Titel/Title: IT Track or People Track?

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Abstract
This thesis deals with knowledge management at companies in the Falun-Borlänge region. The purpose is to create better understanding of which path companies have chosen and why, respectively. A qualitative survey seeks to discover if companies have chosen IT track or people track. This is a practical and useful model for an evaluative study. In the same context, a number of important models for evaluating knowledge management are presented.

The result shows that the companies provide a multitude of training within several frameworks. Education is mostly provided in a traditional manner but there are many examples of interactive state-of-the-art training. Furthermore, most of the companies primarily focus upon people and processes, but some focus at technical facilities as well. In some cases are the technical frameworks used for support of core processes.

Key words: Knowledge management, IT Track, and People Track.
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**Introduction and Background.**

It is claimed that we now live in a society based upon knowledge and information. We live in an information age and an information society. The now late Peter Drucker (1993) described knowledge and not capital or labor as the only meaningful resource in the knowledge society. The concept of information is closely related to data, instruction, knowledge, meaning, communication, and representation. Data are metrics or symbols which simply exist and have no significance beyond its existence. Information is data which has been given meaning by way of relational connection. Knowledge on the other hand, is the appropriate collection and deterministic process of information. Basically, information is a message with a sender and receiver.

Information technology (IT) and information and communications technology (ICT) are the technologies required for information processing. This includes both hardware and software used for converting, storing, processing, transmitting, and retrieving information. Information provides answers to questions put in terms of “who”, “what”, “where”, and “when”.

Knowledge is a matter of philosophy. Historically, knowledge must be justified, true, and believed. It provides answers to questions put in terms of “how”. Furthermore, it must involve an agent who uses knowledge to perform actions necessary to reach a goal. There is a practical side of knowledge and a more philosophical side of it. At the same time it is matter of central part of daily life and an ongoing argument amongst philosophers, sociologists, and historians. Knowledge consists of information augmented by intentionality. This is part of the so called DIKW hierarchy which puts data, information, knowledge and wisdom in an increasingly useful pyramid.

Understanding is interpolative and probabilistic process which is cognitive and analytical in its character. It provides the answer to “why”-questions.

Wisdom is an extrapolative, non-deterministic, and non-probabilistic process. It calls upon ethical codes and previous levels of understanding. It asks questions to which there is no easily achievable answer. Consequently, wisdom is a human state, not easily programmed into a computer.

Such implementation of an information system could be performed in many different ways, all of which with favors and shortcomings. Some organizations are knowledge intensive which takes a path of moving from a knowledge-intensive structure to a knowledge-based structure.
Problem

Companies implementing an information system in general and a knowledge system in particular, face certain critical success factors. Information is not easily sent and received over an organization. Knowledge is not easily shared and necessary interaction could become quite complicated. Some difficulties are intrinsic to knowledge management such as categorizing, classifying and grouping. Other difficulties are accidental in nature, arising from limitations in the used tool.

ICT is becoming increasingly complicated and/or sophisticated, and proper understanding has become ever more important. Knowledge is definitely a competitive advantage, part of core activities and strategy.

There are different ways of nurturing and applying underutilized talent. On the one hand there are learning organizations. Consequently, there are organizations that are not learning and many organization learning programs.

Knowledge is also a way of boosting added value to goods and services. Products could be made intelligent creating a strategic advantage through knowledge. An organization’s ability to create new knowledge is a primary source of competitive advantage.

Competence systems are typically based upon a rationalistic view of competence. It is a demanding task to capture emerging competencies in a knowledge-based environment. Knowledge workers a k a “symbolic analytic workers” face a dynamic nature of their work. There is a constant need for innovation and continuous learning.

Nonaka & Takeuchi (1995) argue that Western companies have been focusing too much on:

- Explicit knowledge.
- The measurement and management of existing knowledge.
- The selected few carrying out knowledge initiatives.

We have to unlearn their existing view of knowledge and pay more attention to:

- Tacit knowledge.
- Creating new knowledge.
- Having everyone in the organization involved.

These two gentlemen argue that three fundamental shifts fuel a knowledge movement:

- A shift to knowledge as the basic resource.
- A shift to knowledge-based industries.
- A shift to growth as the top managerial priority.
Purpose
The purpose of this thesis is to make a survey of how knowledge is organized within the companies of the Falun-Borlänge region, and to create better understanding which path companies have chosen and why, respectively. In order to support my survey with a theoretical framework I present some perspectives representing the discourse of organizational learning.

Questions
How do You organize learning?
Motivate Your choice!
Which conclusions have You drawn?

