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Use of Knowledge in ICT Investment
Decision Making of SMEs

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Abstract

Many ICT investments are complex processes and have also strategic implications for organizations. In this paper we discuss how the managers use knowledge when making ICT investment decisions. The focus of the study is on how the organizational process of knowledge creation affects the individual-level decision making and how knowledge conversions between tacit and explicit knowledge occur in this process. Our data consists of six semi-structured interviews in six small or medium-sized companies. The results show significant differences in how the tacit and explicit dimensions of knowledge act by forming a ‘cognitive model’ of decision maker’s use of knowledge. In ICT investments, there are four contributing factors: problem, product, provider, and solution. The decision processes are described and compared in more detail based on the categorization of these factors.

Keywords: ICT investment, decision making, organisational learning, ICT adoption

Introduction

ICT investment decision making is one of challenging organizational decision making processes. Although there is a multitude of methods and models created for effective information system evaluation and selection, many organizations fail in their ICT investments (Garcia2003, Lyytinen and Robey 1999). The system buyers do not make the effort needed for a successful ICT investment decision (Comella-Dorda et al. 2002) and most of them do not even have the decision making tools, methods or support. Especially in small and medium size enterprises the ICT management is quite often based on short-term, informal, and ad hoc practices (Doukidis et al 1996, Burgess 2002).

Another problem is the used evaluation criteria and techniques that are usually developed for some other organizational decision making than ICT related decision making. A serious problem in these techniques is perhaps the lack of appropriate context specific knowledge. Ncube and Dean (2002) suggest that the buyer organization should itself create the criteria and requirements for its own ICT investment decisions that should be linked to the organizational strategy. Buchowicz (1991) found out that, if ICT decisions are seen only as purchase events, the decision maker fails to fully understand their linkage to
the strategy and goals of the company. These decision makers tended to utilize previous experiences in their decision making and were often dominated by professional peer approval.

From our point of view, the main reason for these failures is that the investment process is mostly seen as a technical process and too little attention is given to its social nature. Though the creation of new knowledge, its identification and management related to decision making is time consuming and expensive, it really improves the decision itself (Saad et al. 2005). Bannister and Remenyi (2000, p. 231) suggest that “the understanding of these more complex processes and decision making, in IT as elsewhere, needs tools drawn from philosophy and psychology”. Hence, our focus is on the real knowledge use in decision making.

The aim of the study is to describe how the SME decision makers use their knowledge when making investment decisions. We study this phenomenon as a social action (Lyytinen 1985) in the context of organizational learning (Nonaka 1994). Nonaka’s framework of organizational knowledge creation between tacit and explicit knowledge is used as a primary framework to explain the use and the conversion of knowledge in the decision making processes of SMEs’ ICT investments. Tacit knowledge can be seen as a valuable resource to these organizations, sometimes even more than explicit knowledge.

The results show that decision makers differ in the way they use knowledge in ICT investments. When making decisions, the persons use their tacit cognitive maps which drive the purchasing process of information systems. According to our findings, there are three main contributing factors from which the cognitive models are built up: problem, product and provider. These three factors work as bases for the cognitive orientation style of how the decision maker figures out the problem at hand.

In the following chapters, we first describe the research methods and present an overview of the data. After that we show an analysis of the expressions of the interviewees from the viewpoint of how tacit and explicit knowledge contributes to their decisions. Based on the different styles of using knowledge, we then classify the decision makers into three categories. Finally, we draw the conclusions and discuss the categories found.

Research approach

Research goals and questions

The goal of the study is to discuss the use of knowledge in the ICT investment decision making. The research questions are formulated as follows:

1. How do the decision makers acquire and process knowledge when making ICT investments?

2. What factors affect the decision making?

We approach these questions first by providing the basic concepts and theories for the topic, then by discussing our findings from data gathered in interviews of SME decision makers.

Basic Concepts and Theory

According to Nonaka, “information is a flow of messages, while knowledge is created and organized by the very flow of information, anchored on the commitment and beliefs of its holder” (Nonaka 1994, p. 15). Knowledge can be explicit in the way that is easily transmitted from people to people through language, but a major part of human knowledge is tacit; hidden and not easy or not even possible to convey through words. The term tacit knowledge was first introduced by Michael Polanyi. Starting from the fact “we know more than we can tell” (1966, p. 4) Polanyi defined tacit knowledge being part of human knowledge that is intertwined to human skills and typically hidden although in some ways it can be discovered and perhaps made explicit.

