Web 2.0

IT and Knowledge Management in the 21st Century

- A case study of Mindroute Software AB

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Abstract

The paper was written on the premise that knowledge and knowledge management are central competitive business advantages and that IT has developed favorably towards alleviating the process of harnessing intellectual capital. This topic has been frequently discussed with significant variances in theoretical approaches arguing both for and against IT’s impact in knowledge management. The authors have empirically explored the role of IT in this field through findings from a case study which quite originally manages knowledge with the emergence of novel web 2.0 tools. The findings of this study leads us to suggest a revised understanding of IT’s role in knowledge management based on the development of socially interactive web 2.0 which has the potential of replacing less effective and outdated IT tools. Optimal impact is suggested to be accomplished by sequentially integrating these various web 2.0 tools into the knowledge management process.
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1 Introduction

Organizations today manage vast amounts of information, both on the sending and receiving end of communication. Organizational information can be essential as it has the potential of being utilized into knowledge. The knowledge a firm possesses is claimed to be the result of several years of organizational activity where individual knowledge is combined into a collective base (King et al, 2004). The increased competition and globalization in today’s business environment has created a stronger need to focus on how an organization manages its intellectual capital (Perrot, 2007). In the last decade, indications have shown that we are entering a new economy where the basic resource is not natural resources or capital but instead knowledge and intellect. In contrast to physical assets, knowledge assets are not dependent on laws of decreasing value, but instead with frequent use, they can increase in value (Marchad et al, 2000). According to Chen and Huan (2007), in today’s increasingly unstable and competitive environment, knowledge is widely considered the main source of competitive advantage for firms. As a consequence, organizations have become progressively more concerned with the concept of knowledge management (KM), since nurturing organizational assets potentially could enable long term competitive advantage (Khalifa et al, 2002). Knowledge management can be defined as:

“...any processes or practice of creating, acquiring, capturing, sharing, and using knowledge, wherever it resides, to enhance learning and performance in organizations.” (Perrot, 2007)

Keeping up with the demands of the shifting knowledge economy is challenging. Organizations should be aware of emerging knowledge tools that are in use today and modify their technology to maintain a competitive global advantage (Hedgebeth, 2007). In response to this, many organizations have developed Knowledge Management Systems (KMS) designed distinctively to facilitate the sharing and integration of knowledge (Bolloju et al, 2002). As people have started to utilize novel applications of technologies such as the Internet, it has been suggested the time has come for a discussion of a new paradigm in knowledge management (Perrot, 2007). Perrot refers to the emergence of web 2.0, or the social web, which is suggested to create new ways of managing knowledge through the interaction between collaborative and social technologies such as Blogs, Wiki’s, RSS (Really Simple Syndication) and Mashups.
A weblog (Blog) is defined as a website which contains periodic, chronologically ordered posts on a simple webpage (Ojala 2004). Wikis can be defined as web-based collaborative applications that enables users to manage content by adding and editing information online (Hedgebeth, 2007). Really Simple Syndication (RSS), as it is commonly called, can be seen as an online pathway of information flow which facilitates user control over what kind of information the individual wants (Ewing 2007). Nowadays, many websites offer the possibility to subscribe to feeds. Mashups which often function simultaneously with RSS feeds, iGoogle being the most recognized example, are defined as web applications that can combine information from several sources which are normally provided through uncomplicated web services (Tatemura et al, 2007). These are all relatively novel technologies and theory on its effect on knowledge management is in its early stages.

1.1 Problem

Theory explores the concept of knowledge management as an increasingly important factor for a firm’s competitiveness as well as the developmental role IT has had on knowledge management. Nevertheless there is an ongoing debate to what degree IT impacts knowledge management. There is an evident division amongst theorist on the subject; while some claim that IT plays a highly significant role in KM, others discard the notion of over relying on IT as a tool for successful knowledge management. This is a contemporary and interesting division that we aim to further investigate. In synchronization with the current emergence of web 2.0 tools, such as wikis, mashups, blogs and RSS, theorists have explored these social and collaborative web tools as knowledge management enablers. Marchad (et al 2000) claim that there is no simple procedure, concept or software package that has yet to be developed that can sufficiently incorporate the various approaches of knowledge management. Although a seven-year assertion, still today there are few, if any, theories on how these new IT tools can be utilized and integrated. Concretely, few of these contemporary theories are applied to case studies which, as a result, have provided little empirical data on how these tools actually enhance knowledge management. Henceforth, the authors recognize a theoretical gap reviewing the interaction between and the effect of the web 2.0 tools presently available.

For this study, Mindroute Software AB has been chosen to provide a pragmatic example of the theoretical discussion. Mindroute delivers consultant independent software solutions and has recently developed the software program Incentive, a program aimed to facilitate the
management of knowledge in organizations. Mindroute is currently the only provider of integrated web 2.0 solutions.

1.2 Purpose

The purpose of this paper is to explore the significance of IT in knowledge management and whether or not the emergence of specific web 2.0 tools can enhance KM and if so, how this can be proposed.

The following research questions aim to answer the purpose and will be used as the underlying structure of the paper.

- What IT tools are available for facilitating knowledge management?
- Why should companies be concerned with managing knowledge through IT?
- How can companies manage knowledge effectively and efficiently by IT?

1.3 Paper Delimitation

This study is exclusively focused on drawing conclusions and discussing the information collected for the purpose of the paper. The presented material is collected during a limited period of time, from a single company. Hence, the possibility of making generalization from the presented material is considerably limited. This limitation is relevant to address as the study is addresses the area of IT, which is characterized by a high pace of development and ever-changing market conditions. Results and conclusions are based on the collected material from a single firm; therefore the material should only be seen as representative for the situation and perspective of the respondent firm.

Due to the unique nature of Incentive, competing solutions available on the market will not be discussed, as the authors are only interested in firms offering integrated web 2.0 solutions and not providers of the individual tools. The authors claim that due to the currently unique position acquired by the respondent company, further incorporation of alternatives will contribute little to the discussion and result of the paper.
1.4 Disposition

The authors have structured this paper by initially introducing the subject and purpose to its reader. Following the introduction the reader will be presented to the chosen theoretical framework, followed by a thorough review of the method and subsequently the empirical findings of the authors’ research. Based on theoretical framework and empirical findings an analysis of the collected material will be presented followed by a brief conclusion and finally a discussion surrounding the topic. The structural outline of this paper is in the sequential order of the theoretical framework, method, empirical findings, analysis and conclusions. These sections are consistently approached by arranging collected and reviewed material in line with the selected structural concepts of What, Why and How? These structural concepts have been constructed based on the previously presented research questions and these are selected as they gradually concentrate the material from an open perspective on KM to a more defined view of the contemporary approaches of IT in KM. Equally important; the structure intends to facilitate easy reading as the reader might not be familiar with the subject.

Even though the authors aim to follow this structure, it is relevant to draw attention to some discrepancies in the structural agenda. The authors recognize the difficulty in wholly separating What, Why and How in the presentation of the empirical findings of which the reader will find material overlapping these concepts. In the analysis, the What section is moderately represented as it provides little material for analytical discussion.
2 Theoretical Framework

The theoretical framework created for the purpose of this paper will be presented in two major sections. The first section is focused on introducing the reader to knowledge management and the second, and main part of the theoretical section, will be focused on the aspect of IT in knowledge management, where contemporary IT tools and theoretical discussions regarding the incorporation of IT in knowledge management will be presented. The general outline in the theoretical section is structured in accordance with the disposition of *What, Why* and *How?*

2.1 *What is Knowledge Management?*

Companies are seeing an increasing level of importance of being able to transfer and retain knowledge within the organization, as knowledge is suggested a key factor in creating competitive advantage (Liebowitz, pp. 7, 1999). Today’s market climate has been described as an “information economy” and within this economy, information and knowledge are considered the key resources for organizational success.

Knowledge management (KM) can be, and has been defined in many different ways. According to Groff and Jones knowledge management is "*the tools, techniques and strategies to, retain, analyze, organize, improve and share business expertise*" (Groff et al, pp. 2, 2003). A more straightforward approach is: “*KM is the getting the right knowledge to the right people at the right time so that they can make the best decision*” (Liebowitz, pp. 6, 1999). Several more could be presented, but as the same theme is reoccurring, further definitions are superfluous. There is a general consensus within the theoretical realm that knowledge management concerns the acquiring, storing, distribution, and application of knowledge.

One discussion that has been raised within the subject area is whether knowledge management more appropriately should be referred to as “information management”. This discussion is based on the notion that knowledge cannot be managed (Groff T, et al, pp. 2, 2003). The main difference between information and knowledge is that knowledge is to be considered as a guide to action. Distinction can be drawn from it to be applied to a specific situation or to solve a problem. Information and data is to be considered only as entities that can inform or for that matter, confuse (Groff et al, pp. 3, 2003). This aim of discussion is supported by Chinying Lang as she describes the paradoxical state of knowledge
management, meaning that the cognitive and highly personal character of knowledge is contrasted by the aspect of systematization and structure which management would require – connecting KM to the management of information (Chining Lang, 2001). It is suggested that knowledge is inherently a social act, and KM needs to be directed towards facilitating the connection of people within an organization as to “…be able to think together and to take time to articulate and share information and insights they know are useful to other in their community” (Chining Lang, 2001).

