the knowledge transfer procedures used in real-life ERP projects and then evaluates the difference in external workload from the consultants in a very unique situation of two very similar enterprises, with comparable business processes and information requirements, and which implemented the same ERP system with help of the same external consultants but using different knowledge transfer approach.

Keywords: knowledge transfer, ERP implementation, ERP expertise building

1. Introduction

Knowledge transfer, being one of the two core processes of knowledge management (Kumar and Ganesh, 2009) is also recognized as an important success factor in IT implementations (Gallivan, Spilter and Koufaris, 2005; Haines and Goodhue, 2003; Karlsen and Gottschalk, 2004). It should be carried out in two main directions: from the client to the third – party consultants, regarding business needs and processes the system should support, and from the consultants to the client, regarding the way the IT solution works, the latter being less explored in the literature (Ko et al., 2005). This paper concentrates on the knowledge transfer from consultants to users during the implementation of a specific IT solution – namely ERP system, presenting the ways this transfer can be carried out and discussing the impact of the knowledge transfer method chosen on the amount of the external work needed from the consultant to accomplish it.

2. Knowledge transfer in ERP systems implementation – literature overview

Knowledge transfer, together with knowledge creation are considered to be the two key processes of knowledge management (Ofek and Sarvary 2001). Kumar and Ganesh (2009) define the knowledge transfer as: ‘a process of exchange of explicit or tacit knowledge between two agents, during which one agent purposefully receives and uses the knowledge provided by another. ‘Agent’ can be referred as to an individual, a team, an organizational unit, the organization itself or a cluster of organizations.’ From the knowledge delivery perspective, the knowledge transfer can be classified into the following categories:

- Codification – when the knowledge transfer is based on documents, repositories and knowledge databases,
- Personalization – involving interaction between people (Child and Shumate, 2007; Bordia et al., 2006; Boh, 2007, Scheepers et al., 2004).

Another classification can be made according to the knowledge absorption approach criterion (Bostrom et. al., 1990):

- Exploration oriented - inductive, trial and error, high learner control, incomplete learning materials, relevant task focus,
- Instruction oriented - (deductive, programmed, low learner control, complete materials, features focus).

The literature overview made by Davis and Bostrom (1993) points out the exploration oriented approach as a more effective one.
During the implementation of any IT solution a knowledge on how it works has to be transferred to the end-users. This is also the case for ERP systems, being the example of a complex standard IT solution used by most organizations around the globe (Chen, 2001; Akkermans and Helden, 2002). The most common approach to the ERP system implementation involves a third-party implementation partner as a source of knowledge on the system to be implemented. In case of such implementation the knowledge transfer has to be done in two directions:

- From the client to third-party consultants, regarding business needs and processes the system should support – to assure that the system is designed and built according to the requirements of the client’s organization,
- From the consultants to the client, regarding the way the IT solution works – to allow the future users carrying out their day-to-day activities in the new system.

Both directions of the knowledge transfer are equally important for the success of an ERP system implementation. If the consultants do not understand the business processes of the customer and requirements for the system, the result of the implementation will not satisfy the customer's organization needs and the entire project may fail. On the other hand, even a system perfectly fitting the requirements can be abandoned if the end-users are incapable to operate it.

That is why most authors, dealing with user training find it essential for successful IT system implementation (Gallivan, Spilter and Koufaris, 2005; Haines and Goodhue, 2003; Karlsen and Gottschalk, 2004; Mahapatra and Lai, 2005). Although this statement is treated almost axiomatic, the relationships between the amount of user training and performance outcomes are neither simple nor consistent (Gallivan, Spilter and Koufaris, 2005). The role of the knowledge transfer to end users is also sometimes underestimated by the clients. Haines and Goodhue (2003) state that only 5 of the 12 organizations included in the case study found the knowledge transfer crucial for a project success.

These findings should bring attention of IT researchers and practitioners to the way a user training is carried out. To be able to apply an optimal knowledge transfer procedure one has to be aware of what type of knowledge is to be transferred. Koskinen (2004) presents two classifications of knowledge:

- Tacit vs. explicit,
- Additive vs. substitutive.

The ways of transferring tacit and explicit knowledge was described in Hansen, Nohria and Tierney (1999). Tacit knowledge is based on personal experience and cannot be easily separated from the person that possesses it while explicit knowledge is easy to codify, store and transfer via mechanical media, such as books, databases or computer software. The type of knowledge which is supposed to be transferred determines to some extent the transfer methods. As the tacit knowledge is hard to codify, it would be rather transferred via personalization, whilst explicit knowledge can be transferred both by means of codification and personalization.

The second classification is based on the criteria, whether the new knowledge adds to the existing knowledge of a receiver or substitutes it with the new one. It determines the complexity of the knowledge transfer process and thus affects the methods that should be used. If the knowledge is additive, it is more likely that a receiver would be able to acquire it without any external help on the exploration basis but if he/she is faced with the need to replace the currently possessed knowledge with a completely new one, it is more likely that the help of external parties would be necessary.

Knowledge on the new IT solution is mostly explicit, as the way the system works can be codified and presented in the documentation. It is also substitutive as the knowledge on the old IT system has to be replaced with the knowledge on a new one.

As the knowledge on the operation of a new system can be codified in form of documentation, user manuals, on-line help, eLearning tutorials etc., it could be delivered to the end-users only in that codified form. However the complexity of the ERP solutions and substitutive characteristic of the knowledge on their operations makes it very difficult to absorb it only by self-study. The knowledge should rather be delivered with the use of mixed codification/personalization approach.

As it was mentioned above in this section, the new knowledge can be absorbed by the recipients with the use of exploration or instruction oriented approach.
The mix of approaches regarding the delivery and the absorption determines the knowledge transfer method. The possible knowledge transfer methods are depicted in table 1.

**Table 1: Knowledge transfer methods**

<table>
<thead>
<tr>
<th>Exploration</th>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codification</td>
<td>Self study with the use of user manual</td>
</tr>
<tr>
<td>Personalization</td>
<td>Learning by doing the work together with the consultants</td>
</tr>
</tbody>
</table>

The question arises on the combination of the above methods which should be used to optimize the process of knowledge transfer from the consultants to the system users.

As it is seen in table 1 users can acquire knowledge about the new IT system in three main ways:

- By formal training during dedicated training sessions – either provided by a tutor or performed via eLearning tools,
- By self-study with the use of system documentation, on-line help and help provided by other users,
- By acquiring the knowledge from the consultants during the implementation process.

The first mentioned way of acquiring knowledge about the IT system follows the instruction oriented approach while the two remaining ones are exploration oriented.

Gallivan, Spilter and Koufaris (2005) found that formal training, although valuable, does not necessarily lead to better IT acceptance by the users. They state that informal help provided by more experienced users (lead users) is at least equally important as formal training, and as apart from assuring the knowledge transfer, it has a ‘social influence’ on the trainees. King (2005) found that communication and knowledge exchange between the key users and consultants is the crucial factor for the ERP implementation success.

Therefore, all three ways of transferring knowledge to the end-users are valuable. The question that arises is how they should be mixed together in order to attain the best outcome at the optimal cost. The appropriate mix of training methods should assure the proper outcome which is:

- User expertise in operating the system,
- User acceptance of a new solution,
- User ability to make on-going adjustments of the system configuration based on changing business needs of the organization.

The next sections present the study on the transfer procedures used in ERP implementations and evaluation of the external workload from the consultants, needed to complete this transfer.

**3. Knowledge transfer procedures – a field study**

The approaches to knowledge transfer during the ERP system implementation were examined in 10 SAP implementation projects. The participant observation was selected as a primary research method, followed by the examination of the source documentation of the project, i.e. offers, contracts, project management minutes and consultants’ activity reports. The author of this paper participated in the projects under examination as a member of consulting teams, having no influence on the knowledge transfer approaches that were adopted.

The projects were executed in the enterprises from different industries and led by consulting enterprises of different size and origin. The information on the specificity of clients and consulting organizations is shown in table 2.

The projects 1 – 4 were supported by local branches of large international IT consulting companies. Two of them followed the SAP implementation methodology, whilst the third one used its own. The difference between the above mentioned methodologies consisted in the documents’ layout and naming, however, division of the project into phases and the product list was consistent with SAP ASAP guidelines. Projects 5 – 10 were carried out in cooperation with the local IT consulting
enterprises and both of them performed the implementation according to the general guidelines of ASAP.

**Table 2: Characteristics of the clients and consulting organizations**

<table>
<thead>
<tr>
<th>Project No</th>
<th>Client organization</th>
<th>Consulting organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Financial sector organization</td>
<td>Large international consultancy 1</td>
</tr>
<tr>
<td>2</td>
<td>Telecommunication services supplier 1</td>
<td>Large international consultancy 2</td>
</tr>
<tr>
<td>3</td>
<td>Telecommunication services supplier 2</td>
<td>Large international consultancy 2</td>
</tr>
<tr>
<td>4</td>
<td>Chemicals dealer</td>
<td>Large international consultancy 3</td>
</tr>
<tr>
<td>5</td>
<td>Energy supplier</td>
<td>Small local consultancy</td>
</tr>
<tr>
<td>6</td>
<td>Mining enterprise</td>
<td>Large local consultancy</td>
</tr>
<tr>
<td>7</td>
<td>Shipping company</td>
<td>Large local consultancy</td>
</tr>
<tr>
<td>8</td>
<td>Chemicals producer 1</td>
<td>Large local consultancy</td>
</tr>
<tr>
<td>9</td>
<td>Chemicals producer 2</td>
<td>Large local consultancy</td>
</tr>
<tr>
<td>10</td>
<td>Chemicals producer 3</td>
<td>Large local consultancy</td>
</tr>
</tbody>
</table>

According to ASAP methodology the project consists of five phases, each of them resulting in the delivery of the following main products (Ehie and Madsen, 2005):

- **Project preparation** – resulting in the preparation of Project Charter which contains project mission, scope, schedule, structure, communication procedures, document layouts and general technical architecture. The knowledge product for the customer in this phase is the initial training for key users;

- **Business blueprint** – which results in the preparation of the Business blueprint, containing the design of the future system and being the only knowledge product of this phase;

- **Realization** – the main product of which is the configured and tested system. The knowledge products of this phase are the system documentation and user manuals;

- **Final preparation** – which results in the system ready to run and trained users as the main knowledge product;

- **Go-live and support**.

The knowledge products in the projects under examination were consistent with the above list but the approach to achieving them differed from project to project. It is reflected in Table 3.

The Project Preparation phase did not differ in any of the 10 projects. The Project Charter document was prepared in cooperation between the Project Managers of the client and consulting company and the initial training was carried out by consultants. Similarly the Business Blueprint phase looked alike in all the projects. The Business Blueprint was prepared in cooperation between consultants and key users. In this phase the knowledge transfer takes place in both directions. The users explain to the consultants the way the enterprise operates and articulate their requirements of ‘what the new system should be’. The consultants describe the users how their requirements will be reflected in the system and write it down in the form of a Business Blueprint document. Worth of mentioning is the fact that, as the system is not ready for any kind of presentation, it is very difficult for the users to understand fully how the business processes is going to be reflected in the system.

The first differences occur during the Realization phase. In six projects the configuration was carried out solely by the consultants, while in the other four projects, obligations were split between the consultants and key users. In these projects, basic configuration was completed by the consultants, whilst the configuration steps, subject to more frequent changes during the system use, were carried out by the key users. Obviously, it required the knowledge transfer from the consultants to the users so that they were capable of carrying out the required configuration work.

Additional knowledge products of this phase are the system documentation and user manuals. System documentation is a technical document describing the system configuration and in all but one of the projects it was completed by the consultants. In one of the projects (no. 10) the users requested the possibility to update of the system documentation in steps which were performed by them. User manuals, on the other hand, explain how the system works from the business perspective. In all the projects, in which the key users carried out a part of the configuration work, they also developed the user manuals under supervision of the consultants. Also in one of the projects (no. 9), where the
configuration work was provided solely by the consultants, the key users were involved in the user manuals' development. In the other projects this step was carried out by the consultants.

Table 3: Approach to knowledge transfer

<table>
<thead>
<tr>
<th>Project phase:</th>
<th>Project preparation</th>
<th>Business blueprint</th>
<th>Realization</th>
<th>Final preparation</th>
<th>Go live and support</th>
<th>Knowledge transfer approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>Project Charter</td>
<td>Initial training</td>
<td>Business blueprint</td>
<td>System configuration</td>
<td>Documentation</td>
<td>User manuals</td>
</tr>
<tr>
<td>1</td>
<td>Project managers</td>
<td>Consultants + Key users</td>
<td>Consultants</td>
<td>Consultants</td>
<td>Key users with substantial help of consultants</td>
<td>Consultants</td>
</tr>
<tr>
<td>2</td>
<td>Project managers</td>
<td>Consultants + Key users</td>
<td>Consultants</td>
<td>Consultants</td>
<td>Key users with substantial help of consultants</td>
<td>Consultants</td>
</tr>
<tr>
<td>3</td>
<td>Project managers</td>
<td>Consultants + Key users</td>
<td>Consultants</td>
<td>Consultants</td>
<td>Key users with substantial help of consultants</td>
<td>Consultants</td>
</tr>
<tr>
<td>4</td>
<td>Project managers</td>
<td>Consultants + Key users</td>
<td>Consultants</td>
<td>Consultants</td>
<td>Key users with substantial help of consultants</td>
<td>Consultants</td>
</tr>
<tr>
<td>5</td>
<td>Project managers</td>
<td>Consultants + Key users</td>
<td>Consultants</td>
<td>Consultants</td>
<td>Key users with supervision of consultants</td>
<td>Key users under supervision of consultants</td>
</tr>
<tr>
<td>6</td>
<td>Project managers</td>
<td>Consultants + Key users</td>
<td>Consultants</td>
<td>Consultants</td>
<td>Key users with supervision of consultants</td>
<td>Key users under supervision of consultants</td>
</tr>
<tr>
<td>7</td>
<td>Project managers</td>
<td>Consultants + Key users</td>
<td>Consultants</td>
<td>Consultants</td>
<td>Key users with supervision of consultants</td>
<td>Key users under supervision of consultants</td>
</tr>
<tr>
<td>8</td>
<td>Project managers</td>
<td>Consultants + Key users</td>
<td>Consultants</td>
<td>Consultants</td>
<td>Key users with supervision of consultants</td>
<td>Key users under supervision of consultants</td>
</tr>
<tr>
<td>9</td>
<td>Project managers</td>
<td>Consultants + Key users</td>
<td>Consultants</td>
<td>Consultants</td>
<td>Key users with supervision of consultants</td>
<td>Key users under supervision of consultants</td>
</tr>
<tr>
<td>10</td>
<td>Project managers</td>
<td>Consultants + Key users</td>
<td>Consultants and key users</td>
<td>Key users with supervision of consultants</td>
<td>Key users</td>
<td>Key users + consultants</td>
</tr>
</tbody>
</table>

The work distribution in the Final Preparation phase is a consequence of the users' participation in the preceding steps of the implementation project. In this phase the system has to be tested, identified errors must be corrected and the end-users must be provided with a training. All consulting enterprises examined in this study insisted on the tests by the users as they were the final recipients of the systems. However, the knowledge about the system differed from project to project due to the users' involvement in the preceding phases which affected the work distribution during the testing. In projects no. 1 – 4 the tests were carried out by the key users with substantial help provided by the consultants. Consultants were presenting the functionality to be tested and then the key users repeated the same steps by themselves. So the testing was, in fact, combined with the training of the key users. In projects 7 and 8 even more work was assigned to the consultants as the key users were not eager to perform the tests. So the tests were carried out in a form of a presentation made by the consultants in front of the users.
In two of the projects (5 and 9) the tests were carried out by the key users but they requested the consultants’ help. The reasons were different in each of the cases: in the project no. 5 the users were not sure of their knowledge, although objectively, they were able to carry out the tests by themselves. In the project no. 9 the users actively involved themselves in the project after the implementation phase, and thus, they had some knowledge gaps which had to be covered by the consultants.