Nonaka continued defining tacit knowledge to more practical direction and argued that it has cognitive but also technical elements. To Nonaka (1994) tacit knowledge is human action and involvement in a specific context. These two dimensions of knowledge are independent (Bolloju et al. 2002), mutually enabling and generate new knowledge in the process of knowledge conversion. During the decision making process the decision makers combine data and knowledge in different forms to form
a better understanding of the problem and this process generates new knowledge. Typical examples of these conversions for our study are given as follows:

- **From tacit knowledge to tacit knowledge** (socialisation): personal conversations, experience, etc.
- **From tacit knowledge to explicit knowledge** (externalisation): analysing user needs and requirements
- **From explicit knowledge to explicit knowledge** (combination): analysing and evaluating document based or other exactly coded information to find out a decision.
- **From explicit knowledge to tacit knowledge** (internalisation): implementation, understanding and learning to use an IT system.

In a working context, the conversions between tacit and explicit forms of knowledge are not always clear. Conversions are more like a “generative dance” (Cook and Brown 1999) between these forms of knowledge. This “generative dance” is conducted by the person’s cognitive maps that lie behind the uttered explicit phrase (see Ambrosini and Bowman 2001).

**Research Methods**

The paradigm advocated in this paper is a qualitative one culminating to an assumption: The reality is subjective and multiple, and the world can be understood best from the point of view of the individuals directly involved in the activities in question. We stress the importance of the experience of individuals in the creation of a social world (Burrell and Morgan 1979, p. 3). The emphasis is on understanding the unique features of the phenomenon rather than its universal regularities in objective reality. Because of this people involved in the ICT investment decision making process are regarded as the most appropriate informants. In order to make the data reveal the personal worlds of the informants at the best, we used an interview with open-ended questions.

**About the sample**

The research was conducted by Lahti University of Applied Sciences as a part of a larger research project concerning the local ICT industry and its small and medium-size business clients. SMEs are considered the key group of many publicly financed ventures promoting electronic business leverage in Finland. Yet, there is little knowledge of ICT investment decision making specifically in the Finnish SME sector. The data consists of semi-structured interviews of seven persons who are responsible for ICT investments in their organizations. One of the interviewees was dropped out because he did not allow recording the interview.

The interviews took place in the workplaces of the interviewees. They were posed questions intended to reveal their personal style of using tacit and explicit knowledge when working with ICT investments. The stories were recorded and transcribed on paper.

The semi-structured interview consists of 13 questions:

1. The size of your company (number of staff)?
2. What kind software products and service does your company buy?
3. What are your essential issues in making decisions in ICT investments?
4. From whom or what kind of a purchaser do you buy ICT products?
5. Describe your company’s typical purchasing process.
6. What decision stages does your purchasing process include and who are involved in them?
7. What is a successive purchasing process like?
8. What problems have you had in your purchasing process?
9. How do you know the purchase process is successful?
10. Describe your recent purchasing process.
11. What kind of knowledge is needed for purchase?
12. From where and how do you get this knowledge?
13. How one should develop this knowledge?

All the interviewees worked as IT managers or as chief executives in local SME companies. Five companies operate in the area of industrial technology and expert services. One represents a company from a newspaper publishing group. The size of the companies varies from 10 to 450 employees. Due to the group structure, the largest company can also be regarded as an
SME. All the companies buy or outsource their ICT services from software vendors and none of them has software development of their own.

Coding principles

In the coding process we went through all the expressions in the data of transcribed interview texts. Typically, an expression was a word or a sentence referring to the decision making process. The expression was first picked up from the text, then interpreted by identifying the key information related to the actual meaning of the expression (like subject, attribute, etc.). The data was first coded separately, and then we compared our interpretations and if different, reinterpreted the expressions together.

These expressions reflect the way how the interviewees act in their working context as decision makers. In this process of decision making, tacit and explicit knowledge are an inseparable part of the action itself. The more the activity is based on explicit knowledge, the more specifically the criteria related to it are expressed. The tacit dimension, on the other hand, comes out in more vague and value laden expressions which are more or less implicit in nature.

The tacit knowledge was operationalized by using Ambrozini and Bowman’s (2001) concept of personal cognitive maps. These maps work as a means for the individuals to make sense of the reality. The cognitive maps reveal the causal and structural relationships expected to exist between expressed issues by the observer.