Delimitations
It is beyond scope of this thesis to audit specific companies. I only seek to discern patterns of how knowledge is managed.

Knowledge management is highly facilitated by studying service management in order to study the external side of organizational learning. My investigation does not take external interaction of knowledge and competence into account. It would take interviews with customers and other constituents, which is not considered an option.

Some of these companies might use IT-related learning tools. It is beyond scope to rate these individual tools. This is also related to viewing the now popular human-computer interaction (HCI) perspectives.

It is also beyond scope to consider system analysis and development of knowledge infrastructure.

Furthermore, I have no intention to consider traditional cognitive models.

Moreover, typical technical considerations such as requirements, security, and modifiability in terms technological knowledge infrastructures is beyond scope of my study.
Methodology

I am using a qualitative approach and my investigation is facilitated by interviews. It is not advisable to put numbers on social processes without extensive primary data. Furthermore, it is beyond scope of my study. There are basically five qualitative approaches:
1. Experiment
2. Survey
3. Qualitative research
4. Case study
5. Action research

<table>
<thead>
<tr>
<th>Qualitative Method</th>
<th>Quantitative Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emphasis on understanding</td>
<td>Emphasis on testing and verification</td>
</tr>
<tr>
<td>Focus on understanding from respondents’ point of view.</td>
<td>Focus on facts and/or reasons of social event.</td>
</tr>
<tr>
<td>Interpretation and rational approach.</td>
<td>Logical and critical approach.</td>
</tr>
<tr>
<td>Observations and measurements in natural setting.</td>
<td>Controlled measurement.</td>
</tr>
<tr>
<td>Subjective “insider view” and closeness to data.</td>
<td>Objective “outsider view” distant from data.</td>
</tr>
<tr>
<td>Explorative orientation.</td>
<td>Hypothetical-deductive, focus on hypothesis testing</td>
</tr>
<tr>
<td>Process oriented.</td>
<td>Result oriented</td>
</tr>
<tr>
<td>Holistic perspective.</td>
<td>Particularistic and analytical</td>
</tr>
<tr>
<td>Generalization by comparison of properties and contexts of individual organism.</td>
<td>Generalization by population membership</td>
</tr>
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</table>

My method is interpretative and associated with the postmodern hermeneutic school. Hermeneutics is a theory of interpretation, understanding context through empirical means. It is also referred to as qualitative view of knowledge. There are basically six versions of hermeneutics:
1. Methodological hermeneutics (Schleiermacher and Dilthey). Interpreting texts taking into account which context it stems from.
2. Philosophical hermeneutics (Heidegger and Gadamer). A more direct way of experiencing our world without necessary understanding it.
4. Phenomenological hermeneutics (Ricoeur). An attempt to synthesize hermeneutics, structuralism, and phenomenology.
5. Deep hermeneutics (Freud). Psychoanalytical theory.
6. Postmodern hermeneutics (Kuhn, Lakatos and Feyerabend). Hermeneutics which could also be applied on the natural sciences.
Thomas Kuhn published “The Structure of Scientific Revolutions” in 1962. It replaced the positivistic hegemony in terms of interpretation of science. He differentiated normal science and crisis science (also referred to as revolutionary science). Normal science takes place when scientists build a society based upon a common paradigm - while crisis science is the opposite. Kuhn meant that scientists study nature the way the paradigm says and not science at it is. Consequently, they study of nature through their instrument, and their methods, their views et cetera – all according to the ruling paradigm.

The emphasis is on individuals’ interpretations of their environment, and their behavior. Presentation of data lies in participants and their terms. The main purpose of qualitative research is to study social reality. Hermeneutics is contrasted with empiricism, rationalism, the previously mentioned positivism, Karl Poppers falsification, constructionism, and inductionism.

These perspectives could be in furtherance by viewing method in either analytical, system or actor perspective. This is typically performed in terms of business administration, and management.

My postmodern hermeneutic method leans towards the actor perspective and the system perspective in particular. Some would also call it a social constructive perspective.

I would say that my method is rather deductive since I try a few theoretical models with reality rather than use practice as starting point for theory. However, my conclusions do not tell more than the premises, and the conclusions do not follow logically from the premises.
**Target Group**
Primary data from the selected target group will be collected and analyzed, foremost via interviews. Companies included:
- Teknikdalén
- Dalregementet
- The municipality of Falun
- The municipality of Borlänge
- Stora Enso
- SSAB
- Banverket
- Vägverket
- Adnome
- The University
- Wallinstitutet

**Secondary Data**
A comprehensive literature study is performed in terms of organizational learning. This concludes books, articles, and web sites. For obvious reasons, in terms of science, one has to apply critical thinking in all cases.
Theoretical Frame of Reference.