Approaches to KM are essentially process-based and are often built or structured in three steps. These steps essentially consist of the acquisition, dissemination and utilization of knowledge (Liebowitz, pp. 7-8, 1999). Theory suggests that by developing a system that adequately processes these concepts, the organization can gain competitive advantages (Liebowitz, pp. 7 1999)(Quirke, 2001)(Amin et al, pp. 15, 2004). One reoccurring theme in the discussion of desired outcomes of KM is the concept of making knowledge organizational rather than individual (Erickson et al, 2001).

In theoretical discussions, the actual benefits of knowledge management are seldom explicitly discussed. The question of how it actually relates to the profitability of the company is sparingly addressed (Quirke, 2001). The benefits of knowledge management is theoretically asserted to be related to organizational development as applied knowledge, gathered from internal sources, can contribute to more effective processes of production. Additionally this could facilitate innovation and an enhanced organizational flexibility and adaptability which can respond better to market change (Quirke, 2001) (Patriotta, pp. 16, 2003).

2.2 IT in Knowledge Management

In this section focus lies on the role of IT in knowledge management. While some theorists argue that IT plays a significant part in today’s competitive business environment, others assert that there is little association between technology and profitability. Both sides of the issue will be discussed in this theoretical part as well as how technology can be applied in knowledge management.
2.2.1 What is IT in KM?

It is important that the reader comprehends the term IT in knowledge management since it is constantly repeated and an integral part of the paper. Therefore, this section of “What is IT in KM?” will introduce the reader to different IT tools such as Intranets, KMS, Collaborative technologies and Web 2.0 tools which collectively comprise the authors’ understanding of IT in KM.

2.2.2 Intranets

A perhaps less currently used IT tool is Intranets. Intranets can fundamentally be described as linking various information systems together that support different fields of function within different organizations that would otherwise be unable to cooperate as a result to differences in technological platforms. Jacko et al (2002) describe an Intranet as a system within an organization that has the ability of enabling people to access information, communicate, collaborate without geographical boundaries, share knowledge, and learn from each other. They are according to Skyrme (2001) an important part of knowledge management infrastructure because they offer several benefits to knowledge networking. Knowledge management enabling characteristics like easy access and user friendliness are mentioned as well as universal access to information and person to person interaction (Skyrme, p. 88, 2001).

2.2.3 Knowledge Management Systems

The development of new and modern processes and systems has allowed for new ways of sharing knowledge within the organization. Knowledge management systems (KMS) refer to a group of information systems that can be applied to manage organizational knowledge. That is, they are IT-supported systems developed to maintain and enhance the organizational processes of knowledge creation, transfer, storage/retrieval and application (Maryam et al, 2001, Bolloju et al, 2002, Nevo et al, 2007). Examples of knowledge management systems are knowledge repositories, knowledge discovery and mapping tools, community builders, enterprise knowledge portals, collaborations tools, and navigation systems. (Nevo et al, 2007)
2.2.4 Collaborative and social technologies

The Internet has created new ways of knowledge networking and Skyrme (2001) was in the forefront when he claimed that collaborative technologies, such as the Internet could make a significant impact on knowledge sharing. It is argued that collaborative technologies can enhance collaboration between employees as well as sharing the organizational information and knowledge. Collaborative technology can be defined as any software that allows shared access over a network (Skyrme, pp. 85, 2001). These technologies can fulfil five corresponding roles in knowledge development:

1. A knowledge connector – they connect people to information and people to people. The internet provides many starting points to find appropriate information to expertise.
2. A tool for improved communications – constraints like geography and time does no longer have to be a problem and conversations are recorded as organizational memory for future purposes.
3. Access to information repositories – a user can access vast amounts of scattered information. Furthermore much of that information is more comprehensive and up to date than if individuals manage it themselves.
4. A vehicle for active knowledge exchange – facilities for contribution, both simultaneously and individually, allow workers to share knowledge and collaborate in its ongoing development.
5. An alternative to conventional meetings - meeting support systems seize additional knowledge in face to face settings. Groupware allows participants to contribute to virtual meeting whenever, wherever. (Skyrme, pp.90 2001)

2.2.5 Web 2.0

In Oberhelman’s (2007) view, Web 2.0 usually refers to web tools that, in contrast to the previous Web 1.0 tools that passed on information to an inactive and receptive audience, instead invites people to interact, collaborate and edit information (Oberhelman, 2007). Needleman (2007), states that the purpose of Web 2.0 is to utilize it as an internet platform to build sociable applications that progress on the premise of user quantity. Concisely, the applications were built to improve the collective intelligence. By many, the second version of the Web, more commonly known as Web 2.0, has been called “the social Web” because it is described as more open and user friendly by for example enabling users to create and publish their own content. With the modification of Web 2.0, new software tools have emerged to
allow for online activities that were previously not possible. Wikis and blogs are examples of how the Web has grown to be more social. (Maged et al, 2007)

“The social Web is about conversations, interpersonal networking, personalization and individualism. It is the people-centric Web” (Maged et al, 2007)

<table>
<thead>
<tr>
<th>Web 1.0</th>
<th>Web 2.0</th>
</tr>
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<tbody>
<tr>
<td>Encyclopaedia</td>
<td>Wikipedia</td>
</tr>
<tr>
<td>Personal Web Sites</td>
<td>Blogs</td>
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<tr>
<td>Publishing</td>
<td>Participation</td>
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<td></td>
<td>Syndication (RSS)</td>
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Fig 1. A model displaying the difference between Web 1.0 and Web 2.0 (Maged et al, 2007)

At a website named after the development there are some fundamental differences between Web 1.0 and Web 2.0 in particular. Web 2.0 has become less complex to manage in terms of simplicity and user friendliness. The level of openness has increased the possibility to communicate with more people. Communities have evolved through e.g. blogs and forums and integrated solutions such as Mashups have been created to combine services and to further develop existing solutions (www.web20.se). Needleman (2007) makes the distinction that web 2.0 is participative, where the users are the co-developers, not simply publishers.

Some theorists believe that collaborative learning is an activity where people interested in learning new things can, via the Internet, function as a learning community where they share resources, knowledge, experiences and responsibility (Maged et al, 2007). Through the use of Web 2.0, information that was once controlled by authority, now have the opportunity to liberate itself allowing in principle for anyone to create, gather, organize, find and share content that meet their needs. Maged (2007) propose the idea that increased contribution from users will eventually create a collective intelligence and content that is dynamic and reusable. He further emphasizes that this level of commitment can promote a sense of community, empowerment and ownership. Wikipedia is certainly the most recognized example of this.

### 2.3 Why Incorporate IT in Knowledge Management?

"Younger employees are very comfortable with computers and technology. And that's the future — people coming into the company will be tech savvy." (Ewing, 2007)
In today’s business environment, globalization and increased competition has generated a pressing need to focus on how an organization manages its intellectual capital. Consequently, the concept of knowledge management has gained interest and it is suggested that recent technology has enabled thoughts and ideas to more easily be managed. With wider use of technologies such as the Internet, Perrot 2007, as previously stated, suggests that the time has come for a new paradigm for knowledge management. In recent times there has been a shift in view within the firm which argues that intellectual capital is the firm’s key asset. Acquiring, integrating, and leveraging individual firm members’ knowledge has now according to Nevo et al (2007) become a significant KM activity and bearing this in mind they argue that IT plays a revised role in supporting KM. Maryam & Dorothy (2001) assert that IT has the ability to systematically enhance and expedite large-scale intra-firm knowledge management.

Jackson (pp.2, 1999) is more specific in his view of why IT plays a progressively important role to KM.

- “The demand for more flexibility by individuals, combined with improvement in technological capabilities and cost-effectiveness will make working arrangements increasingly viable and attractive.”

- “The need for organisations to improve innovation and learning will demand new knowledge management systems, making use of IT support that helps members to acquire, accumulate, exchange and exploit organizational knowledge.”

- “Because access to and transfer of knowledge and expertise will increasingly take place across boundaries, internal networks and scattered project groups, as well as inter-firm collaborations, will become more and more common.”

Plessis (2004) argues that IT has the ability to enhance the effectiveness and cost efficiency for the organisation in terms of updating and managing the knowledge base, but also in terms of increased productivity from employees. For instance, IT can more quickly and easily access and utilize the available knowledge. Through the use of standardisation, both customer and supplier access and retrieval of knowledge can be more efficient, in effect increasing their satisfaction (Plesiss et al, 2004).