In each expression, the interviewee uses a set of concepts to relate his/her individual style of using knowledge when trying to figure out the decision problem of information system acquisition. In our analysis, we interpreted the expressions by naming the subject of the expression and the attribute linked to that subject. We also identified how the interviewees used knowledge in their expressions by naming the information channel and the type of knowledge conversion used in that specific expression. The main emphasis of the analysis lies on the subject of the expression and the type of knowledge conversion. These concepts are the focus of description, whereas the attribute of the subject and the information channel are used to help the interpretation and the description of categories found. The concepts were formulated from general pre-understanding from the data and they also work as a tool to analyze the data.

A typical example about the interpretation of an expression is presented as follows:

Expression: “... once in a blue moon you see that they really can solve the problem. They only know where their software can be used.”

Interpretation:
1) Subject of expression: Provider
2) Attribute of the subject: Product
3) Information channel used: Experience
4) Type of knowledge conversion: From explicit to tacit (E \( \rightarrow \) T)

The first concept, the subject of expression is the most central one. It frames the whole expression using the other concepts as the features of the actual subject the interviewee is talking about. In the example, the decision maker is talking about the provider. The second concept, attribute of the expression, indicates the main concept the actor uses when describing the subject. Typically, it could be an adjective as well as a noun phrase. The actual context of the speech itself guided us to make the difference between the subject and its attribute. Another issue is the meaning of the linkage. For example, in this example the interviewee is talking about the provider’s ability to serve the customer with his product. The third concept, information channel, refers to the channel or context in which the source of knowledge of the expression is originally acquired and processed. In our example, the interviewee bases his knowledge on his own experience. The fourth concept, type of knowledge conversion, refers to the tacit and explicit dimension of knowledge used and also shows how this knowledge is used in the argumentation. The direction of the knowledge conversion is neither easy to find out, nor clear to interpret. The use of knowledge and knowledge conversion goes into both directions, at the same time enabling the interplay between the social and physical world constituting a generative dance (Cook and Brown 1999) between knowledge and knowing. In our example, the interviewee is explaining how difficult it is to convert the explicit knowledge expressed by the provider to personal internalized tacit knowledge to be applied in the real business context.
Data Analysis

In this chapter, we analyze the data by trying to unfold the interviewees’ personal styles of approaching the decision making problem. First, differences of the interviewees in relation to the use of subjects in expressions are analyzed, and after that, we focus on the differences of how the knowledge is used with these subjects. Finally, we describe the individual decision makers in the categories found.

Use of Knowledge in Decisions

The primary focus of expressions among interviewees is shown in Table 1. The table shows differences in the way how they relate concepts when describing their decisions. One interviewee (I2) concentrates mostly on the problem to be solved, whereas the others talk about the product or the provider as the most important factor. The solution was mentioned as a subject too, but it did not play a significant role.

Table 1. Subject of expressions among interviewees.

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Problem</th>
<th>Product</th>
<th>Provider</th>
<th>Solution</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>3</td>
<td>9</td>
<td>8</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>I2</td>
<td>18</td>
<td>7</td>
<td>11</td>
<td>3</td>
<td>39</td>
</tr>
<tr>
<td>I3</td>
<td>3</td>
<td>8</td>
<td>11</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>I4</td>
<td>3</td>
<td>4</td>
<td>12</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>I5</td>
<td>6</td>
<td>12</td>
<td>9</td>
<td>2</td>
<td>29</td>
</tr>
<tr>
<td>I6</td>
<td>2</td>
<td>6</td>
<td>9</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Grand Total</td>
<td>32</td>
<td>46</td>
<td>60</td>
<td>7</td>
<td>145</td>
</tr>
</tbody>
</table>

The data showed that, when having the problem as the subject, the interviewees stressed the buyer’s responsibility as a common attribute to the subject. They include expressions dealing with such matters as: clearing up the problem, user requirements and user involvement. The second category concentrates on the product as the main subject. The attributes related to the product are quite easy to perceive and compare with each other. These include features such as: price, ease of use, reliability and technology. The third category, the provider, was the most popular subject in use. In these expressions, the investment makers brought up, in addition to the company itself, the personality of its representatives. In this sense, the expressions are mostly related to communication and the provider’s willingness to serve the buyer. The last category, solution, was linked to the provider’s ability to solve the problem.

A more detailed analysis of the data shows differences between the activities, which the interviewees consider important in the decision making process. The decision maker using the problem as the main subject stresses the early stage of the process, by setting the focus on the business problem. In this case, the investment process takes place when the old system does not meet its requirements any more. The decision maker has to “clear up the situation” and find out the conceivable solutions before meeting the representatives of the provider. When making the preparatory tasks, the decision is no longer considered so difficult.