The Concept of Knowledge.

The definition of knowledge has been, and still is, of great interest to philosophers, social scientists, and historians. It usually follows three criteria: justified, true, and believed. Meeting these criteria may be crucial or impossible. Knowledge consists of information augmented by intentionality or direction. Davenport & Prusak (1998) define knowledge as:

“Knowledge is information combined with experience, context, interpretation, and reflection. It is a high-value form of information that is ready to apply to decisions and actions.”

While Nonaka & Takeuchi (1995) defines knowledge as:

“Explicit or codified knowledge refers to knowledge that is transmittable in formal, systematic language. On the other hand, tacit knowledge has a personal quality, which makes it hard to formalize and communicate.”

IT applications include intranets, repositories and group decision support systems. These tools can be classified into three general categories: generation, codification, and transfer. Knowledge generation require tools that enable acquisition, synthesis, and creation of knowledge. Knowledge codification support representation of knowledge in order to make it accessed and transferred. One common typology consists of four types of knowledge:

- Process knowledge.
- Factual knowledge.
- Catalog knowledge.
- Cultural knowledge.

An alternative framework for classifying tools consists of five categories:

- Business intelligence.
- Collaboration.
- Transfer.
- Expertise.
- Discovery/mapping.

On a more practical level, knowledge is usually shared by groups of people and could be manipulated and managed in certain ways. Situated knowledge is knowledge specific to a particular situation. Trial-and-error and learning from experience tend to create highly situational knowledge. Situated knowledge is typically embedded in language, culture, and traditions.
A knowledge system contains both explicit knowledge and tacit knowledge. Explicit knowledge is formal and systematic. This means documents, manuals, reports, studies which are relatively easy to share and communicate.

Tacit knowledge is more subtle. It is typically learned by experience and indirectly communicated. A great portion of an organizations intellectual capital is unwritten and undocumented. Tacit knowledge is highly personal and hard to formalize, making it difficult to communicate and share with others. Furthermore, it is deeply rooted in an individual’s ideals, values or emotions.

There is a social aspect to knowledge. People and cultures gain knowledge through experience, observation, and inference. Knowledge represents a social capital and is often referred to as human capital. Sociology examines how knowledge and society interacts. The spread of knowledge is examined in terms of diffusion. The diffusion of innovations is one practice of study. Polanyi’s concept of knowledge is based upon three theses:

- True discovery can not be accounted for by a set of articulated rules or algorithms.
- Knowledge is public and also to a very great extent personal. That is constructed by humans and contains emotions.
- The knowledge that underlies explicit knowledge is more fundamental. All knowledge is either tacit or rooted in tacit knowledge.

Furthermore, Polanyi emphasizes the functional aspect of knowledge.

Human capital is a way of defining and categorizing people’s skills and abilities used in employment. Early economic theory referred to it as “labor”; one of three factors determining the production function. Nowadays human capital is a fourth factor of its own and not considered a commodity. Gary Becker is a leading theorist within this science field.

Skills and knowledge represent core capabilities of an organization. Those skills can be public, industry-specific or company-specific. The latter are typically tacit skills and less codifiable.
There are several types of knowledge relevant to an organization. Nonaka and Takeuchi (1995) suggest separating the concepts of data, information, tacit knowledge and explicit knowledge:

- Data is factual, raw material and therefore without information attached.
- Information is refined into a structural form, e.g. client databases.
- Explicit – or codified or articulated – knowledge relates to “knowing about” and can be written and easily transferred. This category of knowledge may include manuals, specialized databases or collections of case law or may even be in the form of standardized techniques of investigation or templates for documents. A key attribute of explicit knowledge is the possibility to store it. Explicit knowledge is 'knowing about', and few disagree that it can be stored and shared using manuals and databases.
- Tacit knowledge relates to “knowing how” or “understanding” and cannot be directly transferred between individuals; it is transferred through application, practice and social interaction.
- Organizational Knowledge Management (KM) is the creation, organization, sharing and flow of knowledge in organizations.
- Knowledge Management seeks to make the best use of the knowledge that is available to an organization, creating new knowledge, increasing awareness and understanding in the process.
- Knowledge Management can also be defined as the capturing, organizing, and storing of knowledge and experiences of individual workers and groups within an organization and making this information available to others in the organization.
**The Knowledge Management Model.**