In the projects no. 6 and 10 the key users had enough knowledge and were confident enough to perform the tests by themselves, under occasional supervision of the consultants.

The work distribution during the end-users training is a consequence of the preceding steps. In all the projects, which the key-users did not participate in actively, the end-user trainings had to be provided by the consultants. In projects no. 5 and 9 the key-users provided the training but they requested the supervision of the consultants while in projects no. 6 and 10 the key users had enough knowledge and were confident enough to run the training sessions by themselves.

Summarizing the above study, the following pattern can be observed regarding the knowledge transfer from consultants to the key users:

- In three out of ten projects the knowledge was gradually transferred from the consultants to the key users during the project. The key factor was the users’ participation in the project works, starting from the Realization phase. The key users were gradually taking over more and more responsibility for the creation of the knowledge products as their understanding of the system operations was growing.

- In six projects the knowledge transfer during the project was limited due to a little participation of the key users in the project works. All the knowledge products were developed by the consultants and the role of the key-users was limited to the supervision of their work.

- In a one project a mixed approach was observed: the key-users did not participate in the configuration of the system but they started to absorb the knowledge when developing the user manuals and they tried to follow the scheme depicted in point 1 starting from that phase of the project.

The above evidence show that the knowledge transfer during ERP implementation can be based on two alternative approaches:

- Exploration oriented knowledge transfer, involving the users in the implementation process
- Instruction oriented, assuming a passive attitude of the users to the implementation and the knowledge transfer process.

The approach to knowledge transfer did not depend on a type of a consulting organization leading the project. In all the projects under examination the consulting organizations suggested the exploration oriented approach, however, the customers preferred the instruction based approach.

The following sections present the two transfer procedures and their evaluation in regard to the consultants’ workload required to complete the knowledge transfer to the users.

4. Exploration oriented knowledge transfer procedure

First of the two knowledge transfer procedures that was observed during the study was the exploration oriented one. It was chosen by four out of ten examined enterprises and three of them followed the below procedure:

- Initial key-users training – workshops,
- Knowledge transfer from consultants to the key-users during the implementation:
  - Participation of the key users in the configuration works,
  - Preparation of the user manuals by the key users,
- System testing by the key users,
- Preparation and training carried out by the key-users for the end-users.
On-going support and knowledge transfer from the key-users to the end-uses after system has been launched.

The above procedure assumes the identification of the two user groups:
- Key-users – responsible for the knowledge absorption, actively participating in the implementation and operating as the first level of support after go-life,
- End-users – carrying out the limited number of the operations in the system and not actively participating in the implementation.

The first group constitutes the implementation team together with the external consultants. It supports the implementation works not only during the business-processes’ analysis, requirements gathering and system planning (which, obviously being the crucial success factor for the implementation success is not the subject of this paper), but also during the configuration, testing and go-life phases of the project.

This knowledge transfer procedure requires active participation of the key users during all phases of the project and in return offers gradual gaining of expertise in the system operations which results in trained key-users at the system start.

5. Instruction oriented knowledge transfer procedure

Alternative knowledge transfer procedure, is based on the instruction oriented knowledge transfer paradigm. It was chosen by 6 out of 10 examined enterprises. It assumes minimal involvement of the users in the implementation process and consists of the following steps:
- Initial key-users training – workshops,
- Implementation done solely by the consultants
- Preparation of the user manuals by the consultants,
- System testing by the consultants, key users act only as an approval body,
- Preparation and execution of the end-users training by the consultants.
- On-going support and knowledge transfer from the consultants to key-users and the end-users after a system go-life phase.

In the above procedure the division of the users into key- and end-users has a different meaning than in the exploration based knowledge transfer presented in the previous paragraph. Key-users constitute a part of the implementation team but their role is only to transfer the knowledge concerning the enterprise to the consultants, formulate the requirements and they are supposed to supervise and approve the work of the consultants. End-users do not take part in the implementation works at all and start working with the system when it is successfully launched. All operations during the implementation are carried out solely by the external consultants and the knowledge transfer to the users takes place only during the training sessions after the system is ready and during the after go-life support.

One of the critical parameters that have to be taken into consideration by decision-makers while choosing the knowledge transfer method is the amount of the workload required from the consultants. It will be examined in form of a field study of the ERP system implementation carried out in the two branches of the chemicals industry company. One of them used the exploration oriented and the second one – the instruction oriented approach to the knowledge transfer.

6. Impact of the knowledge transfer method on consultants’ workload

The following field study describes the implementation of a single functional area of the SAP system in two companies within the same holding (companies 8 and 10). The two companies were established during the restructuring process of a state-owned enterprise, which was divided into smaller entities, each of them dealing with a single product line. Therefore, The business field of both enterprises is very similar as they deal with the same production and distribution processes of similar products. Although both enterprises constitute a part of the same holding, their managers were authorized to shape the implementation process of an ERP suite independently. The similarity of the
business processes carried out in both enterprises and the fact that they implemented the same ERP system (SAP) with support provided by the same external consultants makes the two cases comparable by means of the ERP system scope and architecture and consequently, knowledge to be transferred.

The research question was: **What is the difference in the amount of consultants’ workload to transfer the same knowledge with the use of exploration and instruction oriented approaches.**

The data was collected with use of the direct observation method, as the author participated in the project. Analysis of the documentation with the emphasize on consultants’ activity reports was used as the supportive data collection method.

The dependent variable in the study is the amount of consultants' workload required to complete the knowledge transfer to the users.

The amount of knowledge to be transferred is the same in both cases (the same ERP system, the same functional area, the same implementation scope, very similar business processes reflected in the system) and thus, it does not affect the dependent variable.

The independent variable, which caused the differences in the consultants' workload, is the knowledge transfer strategy.

In addition to the above quantitative research, the qualitative analysis of the factors that affected the selection of the knowledge transfer method will be presented.

The first enterprise, the largest one from among the companies in the holding, followed the exploration oriented knowledge transfer methodology described above in this paper. As the idea of implementing the ERP system was raised by the managers of this enterprise and it was the main sponsor of the project, the motivation to get it right was very large. The managers formed highly motivated implementation teams in each of the business areas involved in the project and assigned a very high priority on the project success. The members of the board of directors actively participated in the project operations (one of them was nominated as the project leader) which enhanced the motivation of the implementation teams and the project priority.

After the initial trainings, the aim of which for the key-users was to familiarize with the basics of the system, the implementation team was set up. The members of the implementation team actively participated in all phases of the project. They transferred the knowledge on the business processes to the consultants, developed some parts of the system business blueprint and then, together with the consultants, evolved the configuration. After the knowledge transfer, during the configuration phase, the key-users were able to prepare and perform the tests of the system by themselves. They also developed the user-guides and carried out end-users’ trainings without the consultants. Their familiarity with the system was so good, that neither assistance during the system go-life, nor any follow-up consulting were required after the system start-up. Thus, the enterprise’s additional knowledge transfer external costs equaled to zero. The members of the implementation team also managed to deal with their daily duties and no overtime was paid, so no measurable internal costs appeared in the enterprise. Obviously, the team members paid some costs in form of stress, high pressure and work overload during the implementation process.

The second enterprise showed less commitment to the implementation. One of the main reasons of this situation was that the managers of this enterprise regarded the project as something imposed by the holding company. Contrary to the first enterprise, the board of directors did not participate in the project. The project leader was not a member of the board and thus, he had not power enough to assign a high priority to this project and had no relevant tools to motivate the implementation teams. The second reason was that the enterprise was a new entity and it had more serious problems concerning the day-to-day operations than the implementation of a new IT solution. The members of the implementation team claimed they had no time to participate in the project and delegated the work to the consultants. During the business process analysis the most frequent answer was: ‘do it as it was done in the other enterprise’. So the business blueprint was actually copied from the first enterprise and the entire configuration was rolled out without the participation of the key-users. As an effect, during the final tests some of the key-users were not able to log into the system without the
help of the consultants. Neither were they able to develop the user-guides nor carry out the trainings to the end-users.

All of the above enumerated tasks were carried out by the consultants. After the system start the key users were not able to perform the daily activities in the system and needed additional assistance provided by the consultants.

The summary of the additional consultants’ workload during the project is shown in table 4.

Table 4: Additional consultants’ workload

<table>
<thead>
<tr>
<th>Activity</th>
<th>Workload (in man-days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of user-guides</td>
<td>2</td>
</tr>
<tr>
<td>End-user training</td>
<td>2.5</td>
</tr>
<tr>
<td>After go-life assistance</td>
<td>7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>11.5</td>
</tr>
</tbody>
</table>

All remaining implementation tasks took 34.5 days. The use of instruction oriented rather than exploration oriented knowledge transfer in the second enterprise raised the implementation external workload and consequently, costs by 33%. If the business blueprint had not been carried out at the roll-out stage, the workload would be approximately 45 days. The workload and cost increase due to the instruction oriented knowledge transfer would then be 25% of the budget.

Furthermore, the key-users of the second enterprise were much worse prepared to work with the system and to implement any changes (even simple ones) in the configuration. Any simple change in the configuration would involve consultants whereas the key-users in the first enterprise are capable of maintaining the system on their own.

7. Discussion and conclusions

The examination of the knowledge transfer procedures in 10 ERP implementation projects has revealed that enterprises choose one of the following options:

- Exploration oriented – requiring users’ active participation in all phases of the project and gradual knowledge transfer from consultants to the users during day-to-day project work,
- Instruction oriented – depending on the formal trainings sessions provided by the consultants and not requiring users’ active participation in the project activities.

The results of the in-depth analysis of two projects with similar scope proved that the choice of the knowledge transfer approach may significantly influence the project external workload and thus, costs. In order to transfer the same quantity of knowledge, the enterprise which have chosen the instruction oriented approach had to use at least 25% more external consulting work compared to the second one, using the exploration oriented approach. The largest quantity of work regarded the after go-life support, which means that the users of the system were not trained enough to use it by themselves. As it was previously represented, the research presented in this paper focused only on the external workload/cost of the project. The use of the exploration oriented approach to the knowledge transfer requires much more user involvement and thus, it may cause work overload, additional stress and frustration of the employees. This may affect the quality of the day-to-day work of the employees involved in the project and cause some indirect consequences in terms of a company’s performance. The above issue requires further research. So does the motivation of companies to choose the instruction oriented approach to knowledge transfer despite it is not recommended by the consultancies.

8. Summary

This paper discussed the phenomenon of knowledge transfer from consultants to the users during ERP implementation. As it is one of the key factors of implementation success, the knowledge transfer procedures should be carefully planned and carried out.

The examination of ten implementation projects revealed that majority of the enterprises included in the study have chosen the instruction oriented knowledge transfer approach, although the consulting enterprises insisted on using the exploration oriented one. Further investigation of the two similar ERP implementations resulted in the conclusion that this choice may increase the external workload.
needed to accomplish the project by 25%. The results of this study should make the enterprises planning carrying out of an implementation project to take this fact into consideration while preparing the project schedules and budgets.

References


Culture and Trust in Fostering Knowledge-Sharing

Christine Tan Nya Ling
Multimedia University, Melaka, Malaysia
nltan@mmu.edu.my

Abstract: In this competitive age, knowledge is continuously being identified by both scholars and practitioners as the most competitive asset. Numerous organisations in today’s knowledge-intensive economy are keen not only to determine knowledge-sharing but to also introduce strategies to adopt as well as implement knowledge management (KM) so that knowledge coming from workers are transformed into organisational knowledge. In spite of this, businesses find it a challenge to leverage knowledge due to their workers’ intentional and unintentional practice of knowledge hoarding. For that reason, the purpose of this paper is to further understand and explore the co-existence of two influential elements in knowledge sharing, namely, ‘culture’ and ‘trust’ in inculcating a culture that shares. A review of literature managed to highlight and examined the need for organisations to extend a deeper understanding of the interactions between these two elements, which are often regarded as crucial factors that supports the tradition to share knowledge (both tacit and explicit) originating from organisations’ valuable assets - workers. The paper discusses and reveals ‘sociability’ and ‘solidarity’ with the different essentials of culture as well as elaborating on ‘benevolence trust’ and ‘competence trust’ that facilitate sharing. At the same time, this paper had further investigated the main pre-conditions to foster knowledge-sharing in a culture of organisations, which identifies the levels of trust and solidarity in explaining the four types of cultures i.e. networked, communal, fragmented, and mercenary.

Keywords: knowledge-sharing, trust, culture, sociability, solidarity, benevolence, competence, networked, communal, fragmented, mercenary

1. Introduction

It is often said that knowledge created and applied in the mind of the knower (Alavi & Leidner 2001) is the most crucial and prized resource of an organisation. Hence knowledge originating in the minds of workers, especially in the current emergent knowledge-economy, is indeed valuable and should not be taken lightly, ever so in accomplishing business performances. As strongly suggested by Jain, Sandhu, and Sidhu (2007), the impeccable success of a knowledge-intensive economy is purely supported by the ways in which organisations effectively acquire, use, and leverage these knowledge. In fact, many of these organisations actively support their workers’ productivity by improving their ‘know-how’ and experiences so as to maximise competitiveness and innovativeness.