When the product is considered the main subject, the features of the software, e.g. the price and technology, usually come out the first. These buyers usually put the software out to tender and make comparisons between the products in the bids. Some other product oriented factors, like compatibility with existing technology, reliability, meeting the user needs and ease of use were mentioned in general terms outside the context of a business problem. The most popular product related attribute was the price.

Finally, when the provider is the subject, it is mostly evaluated in terms of service. These expressions refer to the relationship between the buyer and the seller. They include such terms as proximity, personal communication and the way the provider takes care of his/her responsibilities as a whole. The cases of complaints by the interviewees mostly refer to a nonworking relationship between client and provider. All in all, the client must feel that the provider is able to handle the service as a whole.
Besides the subject of the expression, another important factor is how the decision maker acquires and processes the knowledge involved in making ICT investment decisions. Table 2 shows how the orientation style comes out as a conversion process (→) between tacit (T) and explicit (E) knowledge.

Table 2. Use of Knowledge.

<table>
<thead>
<tr>
<th>Type of knowledge conversion</th>
<th>Problem</th>
<th>Product</th>
<th>Provider</th>
<th>Solution</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Externalisation T→E</td>
<td>27</td>
<td>7</td>
<td>11</td>
<td>1</td>
<td>46</td>
</tr>
<tr>
<td>Combination E→E</td>
<td>1</td>
<td>21</td>
<td>20</td>
<td>3</td>
<td>45</td>
</tr>
<tr>
<td>Internalisation E→T</td>
<td>3</td>
<td>9</td>
<td>10</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>Socialisation T→T</td>
<td>1</td>
<td>9</td>
<td>19</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Grand Total</td>
<td>32</td>
<td>46</td>
<td>60</td>
<td>7</td>
<td>145</td>
</tr>
</tbody>
</table>

According to the data, the decision makers having the problem as the main subject use mostly externalisation whereas the most commonly used knowledge conversion by the decision makers stressing the product is the combination. The decision makers using the provider as the subject used both combination and also socialization as their primary method. Internalization is used least; mostly linked to product and provider.

The decision makers using the problem as a subject rely on personal thinking and analysis. They focus on understanding the problem and the user’s ability to express his needs clearly enough. They also stress the communication and importance of finding shared language between user and provider.

The product as the subject of the expression is used quite often. The attributes used with product are the following: functions, price and solution. The usage of these attributes indicates orientation to the features of the software itself and its capability to solve the problem. The price as an attribute did not differ between the categories. When having the product as the main subject, it tends to lead the interviewee to process the knowledge explicitly and to use information channels like documents and own analysis of data. To some extent, they also rely on experience in which the tacit dimension of knowledge dominates. They obtain knowledge from colleagues by evaluating and comparing their experiences to find out how the software “works in practice”.

The most often used subject is the provider. The provider also plays a central role at the early stage of the ICT investment process. As it comes out in their expressions, it is the provider they want to find first. If the decision maker already knows a candidate provider, it is also used.

The provider related subjects refer to reliability like checking backgrounds, making contracts, earlier deliveries, working relationships, getting support, etc. The providers are evaluated by their products and solutions. The social interaction together with shared language between the customer and provider was mentioned throughout the interviews. Even if the customers did not mention any bad experiences about providers, they still want to have a sense of a reliable service. The customers seem to look for a provider who is able to solve the problem and who does not lead the buyer into trouble.

The mostly used information channels to evaluate providers are own experience and interaction with colleagues. Explicit information channels like analysis and documents are also used. These are the internet and documents which provide document based explicit data. However, the data used from these sources is quite general information like the size, products, location and financial soundness.

The type of knowledge used in expressions concentrates on processing mostly one type of knowledge only, either explicit or tacit, and not so much on conversions between these two types. The decisions makers tend to combine the explicit document based information or rely on their experience of social interaction between the customer and provider. The other two conversion processes are not used that much. The decision makers do not test their explicit ideas in practice, nor do they try to make their tacit experiences into an explicit and analyzable form.
Analysis of the Categories

Orientation styles of the interviewees

In this chapter, we categorize the decision makers into three orientation styles based on the most used subjects, problem, product, or provider. The results are given in Table 3. below.