As people become more familiarized to using new and different media, consumers are more comfortable with accessing, creating and sharing information. According to Ewing (2007), a 2006 study from Fortune 500 companies and global organizations, indicated an increased
awareness of new media technologies such as blogs and wikis. These tools can create platforms for companies to connect their workforce around the world. "A global manager can become incredibly efficient using online tools. It helps to create communities within the organization to start conversations about products, ideas and issues." (Ewing, 2007)

2.3.1 A Study: Why should IT be considered in KM?

A recent survey conducted by Nevo et al (2007) aimed to investigate the most significant benefits panel members expected to derive from KMS. Nevo’s respondents were anonymous and the sources were consequently not revealed whereby no references will be mentioned after the quotes. These were the most important factors and motivations for IT in KM.

• Improved productivity and effectiveness

“The business benefits are in that wealth of experience of collected knowledge over years of what works in certain situations and being able to collect the data so that you could run optimally and have the best productivity that you could get.”

• Improved efficiency and cost savings

“In any company, the real delay is caused by having to rework things. And you know the old axiom “we never have time to do it right, but we always have time to redo it”. That's where the biggest flaw is in most companies, is that lack of speed and that impacts the customer service and that impacts everything. If you can do things correctly one time though, you have a significant competitive advantage and I think a system like this can underpin that kind of ability.”

• Increased responsiveness

“You need to be responsive to what's going on in the world, and the better you can do that, the better your business is going to be. That's what these systems do, they give you insight into your business to figure out how you make it better or how you serve your customers better.”

• Better communications

“I think just the benefits of having a workforce that understood common issues or common problems. It would be a way to very quickly communicate areas of interest to the company ... as a communications vehicle I think it can have a lot of benefits.”

• Innovation

“When it comes to new product development, or new knowledge, or new innovation, then the knowledge management has to contribute towards those kinds of things.”
2.3.2 Challenges Concerning IT’s Role in Knowledge Management

One of the commonly acknowledged problems facing managers today is the difficulties involved in stimulating employees to share their knowledge (Perrot, 2007). King et al (2004) recognize the same “knowledge is power” issue. By utilizing knowledge management technologies as a means to capture and distribute knowledge, individuals are repeatedly required to contribute their knowledge to a system instead of keeping it to themselves or sharing it solely with their associates through personal conversations or written exchanges. Presumably, some individuals in some organizational cultures follow the “knowledge is power” saying by marketing and sharing knowledge only when externally driven to do so. This could be the cause of not knowing who will benefit from the knowledge shared and thus keeping an apprehensive approach to sharing knowledge (King et al, 2004).

In 2001 and 20 years back, US industry invested more than 1 trillion dollars in technology Marchad et al (2000). In Sweden, analysts make a projected investment of 143 billions SEK in IT 2007 (www.exido.se). However industry-wide analyses of IT investments show little relationship between IT expenditures and company performance. This disconnect between IT expenditures and organizational performance may be caused by managerial unawareness in how knowledge workers communicate and function through the social processes of collaborating, knowledge sharing and building on each other’s ideas (Lang, 2001). Recent discussion however, claims that the IT productivity paradox might be missing the true purpose of IT’s function by expecting any return on IT in the first place. Marchad et al (pp. 253, 2000) suggest that managers should be looking at the usage of IT. Many companies have been unsuccessful to exploit technology because they have fallen short to understanding the critical determinant of technology effectiveness in organizations i.e. how people use it. Marchad continues to say that by neglecting technology use, people forget that technology is not valuable, meaningful or consequential by itself, it only becomes so when people engage with it in practice (Marchad et al, pp. 253, 2000).

The respondents of the previously mentioned survey, conducted by Nevo et al (2007), moreover responded to a few problem areas regarding the potential challenges companies are faced with using technology as a means to improve KM. These are the problem areas and motivations why:

- Usage
“If you set up some kind of knowledge database and three months later or six months later ... you realize people haven’t used it, it’s a failure. It comes back to the whole purpose behind it is for people to use it to make their lives or their work easier.”

• **Ineffectiveness**

“To the extent that we bring in a system and we spend a lot of money on it and people use it but we don’t get a sense that the business itself has been impacted ... then that would be a failure.”

• **Technical features**

“That is one of the big problems with knowledge management systems in general is that faced with the big cost, trying to come up with expected benefits and then actually measuring the benefits that you get out of the expenditure that you’ve made.”

Marchad et al (pp. 52, 2000) argues that the concepts of KM are essentially people focused and further enabled by technology, not technology driven which also leads to the problem of processing large amounts of information and data. This could reduce and even undermine perceptive thinking and decision making abilities. Skyrme address various challenges companies are faced with when applying knowledge technologies. The first is the perceived problem of information overload, which itself can be seen as a consequence of technology abundance (Skyrme, pp. 93, 2001) (Quirke, 2001). A second challenge is to recognize that many of the tools described solely address explicit knowledge. However, by many, the most valuable knowledge in an organization is believed to be the tacit knowledge. Therefore, Skyrme suggests that the majority of technology needs to be complemented with non-technical processes and methods that can help transfer tacit knowledge. In Skyrme’s view the largest challenge is insufficient emphasis to human and organizational factors (Skyrme, pp.93, 2001).

Erickson and Kellogg (2003) suggest that effective knowledge management involves networks of people, relationships, and social factors like trust, obligation, and commitment. In regards to the social nature, this is suggestively seen as a considerable challenge to anyone interested in creating knowledge management systems (Erickson et al, 2003). It is suggested that knowledge and management of it is dependent on collaboration between a wide array of
contributors ranging from people and processes to supportive technologies in an organization (Raghu et al, 2005).

2.4 How Can IT be Incorporated in KM?

The exchange of knowledge between individuals and enterprises can be accomplished by knowledge management technology. This section will explore how technologies can be incorporated to support and improve the different denominations of KM (acquisition, dissemination and utilization), a study by Nevo (2007) and specifically how the different web 2.0 tools can be utilized.

2.4.1. Knowledge Acquisition

In terms of knowledge acquisition, Intranets can be seen as an example of how to facilitate greater amounts of exposure to online organizational information. Maryam et al (2001) exemplify this by asserting that as information exposure increases, people may increasingly adopt knowledge creation by making interpretations of information that can result in new knowledge. Interpreted this way, an intranet can be seen as a support to individual learning. There is also a possibility of increasing the quality of knowledge creation through computer enabled communication. Suggestively, this can be achieved by establishing an environment for creating and sharing beliefs, confirming mutually agreed interpretations, and for allowing expression of new ideas. By facilitating the establishment of dialogue within the organization, information systems can enable individuals to arrive at new understandings and more accurate interpretations than if left to interpret information individually (Maryam et al, 2001).

2.4.2 Knowledge Dissemination

IT can, according to Maryam and Dorothy (2001), increase knowledge transfer by broadening the individual's reach within the organization. An employee in search for knowledge can regularly be limited to co-workers within the same department, or even room. This can conceivably decrease the likelihood to find new knowledge because individuals in the same area tend to possess similar information. Therefore it is suggested that by expanding the individual's network to more extended connections is considered vital to the knowledge dissemination process because such networks can generate new ideas. For instance, computer
networks, electronic bulletin boards and discussion groups can all create a forum that facilitates contact between the person seeking knowledge and those who may have access to the knowledge (Maryam et al, 2001). Providing categorizations or organizational knowledge maps facilitates rapid knowledge location, or the individual who possesses the knowledge, faster than would be possible without such IT-based support (Maryam et al, 2001).

2.4.3 Knowledge Utilization

With the use of IT, knowledge utilization can be efficiently embedded into organizational routines through the proposed institutionalization of "best practices". Furthermore, IT can enhance the integration of knowledge and application by facilitating the capture, updating, and accessibility of organizational directives (Maryam et al, 2001). Intranets can in this instance improve availability and maintenance of company directives and this could in effect enable change more expeditiously. By broadening the individuals' internal social networks and by increasing the amount of organizational knowledge available, IT allows for organizational knowledge to be applied whenever and wherever (Maryam et al, 2001).

2.4.4 A Study: How Can Companies benefit from IT in KM?

According to the study previously discussed by Nevo et al (2007), employers that have experience from using IT in KM show a number of beneficial outcomes as a to how IT in KM can prove to be successful. These are the perceived success factors that the employers have derived from experience:

- **Easy to use**

  “It has to be easy to use. The way the information is stored and the way the information is accessible has to make sense. If it’s not easy to use, people will not use it – me including. I don’t have time to waste ... I might as well pick up the phone and start phoning people.”

- **Knowledge that is valuable and of high quality**

  “Fundamentally with knowledge management – is the crux of it – it's fine to be able to measure the consumer side of it and it's important but the reality is if the employees don’t find it valuable, they won’t use it, they won’t update, they won’t share their knowledge and put it into the system and it’ll die by itself. So the biggest success factor is seen by how relevant the users of the system feel it is, and they’re prepared to participate. Without that, it doesn’t matter how much you can get out of the thing – if they’re not committed to share their information and update it because they don’t see any value in it to themselves, it’ll just die.”

- **System accessibility**
“Easy access is key. You don’t want them to have to log off a system to get on to another system.”

- **Involved users**

  “Education of the people who are going to use it, in terms of what the system can do and how they use it. They have to understand how they use it and the benefits that it brings them with how they use it.”