As a result, knowledge have been fundamentally perceived as the most critical industrial resource that businesses should embrace since it is considered to be a valuable organisational survival kit in this present knowledge-economy era. The excellent management of knowledge, which is distinctively known as knowledge management (KM) is essential and should be lauded by organisations throughout. Thus far, KM has helped businesses to evade struggles related to business cost by minimising the waste of precious time and resources, therefore avoiding the need to ‘reinvent the wheel’. With KM, businesses are able to determine better ways to cultivate, nurture and exploit individual knowledge together with organisational knowledge as a whole, coming from diverse levels and contexts throughout numerous organisations (Handzic 2004). Sadly, there are still numerous corporations that are unable to grasped the idea and concept of KM, which had resulted in the slow embracement of KM initiatives and activities; the incapability to further improve organisational productivity and in strengthening competitiveness (Holsapple & Joshi 2002) that could eventually lead towards poor innovation.

The term ‘knowledge’ as rendered by both Nonaka and Takeuchi (1995), originates from the human brain in the form of ‘tacit’ - personal and context-specific knowledge needs to be expressed by explicit measures to achieve its ‘explicit’ - formal and systematic form. It is therefore essential to inculcate the sharing of both tacit and explicit knowledge among workers within the organisation itself (Syed-Ikhsan & Rowland 2004). In doing so, KM will only be acknowledged as being successful as a result of knowledge-sharing by further placing that knowledge in plain good use (Gurteen 1999). Apparently, Gurteen (1999) had considered knowledge in KM as a systematic set of principles, processes, organisational structures, and technologies that help workers share and leverage knowledge to fulfil their business objectives. Hence, the viable sharing of knowledge will be helpful in supporting KM initiatives since knowledge-sharing has been revealed as one of the successful facets of KM practices (Alavi & Leidner 2001; Earl 2001; Hendriks 1999; Kuo & Young 2008) through formal or informal interactions and collaborations (Friesl, Sackmann & Kremser 2011).
However, despite the fact that sharing is crucial, workers are still wary of those they ought to share knowledge with, especially in a competitive environment where ‘knowledge is power’. This conviction is less of a surprise due to the lack of trust that exists among working personnel, resulting in only a privilege few who possess the pertinent knowledge. For this reason, businesses will need to look into creating as well as maintaining a culture whereby workers are willing and able to share, which is a prerequisite to increasing organisational success. As made clear by Gurteen (1999), it is essential that workers must not only be encouraged to join forces, but also to cooperate with each other and to share effectively to create a sharing culture. Knowledge-sharing, as supported by Mackay (2001) is a mutual practice, where workers yield to the idea that they will obtain something back in return. In this context, the missing link that exists in organisational cultures is the lack of trust leading towards the concentration of knowledge among a privilege few (Robins n.d.).

To create an environment where trust exists, a worker need to believe that his or her knowledge will not to be misused and that he or she will obtain significant value in the near future coming from reciprocal knowledge-sharing (Mackay 2001). As established by Ribière, Amtzen, and Worasinchai (2007), workers are not likely to share knowledge if they are reluctant to trust each other. For this reason, these individuals need to comprehend the benefits of knowledge-sharing, i.e. assists them in doing their jobs more effectively; helps them in retaining their jobs; facilitates their personal development and career progression; rewards them by getting things done; and gives them personal recognition; hence sharing will without a doubt turn into a reality (Gurteen 1999).

The aim of this paper is to explore the roles of trust and culture in fostering knowledge-sharing. This study had discussed and revealed the different essentials of culture (i.e. sociability and solidarity), and trust (i.e. benevolence-based and competence-based trust). In fact, this paper had also further investigated the main pre-conditions to foster knowledge-sharing, which identifies the high and low levels of trust and solidarity in explaining cultures in organisations. It is therefore highlighted that that both trust and culture need to exist altogether, making knowledge-sharing a norm in achieving competitive knowledge-based business environment.

2. Nature of knowledge and knowledge-sharing

The nature of knowledge, even though may somehow seem to be complex, continues to be defined and explained by numerous scholars and researchers in various fields and backgrounds. In *Managing in a Time of Great Change* (Drucker 1995), it is argued that knowledge is the prime economic possession and prevailing source of competitive advantage not to be reckon with. Thus, knowledge will only be seen as valuable when it is created and applied for specific purposes (McDermott 1999; Swan & Scarbrough 2001). Drucker (1995) further exclaimed that knowledge is precisely viewed in the context of KM as an approach for gathering and generating value by vigorously leveraging the ‘know-how’, experience, and also decisions residing within or outside the organisation (Davenport & Prusak 2000). For this reason, in the perspective of KM, the nature of knowledge can be defined as a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information (Davenport & Prusak 2000; Greiner, Bohmann & Krcmar 2007) to further enhance organisational performance, in terms of collaboration, competitiveness and innovativeness.

Derived from the observation made by Spiegler (2000), “yesterday’s data are today’s information, which will become tomorrow’s knowledge, and knowledge, in turn, recycles down the value chain back into information and into data” (p. 2). In order to appreciate the true essence of knowledge, an individual needs to understand data and information as well. Data, information, and knowledge, as acknowledged by Bhatt (2001), are terms that are not simple to distinguish and define, especially from the perspective of a worker. He further explained that in general, data are simply raw facts, information is an organised set of data, whereas knowledge is perceived as important information (Bhatt 2001). Consequently, Bhatt (2001) further explicated that data, information, and knowledge are in fact recursive (as shown in Figure 1), wherein knowledge is a combination of organised data, incorporated with a set of rules, procedures, and operations gained from the course of experience, skills and practice. In this situation, knowledge is a ‘meaning’ made by the mind (Bhatt 2001; Marakas 1999). If knowledge is without ‘meaning’, then evidently knowledge can be identified and recognised only as information or data. Hence, it is only through meaning, that information finds life and becomes knowledge (Bhatt 2001). The interaction of data, information, and knowledge, coupled together with culture and trust that facilitate knowledge-sharing would help establish a learning organisation as a whole.
3. Views of culture and trust in knowledge-sharing

Numerous researchers believe that knowledge-sharing is a type of social dealing among individuals due to the fact that effective knowledge-sharing is individual-based, or rather than people-based (Riege 2005). That is why it is crucial for organisations to apprehend the thoughts, minds, and also behaviour of its workforce considering that knowledge-sharing does indeed require a culture that facilitate workers to share knowledge as part of their daily work activities. The major purpose of effective knowledge-sharing as exclaimed by Buckman (1999) is to focus on organisations most critical need; ensuring that the system should support strategy; making sure that organisation build trust by emphasising fundamental virtues rather than values; sharing knowledge and adopt best practices; solving customer's problems speedily; allowing associates to solve the problems they encounter without interference by the management; injecting customer feedback into new product development process (Buckman 1999).

As a result, businesses must create a desire to share as a guiding principle in organisational survival. In doing so, there is still the unresolved issue of ‘trust’ (Riege 2005), which is arguably one of the most crucial success factor for creating a culture that shares knowledge (Tan, Lim & Ng 2009). Apparently, the ‘lack of trust’ syndrome, according to Riege (2005), originates from either the trustor or the trustee (knowledge participants). In addition, Riege further exclaimed that lack of trust exists in two separate forms: (1) trustee as a result of misuse knowledge or taking undeserved recognition for it; or (2) accuracy and credibility of knowledge that comes from the trustor. Therefore, the value and encouragement for knowledge-sharing for organisations does indeed require the creation of a culture of trust (Lengnick-Hall & Lengnick-Hall 2003), in which workers will be more willing to share what they know in a trusting culture (Davenport & Prusak 2000; Fairholm & Fairholm 2000; Faraj & Wasko 2001; Leana & van Buren 1999; Robertson & Hammersley 2000; Settoon & Mossholderb 2002). As anticipated, the culture of trust in the workplace does have a strong and robust influence that act as an important force behind the sharing of knowledge (Tan, Lim & Ng 2009). Likewise, both Hsu and Huang (2005) suggested that trust should indeed be established between employee-to-employee interactions in fostering a culture that shares; moving ahead into a ‘knowledge-oriented culture’.
4. Culture and trust: Fostering knowledge-sharing

The culture that exist in each organisation is tremendously essential (Ndlela & Toit 2001) seeing that a strong culture that inculcates the sharing of knowledge among workers (including both employers and employees) does facilitate the organisation in increasing its competitive edge (Alam et al. 2009).

Culture in an organisation is a dominating mechanism that limits what is considered desirable, possible and practical to do; affect its KM initiatives and will persuade workers towards particular forms of activities in knowledge-sharing. Karlsen and Gottschalk (2004) argue that “...shaping culture is central for an organisation’s ability to manage its knowledge more effectively” (p. 9). Principally, culture can interact with knowledge-sharing in a number of different ways, as it shapes assumptions about what knowledge is worth exchanging; defines the relationship between employee knowledge and organisational knowledge; establishes the context for social interaction that plays a key role in how knowledge will be shared; shapes the processes by how new knowledge is created, validated and disseminated throughout the organisation (Brache 2002; Karlsen & Gottschalk 2004). Besides, culture is alleged to have influence the knowledge-related behaviours of individuals, teams, units and also organisations as a whole because it influences the purpose of workers in terms of identifying which knowledge that is appropriate to share, with whom to share it with and when is the right time to share it (King 2007).

Culture has been defined as “values, rules, practices, rituals and norms through which an organisation conducts business” (Brache 2002, p. 102). While Hofstede (2001) classified culture to be “the collective programming of the mind that distinguishes the members of one group or category of people from another” (p. 9), Schein (1995) however, looks at culture in knowledge-sharing as “a pattern of basic assumptions invented, discovered, or developed by a given group as it learns to cope with its problems of external adaption and internal integration that has worked well enough to be considered valid, and therefore, to be taught to new members as the correct way to perceived, think, and feel in relation to those problems” (p. 9).

Ribière (2001) defined culture as the character or identity of an organisation on how things are done in an organisation. He further explains that culture is reflected by artefacts that can be noticed by just visiting a company, such as office spaces, how people are dressed up, jargon used, etc. Therefore, Ribière (2001) further exclaims that to truly understand a culture, the real core elements that shape the culture, such as the history of the company and beliefs and values shared among employees must be understood. In this context, culture guides day-to-day working relationships; determines how people communicate within the organisation; what behaviour is acceptable; how power and status are allocated (Ribière 2001).

In unison, culture is observed by Levin, Cross, Abrams, and Lesser (2004) to encompass the values, beliefs, attitudes and behaviour of an organisation. Regardless of the various definitions provided, the most straightforward description of any culture in any organisation can clearly be captured as ‘the way we do things around here’ and ‘the way we treat one another around here’ (McKinlay & Williamson 2010). Eventually, workers will need to share and exchange their ideas and knowledge with others because it is the ‘natural’ way of doing things, rather than being force to do so (Alam et al. 2009).

Additionally, Schein (1995) exerted that culture sweeps across organisational individuals and units. These common essentials comprise deeply rooted beliefs, values, and artefacts held by organisational workers and work units (groups). Beliefs are accepted as a way of doing things and are passed on to new workers. Consequently, these beliefs are shaped as workers make decisions, cope with problems, and take advantage of opportunities that is faced. Ultimately, culture surfaces when workers in the organisations accept these beliefs (King 2007; Schein 1995). Values, however are underlying beliefs that present a set of social norms that define the ‘rules’ through which workers interact (DeLong & Fahey 2000; King 2007; Schein 1995). Values is a form of informal social control as it defines the appropriate behaviours for workers (King 2007; Schein 1995). Lastly, artefacts (or symbols) are the most manifest aspects of culture consisting of the constructed physical and social environment of an organisation such as logos, mottos, and mission statements (King 2007; Schein 1995).

To understand culture, both Goffee and Jones (2009) claimed that culture is simply a ‘community’. In fact, it is an outcome of how individuals share knowledge with one another. Communities are built on
shared interests and mutual obligations and thrive on cooperation and friendships. In the lens of sociology, Goffee and Jones had dissected and managed to divide community into two separate distinct human relations dimensions: sociability and solidarity. Sociability is the measure of sincere friendliness (e.g. kindness) among workers in a particular organisation whereby workers are more like friends than co-workers (Carneiro 2010; Goffee & Jones 2009). Thus, these workers are inclined to spend most of their time in sharing ideas perhaps via face-to-face communication in sustaining a high level of unarticulated reciprocity. Reciprocity is a trait of friendship in which actions are taken that favours others with no anticipation of instant payback (Rashid, Sambasivan & Rahman 2004). Basically, all these happen on an informal and natural basis, in which there are no strings attached (Carneiro 2010; Goffee & Jones 2009). The benefits of high sociability comprises of informal sharing of knowledge; out-of-the-box thinking; and high esprit de corps (Goffee & Jones 2009). Unfortunately, high sociability does have its limitations, for instance disagreements; criticisms; poor performances that can be avoided or tolerated in the fear of displeasing other friends (Goffee & Jones 2009).

Solidarity, in contrast, is the measure of the workers’ ability to pursue shared objectives (e.g. cooperativeness and reliability) quickly and effectively, in spite of their personal ties (Carneiro 2010; Goffee & Jones 2009; Munro 2003) in the best interest of the organisation. At this juncture, a joint sense of purpose is very much essential. Even if the workers don’t know each other, a sense of high solidarity will bring them together to act as one. In terms of advantages, they consist of a strong sense of response to competitive encroaches and other organisational crisis; low tolerance of poor performance (Goffee & Jones 2009). Besides, solidarity encourages workers steadfast dedication to the organisation’s mission and goals; quick response to changes in the environment; unwillingness to accept poor performance (Rashid, Sambasivan & Rahman 2004). Rashid, et al. (2004) posited that workers in high solidarity organisations often trust their employers to treat them fairly, based on merit, with resulting commitment and loyalty to the firm. Nevertheless, like sociability, high solidarity also has its drawbacks, which includes attitude such as “What’s in it for me?” and ruthless turf battles exists (Goffee & Jones 2009).

<table>
<thead>
<tr>
<th>Sociability</th>
<th>Solidarity</th>
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<tbody>
<tr>
<td>High</td>
<td>Communal</td>
</tr>
<tr>
<td>High</td>
<td>Mercenary</td>
</tr>
<tr>
<td>Low</td>
<td>Fragmented</td>
</tr>
<tr>
<td>Low</td>
<td>Networked</td>
</tr>
</tbody>
</table>

Figure 2: The four dimensions of culture: Networked, communal, fragmented, and mercury (source: Goffee and Jones (2009))

In order to relate both sociability and solidarity with culture, these two dimensions are plot against each other, revealing four different elements of culture, identified as “Two Dimensions, Four Cultures”, which consists of: (1) networked culture - high sociability and low solidarity; (2) communal culture - high sociability and high solidarity; (3) fragmented culture - low sociability and low
solidarity; and (4) mercenary culture - low sociability and high solidarity (as shown on Figure 2). As supported by Rashid, et al. (2004), these four elements of culture is similar or comparable to organisations in Malaysia. An organisational culture as further emphasised by Langham (2003), depends on its degree of solidarity and commitment to a common goal; the amount of socialising and trust present among its workers.