There are quite a few terms used within the framework of knowledge systems. The term “knowledge management” (KM) has been used since the mid-1970s. Because the concept of knowledge is philosophical in its form, there are several different definitions used in terms of KM. There are many ways organizations could extract value from, exploit, and develop their intellectual assets. They all take combination of data, and information processing - sometimes combined with innovations from human beings. Ruggles(1998) proposes eight major categories of activities to describe what KM is:

1. Generating new knowledge.
2. Accessing valuable knowledge from outside sources.
3. Using accessible knowledge in decision making.
4. Embedding knowledge in processes, and/or services.
5. Representing knowledge in documents, databases and software.
6. Facilitating knowledge growth through culture and incentives.
7. Transferring existing knowledge into other parts of the organization.
8. Measuring the value of knowledge assets and/or impact of knowledge management.

A primary factor is the management of existing knowledge. That is retrieving, compiling, arranging and categorizing memos, articles, reports, presentations, and so forth. A secondary factor is acquisition, creation, communication, sharing, and applying knowledge.

There are basically three ways of obtaining new external knowledge:

- Passive learning. Occurs through technical knowledge resources such as training, journals, and seminars.
- Active learning. Takes place through organizational initiatives such as benchmarking or competitor analysis.
- Interactive learning. Face-to-face interaction in order to facilitate assimilation of tacit knowledge.
There are seven characteristics of knowledge situation according to Dignum and Heimannsfeld (1999):

- Strategy
- Organizational structure
- Technology
- Performance
- HRM
- Organizational culture
- Level of explicitness of knowledge.

A knowledge audit provides answers to why a specific organization does not reach its goals. Calabrese provides a four pillar model in support of enterprise wide knowledge management initiatives for a KM implementation:

- Leadership
- Organization
- Technology
- Learning.  

Art Murray further developed the four pillar model into a top-level conceptual framework for knowledge management. Dr Charles Bixler identified specialized concerns for knowledge management tools in secure environments:

- Business requirements
- Functional requirements
- Technical requirements
- Implementation requirements.

Conditions are constantly subject to change and a company faces adaptation in order to survive.

Some argue that internet provides the best opportunity to improve education since Gutenberg invented the printing process.

Different public sector agencies such as municipalities are forefront to implementing knowledge management systems.

On a basic level there are four kinds of distributed knowledge management systems:

- Document management systems
- Groupware
- Organizational Memory Information Systems (OMIS)
- Intranets and extranets.

Their weaknesses according to Dignum & Heimannsfeld (1999):  

- Concentrate explicit knowledge leaving tacit knowledge.
- Knowledge is considered without context within which it was created.
- The systems are not designed to be an integral part of knowledge creation
- The meaning of the terms used as part of structured or unstructured information is not explicitly stored in the system.
- Most systems focus on KM within a specific area of application.

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1 C f Appendix A.
2 C f Appendix B.
3 Ellsworth (1994) et al.
One obvious dichotomy is to contrast the artifacts versus people and processes. Some organizations focus on technology needs while others focus at people needs. All organizations have their own unique definition of how knowledge should be collected, categorized and made available to employees. There is no one-size-fits-all solution to the management of knowledge.
Content Management Systems.

Digital information is often referred to as content or rather digital content. Content management is a set of processes and technologies supporting the evolutionary life cycle of digital information. The digital content life cycle consists of six primary phases:

- **Create**
- **Update**
- **Publish**
- **Translate**
- **Archive**
- **Retire**.

Content management is a collaborative process which often consists of the following basic roles and responsibilities:

- **Content author.** Responsible for creating and editing content.
- **Editor.** Responsible for tuning the content message and the style of delivery.
- **Publisher.** Responsible for releasing the content for use.
- **Administrator.** Responsible for managing the release of the content.

A content management system is a set of automated processes that may support the following features:

- Identification of all key users and their roles.
- The ability to assign roles and responsibilities to different instances of content categories or types.
- Definition of workflow tasks often coupled with messaging so that content managers are alerted to changes in content.
- The ability to track and manage multiple versions of a single instance of content.
- The ability to publish the content to a repository in order to support the consumption of the content.

Content management systems take the following forms:

- A web content management system is software for web site management - which is often what is implicitly meant by this term.
- The work of a newspaper editorial staff organization.
- A workflow for article publication.
- A document management system.
- A single source content management system, where content is stored in chunks within a relational database.