- **Integration**

  “We’ve slowly brought the intranet in and it’s indispensable as part of just doing their job on a daily basis, because once you get them in then everything that is there is available to them, but if they’re not going to sign on to the system then they’re not going to ever accept it. So that’s how we’re trying to evolve that process by making the intranet an indispensable tool for the day to day stuff and then add on this information gathering bits as part of the whole process.”

- **Incentives**

  “There has to be some Incentive for employees to collaborate and contribute to the quality of information and to go more into the depth and breadth of contents in the system.”

### 2.5 Web 2.0 Tools

This section goes through the emergence of web 2.0 which has created new ways of interacting, by using collaborative and social technologies such as Blogs, Wiki’s, RSS and Mashups. These are all relatively novel technologies and theory on its effect on knowledge management is in its early stages.

#### 2.5.1 Blogs

Ojala (2004) asserts that application of appropriate software tools can facilitate communication and ease of access to knowledge. A weblog (blog) is defined as a website which contains periodic, continually ordered posts on a simple webpage.

It is suggested that in an environment where collaboration is important, blogs could potentially bring substantial benefits to companies willing to adopt the technology (Ojala 2004). Hiler states that blogs have the potential to involve people in collaborative activity, knowledge sharing, reflection and debate where complex and expensive technology has not been as successful (Williams et al 2004). Bloggers i.e. blog writers, can supplement additional knowledge for research projects, share market knowledge, capture and disseminate relevant
news externally, and contribute valuable insights on specific topics. Additionally, bloggers can be especially useful for knowledge promotion in varying cultural environments and can be established almost anywhere. (Ojala, 2004)

More specifically, blogs can provide the opportunity to capture knowledge in an organisation and further disseminate that knowledge throughout the organisation. In contrast to previous IT systems this could be achieved without the time and financial expense of having to implement formal knowledge management tools (Williams et al 2004). Indeed many theorists claim the cost-efficiency of blogs. Ojala (2004) assert that unlike many other computer systems, blogs do often not require a major budget because the company is not required to spend a huge amount of time on programming, installing or implementing a blog. Furthermore, should the weblog be considered unsuccessful, it can be fairly inexpensively shut down (Ojala, 2004).

By having the ability to comment and post democratically, employees can be empowered to voice their ideas and concerns and provide feedback which was not previously possible in a similar environment (Williams et al 2004). It is also feasible to conceive the idea that personalized responses to news and messages can develop a deeper understanding in an organization which in effect could broaden the collective knowledge of the firm (Williams et al 2004).

### 2.5.2 Wikis

Wikis are defined as web-based collaborative applications that allow users to add and edit online content (Hedgebeth, 2007). A wiki is an example of social software that could facilitate work in a virtual environment. Wikis have the potential to provide individuals with a forum for improving knowledge, progressing ideas and form virtual collaborative social research communities. This could provide novel repositories for all aspects from planning to implementation (McKiernan 2005).

Wikis can be used for numerous objectives. They can be used as a source for locating information and knowledge and/or as a method of virtual collaboration, e.g. to create dialogue and share information among participants in group projects where individuals learn from each
other (Boulos et al, 2007). Sauer et al (2005) further explains the possible benefits of wiki’s. Wiki’s can enable the team members to share knowledge in an easier and quicker fashion which could result in an efficiently managed knowledge base within the group. Information that was hidden in old manuals and documents can instead be made more accessible and updated simultaneously. (Sauer et al, 2005)

According to Sauer et al (2005) blogs and wikis are undemanding and affordable tools for communication and knowledge management. It is suggested that their rather unsophisticated structure can facilitate integration into already existing intranets and internet-solutions. Sauer goes further by stating that web 2.0 tools such as blogs and wikis have the potential to offer all the features of complex and expensive IT-solutions (Sauer et al 2005).

2.5.3 RSS (Really Simple Syndication)

Theorists argue that in this day of age with countless websites, publications, and overflowing e-mail inboxes, it is considerably harder to keep pace with the abundance of sources of information. RSS feeds can enable the employee by staying up to date with great amounts of newspapers, blogs, databases, catalogues etc without having to visit numerous websites every day (Ward, 2007). Really Simple Syndication (RSS), as it is commonly called, can be seen as a pathway for information flow on the Web which facilitates user control over what kind of information that reaches the individual. More specifically, a news reader is a tool that collects web content which is supplied in the form of a web feed, which sequentially can be published on blogs, mashups and web sites. RSS feeds works automatically and besides having to determine the settings, do not have to be controlled (Ewing 2007). When news are published, they are automatically sent in the RSS feed to an aggregator which can be displayed wherever chosen. Some companies have created an RSS page within their intranets to store all RSS feeds in order for the employees to find information that is specifically customized to their needs. This could effectively help the internal communications team to communicate more efficiently to employees by motivating them to pull relevant information instead of pushing messages to the employees (Ewing, 2007)

2.5.4 Mashups

Similarly to RSS feeds, Mashups is a result of the increased need for efficiency and effectiveness on the web. The need to integrate data from numerous web sources is rapidly
increasing and this is supported by the recent abundance of mashup applications (Thor et al, 2007). Mashups are defined as web applications that can combine information from several sources which are normally provided through uncomplicated web services (Tatemura et al, 2007). The function is designed to gather information or applications from different systems to create new opportunities in services and applications for the user. As an example, a mashup can be seen as a diagram illustrating the most recent sales numbers collected from a system that supports sales information. This could then be incorporated with other pieces of information which potentially creates new sources of information (De Keukelaere et al, 2007).

Thor et al (2007) claim that mashup applications are interactive and dynamic web 2.0 tools since the specific user can control what content it may be interested in. A recent example of the adaptation to mashups is iGoogle (Thor et al, 2007).
3. Method

Previously stated, the purpose of this paper is to explore IT in knowledge management and whether or not the emergence of specific web 2.0 tools can enhance KM and if so, how this can be proposed. As the authors are adopting an explorative approach to the study, a qualitative research method is to be preferred as the purpose is not to find causality between different variables (Bryman, pp. 301-302, 2002). The purpose is to understand and explore the standpoint of the respondent regarding the process of developing and implementing tools for a specific process. Therefore the authors propose that the choice of approach as presented is to be considered as optimal for answering the purpose of the paper.

For this study the authors have chosen to collect information by conducting an interview with the CEO of Mindroute, a company, which develops and delivers integrated IT solutions and tools for internal communication and knowledge management. To acquire an extensive understanding and background of the topic area, a literary review of relevant theory has been conducted and presented in the theoretical section. The field of knowledge management is extensive and has been processed over a time span exceeding two decades. This paper has been narrowed into focusing, to a great extent, on the most contemporary and novel approaches to KM. As these approaches and discussions concerning recent development of IT tools are relatively new, little has been written, limiting the number of published sources on the subject.

3.1 A Case Study

The authors chose to conduct a study on Mindroute Software AB, founded in 2002 with the idea of creating a software program. The business idea of Mindroute is to deliver consultant independent products with lower cost of management than other alternatives. The company was chosen as the subject of this paper on the basis of a newly developed software program Incentive. Mindroute state that Incentive can be used as a personal web for companies, and is described as a living knowledge platform which consist of integrated web 2.0 tools such as blogs, wikis, RSS and mashups. They are the single company in the world that currently offers integrated Web 2.0 solutions while competitors are focused on the development and marketing of individual IT-tools. Furthermore Mindroute was selected on the basis of their recent achievement of landing a contract with Sony Ericsson worldwide. In addition to their
market recognition, *Incentive* was nominated for the Guldmusen award in the category of best IT-product of 2007 (www.guldmusen.se). This validates the company as a pioneer firm on the market.

The market characteristics of a small number of competitors limit the potential amount of respondents for the study significantly, but the authors suggest that this aspect increases the relevance of focusing on Mindroute. This case is distinctive to the subject since the effect of integrating web 2.0 online tools for improving knowledge management has gone relatively unexplored. Furthermore it is an advanced area that makes the study even more relevant. The selection of Mindroute is also based on the presently original business idea developed by the company.

### 3.2 Interviews

The primary information gathered for the purpose of this study has been collected through an interview with Rickard Hansson, CEO of Mindroute. The contact has been established through inquiry via telephone. Mindroute was brought to the author’s attention by a business contact from previous employment, which during discussion regarding internal communications and knowledge management referred to Mindroute as an interesting source of information. Upon reviewing the prospect company, the authors found sufficient material to proceed with Mindroute as the subject for empirical study. Mr. Hansson is chosen, as he is the CEO and founder of Mindroute and is highly involved with the development of the products of the firm and therefore considered the most knowledgeable and relevant to interview.