In a networked culture, there will be a high degree of trust as workers will be very willing to share information so long as they can be given good reasons for doing so. In a communal culture, the willingness to share will be combined with a very clear focus on what is needed. This can be a perfect condition for the introduction of teamwork in terms of knowledge-sharing amongst workers. In a mercenary culture, workers are focused in ensuring that tasks are performed, as a result having a very utilitarian approach to knowledge. Therefore, in this culture the emphasis will be on the realistic short-term solutions that deliver value and not on vast accumulations of knowledge. Lastly, in a fragmented culture, workers will tend to work as individuals. Hence, organisations introducing cooperation between workers to share knowledge will need to appeal to the self-interest of the individual.

There is no particular culture that can be labelled or identified as ideal or the 'best' because each culture presented is appropriate for different business environments (Goffee & Jones 2009). As a result, top management such as superiors and managers must be able to determine and assess their organisational culture, no matter whether it is networked, communal, fragmented, or mercenary so as to consequently shape it accordingly. Besides, Er-ming, Ping, Xin, and Xin (2006) establishes that top management also play a role in knowledge-sharing since superiors and managers are capable of leading by example, which can have a considerable impact on building trust. These researchers conclude that top management's activities and personal behaviours provide the foundation for trust, and that managers have the responsibilities in taking the initial step to build trusting relationships. Hence, top management will need to first acquire trust of workers, practice what they advocate (in support of a trusting relationship), and to further build a trusting environment throughout their organisation, only then are workers willing to share knowledge mutually. Such a relationship may created a positive psychological contract among workers; build relationship of reciprocal exchange; encourage fulfilment of responsibilities and obligations; consequently increasing knowledge-sharing.

As determined by both Davenport and Prusak (2000), any KM initiatives will fail without trust. If workers are not satisfied by the KM system or practices in their organisation, they will not be likely to get involved in knowledge-sharing activities (Ribière 2001). With this, organisations should emphasise trust among workers, only then will knowledge-sharing become part of the organisational culture. Henceforth, to create an environment conducive to sharing, trust plays a significant role in terms of influencing and inculcating knowledge-sharing in organisations (Alam et al. 2009) as trust is the means and basis of a sharing culture (Hsu & Huang 2005).

In order to intensify and achieve the required level of knowledge-sharing, it is important to create a culture of trust (Buckman 1999). Trust has been found to facilitate knowledge-sharing in a variety of settings involving team member interdependence (Jarvenpaa, Knoll & Leidner 1998; Jarvenpaa & Leidner 1999; Moreland & Myaskovsky 2000; Quigley et al. 2007; Rau 2005). Trust acts as is a predominant enhancer of proactive knowledge-sharing. As a matter of fact, Buckman (1999) argues that a trustee must be able to trust that the knowledge obtained from a trustor is of the best and most accurate, and the trustor in turn must be able to trust that the trustee is using that knowledge in the most appropriate manner. If this condition is not met, workers will abstain themselves from sharing since trust did not appear to be visible. It is therefore essential to extensively stimulate trust in an environment that allows workers to share information with one another.

A culture, according to Ribière (2001) can only measured and assessed through a process of understanding the organisation; its history; through interviews and observations of workers’ behaviours; beliefs and values (Ribière 2001). Ribière emphasised that in an organisational culture, the dimension of a culture i.e. ‘trust’ and ‘solidarity’ are the main pre-conditions to foster knowledge-sharing. Based on the extensive review, Ribière decided to make use of an organisation’s level of trust and the level of solidarity through the tools developed by De Furia (1997) on the variables of trust; and Goffee and Jones (2009) on solidarity. Even though De Furia (1997) emphasised that sociability is an important factor for knowledge-sharing, it should however be a subcomponent of trust based on his findings that affection can be present without trust (e.g., parent-child); trust can be
present without affection (e.g., passenger-pilot) (De Furia 1997). With this, Ribière had mapped both variables against each other to obtain a matrix of four cultures as illustrated in Figure 3.

![Figure 3: Organisational culture matrix (source: Ribière (2001))](image)

The four culture types are: (1) networked - high trust and low solidarity; (2) communal - high trust and high solidarity; (3) fragmented - low trust and low solidarity; and (4) mercenary - high trust and high solidarity. The key behaviours of each culture type are depicted in Table 1.

Both researchers and scholars fundamentally agree that trust is a multifaceted phenomenon, which consists of elements such as uncertainty of dependability; vulnerability of dependency (Li 2007); expectations that the trusted parties will not harm the trustors (Gambetta 1988); willingness of trustors to assume risk with the trusted parties (Mayer, Davis & Schoorman 1995); efforts to fulfil commitments, honest; and does not seek to take unfair advantage of opportunities (Cummings & Bromiley 1996; Dirks & Ferrin 2001; Quigley et al. 2007; Zucker 1987). To parsimoniously incorporate these varied components, Rousseau, Sitkin, Burt, and Camerer (1998) state that trust is a “psychological state comprising the intention to accept vulnerability based upon positive expectations of the intention or behaviour of another” (p. 395).

In a study by Levin, et al. (2004), it is postulated that trust can assists knowledge-sharing by means of two distinct categories: (1) benevolence-based trust and (2) competence-based trust. When it comes to trust, most individuals will relate it to its benevolence-based form. Benevolence-based trust is identified as the belief that an individual will not harm another even when given the opportunity to do so. For instance, if a worker (i.e. trustee) is in urgent need of information, the trustee will then seek help from a co-worker (i.e. trustor) to acquire this information, but in doing so the worker must be able to trust that the co-worker will not intentionally do harm (i.e. by giving the wrong information) even if the co-worker has the opportunity to do so. On the other hand, competence-based trust is the belief in another individual to be knowledgeable or competent in a given subject area. For instance, when a worker is in need of information, the worker will seek and trust only those that he or she thinks have the competence to give him or her information. Hence, trust is increased and decreased by the lack of evidence of these components in the parties’ actual behaviour and communication (Blomqvist & Stahle 2004). Consequently, trust is known to be the means of which knowledge flows (Levin et al. 2004) to further support knowledge-sharing.
Table 1: The description of the four organisational culture types

<table>
<thead>
<tr>
<th>Networked (Low Solidarity, High Trust)</th>
<th>Communal (High Solidarity, High Trust)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A lot of talks =&gt; possibility of rapid information exchange.</td>
<td>Communication in every channel.</td>
</tr>
<tr>
<td>Sharing of relevant information. Opportunities for learning and increased creativity. Discussions, opinions, and suggestions are solicited and are taken in consideration. Little commitment to shared business objectives. Management often has trouble getting functions or operating companies to cooperate. High sociability. People share ideas and information with no immediate expectation of return.</td>
<td>Communications flow easily inside between levels. Sharing of relevant information. Discussions, opinions, and suggestions are solicited and are taken in consideration. Equitable sharing of risks and rewards among employees. Teamwork across functions and locations =&gt; synergy =&gt; opportunity for learning and for creativity. High commitment =&gt; low turnover. High consciousness of organisational identity and membership. Members give help and share information with no expectations of getting back.</td>
</tr>
<tr>
<td>Fragmented (Low Solidarity, Low Trust)</td>
<td>Mercenary (High Solidarity, Low Trust)</td>
</tr>
<tr>
<td>Selectively disseminate information. Members don’t share ideas and information with other units. Talk is very limited. Documents might not be read. Little commitment to shared business objectives. Management often has trouble getting functions or operating companies to cooperate. Members try to get help without giving anything in return. Members are secretive about their project and progress. Minimise dependence on others. Individual creativity but not at the group level. Don’t identify with their institutions =&gt; might easily leave (high turnover).</td>
<td>Communication is swift, direct and work focused. Paper and memo driven. Productivity and performance driven. High level of commitment to a common purpose. Rarely bastions of loyalty. Disinclined of sharing if busy. Cooperation between units with different goals is even less likely. Lack of synergy. Low tolerance of underperformance and even failure =&gt; doesn’t support learning. Minimise dependence on others. Equitable sharing of risks and rewards among employees. Reciprocity is negotiated. People protect each other.</td>
</tr>
</tbody>
</table>

Source: Ribière (2001)

Thereafter, trust should indeed be regarded as a significant factor in contemporary society and should not be taken lightly in view of the fact that trust is by and large coupled with a multitude of advantages not only to organisations but also individuals. Social theorists have argued that, trust is necessary to predominantly handle the increasing complexity and uncertainty of modern society (Giddens 1990; Luhmann 1982); affecting the extent to which an individual believes in the honesty of the shared knowledge; therefore willing to act on it (McEvily, Perrone & Zaheer 2003; Quigley et al. 2007; Szulanski, Cappetta & Jensen 2004). Trust may have a comparable control on what workers judge about the usefulness and occurrence of knowledge-sharing. Even if a worker is highly confident in his or her own capabilities, due to lack of trust, he or she does not believe that critical knowledge and credible information will be shared. Trust typically carries an expectation that an individual worker can therefore rely on his or her co-worker’s actions and words and that the co-worker has good intentions toward the individual worker (Dirks & Ferrin 2001; Mayer, Davis & Schoorman 1995; McAllister 1995; Quigley et al. 2007; Robinson 1996).

Trusts are significantly essential since “without trust, a co-operative and collaborative relationship with the others cannot be attained (Scarnati 1997). It is the catalyst that makes it possible for organisations to function and is a bonding agent that holds our personal and business relationships together.” (p. 25). In the past decade, many authors inclusive of Wong, Ngo, and Wong (2003) have recognised that when workers trust each other, positive work outcomes will eventually unveil. It is further observed that workers are, for that reason, more willing to provide knowledge to their co-workers to whom they trust and who treat them fairly. Therefore, the prevalence of work teams and the interdependent nature of work tasks that involves workers to collaborate and coordinate with one another to accomplish organisational goals, does ultimately entails workers to trust each other.
(Groysberg & Abrahams 2006). With this, trust among workers are considered to be the key component of effective team decision-making and proactive behaviours at work cooperation, organisational citizenship behaviours (McAllister 1995), reduced monitoring (Langfred 2004), enhanced group performance (Dirks & Ferrin 2002) and organisational performance (Davis et al. 2000) both of which are necessary for the effective execution of interdependent work effort (Alge, Wiethoff & Klein 2003; Parker, Williams & Turner 2006).

Besides, since it is common for tasks to be interdependent, reward and penalty systems are often team-oriented. When workers trust their co-workers to do their best, they are more willing to work hard themselves, because they know that their efforts will be rewarded accordingly. Last but not least, trust does indeed also facilitate social exchange relationships (Blau 1964), which can be noticed when workers trust each other, seeing that they are more willing to help each other knowing for a fact that their co-workers are likely to reciprocate their help in the imminent future (Gouldner 1960).

The decision to trust invokes an evaluation of trustworthiness of another party and the risk involved in the trusting behaviours (Mayer, Davis & Schoorman 1995). Information from the surrounding is an important source, especially when trustors do not know or have limited knowledge of the potential trustees. Even when the trustors and the trustees know each other, significant parties may still play an important role in interpreting the meaning and the importance of the trustees’ behaviours by drawing from past observations and interactions, especially when uncertainty arises (Salancik & Pfeffer 1978). Such situations may be prevalent given that trustors may simultaneously receive trustworthy and untrustworthy information from the trustees (Lewicki, McAllister & Bies 1998), or they may encounter situations in which trustworthy trustees behave in a seemingly dishonest manner (Robinson 1996). As accounted by Kasperson, Golding, & Tuler (1992), there are four determinants of trust that includes: (1) commitment to a goal, based on perceptions of objectivity, fairness, and information accuracy; (2) competence; (3) caring; (4) predictability, which are key players in a culture that further support knowledge-sharing.

Thus, to create a culture that shares, it is therefore essential to enhance trustworthiness among employees, making it as a part of the social norm that is being practiced on a daily basis (Tan, Lim & Ng 2009). Organisations wanting to support knowledge-sharing, and subsequently at the same time reform its culture, can therefore do so by promoting trust amongst workers. With this, workers would be equipped to disseminate pertinent knowledge. In fact, they would be able to discern the importance of sharing critical knowledge that will lead to the sharing of the right information with the right people at the right time (Smith & Farquhar 2000). With this, Robins (n.d.) insisted that workers must be able to apprehend the importance of knowledge-sharing, especially in terms of discerning how knowledge-sharing has helped their organisation in the past. To achieve this, Robins strongly urged organisations to make use of case studies and best practices report, to train workers on the tools used to share information within the organisation, to provide a ‘cause-and-effect analysis’ of disseminating information when it is needed, and lastly rewarding workers each time knowledge is shared.

5. Conclusion

Organisations nowadays need to capture and take advantage of their workers most valuable resource – tacit and explicit knowledge, so as to optimise the chances for successful knowledge-sharing. Besides, cultural understanding need to be addressed and should be taken into consideration seeing that the setting-up of an organisational culture that shares knowledge is an important effort not to be taken lightly.

With this paper, the role of both trust and culture are further analysed and examined particularly when it comes to instilling the sharing of valuable knowledge among organisational workers. The aim of this paper is to provide a better understanding of culture (sociability and solidarity) and trust (benevolence and competence) acts as elements that needs to co-exist in facilitating knowledge-sharing. Even though trust has been research in other contexts, it has not been researched together with the cultural dimensions: networked, communal, fragmented, and mercury. Besides, additional attention on both the level of trust and solidarity are further investigated since both are the main pre-conditions in stimulating an environment that allows individual workers to share knowledge together.

While it is not easy to motivate workers in an organisation to share their knowledge, this aspiration can however be achieved through the creation of a culture that inspires trust in the workplace. Thus, it
is vital to support the critical co-existence of both culture and trust in an organisation that instantaneously permits and further support the willingness of workers to share knowledge with the intent through which the organisation can continuously remain competitive.

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In Search of the Golden Mean: The Ambivalence of Knowledge Explication

Georg Hans Neuweg and Stefan Fothe
Johannes Kepler University, Linz, Austria
georg.neuweg@jku.at
stefan.fothe@jku.at

Abstract: Knowledge Management (KM) tends to regard the explication of knowledge as thoroughly positive. In this paper, we argue that this attitude rests on misconceptions regarding the nature of implicit knowledge and knowledge explication. Rather than following undifferentiated imperatives to maximise the amount of explicit knowledge, practitioners of KM are better off considering the ambivalent effects of knowledge explication. For this purpose, we suggest applying the Tacit Knowing View (Neuweg, 2004) and Contingency Theory to the problem of determining the right level of explication. The paper is divided into four parts. In the first part we trace KM’s need for the explication and formalisation of knowledge. In the second part, we address theoretical misconceptions. First, we apply Ryle’s finding that sloppy language use may lead to illegitimate assumptions toward explication. Secondly, we argue that, albeit superficial references to the work of Polanyi can be found throughout KM, actual epistemological positions rather seem to follow Popper. In the third part, we systematise limitations, problems, and side effects of explication. In the fourth part, we suggest the heuristic concept of explication optimum as a framework for developing KM activities.