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5 Ibid.
6 Ibid.
7 Ibid.
**Competence Management**

There is an increasing reliance upon competence in organizations. Competence portals represent a subgroup of knowledge management. Competence is an extension to knowledge. Competence resides inside of humans and competence management is about humans. Keen (1998) defines competence as a whole comprised of seven parts:

- Abilities: The ability to do and to handle tools.
- Knowledge: To know relevant facts and methods.
- Experience: The practical use of knowledge.
- Contacts: The ability to create and make use of relations to other people.
- Values: The willingness to act and to share basic values.
- Coordination: The physical and psychological energy needed to perform.
- Leadership and resources: Motivation and physical ability.

There is traditionally a rationalistic view to competence since the days of Taylor. He contended that workers competencies should be classified into standardized sets of formulas, rules, and laws. Taylor represents the job-based approach which was suitable for the mass production economy. There are a number of trends highlighting a need for a different approach to organizing work. Organizations must be more adaptive on their core competencies and knowledge. According to Prahalad & Hamel (1994), a competitive advantage is achieved by developing particular organizational competencies rather than size, financial resources, and technological resources. Modern competence management centers on providing an organization with accurate charted representation of its members existing competencies.

Competence is the driving force behind any successful business. This is particularly the case in terms of knowledge-based organizations. Knowledge-based organizations have an acute awareness of competence management. The management of competence is thereby of vital importance.

Competence managers therefore face a whole record of challenges and there is a need for heightened awareness. The role of the individual has changed. Bureaucratic systems tend to oversee the individual. Competence and the learning ability of the individual are at the very heart of a modern organization. Senge (1994) argue that individuals are the key competitive asset of the organization. Furthermore, the rapidly changing environment makes the idea of job stability inappropriate. Individuals have to change what they are doing and in some cases develop new competence in order to perform at new tasks.
**IT Track**

In order to make a meaningful study I have chosen to contrast IT track with people track. That is technical artifacts versus people and processes. Knowledge infrastructures consist of both:

- People
- Organizational systems.
- Technological systems.

An open goal-oriented organization is thereby both a social system and a technological system. The knowledge process is an example of business process. The knowledge worker makes certain knowledge-specific activities and the technological knowledge infrastructure facilitates the knowledge process.

The technological knowledge infrastructure consists of software applications such as intranet, extranet, data bases, file servers, knowledge management systems, document management systems or content management systems.

IT track represents the management of information. Researchers in this field typically have education within computer science or information science. They work in projects within information management systems, artificial intelligence (AI), groupware etcetera. For them, knowledge represents an object which can be identified and handled within information systems.

According to Karl-Erik Sveiby\(^8\), the evolution of IT track systems has gone through disparate phases:

1. The first phase focused on productivity.
2. The second phase focused on customer. Data warehousing was used.
3. Interaction reaches the surface.
4. Unlocking the value knowledge through people.

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\(^8\) [http://www.sveiby.com](http://www.sveiby.com)
**People Track**

Business processes such as knowledge management represent an organizational environment at the same time as it might represent a technological environment. It is meaningful to contrast these two. An organization might be supportive of either or both.

People track represents the management of people. People within this field typically have their education within sociology, psychology, philosophy, and business management. They work in projects within assessing, changing, and improving human behavior or individual skills. For them knowledge is a process, and a complex set of dynamic skills. They are traditionally involved in learning and managing these skills individually. This could be viewed as the traditional path.

<table>
<thead>
<tr>
<th>Track</th>
<th>Knowledge is an object</th>
<th>Knowledge is a process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organization level</strong></td>
<td>Reengineers</td>
<td>Organization theorists</td>
</tr>
<tr>
<td><strong>Individual level</strong></td>
<td>IT specialists</td>
<td>Psychologists</td>
</tr>
</tbody>
</table>


People track is still in its infancy when it comes to knowledge management. Information systems did not typically facilitate creation of new knowledge and building environments conducive to sharing of knowledge. Getting people to share what they know is not a technical challenge; it is a matter of corporate culture.

The importance of corporate culture is emphasized by many authors. Peter Senge is a great promoter of organizational learning. He claims:

“To me the first wave of Knowledge management hasn’t been about knowledge at all. It’s been about information – how to capture it, store it, retrieve it, access it and all that stuff. All those verbs work well for information, but none of them actually work well for knowledge.”

It is all about knowledge management intersecting organizational learning.