The authors have chosen a semi-structured form of interview as it allows the interviewer to adapt to the situation and add further questions if necessary. Furthermore it allows the respondent to, if necessary, expand and add questions outside the intended topic area (Bryman, pp. 127, 2002). As the author’s purpose of this study is to explore a relatively unexplored topic area, the authors understandably wish to limit the effect of pre-determined perspectives and opinions discussed in the theoretical section of this paper. The authors intend to do so by allowing the respondent to discuss the questions without the author’s intervention to an as great extent as possible.
The main interview was conducted at the office of Mindroute in Malmö on the third of December 2007. The authors secured the possibility of adding interviews by telephone or email correspondence if necessary for further questions or clarification of collected information. These following interviews were conducted by telephone and by email between December fourth and December 22\textsuperscript{nd}. The respondent was presented with the question topics (see appendix 1) in advance, allowing the respondent to prepare and reflect over the topic. Furthermore as the respondent is Swedish, all questions were asked in Swedish. This was done with the intention of facilitating the discussion and gathering of data. Collected material and used questions have afterwards been translated into English with the aim of keeping a consequent choice of language throughout the paper. The main interview was recorded to secure the content generated during the interview, giving the authors the possibility to review the collected material and to make accurate statements.

3.3 Validity

This paper is based on a qualitative approach and the purpose is not to claim statistical significance, but to explore a socially interactive IT tool. Even though the results generated through this study is limited in aspect of generalization, the authors claim that the study still carries a high level of validity as the respondent company is the only company presently available to discuss the subject from the chosen topic (Christensen et al, pp 308, 2001). The authors recognize that an additional number of empirical sources could have expanded the width of the discussion. However, the authors also recognized the risk of diluting the discussion by adding sources not coherent with the specific purpose of the paper. The authors claim that Mindroute and Incentive are unique in character and can thus not currently be compared or discussed in the same context as firms offering single-tool solutions. The focus of study is relevant and approached by interviewing a respondent closely connected to the topic realm contributing to a high level of validity regarding the empirical findings.

3.4 Construction of questions

The theoretical section has reviewed literature concerning KM and more substantially, IT’s role in KM. This has been approached structurally by asking What, Why and How, intending to distill the theoretical discussion of IT in KM sequentially from a relatively broad aspect towards the narrow scope of contemporary IT-tools. These three concepts have been derived from the three research questions presented together with the paper’s defined purpose which
the authors have adopted with the intention of targeting relevant aspects of the topic discussion, and further, to create a clear direction for the paper resulting in a more transparent and distinct analysis and conclusions.

The empirical material that the authors have acquired is based on the same structural concepts of What, Why and How, which the authors have explored in the previous theoretical section. These three concepts have materialized in three main questions for the collection of empirical material, which functions as headings for several sub-questions and can be found in the appendix, exploring the specific theme. The questions aim to explore the respondent’s perspective and insight regarding IT in knowledge management. The collected material is then used to establish the similarities or discrepancies in correlation with the theoretical findings, which is discussed further in the concluding sections of the paper.

All questions have been conceptualized from the presented theoretical framework, as well as the original research questions, although adjusted to become relevant and specific for the respondent. The three main question themes for the creation of questions are:

- *What is IT in KM?*
- *Why should IT be considered as a KM enabler?*
- *How does companies benefit from the use of IT in KM?*

The authors have attached the chosen questions in an appendix, where a more specific structure is presented.
4 Empirical Findings

In this part the authors present the material derived from a series of interviews with Rickard Hansson, CEO at Mindroute. The structure of this section will follow according to the structural concepts of the paper focusing in this part on Hansson’s view of *What Incentive is*, *Why Incentive* should be used and providing examples of *How Incentive* can be used. To provide the reader with some background, a small introduction of the company has been made. Important to note is that every citation is quoted by Rickard Hansson, CEO Mindroute.

4.1 The company

Mindroute Software AB was founded in 2002 based on the idea of creating software programs. Mindroute has a specific focus on product development and they create standard products within web based communication, such as web publishing and document management. The business idea of Mindroute is to deliver consultant independent products with significantly lower cost of management than other alternatives. They want to make products that consumers can install and manage by themselves. This goes hand in hand with their ambition to be cutting edge in user friendliness.

“A function can be extraordinary and highly advanced but if it does not have user friendliness it’s not a good function”.(Mindroute.com)

4.2 What is Incentive?

*Incentive* is an original web 2.0 software program including tools such as wikis, blogs, RSS feeds and mashups and is less than a year old. *Incentive* was developed in complete secrecy and confidentiality from outside knowledge in order to sustain product competitiveness. This due to the fact that Mindroute wanted to gain full control over the design and functionality of the program and not be influenced by customer wants and needs. Presumably, in a particularly fast moving industry it can be hazardous to rely too heavily on customer wants and needs since consumers do not always know what they want and need until the product is launched. When *Incentive* was released Mindroute was uncertain whether or not *Incentive* was going to be successful since most of the web 2.0 tools are generally speaking new and unfamiliar.
Hansson describes the different web 2.0 tools in *Incentive*. A Wiki can be seen as an ordinary website with the exception that everyone can edit and change it, naturally depending on the nature of the website and what liberties the administrator has authorized. Hansson refers to them as virtual whiteboards where observations and opinions can be posted. Blogs are a more informal way of communicating where short and casual comments. RSS feeds are often integrated with Mashups and used together (e.g. iGoogle). For example, if a website offers one or more RSS feeds, you can subscribe for new website news through an RSS reader, which is included in most modern web browsers. When you are on your mashup site you overview a number of different chosen websites which can be accessed from the mashup site.

“*KM is a type of learning platform where you educate and re-educate personnel. To me it’s about gathering knowledge in one place, any type of knowledge – whether small or big. The real success in managing knowledge is not to focus on it too much.*”

*Rickard Hansson’s interpretation of Knowledge Management*

### 4.3 Why should Incentive be used?

*Incentive* was created to help companies better manage knowledge amongst the co-workers by, for example, blogging about a project or activities. In the initial phase of constructing *Incentive* it became clear that there was no single software program that integrated the different web 2.0 tools (Wikis, Blogs, RSS feeds & Mashups). The main competitors have all specialized on one specific tool. Confluence for example, an Australian company offers wiki solutions as well as SocialTech and Sixapart offers blog solutions. In Mindroute’s view, these different parts are all highly interconnected and should be integrated for optimal effectiveness. Individually, Hansson believes that these tools only can manage knowledge to an extent. It can be perceived more complex to generate new ideas using wiki’s or blog’s solely since these web tools balance each other out according to Hansson. Wikis for example are important to include because they are better storage repositories and are expeditious. Blogs on the other hand can more easily stimulate new ideas and discussions.

“We see that they interconnect”
Fundamentally, *Incentive* aims to enable sharing and access to knowledge. Hansson points out that if a company allows sharing and accessing internally, there is a significantly increased likelihood of finding talent and expertise within the organization.

Moreover Hansson claims that everything is controlled by processes managing the way how we work, when we work and what department in which we work in. Everybody can read what is happening when the CEO sends his weekly address, yet very few can affect the organization. People are not empowered to share their knowledge. This he believes was and still is partly due to the frequent use of for example intranets and e-mail which usually limit information and knowledge between the sender and receiver, instead of reaching the whole department or even the whole organization. Intranets operate solely from top management and down in a supposed “top down communication” where top management communicates with the employees and not vice versa, which results in one way communication. In Hansson’s view it is likely that this monologue from top management will harm the company employees’ efficiency and effectiveness because without interaction and empowerment it makes it harder for the employees to progress. “*Incentive is a personal web for a company. Compared with an intranet, that often functions as a static storage room; our system is a living knowledge platform*”

Blogs have been portrayed by media as a type of diary for private people but Mindroute see much greater advantages in the usage of blogs within a company because superiors and their employees can blog about their projects, discoveries and obligations. The possibility of empowering the employees is a reason Hansson recurrently mentions. The fact that everyone can edit and change a wiki opens up the possibility for every employee to influence. A wiki constantly improves and keeps the knowledge more current because it enables the employee to change the text and correct mistakes. The empowerment of employees can increase the responsibility to the quality of the knowledge shared. As an additional line of reasoning for the use of wikis Hansson points to the success of Wikipedia.org as an example. He argues that Wikipedia is a great example and a role model for how *Incentive* can work if used properly.

“What if a company could achieve the same activity within the firewalls and build an encyclopaedia of knowledge within the own company? That must be the ideal for companies” RSS feeds and mashups are included in *Incentive* so that you don’t have to visit hundreds of favourite sites a day and waste precious time. When you are on your mashup site e.g. iGoogle
you overview a number of different chosen websites. If you are interested in a particular topic or the headline all you have to do is click on that link and read more about it on the original website. RSS feeds have today become an issue because everyone subscribes to different things and there are so many that there’s no way of catching up and filtering them. There is no collaborative thinking in terms of sharing. Hansson claims that *Incentive* can provide that collaborative thinking.

Another reason for the usage of web 2.0 tools and specifically *Incentive*, according to Mindroute is that it facilitates quick, effective and structured documentation. For instance, everything that is noted at work and on a company notebook is company property. Hansson argues that the noted information will never be used because it never becomes indexed, documented or stored but instead thrown away in the trashcan. Hansson thinks this is a great shame and says that although it might not initially lead to increased knowledge he is certain that in the long run as knowledge accumulates; there are great benefits to reap from this. A year after a certain project people might be faced with a similar challenge but have a hard time to recollect what was done and whether or not it was done well.