Keywords: tacit knowing, implicit knowledge, know-how, knowledge management, knowledge explication, knowledge elicitation, explication optimum, contingency theory, Michael Polanyi, Gilbert Ryle

1. The desire for knowledge explication

1.1 Explicating the tacit as a basic strategy in knowledge management

Although there is no single definition of Knowledge Management (KM), most approaches share the interest in managing individual and organisational performances. In the end, it is important what organisations do, not what they know. If performances are continuously successful, know-how is ascribed to the relevant person or organisation. This focus on (actual) practice and (latent) know-how causes frequent references within KM-literature to the work of Michael Polanyi.

Polanyi’s analysis of the nature of knowledge is closely connected to the concept of tacit knowing. Tacit knowing (or implicit knowledge) is practical by nature. It is knowledge which manifests itself in behaviour in a wider sense, that is, in the processes of perception, judgement, anticipation, thought, decision-making or action. And just as important, it is not, not completely or not adequately explicable (verbalisable, codifiable, objectifiable, formalisable, technicisable) by the subject and, under some circumstances, not even by the analytical observer (Neuweg, 2008). With this in mind, Polanyi (1958/1998) strongly criticised the tendency to make knowledge impersonal.

In contrast to Polanyi’s position however, KM holds impersonal knowledge in high esteem. In order to manage know-how, its transformation into explicit knowledge (externalisation, or, as we would prefer to say, explanation; Nonaka and Takeuchi, 1995; Davenport and Prusak, 1998; Probst, Raub and Romhardt, 2000; Hakanson, 2007) has been pointed out as a basic strategy since KM’s early days. Though the tacit is generally valued and assumed to resist complete codification, it would be preferred in explicit form. At times mainly economic reasons are thought to limit explication: “In principle, most forms of economically significant knowledge can be articulated and codified. Whether or not such articulation will take place depends on costs and incentives” (Hakanson, 2001, p29). Hedlund (1994, p76) even goes so far as to regard organisations as “articulation machines”. And indeed, the “drive to codify” (Roberts, 2001) has led to huge advances in generating explicit knowledge (see Liao (2005) for an overview of expert systems).

In more recent times, however, researchers are becoming more sensitive to the limits of explication (see Cowan, 2001 and Busch & Richards, 2005 for Artificial Intelligence perspectives). Complementarily, Turner and Minonne (2010) argue that the dominant focus on problems of capturing, organising and retrieving explicit knowledge “has led to the simplistic misconception that Knowledge Management only involves the capture, or downloading, of the content of employees’ minds” (p161).
In this paper we argue that undifferentiated strategic recommendations to maximise the amount of explicit knowledge in organisations are simplistic and potentially destructive for KM's goal to manage successful performance. Essentially, we argue that the lack of a more differentiated stance towards explication originates from fundamental misconceptions of implicit knowledge and thus knowledge explication. These misconceptions seem to derive from unsystematic and superficial references to a many-faceted theoretical background. As a consequence, knowledge explication cannot appear in its ambivalence and hence is not seen as a difficult decision problem.

The paper is divided in four parts: Within this first part, we describe desired effects of knowledge explication. In the second part, we trace misunderstandings in the dominant view on implicit knowledge and knowledge explication. Based on the analysis of Gilbert Ryle and Michael Polanyi, we unfold a different view of knowledge explication. This view allows for the systematic inclusion of limits, problems, and side-effects in the reflection upon knowledge explication. These are discussed in the paper’s third part. In the final part, we suggest replacing the criticised idea of an explication maximum with the heuristic concept of an explication optimum.

1.2 Reasons to advance knowledge explication

Explication and formalisation have important advantages for organisations. We now take a closer look on some of the main benefits of codifying know-how in symbolic representations.

Shifting from Performance to Competence by Grasping the Rule

Performances are surface instantiations of a competence which exists on a deeper level (Chomsky, 1978/2005). Every practice exhibits just a facet of know-how and is inevitably bound to a specific context. Therefore, it loses a substantial part of its value when contexts change. This is the focus of formalisation as a special form of explication. Formalisation aims at directly codifying the competence to generate successful practices under varying circumstances. Therefore, rules that appear to govern the successfulness of practice are extracted. In its crystalline form, the competence (sic!) can be added to organisations’ explicit, collective knowledge base. Since the competence is no longer held by individual practitioners but by the rule system, it can be made available to instruct anybody to generate performative practices wherever and whenever needed.

Transferability and Replicability

This idea to replicate practice by transmitting the rules of practice is hardly new but bears resemblance to classic ideas of management and organisational studies: Formalisation is closely associated with standardisation, codification, knowledge distribution, programming of the organisation and mechanisation. Explication enhances transferability and replicability which are important prerequisites for expansion: “Unless able to train large numbers of individuals or to transform skills into organizing principles, the craft shop is forever simply a shop. The speed of replication of knowledge determines the rate of growth” (Kogut and Zander, 1992, p25). Whereas explicit knowledge is easily and asynchronously transmittable over long distances, the transmission of implicit knowledge is regarded as “slow, costly, and uncertain” (Grant, 1996, p111).

Reduction of Complexity

Human capacity in information processing is limited. Hence, organisations must ensure a minimal quality and rationality. Therefore, it is necessary to reduce complexity. Formalisation seeks to remove ambiguity (Roberts, 2001, p111) and to provide standard procedures to replace decision making, planning, coordination, or instructions. Even for complex tasks, such as cancer detection, approaches that rely on explicit procedures rather than implicit knowledge are becoming more and more reliable (Iwai & Ishino, 2009).

Reflection and Learning

It is not possible to reflect upon one’s own implicit knowledge in its “natural state”. Following Popper (1972, p25), only objective insights can be reflected upon and criticised. To become objective, knowledge needs to be expressed verbally or printed out. In this sense, explication may crack ineffective trial-and-error-cycles. “Considerable empirical evidence supports the notion that the understanding of processes, both in production and in management is the key to process improvement. In short, an
organization cannot improve what it does not understand. Deep process understanding is often required to accomplish codification” (Tece, Pisano and Shuen, 1997, p525). Hence, explication offers opportunities for innovation and learning on both individual and organisational level.

Control and Power

Explication aims to affect the balance of power within an organisation. Often individuals benefit from uncodified knowledge which is exclusively under their control. KM aims to raise the proportion of explicit knowledge in relation to implicit knowledge (Reinhardt, 2001, p143), thus shifting know-how within an organisation from individual to organisational level. Apart from power interests, this offers two advantages: First, organisations become less vulnerable to knowledge retention (see Levy (2011) for a review). If individuals leave, organisations do not lose competencies but only performances which can be easily replicated (see Levy (2011) for a review of current approaches). Second, the explication of competences allows hiring less qualified and therefore less expensive workforce. Since the origins of organisational theory, mechanisms have been intended to replace individuals’ skills (e.g., Ure 1835, p20; Taylor, 1911). Contemporary approaches aim to expand this idea even to lower and middle management (Kieser and Walgenbach, 2003, p36).

2. Tracing some misunderstandings

The strategy to focus on explication rests on the belief in the usefulness of explicit knowledge for the purpose of managing practice. This belief itself is based on the assumption that implicit knowledge is the cognitive authority governing the generation of successful performative practices. Hence, successful performances are the outer instantiations of successful knowledge. Understandably then, processes are believed to be best managed if only the “knowledge “behind” these processes was explicated (“elicited”) and distributed. Not surprisingly, explication aims to illuminate this knowledge-base behind practice. Thus, it is recommended to explicate as much as possible of this competence.

However, this position is not universally accepted. In line with others (e. g. Tsoukas, 2003, Virtanen, 2011) we advocate the consideration of a solid theoretical body in order to judge explication’s potentials in the light of its limitations, dangers, and side-effects. In order to develop a systematic perspective on explication, it is necessary to rely upon what we call “the tacit knowing view” (Neuweg, 2004, 2008). This view rests on an interdisciplinary groundwork. Important areas of inquiry are, above all, philosophy and epistemology (e. g., Ryle, 1949/2000; Wittgenstein, 1953/1973; Polanyi, 1958/1998, 1966/1983, 1969; Bourdieu, 1990; Schatzki, Knorr Cetina and von Savigny, 2001), cognitive science and artificial intelligence (e. g., Searle, 1983; Suchman, 1987; Dreyfus, 1972; Dreyfus and Dreyfus, 1986), theoretical psychology (Nisbett and Wilson, 1977), experimental psychology (e. g., Reber, 1989, 1993; Berry, 1997), sociology of science (e. g., Fleck, 1935/1979; Kuhn, 1970), sociology of knowledge (e. g., Collins and Kusch, 1998; Collins, 2001, 2010), and research into professional expertise (e. g., Schön, 1983; 1987; Benner, 1984; Dreyfus, 1982), as well as technical and vocational education and training (e. g., Eraut, 1994, 2000; Neuweg, 2001).

This interdisciplinary groundwork forms the background to the following analysis. We will reflect upon the status of implicit knowledge as well as the nature of explication. Our first argument is concerned with the assumption that successful practice can be theorised as mere knowledge application. Here, we apply Ryle’s argument that sloppy language use can lead to illegitimate standpoints toward explication. Based hereon, we refer to the work of Polanyi for a different understanding of implicit knowledge and explication.

2.1 A category mistake at the root of mis-conceptualising explication

Although the philosopher Gilbert Ryle does not broach the issues of implicit knowledge or knowledge explication, his analysis is important for our concern. Based on Ryle’s analysis we argue that the idea of implicit knowledge as a substance behind practice rests on a category mistake which itself can be traced to sloppy language use. Before taking the case to implicit knowledge, we briefly summarise Ryle’s analysis.

For Ryle, it is important to distinguish episodic and dispositional words. By saying that the glass broke because it was fragile, we provide a dispositional explanation (Ryle, 1949/2000, p43), not referring to what happened in the particular episode when the glass actually broke but to a general characteristic of the glass. Alternatively, we can argue that the (fragile) glass broke because it was hit by a stone.
Both explanations belong to different categories. Episodic explanations refer to events or processes that preceded the episode. Dispositional explanations in contrast do not refer to anything prior to the event itself. Therefore it is crucial not to mix up both categories.

When we say John Doe acted cleverly, cleverly refers to his disposition. Herewith, we admit that John Doe was not only clever in this particular episode but that cleverness is one of his general attributes. If one mistakes clever for an episodic word one comes to conclude that there must had been an additional event prior to the actual episode. Thus, any instance of cleverness would require a process of “clevering” prior to acting cleverly. Hence, there must have been an unobservable (maybe even inaccessible) mental activity prior to the observable action itself. Thus, the observable cleverness is seen to be caused by an inner mental cleverness. Therefore, if only this inner knowledge base was explicited, one would gain immediate access to the competence at work.

However, inner processes of “clevering” need not exist. “When we describe a performance as intelligent, this does not entail the double operation of considering and executing” (Ryle, 1949/2000, pp29-30). The process was introduced by us when we mistook clever for an episodic word. If we had taken clever for the dispositional word it is, there would have been no reason to claim any process of “clevering” every time John Doe is clever. Regardless of such semantic considerations, the question what happens within his head must be answered empirically. However it must not be taken to be already answered.

Ryle’s analysis helps to reframe some well known obstacles of explication (e.g., Collins, 1985, see below): Rather than being minor barriers, they result from a fundamental misconception. The reason for our inability to properly illuminate the knowledge base “behind” practice might be that there exists none of the suggested form or relevance. Know-how, as exhibited in practice, must not be understood as the mere application of explicit or implicit knowledge. Rather, the dispositional term know-how refers to practice itself. Therefore, there is no legitimation to conclude that know-how necessarily results from any knowledge substance “behind” practice.

Nonetheless, it is legitimate to extract rules from practices – as long as these are not meant to represent “underlying” processes to practice. Rather than eliciting a mental substance, the rules are correlates of practice. The rule system simulates externalisations of expertise. However, it does not refer to episodic processes in the expert’s head when she acts as if applying the rule system. Although extracted from her practice, the rule system should not be assumed to cause her practice. Further, it is illegitimate to conclude that subjects necessarily would need to know these rules in order to be able to perform accordingly (for a detailed analysis see Neuweg, 2001, 2004).

2.2 Polanyi or Popper: Epistemologically, one has to decide

Grant (2007) analyses citations within KM publications and concludes that Polanyi’s work is among the most cited references. However, he goes on, it “has frequently been misinterpreted” (p173). In order to rectify basic lines of argument within KM, we, along with others (e.g. Miller, 2008; Güldenberg & Helting, 2007), propose to refer to the original positions in epistemology. We suspect that, although Michael Polanyi is often referred to as one of KM’s favourite patrons, the real one is Karl R. Popper. This position nicely complements the distinction between objectivist and practice-based views of knowledge (Ferguson et al., 2010).

Popper (1972) promotes an “epistemology without a knowing subject”. He claims the existence of three worlds (Popper, 1972, pp106-108): “world-1” representing the physical world, “world-2” consisting of subjective mental conditions and traits (including any know-how potentially resisting explication), and “world-3”, where objective knowledge exists independently from individuals. In particular, Popper (1972, p118) claims the autonomy of world-3 from world-2; a position with massive consequences in favour of KM’s assumed potential. For Popper, if all machines and tools (world-1-objects) as well as our whole personal knowledge of how to use them (world-2-objects) were destroyed but not our libraries (world-3-objects) and our ability to learn from them, the old world (world-1 and world-2) could be rebuilt. Apparently, this mirrors the conviction that companies are able to replicate practice qua explication in different places with different individuals.

However, those who implicitly follow Popper must not explicitly refer to Polanyi, for whom complete objectification means inevitable loss of knowledge: “I think I can show that the process of formalizing all knowledge to the exclusion of any tacit knowing is self-defeating” (Polanyi, 1966/1983, p20). It is
not by chance that Polanyi’s opus magnum is entitled *Personal Knowledge*. Following Polanyi’s line of argument, Popper’s claim that world-3-knowledge can survive on its own, has to be refuted, as world-2-know-how cannot be captured objectively. Rather, for Polanyi, human dispositions and meaning (as part of world-2) are not transferable in purely explicit ways. Reversely, objective knowledge cannot be understood on purely explicit ways. Instead, a joint history of socialisation is necessary. Collins (1985) gives a vivid illustration. A Canadian laboratory succeeded in constructing a particular laser. Other labs failed to replicate the laser, even when specific instructions were sent. In each case the laser could only be made to work following a visit to or from the originating lab and with the aid of very close contact and dialogue. This is in line with Polanyi who “watched in Hungary a new, imported machine for blowing electric lamp bulbs, the exact counterpart of which was operating successfully in Germany, failing for a whole year to produce a single flawless bulb” (Polanyi, 1958/1998, p52).