Sveiby claims that there are four types of players in the organizational power games:

<table>
<thead>
<tr>
<th>Technical Competence</th>
<th>Organizational Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>High</td>
<td>Experts</td>
</tr>
<tr>
<td></td>
<td>Leaders</td>
</tr>
<tr>
<td>Low</td>
<td>Support staff</td>
</tr>
<tr>
<td></td>
<td>Managers</td>
</tr>
</tbody>
</table>


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9 From Knowledge Management Magazine July 1999.
Furthermore, Sveiby models three intangible assets and nine knowledge transfers:

Consequently, there are ten ways to leverage knowledge:

1. Improve knowledge flows between individuals.
2. Improve knowledge flows from individuals to external structure.
3. Improve knowledge flows from external structure to individuals.
4. Improve knowledge flows from individual competence into internal structure.
5. Improve knowledge flows from internal structure to individual competence.
6. Improve knowledge flows within the external structure.
7. Improve knowledge flows from external to internal structure.
8. Improve knowledge flows from internal to external structure.
9. Improve knowledge flows within internal structure.
10. Maximise Value Creation – See the Whole.

The knowledge perspective represents a paradigm shift since human beings have an infinite ability to seek and create knowledge. People are no longer cost generators but rather revenue generators. Production does not longer mean processing physical resources to create tangible products but converting knowledge to create intangible structures. Time and knowledge becomes the bottlenecks rather than capital and skills.

Clustering represents a way forward in terms of knowledge management. Shapiro & Varian claims:

"There is a central difference between the old and new economies: the old industrial economy was driven by economies of scale; the new information economy is driven by the economics of networks..."

Knowledge management clusters is a means of boosting both social capital and human capital. Schenkel, Teigland & Borgatti (2001) suggest a few determinants of a successful knowledge management cluster: density, connectedness, centrality, and graph theoretic distance. In the Falun-Borlänge region there are even a handful knowledge management clusters.

Results

Teknikdalen
Teknikdalen\textsuperscript{11} was founded in 1988 in order to facilitate innovators and entrepreneurs to develop their business prospects, and to develop University of Dalarna. The aim was to strengthen research and development, foremost within technology. There are three profile areas:
- Transports and communication.
- Material development.
- Special development projects.
This means that the Teknikdalen Foundation gathers and disseminates contacts between different businesses and institutions, contributes with know-how and support in the work of development, and is responsible for and runs a number of projects within the profile areas. Consequently, there are mostly technologically oriented companies working in projects. Transports and communication in general and telematics in particular are highly software intensive taking databases in use. There is a special network for intelligent transport system and services.\textsuperscript{12} Furthermore, some member companies use intranet and document management, while others do not.

Dalregementet
Dalregementet\textsuperscript{13} is a dynamic and creative milieu for research, education, and business within the profile areas health and media. The former military base facilitates meetings between people.

Some media companies use specialized software for production of sound and pictures, such as picture database programs. Others are computer intensive since they are working within computer games\textsuperscript{14} and media. Furthermore, University of Dalarna provides education within media in the most modern media house in Europe.

Falun has a strong profile towards health and sports. Health companies are gathered in order to create the prerequisites for stimulating exchange of knowledge, and to create a dynamic business environment.

Some participating members use intranet and document management.

Falu Kommun and Borlänge Kommun.
Both the municipalities use intranet, document management systems, and specialized learning software in terms of schools. The technological knowledge infrastructure and management of information complements people and processes. The municipalities work as open goal-oriented organizations, and are both social systems and technological systems.

\textsuperscript{11} http://www.teknikdalen.se/
\textsuperscript{12} http://www.itsdalarna.se/
\textsuperscript{13} http://www.dalregementet.se/
\textsuperscript{14} http://www.playgroundsquad.com/
**Stora Enso**

Basically, Stora Enso has four facilities in the Falun-Borlänge region:

- Kvarnsveden Mill, which is a publication paper facility.
- Grycksbo Mill, which is a fine paper facility.
- Falun Research Center
- Stora Enso Timber

This means that there is multi-faceted need for education within the company. Stora uses a Personal Administration (PA) system with custom-made courses. Specific courses are flagged for on the intranet. Courses are adapted to users. Focus is at situational specific skills training. Some courses are interactive. The company uses a quality assurance system with skills testing.

**SSAB**

SSAB Tunnplåt AB is the biggest steel sheet manufacturer in Scandinavia and one of Europe's leaders in the development and manufacture of high-strength steel grades. SSAB Tunnplåt was formed in 1988 by the merger of the steelworks in Luleå and Borlänge.

SSAB has net based courses; some with interactions. There is also a course catalogue and flags for courses to come. However, focus is at people and processes.