There is also a matter of efficiency involved in why *Incentive* should be used. In Hansson’s view *Incentive* can due to its integrated solutions provide higher levels of efficiency and effectiveness than its competitors. Instead of purchasing four different web 2.0 systems it is more affordable to choose *Incentive* since you don’t have to spend additional time and money installing the various programs.

A reoccurring theoretical issue with knowledge sharing through IT is the “knowledge is power” dictum which supposedly can stifle the success of KM. The more knowledgeable employees has a tendency to reluctantly share knowledge seeing as it is considered a competitive advantage. Hansson says that if *Incentive* is implemented in a company there will be a ton of people who previously might not have been so verbal, who sit quietly on meetings not voicing their opinion, that get a second chance.

“A great *Incentive* to share ones experiences is that it is supposed to be fun and simple to both give and receive others knowledge.”
4.3.1 Challenges for Incentive

In terms of sparked interest, Mindroute’s media coverage has been above all expecting levels because of the buzz created around these emerging IT tools. Rickard admits that media tends to write about news that is different, out of the ordinary, novel and this has generated some positive exposure in media. This PR has in turn made many companies interested in Incentive and they’ve been to countless pitches. Albeit the shown interest, companies struggle with the difficulties of implementing such a system. They are not quite sure what Incentive is all about and they’re afraid of what potential snowball effect Incentive might generate. The idea of having an open workplace where employees can openly discuss and share work related matters is for some managers an uneasy scenario. Certain departments e.g. Sony Ericsson where new product innovation occurs are sensitive to sharing information and knowledge due to the sensitivity of that knowledge to competitors and sales of existing products. Fundamentally Rickard believes that every company should have rules and guidelines of what type of information and knowledge should be allowed to add to circulate the office. A policy should be implemented that anything non business related should be excluded. He continues however to argue that these policies should not make employees feel intimidated but rather function as a framework for what content is appropriate vice versa.

Incentive’s challenge is still despite its claimed user friendliness the perceived complexity and that educating the employees and stimulating usage takes time. Mindroute try to strive to create a product that is quick and easy to use and to be user friendly. Hansson wants people to simply log in and start working with Incentive without any previous skills. With Incentive he claims that one can start up a wiki within seconds. Furthermore, the creator of the wiki can then decide who can enter and change the wiki. All changes are tracked and it is easy to see who made the change. Nonetheless he cautions that one should not try to push Incentive on the employees but instead let the employees come to Incentive. He believes that knowledge management should not be forced upon the employees but works most effectively and efficiently when open and demand free. The executives and employers need to be patient with such a program, essentially these tools are social tools and are in effect produced from social interaction, eventually he believes that employees will embrace this idea and when they do information and knowledge management will flourish within the organisation.
Mindroute provides the software package and has no consulting role. That is why they are co-operating with a consulting agency called Strat-tech who carries out the task to implement the program and to educate the employees. This is equally as important as acquiring the system because for some people wikis, blogs, RSS feeds and mashups are new phenomena of which they have never heard. Strat-tech also deals with the difficult task of setting up goals for Incentive. In terms of managing knowledge it is hard to set a price and to set an objective of how much knowledge to transfer during a week, Hansson claims that to be impossible. What measures as successful is highly relative in his view. He admits that it’s hard to say whether or not Incentive is a cost efficient tool because it depends on how you measure it. It is very difficult because you cannot measure the worth of knowledge. He does however claim that Incentive is significantly better than the pre-existing e-learning systems, classic intranets and documentation handling systems whom he believes are too static and non productive. As previously mentioned that regardless of whether Incentive is cost efficient or not, it is more cost-efficient than existing competitors.

“You can exchange more information and knowledge on a coffee break than what you can on an intranet in a year”

Despite these challenges that companies face, Hansson eventually points out that one can either choke or embrace new technology and that everyone can influence the company. The key is empowering the people, once you have done that you can be sure that knowledge is better managed on all levels. Hansson believes that IT will play a major role in managing knowledge in the future but believes that IT is already important and here to stay. There is a growing demand for less complicated technologies and web 2.0 or the social web, can provide that.

4.4 How can Incentive be used?

Previously in the Why section, Hansson explained why he though Incentive should be used. At this point, we will go further into detail to review the different examples Hansson gave as to how Incentive can be used.
The integration of different web 2.0 tools makes Incentive original. To provide deeper understanding of the integration process, Hansson makes an example. With the use of RSS feeds, the employee has the possibility of finding valuable information more easily. The RSS feeds in particular might be received from a mashup, e.g. iGoogle, about a subject related to the company which otherwise would be hard to find. The information found could later potentially be spoken and discussed about in a blog which is described by Hansson as a relatively casual way of discussing business related issues. The interaction from the blog might generate into new ideas and consequently lead to someone documenting it in a Wiki which then can be stored and utilized for future purposes. In a sense, these Web 2.0 tools are all connected and it is only once integrated that a good management of knowledge can exist. This concept of integration is displayed in the model below.

![Fig.2 the Mindroute Integration Model (Mindroute)](image)

In the previous section, Hansson emphasizes the importance of empowering ones employees. Hansson stimulates his employees to take notes frequently on every day occurrences whether on the job, at home or in meetings and to add the learned knowledge to their wiki. The blog becomes a diary where it is especially popular to write short comments on. When they arrange sales meetings he expects his employees to document the result on the wiki so that everyone in the organization can read what that person learned from it and in effect share knowledge derived from the meeting.
Hansson makes a case example to motivate the use of wikis. Prior to the Sony Ericsson account was offered to Mindroute, a Sony Ericsson employee started using wikis within its department. After a while, it became clear how successful the use of wikis was and shortly after the news had reached the executives offices a decision was made to implement wikis within the whole organization. This is a good example of how one person made a significant change within the company and that is where Hansson believes the true power of Wikis lies. The possibility of empowering employees creates the opportunity to receive information and knowledge from every corner of the organization from the top to the bottom floor.

Hansson further explains how Sony Ericsson uses their wikis. They are currently managing Wikis as whiteboards around the world. When an employee in Europe is finished working for the day the people in Asia can continue where he left of by entering the Wiki and get updated on the observations and findings of the European employee. This is an efficient and effective way of working because it’s a never ending process and everything, comment or article, is documented for future purpose. Hansson suggests that it can work well as stored knowledge for future challenges.

“It is a never ending contribution of knowledge”

To further explain how to use RSS feeds they can for example be used by subscribing for new website news through an RSS reader, which is included in most modern web browsers. When you are on your mashup site you overview a number of different chosen websites. If you are interested in a particular topic or the headline all you have to do is click on that link and read more on the original website. Hansson emphasize that it is possible to subscribe to Mashups and RSS feeds all over the world. One can for example subscribe to competitors websites or one can find statistics as sales incentives. This kind of information can potentially function as foundations for decision making and enable companies to be proactive instead of reactive. In the previous section Hansson described the issue of not being able to catch up with the superfluous amounts of RSS feeds today. Incentive was constructed so that it contained feed packages where a person can establish a new feed based on several different sources and put that in the package, naming it and filtering it in Incentive. That way the person can share with the rest of the organization.
The issue with not being able to capture and store information was described as one of the reasons why *Incentive* should be used. With this program Hansson states that people can go back and look at the documented knowledge and learn from it generating in more knowledge creation. He claims there is no limit to how much and for how long knowledge can be stored. A huge knowledge base can be created with millions and millions of articles on company matters giving invaluable support to the company in its future ventures.

Mindroute previously used an old intranet from their alternative software but decided that it was time to change into something more interactive so when *Incentive* was introduced they replaced their outdated intranet for *Incentive*. Initially the effect of *Incentive* was difficult to distinguish and very little happened. Then a couple of employees started discussing a trivial topic, publishing a few comments and after a month usage exploded and the trend is that knowledge sharing increases exponentially every month.

“That’s the beauty of it, like a virus, information and knowledge can be spread and stored in one single repository within the company. People don’t have to be concerned with how to correctly formulate their comments anymore.”

If implemented in a company, based on Hansson’s own experiences he predicts the following scenario. Initially a few employees will be interested in *Incentive*; these are usually the tech savvy employees who are used to trying innovative and novel products. They will be the initial users, but as they continue using it Word of Mouth will spark interest in others which will create followers who will try it and in effect eventually the whole organization will use it. The trick is again not to have high expectations of such a program in its implementation phase.

“You don’t just push a button and expect your employees to start blogging”.

He plays out another scenario, “Two people sit in the same room and one employee look for the knowledge that the other person possesses, although he doesn’t know this. However if there was a program that could collect this knowledge and share it with everyone else then that would solve all of the problems. There might be nine other guys looking for the same knowledge but because it wasn’t documented they’d never know where to look for it. The
idea is to stimulate employees to write about their experiences i.e. knowledge, and for some people there is also a level of satisfaction in this as they want to be seen”.