3. Limits, problems, and side effects of explication

In order to develop a systematic perspective on explication it is necessary to analyse the whole process, from practice to practice (see Figure 1). It is only by integrating the receivers’ end that the potentials of explication can be judged appropriately. This third part of our paper is divided in three steps that follow the newly framed process: First we discuss chances to capture know-how in codified knowledge (“explication”). Second, we switch to the learners’ end to analyse necessities for understanding and making use of codified knowledge (“understanding and resubjectivation”). Finally, we address consequences of explication (“modification”).

![Figure 1: Limitations, problems and side effects of knowledge explication](image)

### 3.1 Explication

Defects with regard to the articulation of knowledge of one’s practice are well known. There is an “area where the tacit predominates to the extent that articulation is virtually impossible” (Polanyi, 1958/1998, p87). Polanyi gives skills and connoisseurship as examples for this “ineffable domain”. Within KM however, it seems to be tempting to exclude such phenomena from enquiry and to persist in explication strategies: “Many basic human faculties – such as that of speech, the use of grammar or muscular motion – are not accessible to consciousness, and can therefore not be articulated. However, the analysis of these and other ‘natural’ human faculties, although significant in areas such as neurology, linguistics and philosophy, would seem to fall largely outside the realm of economic enquiry.” (Hakanson, 2001, p5).

It is important to overcome this temptation. As the phenomenon of ineffability is a universal characteristic of experts (Dreyfus and Dreyfus, 1986; Neuweg, 2008), we strongly recommend considering it. The difficulties of experienced experts to report mental precursor- or accompanying processes and structure of their actions (see Nisbett & Wilson, 1977 for psychological evidence) suggest that the
concept of knowledge application may not apply to significant forms of skilled action, above all that of the true master with her expert eye. There is a tacit component even in the most abstract forms of judgment and action. Take, for example, our ability to reason correctly without considering the rules of logic, the art of applying theories of different kinds in a context-sensitive way, or the ability to maintain intelligent practices for which there are hardly any written rules at all; e. g., the practice of invention.

Regardless of actors' defects of articulation, in some domains it is not even possible to appropriately model expertise as knowledge application. Schön (1983) argues that the understanding of expertise as "technical rationality" is implausible in many real-life domains where problem-solvers must cope with complex, uncertain, instable, unique, and value-conflicted demands. Collins and Kusch (1998) relate their thesis about the non-substitutability of experience and socialisation by instruction (irreplaceability thesis) particularly to so-called 'polimorphic actions' the competent execution of which assumes an understanding of the relevant context which can be acquired only through membership of a community of practice and which, as a result, can neither be simulated mechanically nor taught through the imparting of knowledge of rules.

Even if rules can be established, their application to real-world contexts inevitably requires intelligent users. Acting successfully requires interpreting the rules according to the context at hand. The skill to interpret however cannot derive from the rule itself. Hence, one cannot detach intelligence from individuals. Codified competences remain incomplete in a fundamental sense.

Common to these lines of argument is the conviction that expert perception, thinking and acting prove to be situated, related to special cases and context-sensitive, so that their flexibility and underlying situative understanding cannot be exhaustively modelled in terms of rules. The fact that the expert answers the question ‘By what in general does one recognise this or that situation and what in general must be done in it?’, by saying ‘it depends’, marks the central difference between him and a mere novice ‘working-to-rule’ (Neuweg, 2008).

3.2 Understanding and resubjectivation

Even if explication were successful, the usefulness of distributing explicit knowledge is still doubtful. In order to make use of it, receivers must “resubjectivize” this objective world-3-knowledge (i.e., rules, ideas, theories) into their personal world-2-know-how. Only then, knowledge guides practice. However, this process is far from being trivial. In order to make use of it, explicit knowledge must be understood. Thereby it is not sufficient to merely receive syntax. Understanding requires unlocking meaning rather than being receptive. Thus, explication is never complete. Rather it is sufficient, if those intending to benefit from codified knowledge have unlocked its meaning.

Due to this crucial role of meaning, Polanyi – very different to many KM theorists (e.g. Nonaka and Toyama, 2003, p9)\(^1\) – does not see a dichotomy between implicit knowledge and explicit knowledge. For him, they are “not sharply divided. While tacit knowledge can be possessed by itself, explicit knowledge must rely on being tacitly understood and applied. […] A wholly explicit knowledge is unthinkable” (Polanyi, 1969, p144). All knowledge is fundamentally tacit, because deprived of their tacit coefficients, all spoken or written words would be meaningless.

Therefore, with regard to the relationship between words and the world, we will always find some dual movement of comprehension – and if the two fall wholly apart we risk the danger of a lack of comprehension in both realms. To illustrate this dual act of sense reading, Polanyi uses the vivid example of a medical student attending a course in X-ray diagnosis of pulmonary diseases. He watches shadowy traces on a fluorescent screen and hears the radiologist commenting to his assistants. At first he can see nothing that is talked about nor does he understand the language used. But as he goes on listening for a few weeks the pictures begin to make sense – and so do the comments made about them: “Thus, at the very moment when he has learned the language of pulmonary radiology, the student will also have learned to understand pulmonary radiograms. The two can only happen together. Both halves of the problem set to us by an unintelligible text, referring to an unintelligible subject, jointly guide our efforts to solve them, and they are solved eventually together by discovering a conception which comprises a joint understanding of both the words and the things.” (Polanyi, 1958/1998, p101, emphasis ours).

\(^1\) Among those resisting the simplistic distinction are Jimes and Lucardie (2003).
But not enough that throughout the process of reception and understanding we must rely on a shared experiential background between knowledge-posessor and knowledge-receiver – even if receivers grasp the meaning of explicit knowledge, understanding words does not imply proper usage of rules. Contextualising knowledge to concrete situations cannot be learnt explicitly. That is why learning to perform in real-life contexts often requires implicit learning. Learners have to experience (learning by doing) or observe (apprenticeship) what had not and cannot be captured in rules. This is necessary, even if rules were conveyed and it is even more vital in cases where no rules are available: “An art which cannot be specified in detail cannot be transmitted by prescription, since no prescription for it exists” (Polanyi, 1958/1998, p53).

As a consequence, KM should not aim one-sidedly for the production of explicit knowledge but ought to facilitate learning from explicit knowledge and implicit and informal learning as well. Only then explicit knowledge contributes to successful performance.

3.3 Modification

So far, we have asked if practice can be explicated. We then discussed the value of explicit knowledge from the learners’ end. In a third step we now examine whether explicit knowledge may affect existing and newly learnt practices. Attempts to codify largely intuitive practices may affect these practices. Beyond, practices that are learnt explicitly by the submission of knowledge may differ from those that are learnt implicitly by experience and imitation.

In any case, the effects of codification are ambivalent. Bourdieu (1990, p80) argues that “codification is a change of nature, a change of ontological status”. As explication therefore may irritate or even deform practice, he calls for a theory of unintended consequences (p79). We now systematise some unintended effects of explication.

**Eroding Communication Structures and Tacit Mechanisms of Coordination**

In many cases explication desires to substitute face-to-face communication by the transmission of codified knowledge. Programs and technical artefacts are meant to supersede socialisation, self-coordination as well as personal instructions. This view however promotes the erosion of communication structures and tacit coordination mechanisms in organisations. Among others, Schön (1987, p102) urges that fine-tuning and nuances are lost in explication which otherwise were preserved or even promoted. In particular, the suspension of personal contacts is likely to affect the development and preservation of trust. Within KM research, the importance of trust for knowledge sharing is universally accepted (e.g. Lin, Wu & Lu, 2012). However, trust is not only necessary in the process of creating explicit knowledge but is also indispensable to processes of relying on explicit knowledge. Any explicit program is endangered to collapse since its interpretation and adaptation is based essentially on trust. Therefore organisations need to complement explication strategies with the care for a unifying organisational culture and ought to retain chances for personal contacts (e.g. Ybarra & Turk, 2009). Information technologies should not be used to substitute personal contacts but to augment and promote them.

2 *Hansen, Nohria and Tierney (1999) identify two strategies of IT use in companies: Codification strategies – in the sense of Popper – aim to detach knowledge from its possessor by articulation and electronic filing. Personalising strategies, in contrast, follow Polanyi’s assumption that knowledge sticks to persons and can be transmitted through personal contact only. Here, technology has to provide information of “Who knows what?” and stimulate personal contacts via e-mail, phone, or video conferencing.*

**Paralysis through Analysis**

Attempts to codify may positively affect practitioners’ focus on their own practice. However, sometimes it is better to not focus on what one is doing. The centipede easily masters its feet as long as it does not start thinking about it. As soon as it does it gets paralysed and tips over its own feet. In organisations something similar may happen if employees are urged to provide excessive documentation. These obligations may retroact and thus affect practices, leading to less intuitive – and therefore often worse – decisions. Such developments give birth to compulsive organisations (Kets de Vries and Miller, 1984).

**Handicapping Experts’ Personal Growth and Reduced Quality in Decision Making**
Dreyfus and Dreyfus (1987) model expertise as a development process progressing from applying others’ rules (“novice”) via rational planning (“competent”) to intuitive modes of action (“expert”). Organisations with a high degree of articulation force experts to perform more or less novice-like. This is particularly problematic in poorly structured domains where judgement modes of experts and novices greatly differ. Here, the limitations of explicit knowledge limit the quality of expert practice. The heavy use of formalisms may also cause problems in strategic decision making where decision-makers must cope with ambiguity and uncertainty (Roberts, 2001, p111). Here, it may be beneficial to leave explicit processes (Schön, 1983, 1987).

Learning and Innovation Constraints

Know-how develops with practice. It is never complete but notoriously “open”. “To a partly novel situation the response is necessarily partly novel, else it is not a response“ (Ryle, 1979, p125). This initiative momentum cannot be preserved in rules, which are notoriously inert due to their retrograde nature. According to Bourdieu (1990, p84), one strength of formalisation is to relieve users from being creative. Hence, programs facilitate application. This is effective in many cases. However as soon as more than application is necessary, programs not only fail to provide what is needed but often constrain initiative. “The excessive codification of knowledge may lead to knowledge becoming more static since its interaction with tacit knowledge may be reduced” (Roberts, 2011, p110). Thus, organisations find themselves in another situation where they must master the balance of exploration and exploitation (March, 1991, Gupta, Smith & Shalley, 2006, Lui, 2006, Donate & Guadamilla, 2011). Successful organisations are particularly endangered by the competency trap. Understandably, their wish to capture successful practices causes formalisation. Whereas expertise sensibly adapts to circumstances, rules are inevitably less context-sensitive. Over time, the application of rules may be mistaken for original expertise if members rely blindly on the “successful” body of rules (the body must be successful since it derives from successful practices) and adapt reality to rules rather than the natural way around. While this may be satisfying in the short run it is critical over time (Kieser, Beck and Tainio 2001, p616).

In innovation management, in particular, the consequences of a reductionist approach to KM undermine its original goals. The danger lies in separating the skill to create new knowledge from the skill to use existing knowledge. This is the blind spot within Nonaka and Takeuchi’s (1995) knowledge creation (sic!) model. We accept that new knowledge cannot derive from explicit knowledge which is why the spiral starts within the implicit. However, the model remains blind to retroactive effects of explication on the power of creating new knowledge. To use one of the examples of the authors: In a world of bread making machines people lose their power to develop bread making techniques (and themselves) further. Almost tragically, the spiral of knowledge creation is endangered to be a spiral of knowledge demolition.

This Janus-face of explication is already inherent in Weber’s (1922/1978) characterisation of bureaucracies in which efficiency, precision, and determination go hand in hand with complete ignorance towards change and individuality. In contrast to Weber’s bureaucracies however, contemporary capitalist companies face a trade-off between conserving and losing knowledge, which is at the very heart of explication’s ambivalence. While the first objective requires retaining existing knowledge, the latter requires the opposite to allow the organisation to remain flexible and capable of creating new knowledge.

Deskilling Workforce

Formalisation transforms fluid individual expertise into crystalline organisational capability. If successful, the “process intelligence” (Reinhardt, 2001) would be transferred to an organisational level. Then, even children could perfect the necessary skills remaining on individual level (Ure, 1835, p20). “And that’s what [McDonald’s] is, a machine. You don’t have to know how to cook, you don’t have to know how to think. There’s a procedure for everything and you just follow the procedures.” (Garson, 1998, p17, citing a McDonald’s employee). Here, explication’s ambivalence reappears: It aims for foolproofness but – at the same time – ensures the proliferation of fools. The wish for less qualified and thus less expensive employees may come back like a boomerang at times.

Increased Likelihood of Imitation
The unintended effects of explication may contradict the resource-based view of organisations. Often both, organisations as well as their competitors fail to analyse the basis of competitive advantages which have been built in long years of experiential learning (Grant, 1991, 1996; Teece, Pisano and Shuen, 1997). Intransparency ensures the tacitness of advantages and therefore their exclusivity for the firm. To promote codification contradicts KM’s original intentions to protect competitive advantages 3. Explication, originally undertaken to promote replication at lower costs, raises the probability of unintended knowledge transfer to the outside (Grant, 1996, p111; Teece, Pisano and Shuen, 1997, p524; Aidemark, 2009, p4): ”In the efforts to speed the replication of current and new knowledge, there arises a fundamental paradox that the codification and simplification of knowledge also induces the likelihood of imitation” (Kogut and Zander, 1992, p18).

4. Optimising one’s explication policy

In many respects explication is necessary and helpful. However, it may be accompanied by serious side effects. In order to master this ambivalence it is necessary to abandon the view of explication as a panacea for KM-related problems. Rather, a balancing strategy is necessary (see Sanchez, 2005 for the distinction in ‘tacit knowledge’ versus ‘explicit knowledge’ approaches to KM) in order to best serve organisational performance (see Edmondson et al., 2003 for an insightful case study). We close this paper by proposing the idea of a heuristic optimum of explication and by naming important desiderata.

4.1 Underexplication, overexplication, and the state between

Obviously, organisational cultures differ in the way they deal with the problem of knowledge explication. “Implicit” cultures are characterised by deregulation, spontaneity, movement, volatility, trial-and-error-attitude, strong orientation on social relationships, care for open social culture, cooperative leadership, teamwork, a climate of trust, appreciation of impulsiveness, of improvisation, of risk-taking attitude, and of innovation. “Explicit” cultures, in contrast, are characterised by large numbers of defined procedures, extensive planning, data orientation, quantifying attitude, solid and often slow decision making, continuity, caution, precision, dispassion, and objectivity.