Table 3. Number of expressions of orientation styles

<table>
<thead>
<tr>
<th>Orientation</th>
<th>I1</th>
<th>I2</th>
<th>I3</th>
<th>I4</th>
<th>I5</th>
<th>I6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of expressions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td>0</td>
<td>9</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Product</td>
<td>11</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Provider</td>
<td>1</td>
<td>0</td>
<td>9</td>
<td>7</td>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>

Based on the figures in Table 3 we can categorize the decision makers as follows:

Interviewee I2: Problem oriented decision maker
I1 and I5: Product oriented decision makers
I3, I4 and I6: Provider oriented decision makers

The comparison of the content of the answers of the interviewees in each category reveals more differences in orientation styles. In order to analyze the use of knowledge in different categories, we take a look at what the interviewees talk about and what type of knowledge they use in the context of different subjects. Table 4 shows the differences of the decision making styles of the interviewees in each category.

Table 4. Use of Knowledge in Orientation Styles Categories in ICT Investments.

<table>
<thead>
<tr>
<th>Orientation style</th>
<th>Subject</th>
<th>Type of knowledge conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem oriented</td>
<td>Problem</td>
<td>E→E  E→T  T→E  T→T</td>
</tr>
<tr>
<td></td>
<td>Product</td>
<td>1 1 15 1</td>
</tr>
<tr>
<td></td>
<td>Provider</td>
<td>0 4 0 2</td>
</tr>
<tr>
<td></td>
<td>Problem</td>
<td>0 2 9 0</td>
</tr>
<tr>
<td></td>
<td>Product</td>
<td>16 3 3 55</td>
</tr>
<tr>
<td></td>
<td>Provider</td>
<td>7 5 5 9</td>
</tr>
<tr>
<td>Product oriented</td>
<td>Problem</td>
<td>3 2 4 2</td>
</tr>
<tr>
<td></td>
<td>Product</td>
<td>4 2 4 2</td>
</tr>
<tr>
<td></td>
<td>Provider</td>
<td>13 2 5 3</td>
</tr>
</tbody>
</table>

Table 4 shows how the types of the four knowledge conversions are embedded in the expressions. The conversion process from tacit to explicit knowledge among the problem oriented decision makers is apparent, whereas the product and provider oriented decision makers seem to rely more on explicit knowledge. Next, we describe these orientations in more detail.
Problem oriented decision makers

In our data, one decision maker can be regarded as a problem oriented decision maker. For this type of a decision maker, ICT investment mainly seems as a problem to be solved. The role of the user participation and a thorough analysis of his needs are stressed in the investment process. A typical first task is to make a “technical clearing up”. After that, decision makers search for suitable solutions for further investigation. A successful acquisition process requires an understanding of the needs of the decision maker. It is up to the user to express clearly enough his requirements to the provider. The final selection is based on how the software solves the problem.

The process is not to buy a “nice program” and install it into all workstations, but also a process of understanding the problem right and expressing it clearly enough to the provider. The role of the provider comes more important later in the implementation phase. The provider has to talk the language of the user. It is also noticeable that this kind of investment process is time-consuming.

The “technical clearing up” and “understanding the user needs” refers to the kind of knowledge use where tacit knowledge is converted into explicit. This stage is stressed very much by the interviewee. According to him, the rest of the decision process is actually very easy.

Product oriented decision makers

For product oriented decision makers, the buying processes are organized as a project in which they stress a careful evaluation of the existing alternatives and preparing a comprehensive contract. The compatibility of the new software with the existing ones is an important selection criterion. The technical aspects of the software, like functional features, implementation, compatibility, reliability and price are considered affecting factors as well. A successful acquisition process consists of a project of the right timing and reliable performance of tasks from both sides.

Two interviewees in our data represent this type of decision makers. These kinds of buyers know their existing software very well. They want to proceed step by step without taking any big risks. In spite of evaluating the product and other technical aspects, in relation to their original needs and advantages, it is important to gain insight how the provider implements the software in terms of personal communication. The main knowledge used in this process is explicit, and some conversion from tacit to explicit is present when the problem is a subject. However, their expressions about the provider are mainly tacit.

Besides their orientation toward the product and explicit knowledge, these decision makers also have a slight provider orientation and behaviour to use tacit knowledge in their decision making. Maybe this arises from the nature of the IT decision process in SMEs where they are not only responsible for the IT but for the business as a whole.

Provider oriented decision makers

The provider oriented decision makers are orientated towards the ICT acquisition process mainly as a supply process of a software provider. The success of the ICT investment depends on how carefully the provider is selected. The customer/provider relationship is seen as a close and long term service, in which the results are realized afterwards. A lot of attention is paid to the features of the provider, e.g. background, size, reliability, and how well the company is known.