The theory brings up the “knowledge is power” dictum as great issue for the success of KM since the more knowledgeable employees reluctantly shares knowledge seeing as it is considered a competitive advantage. Hansson says that if Incentive is implemented in a company there will be a ton of people who previously might not have been so verbal, who sit quietly on meetings not voicing their opinion, that get a second chance. The implementation of Incentive could alleviate this person’s voice to be heard and the ego’s of the firm might feel challenged by this since others are being heard which in effect makes them more active in the forum. It spirals through the organization and the knowledge increases. It’s furthermore a good way to sustain a competitive environment within the company as knowledge sharing becomes a challenge of who can be most active in the different forums and provide the most essential knowledge to the co-workers. Hansson also believes that the Incentive tools make it easier for employees to deal with initiative. Instead of bluntly telling the boss face to face that this is right or wrong, it is according to Hansson easier to start a discussion on a wiki where that discussion later might cause a change in direction with new solutions.

“Essentially it’s in creating trust that knowledge sharing can flourish and Incentive is a good way of doing that.”
5 Analysis

In this section the authors will review the theory and empirical findings to draw distinctions between the two and remark on important aspects. In accordance with the disposition the authors will continue with the structural concepts of What, Why and How.

5.1 What and Why?

The main argument for applying web based solutions as an approach to managing knowledge is that it is suggested to generate competitive advantage. These competitive advantages are in theory described as increased organisational responsiveness, increased levels of organizational learning, improved internal communications, improved productivity and decreased costs. Although these benefits are not solely connected to the use of web based solutions, contemporary approaches to KM are almost exclusively discussed in terms of IT.

The attributes and functions connected to the web 2.0 tools are, according to the presented empirical and theoretical material exploring KM, contributing factors to knowledge creation and dissemination. As the employee’s capacity increases in regards to making an impact and influence information, the information suggestively increases in relevance as well as the level of applicability for the entire company. By implementing socially characterized web-based solutions, such as blogs and wikis, a company can rather informally disseminate individual knowledge throughout an organisation. The specific information generated in the interaction between employee and a customer, commonly embedded solely in the parties involved, can then be discussed and made available for a large number of people to draw conclusions and reflections from.

Hansson states that there are other advantages of implementing web 2.0 tools. He implies that the use and relevance of the implemented systems grow exponentially within companies as users start to see the potential of the system. This exponential growth is suggested to be triggered by a healthy form of internal competition where more and more employees want to participate. This increased level of participation could be the starting point of creating a company-owned “Wikipedia”, where all knowledge has been documented, contributing to a large base of knowledge ready at hand. This suggested and potential outcome of web 2.0 tools as a knowledge management enabler is connected to the specific application of Wiki. Hansson
claims that using wikis within the company, over time, a large knowledge base is created. As the knowledge is based on the experience and knowledge of the individual employee, Hansson and related theories suggest that companies can process tacit knowledge into explicit knowledge. Furthermore, by this process, previously individually embedded knowledge is suggested to become organisational.

The authors also identify a relevant connection to the integrative character of Incentive, which according to Hansson can be illustrated as a continuous flow of knowledge. Hansson implies that by integrating the four tools of Incentive, knowledge is constantly updated and kept relevant as users can comment and generate discussions regarding material that has been put in the application. This is also to be considered as a controlling element of the system, as the actual users decide on what information is to be considered applicable and comment and add on provided information, driving the improvement of relevance and quality of the information, making it applicable to a certain situation.

Hansson draws the parallel to earlier systems such as intranets, which are considered by him as mere enablers of top-down, one-way communication. Past theoretical discussions have regarded intranets as a good solution for managing internal communications and managing knowledge. However, as technology has evolved, new tools have provided the market with improved chances of successfully acquiring, disseminating and utilizing knowledge that is generated within organisations and embedded within the individual employees. Hansson implies that as the tools are intended to make better use of the individual knowledge within an organisation. The tools also contribute to the empowerment of the employees, giving them validation for their acquired knowledge as vital organisational intellectual capital. This is a benefit which Hansson claims hard to acquire by, in his view, rigid systems such as intranets.

The authors identify that even though tools have suggestively become more advanced and contributing towards its purpose, the tools are almost exclusively discussed in isolation from each other. The business idea of Incentive is based on the synergetic effects between the interactions of the applications. As discussed earlier, integration of the tools can, according to Hansson, create greater impact and more prominent results compared to when implemented individually. The continuous input and involvement of several parties, in order to improve the quality and actual application of knowledge, is closely related to theories suggesting that the systematization of knowledge removes the actual nature of knowledge. The authors identify
this parallel as an indicator that web 2.0 approaches to KM are making this counter argument by developing systems that aim to handle difficult aspects of KM, such as the discussion of socially and interactively lacking dimensions.

5.1.1 Challenges

A number of theorists oppose the idea of actually managing knowledge and often point to the lack of social integration in approaches and techniques used for the purpose. It is suggested that knowledge is something that is created and disseminated through interaction between people. The attempts of systemizing knowledge by creating knowledge banks and transfer through tools like intranets are by some theorists suggested futile and will only contribute to inapplicable and redundant information. Paradoxically, other theorists compare Intranets with collaborative and social tools and claim their effectiveness and efficiency as knowledge management enablers. Hansson admits with experience that intranets, compared to web 2.0 tools do not have the social qualities required for good KM. He draws attention to the common situation of top-down communication through intranets, where management controls information flow which consequently limits the input and empowerment of the employee. This discussion is followed by another related challenge of “knowledge is power”. It is suggested that the more experienced and knowledgeable employees’ reluctantly share their know-how out of the concern that their knowledge will be exploited by and attributed to others. Hansson counters this way of thinking by arguing that Incentive can help previously unnoticed peoples voices to be heard making them more active and participative. This in effect can over time create a competitive environment where knowledge sharing becomes a competitive tool.

Another point where theory and empirical findings are in disagreement is on the challenge of how to stimulate and motivate employees’ to engage in knowledge management tools. Several theorists assert the only way to enable employee action is by educating and encouraging them through Incentives. Although Hansson agrees with educating employees, a program like Incentive can only work if there is there is limited managerial pressure applied. Employees need to figure out by themselves the benefits of using such a system and once they do Hansson claims that participation and ultimately knowledge has the potential of spreading like a virus.
The risks of poor application of knowledge management can be seen as a direct contributor to what is referred to as “information overload” which inhibits the objectives of KM instead of facilitating them. Hansson understands the relevance of this issue and states that by using tools that alleviates employees’ to have better control of information and knowledge will form a natural type of control, suggestively limiting the amount of redundant information. Even though Hansson advocates a self-sustaining socially integrative system, he also points to the importance of rules and guidelines. He states based on own experience, that communicative tools have the tendency to become over-used as a predominantly social forum on a personal level. Subsequently, Hansson suggests that rules and guidelines ought to limit the “personal chatter” to a minimum as to make the system as beneficial as possibly for the company.

5.2 How?

The authors find an interesting similarity and accuracy between some of the, in this sense, antecedent theory on IT in knowledge management and the empirical findings on how to manage knowledge with Incentive. Many of the theoretical suggestions can be applied with Mindroute’s program by using the three theoretical KM components, acquisition, dissemination and utilization. However, instead of exemplifying this application using intranets and other computerized and nowadays out of date systems, web 2.0 tools will be used. In terms of knowledge acquisition, theory asserts the importance of interaction and dialogue in order to share new ideas and perspectives. Through a supposed information system, it enables individuals to better arrive at new insights and make more accurate interpretations. Similarly, the very foundational argument that Hansson makes for Incentive, is providing employees’ with the possibility of interacting with each other, through blogs and wikis. He suggests that by establishing Incentive it enables employees to take part of what their fellow colleagues are doing at work more easily, thus facilitating the process of acquiring knowledge through interaction.

Knowledge dissemination or sharing is another vital component of knowledge management. Previous parts of the theory recommend expanding the network of the individuals to new knowledge sources by establishing for example computer networks and electronic bulletins. Theoretical point of view proposes this in order to simplify whoever seeks knowledge and those who have access to knowledge. By structuring categorizations or organizational knowledge maps it facilitates finding the right kind of knowledge. This view is by consensus
shared with Hansson whose web tools in many ways are synonymous with these descriptions and can be seen as a way of cataloguing and storing knowledge. The RSS feeds can be seen as an electronic bulletin board which allows for a more open view of knowledge sources where Wikis operate as a catalogues and knowledge maps, which enables rapid and global knowledge location upon request.

The last component of knowledge management is described in the theory as knowledge utilization. Focus here lies on establishing routines for “best practices” where employees based on previous experience can make decisions in unity with the directives of the firm. It is argued that IT can enhance knowledge utilization (integration and application) by facilitating the capture, updating and accessibility of these organizational directives. Hansson provides the example of his own company where blogs and wikis have created thousands of stored comments which previously would have disappeared due to the lack of appropriate storage software. Initially, when Incentive was introduced there was little knowledge to utilize. However, as time went by and the comments and postings increased, so did the gathered knowledge that can be used to apply “best practices” to future challenges. Hansson makes the example of a previous customer whom had wanted to re-continue business. By proper usage of Incentive, companies could then revert to the initial customer encounter and review what was successful or not and consequently improve chances of succeeding next time.