Whereas this typology is descriptive, the concepts of underexplication and overexplication are prescriptive. In a state of underexplication growth at scale is hindered, planning is not coordinated and employees lack orientation. The organisation in question would therefore benefit from higher explication levels to promote knowledge distribution and to raise organisational performance and efficiency. However, there is a state of “too much” where explication causes demolition and the retention of practices provokes the loss of competences. The organisation reaches the level of overexplication. It tends towards hyperreflexivity, bureaucracy, slow reactions, repressed innovation, climate of control, and extensive legitimating duties as well as towards deskilled and unmotivated workforce. Here, less explication would best serve organisational performance and development.

Given an optimal level of explication, organisations balance the advantages and disadvantages of explication. They are coordinated efficiently and rely broadly on algorithms and routines; at the same time, they remain spontaneous and changeable. Thus, they are both reflective and fast reactive. Their members are provided with a healthy level of orientation but granted space for decision, innovation and development.

An important desideratum would be the development of tools to diagnose organisations’ level of explication, especially a system of reliable indicators for states of under- and overexplication. While it appears fairly easy to name indicators, it is far more difficult to develop procedures to merge them validly and usefully into total figures representing and assessing the overall level of explication. On the one hand important qualitative indicators result from ethnomethodological and phenomenological microanalyses of the relevant organisation and its structure. On the other hand it is equally important to relate the analysis to quantitative data in order to compare organisations. Further research is called for to identify valid indicators and propose algorithms to usefully merge (subjective) qualitative and (objective) quantitative data.

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3 Halawi, Aronson and McCarthy (2005) take a more optimistic perspective on this matter.
4.2 Contingency theory as a framework for searching for the golden mean

Recommendations in regard to the proper “amount” of explicit knowledge within the firm need to consider the specific circumstances of organisations (Woodward, 1958). One strategy cannot fit the manifold circumstances relevant to the optimal explication level. Rather, explication optima are situated. Therefore, we appreciate current approaches (e.g., Cruywagen, Swart and Gevers, 2008 as well as Sanchez, 2005) and urge for the systematic (re)integration of Contingency Theory (Pugh, 1981; Kieser, 1985; Donaldson, 2001).

The identification of factors determining the optimal level of explication in a given organisation would allow developing heuristics for KM activities. Finally, we suggest some variables affecting the optimal level of explication:

- **Organisation size**: For Weber (1922/1978), very large companies are unrivalled in their firm bureaucracy. Some correlation of 0.6 is found between scales of size and scales of programming and codification (Kieser and Walgenbach, 2003, p209, 261, 314, 322). Recent approaches in KM reflect the specific situation and needs of small organisations (e.g. Evangelista et al., 2010).

- **Growth period**: An organisation’s attitude towards knowledge is expected to evolve with age and scale. In different periods different mechanics and principles support growth as well as affect the dealing with crises. Among these are: pioneering spirit, creativity, strict leadership, delegation, autonomy, coordination, control, bureaucracy, lean management (Greiner, 1972). Hence, a different level of explication is optimal in different periods.

- **Product mix**: Hansen, Nohria and Tierney (1999) recommend “codification strategies” for organisations producing standardised products. On the other hand they favour “personalisation strategies” for those providing tailored products. Generally spoken, organisations dealing with more structured problems show/require higher levels of explication than their counterparts.

- **Environment’s dynamics**: Generally, higher explication levels are expected for organisations in static environments characterised by little change on both buying and sales markets as well as continuous production procedures as opposed to organisations in highly dynamic settings under strong pressure to innovate.

- **Organisational culture**: Organisations with strong cultures may have low explication levels because their culture is homogenous anyway. Peters and Waterman (1982) argue that fewer manuals, organisational charts, and fixed procedures are required in coherent organisation cultures (pp102-103). Similarly, Kieser and Walgenbach (2003, p202) suppose that strong cultures allow a reduction of coordination by programs.

- **Knowledge culture**: This specific part of organisational culture refers to attitudes towards knowledge, know-how and decision-making. As it reflects the psychological demands of its members, its analysis requires psycho-analytical approaches such as the classification in paranoid, compulsive, dramatic, depressive, and schizoid organisations (Kets de Vries and Miller, 1984). Here, higher explication levels are expected for obsessive and schizoid organisations.

With regards to the implementation of an “explication policy”, there might be only one piece of advice which is independent of the circumstances at hand: Be careful.

5. Conclusion

“Although, the codification of knowledge is highly beneficial, we must remain alert to the dangers of neglecting the tacit dimension” (Roberts, 2001, p111). In this paper we argued that the neglect may originate from dominant theoretical positions within the field of KM. In particular, we claim a category mistake to cause problematic concepts of implicit knowledge and knowledge explication. Crucially to KM, these theoretical positions imply recommendations that cannot do justice to the strategic challenge of deciding an organisation’s explication policy.

In contrast, we proposed a Polanyi-derived view on implicit knowledge (Tacit Knowing View) which provides a theoretical basis to integrate the whole panorama of explication-related phenomena, including limits, side-effects and problems. Hence, knowledge explication becomes visible as ambivalent endeavour. As a consequence, the Tacit Knowing View implies different strategic recommendations: Rather than to uniformly follow an imperative to maximise the amount of explicit knowledge, one better strives for an organization’s optimal level of explicit knowledge. In order to advance this perspective, we recommend Contingency theory as a framework and suggested several desiderata.
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Measuring the Role of Knowledge Management Processes in the Commercial Banks of Iran

Ehsan Rasoulinezhad
University of Tehran, Iran
e.rasoli1984@yahoo.com

Abstract: In the current advanced era, knowledge and the applications of it are the essence of organizations for achieving competing advantage and defined as a new strategic approach to innovation and a potential element for creating larger market share. Understanding the knowledge management process in terms of banking sector will highlight how it influences organizational performance. In a developing country like Iran, it is also showing signs of competition and improved performance through knowledge management; however whether the knowledge management process is practiced in Iranian banks is still to be explored. In response to this need, this research explores the key processes and technologies of knowledge management being used in the commercial banks of Iran in order to give an insight for bankers and strategist to understand its importance.

Keywords: knowledge management, knowledge process, knowledge systems

1. Introduction

Knowledge is introduced as the most important property in the organization and knowledge management is generally known as a discipline for identification, collection, organization, storage, sharing and application of knowledge (Akhavan (2009)). In the current competitive environment, the factors leading to enterprise success are no longer simply in the investment of capital, labor and raw material, but in the ability of knowledge innovation from all the members of an organization. Knowledge management has secured an important position in this new era of competitive business environment. Because of this ever increasing global competition and change the traditional organizational management is no longer considered as an appropriate strategy. In 1993, Druker pointed out that the concept pf knowledge workers will have the most vital asset in a knowledge based economy and will the only source for competitive advantage. Meanwhile knowledge management has positive relationship with organizational culture (Aliakbar and et al (2011)). In this regard the KM helps in the management of information, knowledge and expertise through the KM process and using the KM systems to be applied for this process.

One of the key success factors of financial institutions (FIs) is the effective and efficient application and deployment of information and knowledge systems in the areas of operations, management, accounting and marketing. However, organizations must compete for their survival through continuous improvement and innovation to gain competitive advantage. The monetary value of such investments makes it critical for the FI’s to use the right information system and knowledge management system. Not only in Iran, but through out the world, FI’s are becoming more dependent on information system and technology. Information system has dramatically changed the core of operations of business especially the banking institutions. The growth of the knowledge management infrastructure has increased the competition among the banks which has lead to strategies for customer satisfaction and human resource management improving organizational performance. (Hubert Saint-Onge (quoted in Lamb (2001); Dzinkowski (2001); Prodromos & Vraimaki (2009))

In a developing country like Iran, it is also showing signs of competition and improved performance through knowledge systems; however whether the knowledge management is practiced in Iranian banks is still to be explored. It should be mentioned that surprisingly some Iranian bankers don’t care about the power of knowledge in their banks and obviously it would be a vital mistake for their institutions.

1.1 Problem statement

To analyze the role of knowledge management processes on the performance of the commercial banks of Iran.
1.2 Research questions
The concept of knowledge is a critical ingredient for achieving competing advantage. Understanding the knowledge management systems in terms of banking sector will highlight how it influences organizational performance.

In response to this need, this research will focus on exploring the key processes and technologies of knowledge management systems being used in the commercial Banks of Iran. Following research questions have guided this study:

- What knowledge management tools are used in terms for knowledge management in banks of Iran?
- Is there any relationship of knowledge management processes with the performance of the banks?
- Which knowledge management processes is being used to manage the knowledge in the banks?

2. Literature review
The wholesale capture and distribution of knowledge over the last thirty years has created an unprecedented need for organizations to manage their knowledge assets. Knowledge Management (KM) addresses this need by helping an organization to leverage its information resources and knowledge assets by “remembering” and applying its experience. KM involves the acquisition, storage, retrieval, application, generation, and review of the knowledge assets of an organization in a controlled way (Watson (2002), Stankosky (2005)) Businesses need knowledge management programs, because knowledge has become a strategic asset in today's competitive advantage (For instance Chong (2006) indicates that 58.5 percent of the Malaysian IT companies have made significant investments in KM). The knowledge management is embedded in and carried through multiple entities including organization culture and identity, routines, policies, systems, and documents, as well as individual . Technical resources, human resources and cultural, structural resources and the resources which builds KM capability that is related to competitive advantage Chuang (2004)

Organizational performance is affected by knowledge management at different levels of management. A KM- process is further divided into three processes i.e., knowledge development, knowledge utilization and knowledge capitalization. Each process has its own importance (Kalling (2003), Mir Ghafori and et al (2010)). Organizational performance is also effected knowledge infrastructure capabilities and knowledge process capabilities (Gold and et al. (2001))

Due to these facts, an important source of competitive advantage is in the application of knowledge. Knowledge technology can be supportive in knowledge application, by inserting knowledge into organizations processes and procedure. Thus information technology can enhance and provide a positive influence by integration and application with facilitating the capture a, updating and accessibility of organizational directives (Alavi & Leinder (2001)). An important role in the success of knowledge management system is the sharing of both the implicit and the tacit knowledge in which the motivation and commitment of the people plays a significant role (Dyer & McDonough (2001), Kameli (2009)).

The essential factor in managing structural knowledge is creating an appropriate classification scheme to organize information into meaningful categories in a knowledge database that can be easily accessed by its employees. Well executed knowledge based projects have been known to produce extraordinary returns on investments, but they are difficult to measure (Blair & Wallman (2001)). Majority of knowledge management research has been on advanced technology and techniques used to facilitate knowledge sharing. A knowledge organization has been defined as an organization that realizes the importance of its knowledge, and applies techniques to maximize the use of this knowledge to its employees, shareholders and customers. However, any firm interested in making the transition to becoming a knowledge organization has to ensure that its culture is aligned with the requirements for KM success. As attractive as KM is for enhancing an organization’s operations, many commonly agree that there is an important precondition as Davenport (1997) says that two thirds of a firm’s KM efforts should focus upon organizational and cultural issues. The greatest challenge one needs to understand what the culture of the firm is, and one needs to understand whether or not this culture will enable KM or hinder KM.
2.1 Knowledge sharing in financial institutions

Managing knowledge is as important to banking institutions as it is for any other kind of organization. Despite the significance of implementing a knowledge management initiative, there are very few banking institutions formally engaged in a fully integrated KM programs (Prodromos & Vraimaki (2009)). The change in the global competitive business environment has compelled banks to rationalize their products and services and made them to look into knowledge management in order to improve their competitiveness and performance (Dzinkowski (2001) referred in Prodromos D. C. & Vraimaki. Banks to gain competitive advantage may reside in the ability to force knowledge (Hubert Saint-Onge (quoted in Lamb (2001)). Banks do not sell just services and but rather more specifically knowledge (Lamb (2001)).

Ramona Dzinkowski (2001), explains the two basic categories of knowledge management initiatives in financial services companies one it is seen as an integral part of the overall corporate strategy which aims to grow, extract and exploit the company’s knowledge to increase shareholder value. The second focuses on improving upon the knowledge necessary to carry out specific business processes and thereby improving efficiency. Organizational performance and growth depend heavily on how well managers understand customer needs and effectively use or exploit that knowledge to the benefit of the organization, however even the bankers a in some manner engaged in some form of knowledge management. (Piri and Asefzadeh (2006),Prodromos & Vraimaki (2009)).

The World Bank however, breaking new ground in the field, launched a knowledge sharing initiative in 1997 (Egan and Kim (2000)). The bank was determined to transform itself into a knowledge bank, while until that time thought itself mainly in traditional banking terms (Lee & Yang (2000); Laporte (2004). Laporte (2004) referred in Prodromos D. C. & Vraimaki, H. (2009)) reports that the World Bank till 2000 will have a range of knowledge-sharing programs in place: which would include communities of practices, tacit knowledge debriefings, helpdesk and advisory services, extensive knowledge collections using the internet and indigenous knowledge program., Learning from the benefits these financial institutions have realized from implementing knowledge KM initiatives, financial institutions should recognize the importance of systematic management of knowledge.”

2.2 The knowledge management processes

The knowledge management processes are in the literature mentioned as the knowledge management practices. KM practices are defined here as observable organizational activities that are related to knowledge management. It is an interrelated set of various business processes developed in an organization to create, store, transfer, and apply the knowledge.Knowledge management practices the first stage is knowledge acquisition, knowledge creation, knowledge storage, knowledge distribution, knowledge use, and knowledge maintaining (Patrick & Choi (2009))

Table 1: Knowledge management processes

<table>
<thead>
<tr>
<th>Knowledge management systems</th>
<th>Sources &amp; type of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition</td>
<td></td>
</tr>
<tr>
<td>Corporate repositories,</td>
<td>Internal &amp; external knowledge</td>
</tr>
<tr>
<td>On line expert systems</td>
<td></td>
</tr>
<tr>
<td>Discovering patterns</td>
<td></td>
</tr>
<tr>
<td>Transactional processing systems</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>Structured Knowledge system</td>
</tr>
<tr>
<td>Creation of databases using</td>
<td></td>
</tr>
<tr>
<td>Digitizing, tagging, indexing.</td>
<td></td>
</tr>
<tr>
<td>Dissemination</td>
<td>Semi structured Knowledge systems</td>
</tr>
<tr>
<td>Portals</td>
<td></td>
</tr>
<tr>
<td>E-mails</td>
<td></td>
</tr>
<tr>
<td>Instant messaging</td>
<td></td>
</tr>
<tr>
<td>Search engines</td>
<td></td>
</tr>
<tr>
<td>Video Conferencing</td>
<td></td>
</tr>
<tr>
<td>Applications</td>
<td>Knowledge Network systems</td>
</tr>
<tr>
<td>FAQ Repository</td>
<td></td>
</tr>
<tr>
<td>Expert domains</td>
<td></td>
</tr>
<tr>
<td>ERP (Enterprise resource Planning)</td>
<td></td>
</tr>
<tr>
<td>CRM (Customer relationship management)</td>
<td></td>
</tr>
<tr>
<td>SCM (Supply chain management)</td>
<td></td>
</tr>
</tbody>
</table>

Sohrabi and et al (2010) have introduced a practical model for evaluating the maturity of KM in the software industry. They have showed the more that organizations have knowledge-intensive business processes, the more they need structured and realistic programs for acquiring and managing their knowledge as a strategic resource for future continuous improvements.