SSAB is also a part of a competence management cluster referred to as Thin Sheet Network.¹⁵ The network keeps about twenty-five member companies. The cooperation started in 1999 and runs a number of projects. This is a horizontal cluster. As a general rule, horizontal clusters are better suited for ICT-based system than their vertical counterpart.

**Banverket**

The Swedish Rail Administration is the national authority responsible for rail traffic in Sweden. They follow and conduct development in the railway sector, assist Parliament and the Government with railway issues, are responsible for the operation and management of state track installations, co-ordinate the local, regional and inter-regional railway services, and provide support for research and development in the rail sector. Banverket use a lot of technology and their business operations are guided by a lot of security rules. This means that a lot of education has to be specific for operations and little support is found in general education.

Banverket has an education institute of their own in Ängelholm. There are mostly traditional education with teacher led classes and practice. However, introductory studies are made in terms of e-learning.

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**Vägverket**

The Swedish Road Administration is the national authority assigned the overall responsibility for the entire road transport system. Their task is to cooperate with others to develop an efficient road transport system in the direction stipulated by the Swedish Government and Parliament.

Vägverket has been focusing on critical business processes for the last three years. One conclusion is that their intranet should support these processes.

**Adnome**

Adnome[^16] was founded in 1994 as a company providing educational services. Adnome now has two business areas: education and systems development. The company has developed WebDoc, which is a web publishing tool. Adnome works with complete supply of competence within computers. They work in four steps:

1. Introductory survey of competence needs. Adnome use a web-based testing tool.
2. Planning is based upon test results.
3. Education is supervised by an instructor.
4. Follow-up individually or groupwise.

**The University**

University of Dalarna[^17] was established in 1977 with currently 10,000 students. There are a variety of courses at undergraduate and graduate level. Some courses are campus based while others are distance courses. The University uses ICT for all courses and internet[^18] based courses in particular.

**Wallininstitutet**

Wallininstitutet is an education institute which provides educational services within IT, business management, marketing, leadership, and organization. Education is considered a part of a larger process. This process is linked to development processes. On of the key figures has a strong background within human relations. They work in network and strategic alliances. Wallininstitutet work a lot with need analysis, target analysis, and effect evaluation. The teachers all have a business background in order to secure quality. Furthermore, they are cooperating with other education institutes, scientists, and consultants.

Wallininstitutet has an intranet with some document management functions. IT is viewed as one method among other for supporting learning. IT is not considered an end in itself. IT is not considered positive for the learning process. There is a gap between reality and what you really want; difference between theory and practice. The general trend is more hands-on education and more intense courses. They both have individual coaching and education in groups. For some courses is a computer lab taken into practice. Wallininstitutet use open arenas for education.

[^16]: http://www.adnome.se/
[^17]: http://www.du.se/
[^18]: Taking use of Fronter and Marrakech.
Discussion

The Two Business Parks
Both Teknikdalen and Dalregementet were constituted by processes and meetings between people. It is in the very nature of a business parks. Learning is mainly organized in a traditional manner. This means that two competence clusters are at place in the Falun-Borlänge region.

However, very sophisticated information technology is used.

The Two National Authorities.
The two national authorities are looking into possibilities of using e-learning but still primarily use traditional education with teacher led classes. However, both of them have sophisticated intranets which are supposed to support business processes. The two national authorities are knowledge-intensive and an extended use of knowledge management makes sense for them. On the other hand, focus at people and processes make sense since there are many constituents with different needs.

The Two Physical Goods Companies.
These two companies are mature IT users with multifaceted education needs. Focus is at people and processes and specific courses are adapted to users. In cases when it is considered helpful, IT is taken into use. The physical goods companies are not knowledge-intensive but could to some extent be in furtherance of an extended use of ICT.

The Two Municipalities.
The dichotomy of technical artifacts versus people and processes does not quite apply on the municipalities. They are focusing at both technological knowledge infrastructures, and people and processes. For obvious reasons, municipalities are both social systems and technological systems. However, it is interesting that the municipalities are frontrunners in terms of technology.

The Two Educational Services Companies.
The two educational services companies use different approaches. Wallininstitutet has a strong background within human relations, and education is viewed a part of a larger process. Focus is clearly at people and processes. Adnome is the most knowledge management oriented company in the investigation, and even sells a web publishing tool.