It is interesting to observe that most of the theoretical articles focus on particular web 2.0 tools and how they work in isolation, instead of looking at them as a interconnected whole. Hansson believes that this mindset will potentially limit the capacity of the web 2.0 tools and provides examples for their synergism. With wiki systems considered the more structured way of documenting and storing knowledge he claims it is unwise to solely implement such a system, since the actual knowledge needs to be acquired and disseminated before it can be stored. If following Hansson’s way of reasoning, Incentive can be seen as three steps integrating the different web 2.0 applications. The first step should be seen as information allocation regarding the use of RSS feeds and Mashups particularly. In this step, an employee due to its predetermined individual settings will acquire valuable information from RSS feeds flowing to the Mashup. The second step would be that if the information is valuable and business related this could result in an employee posting it on a blog, where the whole organization becomes involved and knowledge is disseminated. Through reiterating discussions and interaction, the necessary knowledge eventually gained from the outcome,
can then be stored in a wiki where it can be utilized in the future. Hansson suggests that without the collaboration of these web 2.0 tools the management of knowledge will be less effective and efficient. An analytical model, figure 3 display’s this chain of events.

![Analytical Model](image)

**Figure 3. Web 2.0 sequential integrative model of knowledge management**

Theoretical discussion reviews both positive and negative aspects of using Intranets as knowledge management enablers. When the level of information, exposed by the employees, increases it makes it more difficult to interpret what information is valuable or not. According to theory, intranets enable that interpretation. Conversely, Hansson is of a different view claiming Intranets are too rigid and directed. As an example of this he uses Mindroute who previously had an installed intranet but replaced it with *Incentive*. After a short while usage exploded and knowledge sharing now increases exponentially every month. Hansson states that *Incentive* was developed with the intention of creating channels of communication and sharing that are based on the premise of user friendliness. The user is supposed to be able to discuss and share information and knowledge in a more open language by using the web 2.0 tools. An excessive amount of structure regarding content and formulation inhibits the user from maximizing the capacity of the system since the process of documenting and information retrieval can become limited by regulations. With for an example a blog the user can in a relatively casual manor add input or follow discussions held by other users. Hansson suggests that any function can be highly advanced, but if the function lacks user friendliness it can never be considered a good function.
6 Conclusion

The purpose of this paper is to explore the significance of the technological aspect of knowledge management and whether or not the emergence of specific web 2.0 tools can enhance KM and if so, how this can be proposed. We aim to fulfill the purpose by addressing the research questions.

*What IT tools are available and why should companies be concerned with managing knowledge through IT?*

Current theory suggests that we are on the verge of a new paradigm. It is suggested that the recent web 2.0 tools are better suited to manage knowledge since they are inherently social tools which can be best utilized through interaction. The authors recognize this suggestion and concur with the theoretical views that these web 2.0 tools are better suited than previous IT solutions. The web 2.0 tools i.e. Wikis, Blogs, RSS feeds and Mashups are all recognized as relevant contributors towards managing knowledge in distinct ways as previously illustrated in fig 3. The development of IT in web 2.0 tools include an unprecedented social characteristic that can involve and empower employees’ towards participating in acquiring and disseminating knowledge and the authors identify this aspect as a solid foundation for generating applicable knowledge. Furthermore, the idea of having a corporate “Wikipedia” should, in the authors view, alone be grounds for the implementation of an IT system capable of documenting and storing knowledge for future leverage. The importance of storing and documenting knowledge has increased in parallel with the nowadays higher rates of employee turnover. It should therefore be of companies’ self interest to be concerned with managing knowledge through IT.

*Challenges*

Exerting too strict and rigid controls on knowledge management can be hazardous if similar IT systems such as *Incentive* are implemented. Pushing a button and expecting employees to start blogging is unrealistic and should not be expected. It cannot be forced but needs to come from personal desire and wish to do so. However, with that said, the authors’ are rather dubious to the idea of wholly letting employees’ explore new IT systems without management. There is a pressing need for rules and regulations within any company, and these need to be clarified. As an additional stimulus, incentives should be implemented for the expediency of the system.
With this in mind, the fundamental challenge of IT is to stimulate employee’s to use it. Previously with regards to Intranets, the social aspect has been neglected and proven difficult to implement into these tools in a successful way. The authors identify the complexity of actually implementing social aspects into IT but most importantly to enable employees’ to start using these systems. The emergence of web 2.0 tools and software packages such as Incentive, has with its recession of complexity, enabled countless users, who previously would not have ventured into the virtual world, to start participating and contributing. These tools may certainly be a successful way of managing knowledge but it is important to draw attention to, in line with the theory, the fact that the IT system is wholly dependent on the human factor and people need to engage in a system in order for it to work. The technology itself is not what generates knowledge, but by who, why and how it is being used.

**How can companies manage knowledge effectively and efficiently by IT?**

A proposed and conceivable solution for efficient knowledge management lies in the integration of the selected web 2.0 tools previously illustrated in fig 2 and analytically developed in fig 3. The authors suggest that the integration of these tools create a flow from acquiring to utilizing knowledge which once implemented, in time can be self sustained. An important distinction is noticeable between the differences in knowledge management amongst the separate web 2.0 tools. In isolation, these tools will exclusively manage particular aspects of KM and not as a whole. By viewing these web 2.0 as sequential and a part of a link of which knowledge management can thrive, greater degrees of KM can be achieved. It should therefore be noted that companies offering single web 2.0 tool solutions to enhance knowledge management is unlikely to cover all components of KM and consequently undermine its competitiveness.

Conclusively, the use of the contemporary IT tools, such as web 2.0, can also contribute with a controlling and rationalizing agent as individual input in the system is constantly monitored and scrutinized by potential users as either applicable or inapplicable. According to the authors this aspect improves the level of quality of knowledge, subsequently driving the effectiveness of knowledge management.
7 Discussion

Upon completion of the paper, the authors have recognized some important points that will be included as a final discussion. It is with optimism that the authors recommend further studies surrounding the topic. It is notable, and this has been reiterated throughout the paper, that research on the topic is still considered premature and further research is necessary to establish the precise impact that these web 2.0 tools have on knowledge management. The cause for insufficient research could very well be found in the novelty of these collaborative IT tools which has not yet allowed, in this point of time, for a significant amount of research to be conducted. The authors have aimed to contribute to the discussion of IT, and specifically web 2.0, in knowledge management. It is nevertheless important to illuminate the possible limitations imposed on this kind of research method as the deliberate choice of selecting a single respondent can potentially constrain the purpose and results. Furthermore by not including the customers’ point of view, conclusions can as a result be potentially biased. The authors recognize this limitation as a valid point but claim that the unique quality of Incentive, which currently is the only program offering integrated web 2.0 solutions, and the novelty of web 2.0 have substantially restricted the possibility of performing additional interviews. Thus, in this framework of time and resources, this research method is considered most conceivable.

With this said, the authors would like to specifically recommend what areas need further research. In particular, it is of interest to define what stages of knowledge management that the selected web 2.0 tools can prove useful in. Secondly, it is important to construct a framework of which managers can measure the relationship between IT and profitability. The subject matter is still to this day rather elusive and a theoretical structure based on hard numbers from the practical field is necessary for its continued success. This paper has provided the reader with a revised insight and understanding on the significance of web 2.0, IT in knowledge management and could function as a stepping stone for further research regarding the topic. Unequivocally, much work is needed to explore and further provide verification of IT as an important KM enabler.
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Appendix

Appendix 1 presents the topic questions used for interviewing Rickard Hansson, CEO of Mindroute. Note that the interviewer or respondent can add further questions during the interview, or during added interviews, if deemed necessary or valuable.

Interview questions to Rickard Hansson, VD Mindroute 3/12 - 07

What is IT in KM?

1. What is Mindroute’s business idea?

2. How was Mindroute’s business idea created? (Background)

3. What is Incentive?

4. What is Knowledge Management according to you?

5. How do you motivate the web 2.0 tools you have chosen? (Blogs, Wikis, RSS & Mashups)

Why should IT be considered as a KM enabler?

6. Why was Incentive created?

7. What makes Incentive unique? Why should companies be concerned with purchasing your services? Are there any competitive advantages?

8. What challenges is Mindroute faced with?

How does companies benefit from the use of IT in KM?

9. How do these tools contribute to increased efficiency within the company and improved knowledge management?

10. What effect does Incentive have on organizational knowledge? How can you measure the efficiency of Incentive?

11. What role do you think IT (Web 2.0 has on knowledge management?

12. How does the future look for Mindroute and more specifically Mindroute?
Follow up questions to initial interview via telephone and e-mail (4/12 – 21/12-2007)

1. Is Incentive a cost-efficient alternative compared to competitors?
2. According to your website Mindroute.com, Incentive allow for fast, effective and structured documentation. How does this work?
3. Why is the integration of Web 2.0 tools an advantage for companies? Could you provide examples of how the tools function better integrated?
4. How can you prevent ineffective communication within a company?