The acquisition process starts by selecting the provider and checking out what kind of a company it is. This is usually implemented by “asking them for a visit” and see whether this face-to-face relationship works. They usually make a “list of issues” and evaluate the pros and cons in teams. However, the provider oriented decision makers rely more on their experience and instinct judgements than on a clear process of explicit judgement criteria. In spite of the use of explicit sources, like the internet and newspapers, the informal tacit knowledge creating channels, like social networks, colleagues and personal experiences, are working media for the final decision.
Conclusions

The goal of this study was to describe how ICT decision makers use knowledge when dealing with problems of information system acquisition and what factors affect this decision making. Based on the analysis of our data, we showed that the individual decision makers use their individual cognitive map when dealing with a complex and knowledge intensive decision. We found three factors forming this model. The main factors – problem, product and provider – constitute the focus of the thinking style which the other matters of decision are related to. By using these factors we can classify the interviewees into problem oriented, product oriented, and provider oriented decision makers.

In addition to the style of orientation, decision makers also differ in how they approach the decision by using tacit and explicit knowledge. The problem oriented decision makers take the ICT acquisition mainly as a task of solving a problem. For this group of decision makers, the problem seems to be comprised of hidden, tacit knowledge that is usually supposed to be expressed in explicit form like user needs and technical requirements. The second group, product oriented decision makers take the ICT investment as an acquisition of a software product. They evaluate the product features mostly in terms of explicit knowledge. They prefer organized stages of tasks and clear selection criteria. The tacit dimension of knowledge contributes too, especially when the provider related issues are concerned. Finally, the provider oriented decision makers focus their ICT acquisition on a careful selection of the provider in which the tacit knowledge has an important role. However, the factors related to usage of explicit knowledge are perceived to play a role as well.

From a general viewpoint, our data signifies that ICT investment decision making is a complex and multiphase process that uses both tacit and explicit knowledge. It seem that this process is not an easy one to manage; although interviewees referred to the use of systematic criteria and organized projects, no further specifications for these were named. Decision making for ICT investment requires explicit searching and comparison of software, but much more knowledge in tacit form such as ICT-related business experience and social networks, and also intuition and risk taking. This kind of knowledge use is apparent in all the three categories of decision makers.

Discussion

The validity of this qualitative research is enhanced by two authors doing first their own coding of the data. However, some problems of validity and reliability exist, the main problem being the subjective approach where the results of this study cannot be generalized to concern all SME ICT decision makers. Some problems of reliability are due to the interview method where we presume that the interviewees are representatives of certain expertise. When dealing with ICT expertise, the explicit knowledge is typically more emphasized. Despite this we presume that the use of tacit knowledge, especially, when talking about the providers, is more common than frequencies of tacit knowledge expressions in our data show.

An explanation for this might be the social norms that make intuition and subjective thoughts not so acceptable for a professional decision making process. According to Jankowicz (2001), tacit knowledge is highly used in professional decision making, but companies do not value it. In an interview situation this can lead to answers that stress more the explicit qualities of the provider and do not reveal so much the tacit knowledge affecting the talk about providers. For managers, the “world of subjective judgement” is yet an uncomfortable one and thus hard to manage and too little supported by decision support tools (Jankowicz 2001, p. 71).

Intuition is yet too little known for its role in decision making. An evaluation process can be seen as a form of intuition where typically a person suddenly gets an inner feeling that one of the solutions offered is the correct one. This kind of an intuition can help in decision making if there is enough analytical-based information or predefined measures for the selection. The danger of intuition is confusing this feeling either with emotions or with habit. (Sauter 1999.) Bannister and Remenyi (2000) suggest that it would be especially beneficial for ICT investment decision makers if we could have more precise knowledge of how we use intuition as “internalized, subjective and idiosyncratic knowledge and knowledge processing” (p. 238) in our decision processes. The ability to use this kind of knowledge makes the difference between mediocre and highly skilled IT managers in their managerial skills. As tacit knowledge can also have a “dysfunctional flip side” as it may block adaptation to changes, slow down innovation, and thus lead to deficits in work practices (Ambrozini and Bowman 2001), we need new tools to help recognize tacit knowledge use in ICT investment decision making.
As for further research, we suggest building a new model for the ICT investment process in the SMEs. From every category of ICT decision making orientation type we found, the best practices could be picked up and combined into an ideal model of the ICT investment process. This model should then be tested in various case studies. The new model for the ICT investment process for SMEs should be emphasizing the use of both tacit and explicit knowledge in decision making. By applying this model to real companies, the prevailing shortcomings in current ICT decision making of SMEs could be found.

References