2.3 Types of knowledge management systems

There are mainly three major types of knowledge management systems (Laudon & Laudon, (2008))

- Enterprise –Wide knowledge management systems (EW-KMS)
- Knowledge work systems
- Intelligent techniques

2.3.1 Enterprise-wide knowledge management systems

This research will be analyzing the first type EW-KMS. These systems are integrated general purpose, an enterprise wide effort to collect, store, disseminate and use the knowledge for various organizations operations and strategies. The table (1) describes the various technologies and their capabilities for storing structured and unstructured data which later is used as expert data for knowledge purposes.

Today, without the use of capabilities of knowledge management systems, effective management of knowledge is hardly possible (Sepehri and Riahi (2011)). One of the fundamental questions in knowledge management is that of the appropriate role of knowledge management systems in organizations. The key focus of information systems has also changed from the management of information to that of knowledge management systems, (John and et al. (2005)).

Due to the emergence of personal networks and applications, knowledge sharing and capturing are becoming more on-demand and just-in-time, Also Knowledge management systems are being aligned to support process-based knowledge management activities (Tsui (2005)). According to Davenport and Prusak (1998), they describe KM as involving three issues which are organizational, human and technical issues. Among these three, the technical is the least important. Many researchers have analyzed about the use of various types of software in knowledge management systems, including Junnarkar and Brown (1997); Liebowitz (1998); Dieng et al. (1999); Alavi & Leidner (2001) and Earl (2001).

According to Edwards and et al. (2005), they have pointed out the forms of both AI-based and conventional software. Among the conventional based some are databases, data warehousing, decision support systems, discussion forums, e-mails, groupware and etc.

Cheuk (2011) has introduced Dervin’s Sense-Making Methodology (SMM) as an approach to design knowledge sharing platform incorporating Web2.0 features which allow user-generated content and have a stronger emphasis on collaboration and interaction amongst users. SMM is a philosophically derived approach which allows knowledge management (KM) researchers and practitioners to more fully understand and listen to user’s needs.

Koulikov(2011), surveys many of the recent critiques of formal mechanisms of knowledge sharing. It identifies a set of methods, structures and ethics of "informal" and unauthorized transfer of information, and suggests that these can offer valuable lessons for the further development of the study of knowledge sharing methods, practices and behaviors in all types of settings.

Rezaeian and Ghazinoori (2011) have presented the model for the role of ethics in success of KM systems. Paper explores the ethical principal of the entire general various functions and processes of knowledge management. For investigating in this area, conceptual model base on the literature of the subject and questionnaire tools made by researcher has been designed.

2.4 Organizational performance

More specifically it was found that knowledge management practices are directly related to various intermediate measures of strategic organizational performance (namely, customer intimacy, product leadership, and operational excellence), and that those intermediate measures are, in turn,
associated with financial performance. According to Tanriverdi (2005), KM has been linked with the financial performance measures but found to be a weak relationship. Gold and et al. (2001) found a strong and significant relationship between both knowledge infrastructure and knowledge processing with organizational effectiveness, using a broad set of non-financial outcomes. Additionally, the results indicate that KM practices are positively associated with organizational performance.

The measurement of organizational performance may take different forms, it could be based on financial performance or Intangibles such as customer satisfaction rate, new competencies and capabilities, end user satisfaction with knowledge management implementation (Fernandez and Sabherwal (2001); Jo R. and et al. (2008)). However, as comprehensive financial data for empirical research may not be easily obtained, however, measures of perceptual organizational performance which correlates positively with objective measures of firm performance can be used (Dollinger and Golden (1992); Delaney and Huselid (1996). In such approach the results and the measures are derived from questions asking participants’ perception of the situation to assess organizational performance relative to the performance of industry competitors.

Performance expectancy variables can be used to measure organizational performance. In 2008, Suzana used. performance expectancy variables to measure organizational performance. Five variables that pertain to performance expectancy in terms of organizational performance were used and they were perceived usefulness, extrinsic and intrinsic motivation, job-fit, relative advantage, and outcome expectations.

3. Research design

3.1 Conceptual framework

3.2 Research methodology

A quantitative research methodology based on a survey using a questionnaire was used. The questionnaire developed by Patrick & Sonia (2009), was used with addition of questions related with gathering of data for the knowledge management systems. This modified questionnaire was pilot tested in one of the commercial banks. The questionnaire was sent to 200 officials of 6 commercial banks in Iran. Out of 150 received questionnaires, 90 were found complete and thus used for analysis.

3.3 Hypothesis

Hypothesis 1: The enterprise-wide knowledge management systems has no relationship with the performance of the banks

Hypothesis 2: Knowledge management processes has no relationship with the performance of the banks
4. Data analysis

4.1 Correlation analysis

Using the SPSS a correlation analysis was conducted among the dependent variable i.e. performance (DEP) with each processes of the knowledge management. The knowledge management processes namely are knowledge acquisition (KA), knowledge creation (KC), knowledge storage (KS), knowledge distribution (KD) and the knowledge utilization (UD). From table (2) knowledge utilization has shown a correlation of 0.58, whereas knowledge acquisition and knowledge distribution has shown a very weak correlation. The knowledge creation and storage has shown a negative correlation.

From table (3) the correlation value is 0.32 with the dependent variable and the independent variable knowledge management processes. However, the KMS indicates a negative correlation value with the dependent variable.

From table (3) the hypothesis 2 is rejected as the p-value is less than the level of significance 0.05. Therefore the knowledge management processes have a relationship with the performance of the organization of the banks.

However, the knowledge management systems have shown a p-value greater than the level of significance, which accepts the hypothesis 1, that there is no relationship with the performance of the banks.

Table 2: Correlation analysis of each process of KM

<table>
<thead>
<tr>
<th></th>
<th>Correlations</th>
<th>DEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>KA</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>KC</td>
<td>-0.10</td>
</tr>
<tr>
<td></td>
<td>KS</td>
<td>-0.41</td>
</tr>
<tr>
<td></td>
<td>KD</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>KU</td>
<td>0.58</td>
</tr>
<tr>
<td>Sig. (1-tailed)</td>
<td>KM</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td>KMS</td>
<td>-0.13</td>
</tr>
</tbody>
</table>

Table 3: Correlation analysis of KM and KMS

<table>
<thead>
<tr>
<th></th>
<th>Correlations</th>
<th>DEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>KM</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td>KMS</td>
<td>-0.13</td>
</tr>
<tr>
<td>Sig. (1-tailed)</td>
<td>KM</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>KMS</td>
<td>0.12</td>
</tr>
</tbody>
</table>

In terms of performance the three dimensions were on three perspectives, organizational financial performance (OFP), organizational market performance and the organizational employee performance (OEP). From Table (4) the correlation analysis with these three with the dependent variable organizational performance reveals that OMP has the highest correlation which is 0.717, whereas the OFP is 0.628 and the OEP is 0.516.
Table 4: Correlation analysis of three dimensions of KM

<table>
<thead>
<tr>
<th>DEP</th>
<th>Pearson Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFP</td>
<td>0.63</td>
</tr>
<tr>
<td>OMP</td>
<td>0.72</td>
</tr>
<tr>
<td>OEP</td>
<td>0.52</td>
</tr>
</tbody>
</table>

4.2 Frequency analysis

Using the frequency statistics each knowledge management system tools was analyzed. The response frequency of the respondents response on the basis of Yes and No were analyzed. The results of their response in percentage are given in Table (5). The results indicate that Voice mails, digital pictures, video conferencing, data mining, are not used for knowledge or even in the daily operations. However, the FAO’S, messaging; electronic memos and databases are used in the banks, but for knowledge are not clear.

Table 5: Frequency analysis

<table>
<thead>
<tr>
<th>Response</th>
<th>KMS</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice mails</td>
<td>53%</td>
<td>47%</td>
<td></td>
</tr>
<tr>
<td>Digital Pictures</td>
<td>60%</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>Video Conferencing</td>
<td>79%</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>Data Mining</td>
<td>83%</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>FAQ</td>
<td>17%</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td>Data Bases</td>
<td>12%</td>
<td>88%</td>
<td></td>
</tr>
<tr>
<td>Electronic Memos</td>
<td>28%</td>
<td>72%</td>
<td></td>
</tr>
<tr>
<td>Messaging</td>
<td>18%</td>
<td>82%</td>
<td></td>
</tr>
</tbody>
</table>

4.3 ANOVA

The analysis of variance is used for the testing whether the model is fit for prediction. In table (6) the results indicate that since the p-value is less than level of significance $\alpha = 0.05$, therefore the null hypothesis that the model is not fit for prediction is rejected and the alternate hypothesis that the model is fit for prediction is accepted.

Table 6: ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>2</td>
<td>0.195085</td>
<td>5.105725</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>87</td>
<td>0.038209</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.4 Reliability analysis

The results from table (7) indicate the reliability value using Cronbach alpha of that there is an internal consistency of .78 indicting that there is an internal consistency among the questions asked for this research.

Table 7: Reliability analysis

<table>
<thead>
<tr>
<th>Reliability Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach's Alpha</td>
</tr>
<tr>
<td>N of Items</td>
</tr>
</tbody>
</table>
5. Discussion and conclusion

5.1 General conclusions

Knowledge management has been gaining ground in the management agenda since 1990's however it has gained more focus as western organizations have realized as a key source of competitive advantage. However, unfortunately in Iran this strategy or its usefulness is still not understood by most of the organizations including banks.

This can be largely attributed to the fact that organizations are merely preoccupied with technology infrastructure, failing to focus on the knowledge management practices or tools. In the light of knowledge management, the main purpose of this study was to develop an understanding of the main KM Processes and tools being used in the commercial banks of Iran. The choice of the banking industry was based on the belief that KM is very important for financial institutions, as various literature sources have indicated. It should also be noted that the banking industry in Iran is growing fast, offering a wide range of new products and services besides the current slow pace due to recession.

One of the main contributions of this research is that it is probably this will be an attempt to explore knowledge-management environment in banks in Iran.

In this research we have used the performance expectancy variables to measure the dependent variable performance. The statistical results indicate that there is a relationship of processes of knowledge management with the performance of the banks but it is showing a very weak relationship. This could suggest that there is some relationship with the performance of the banks but not to the extent that it is directly affecting the performance. The results form table 2 further suggest that among the processes of knowledge management, that the knowledge is utilized as it could be due to the role if information systems or tools of knowledge that are being used in the banks. The other processes for knowledge acquisition and distribution are showing some relationship but a very weak in terms of knowledge management. The literature also confirms that KM has found a strong and significant relationship between both knowledge infrastructure and knowledge processing with organizational effectiveness, using a broad set of non-financial or financial outcomes.

The results indicate that KM practices are positively associated with organizational performance as generally suggested by the KM literature, Tayebi and et al. (2010), Nikpour and Salajegheh (2010)).

It could be attributed to the fact that information technology is used and there is some form of knowledge being acquired and distributed. But the results for knowledge creating and storing knowledge clearly indicate that there is no relationship in terms of knowledge management perspective. It can assumed that there is no specific knowledge management processes established for this purpose and the indication of relationship could be due to the role of information systems which are in some form used for knowledge management also.

The results for the knowledge management systems indicate that they have no relationship with the performance of the banks. However they are used which the statistical results have indicted but for the specific purpose for knowledge management is not clear among the employees. The literature suggests that KM tools have a competitive advantage and above all improve its overall organizational performance. However in this research it contradicts with the literature.

The tools mentioned are part of the information technology and mobile technology and it is possible that the respondents are using them for their operational activities.

5.2 Managerial implications

The literature supports that knowledge management some relationship with organizational performance but to the extent that the employees understand the concept of KM. Although IT cannot, at any degree, substitute for personal communication, the establishment of an efficient KM system could enhance knowledge creating, storing, sharing and distributing. Moreover, organizations should focus on the creation of communities of practice within the workplace (McDermott and O’Dell, (2001)). However the statistical results in this study reveals that organizational market performance has a strong relationship with banks performance. Thus seems to be true as the banks main focus is
customer satisfaction and customer relationship marketing, therefore it has shown this strong relationship. The other two factors have also shown relation with the banks performance. But the main concern whether the employees are utilizing or understanding the role of KM is still ambiguous. The reason is maybe the employees are still in the statuesque of information technology and it could be that the role of information systems in Iran is playing some role in the overall performance of the banks.

The researcher believes that this study may provide a refined view of how knowledge management practices, and knowledge management systems are being used and how they should be used to improve the competencies and organizational performance of the Iranian commercial banks. This study presents empirical evidence on the relationship of knowledge management practices and organizational performance and could better understand the practices of knowledge management in organizations, and ways to apply it, the skills acquired or existing in the employees working in the banks. Organizations should be stressed that there is an increased need for organizations to include their knowledge sharing strategy into corporate strategy (Lin and Lee, (2004)).

Based on the findings in the study, there is a lack of knowledge management processes implementation and a lack of knowledge of knowledge management itself. This research indicates that there is some form of knowledge but due to the lack of understanding and knowledge about knowledge it is not utilized properly. Awareness if given to the management not only will improve their performance but also the productivity of organization, which could lead to a competitive advantage.

Knowledge management practices and tools provide a set of guidelines and practices integral to competitive advantage Overall, it is essential to take a more systematic approach in order to clarify the nature of links between knowledge management practices, knowledge management systems and organizational performance.

6. Limitations

Every study, no matter how well it is conducted, has some limitations. According to this fact, we have some limitations in this research too such as:

- Employees of banks in Iran are mostly unaware between the difference of KMS and information systems.
- Due to the questions format seem to be lengthy
- Return rate is less and the sample size is small.
- Due to time constraint the generalization could not be established.

7. Recommendations

Some important recommendations from our research are presentable as follows. The future researchers can cover these issues in their paper:

- Larger sample size should be taken
- Other KMS technologies could be used to explore the role of KM
- KM models could be used to understand the situation of KM
- KM diagnostic models should be used to evaluate the situation for KM
- Other organizations should be explored

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