The University
The university uses internet for all courses and a learning platform for web-based courses. This learning platform highly facilitates meetings with the teacher and other students. Because of the nature of learning, the learning process is dependant upon interactions with both technology and people.
Conclusions
People and processes versus technical artifacts is not a perfect dichotomy. In effect, organizations focus at people and processes, and possibly technological knowledge infrastructures as well. In a network society it is not advisable to neglect social systems. However, it is possible to be successful without substantial investments in information and communication technology. The generic set of software provides for basic database management, file servers, intranet and document management. Furthermore, the business environment is important as well. One important determinant is how knowledge intensive the organization in question is. The knowledge process is only one of the business processes. There are many ways to facilitate dispersion of knowledge, which is a complex process in itself.

The evolution of IT track systems is mostly in the primitive phases. Focus is on productivity. In most cases there is no focus on the customer, and warehousing not considered. The level of interaction is generally low. There is great potential for unlocking knowledge through people. The organizations work in projects but information management and groupware is rarely used. Most of the learning takes place in a traditional way, with its advantages and disadvantages. In specific cases the use of technological knowledge infrastructures is cutting edge.

The business parks are naturally oriented towards people track. Most of these companies are SMEs with limited resources. The companies in Teknikdalen are knowledge intensive but are on the lower scale in terms of knowledge management.

Both of the national authorities are in the primitive phases of IT track. They are looking into opportunities of an extended use of technology.

The larger industrial corporations are highly dependant on information technology. They are mature IT users. However, they are basically focusing on people and processes.

The municipalities are frontrunners in terms of information technology. On the other hand, because of the nature of business operations is focus at people and processes. The dichotomy of people and processes versus technological knowledge infrastructures does not quite apply.

One of the educational services companies has a strong background within human relations while the other uses both traditional teaching facilities and systems development.

University of Dalarna uses ICT for all courses and state-of-the-art learning platforms for internet based courses. At the same time, learning is a process which can not be neglected.
Recommendations

Knowledge ever more becomes a part of core activities and strategy. It is important to have everyone involved in the knowledge process. Knowledge is a basic resource not to be neglected. There is a never-ending need for innovation and continuous learning. It is advisable for all organizations to consider knowledge management. This is the case both in terms of explicit and tacit knowledge. Attention to tacit knowledge tends to be neglected. There are many ways of nurturing and applying underutilized talent. This is obvious from my investigation. Organizational learning programs should be applied according to local prerequisites. There is not one-size-fits-all solution to knowledge management.

Some attention is also paid to the creation of new knowledge which is particularly the case in terms of the knowledge intensive companies.

In the Falun-Borlänge region there are a few competence clusters at place. This is an excellent way of nurturing tangible knowledge and supporting regional conditions. Competence clusters are a typical way of supporting people and processes, that is associated with people track. As is shown by my investigation, the companies in the region are generally strong on people track.

There are a whole range of IT applications supporting acquisition, synthesis and creation of knowledge. These are all supported with what I refer to as IT track. There are several types of knowledge relevant to an organization since data, information, tacit knowledge and explicit knowledge are involved. One primary factor is the management of existing knowledge, and a secondary factor is acquisition, creation, communication, sharing, and applying of knowledge. There are basically four kinds of distributed knowledge management systems in terms of document management systems, groupware, intranets and extranets, and Organizational Memory Information Systems (OMIS).

Information systems have not always facilitated the creation of new knowledge as well as building environments conducive to sharing knowledge. This is all a matter of corporate culture, and the intersection of knowledge management to organizational learning. It is important to facilitate knowledge flows between internal structure, external structure, and individual competencies. People should be considered revenue generators rather than cost generators.
References

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Appendices

Appendix A. The Four Pillar Model by Francesco A. Calabrese.

Knowledge Management
The Architecture of Enterprise Engineering

Environmental Influences
- Social
- Economic
- Political
- Governmental

Multiple Disciplines
- Leadership
- Organization
- Technology
- Learning

Leadership
- Business Culture
- Strategic Planning
- Vision and Goals
- Climate
- Growth
- Segmentation
- Communications

Organization
- RPR
- Processes
- Procedures
- Metrics
- MBO
- TOVA
- Workflow
- Communications

Technology
- E-mail
- OLAP
- Data Warehousing
- Search Engines
- Decision Support
- Process Modeling
- Management Tools
- Communications

Learning
- Intuition
- Innovation vs. Invention
- Learning
- Community
- Virtual Teams
- Shared Results
- Exchange Forums
- Communications

Stanisloy / Calabrese / Baklanza, 1999
Appendix B. Top level conceptual framework for knowledge management by Art Murray.
About the Student
Patrick S. Risberg holds two Masters Degrees in Engineering Physics and Education, respectively.