9-4-2008

Knowledge Management in Designing and Developing ICT Consulting Services

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芽|Sprouts Working Papers on Information Systems ISSN 1535-6078

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Permanent URL: http://sprouts.aisnet.org/4-28

Reference: Hyötyläinen, M., Asikainen, H. (2004). "Knowledge Management in Designing and Developing ICT Consulting Services," Helsinki School of Economics, Finland . *Sprouts: Working Papers on Information Systems*, 4(28). http://sprouts.aisnet.org/4-28

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HELSINGIN KAUPPAKORKEAKOULU
HELSINKI SCHOOL OF ECONOMICS
PL 1210
FIN-00101 HELSINKI
FINLAND

ISSN 1235-5674
ISBN 951-791-921-2 (Electronic working paper)

Helsinki School of Economics -
HeSE print 2005

#|Sprouts

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Abstract

The demand for ICT services is increasing among SME's as well as large corporations in Finland. Nevertheless, many ICT service providers are still more product than service oriented in their businesses. The movement from product business to service business is not so straightforward as one might think. This paper examines the role of knowledge management in the design and development of ICT consulting services through seven practical cases. First some well known existing knowledge management frameworks and models are combined into a new model. Second, this new model will be used to examine the empirical material collected during seven practical cases of ICT consulting service design and development. Finally some managerial as well as academic implications are drawn concerning knowledge management.

Key Words: knowledge management, ICT services, service design and development

Introduction

Background

According to various research institutes, spending on ICT (information and communication technology) outsourcing in Finland is expected to increase in the following years (Aara Finland Oy, 2003; IDC, 2003a; IDC, 2003b; IDC, 2003c; Market-Visio, 2003a; Market-Visio, 2003b; Meta Data, 2003). This increase is going to take place among all sizes of companies, from small and medium-sized enterprises (SMEs) to large corporations. In these ICT projects a clear majority of time and effort needed (as well as probability of success) is decided upon already in the design phase (Artto, 1994). Often this essential phase for the success of the project is handled by traditional consulting providers, or by the same ICT service provider that is delivering the actual system.

The potential irrationality here is that SMEs are more often than usual reluctant to pay large – or even "normal" – amounts for ICT consulting services. This has two types of challenges

depending on whether you are a consulting service provider or an ICT service provider. First (1), from the consulting providers point of view, as they often get their revenue based on time and efforts consumed, they are not even interested in providing consulting services in smaller scale. Second (2), from the ICT service provider's point of view, the ICT service providers and their managers do not necessarily have the experience needed for service business.

Since ICT service providers' main objective is to sell the actual ICT system, it can be seen that they are more likely to develop service competencies than traditional consulting are to change their earnings logic. However the ICT service provider's core interest area has traditionally been the technology development, not the marketing competence (Rao and Klein, 1994). In practice the ICT service providers have not clearly defined their ICT consulting service offering for their customers. This means that the customers are not even sure what they are getting by paying tens of thousands of euros for consulting services (Buckley et al., 1992; Skaates, et al., 2002). This kind of inexperience can cause severe difficulties with service delivery (Gummesson, 1994).

There are studies that have been focused on service design and development. Some of these studies have focused on different tools – such as "industrialization" (Levitt, 1972, 1976; Quinn and Paquette, 1990; Quinn et al., 1990), "service blueprinting" (Shostack, 1984, 1987), "tangibilization" (Levitt, 1981), "service scripting" (Solomon et al., 1985), or modeling in general (Bullinger et al., 2003) – that have been used in the design and development process. And others have focused to the design and development process itself (Scheuing and Johnson, 1989, Vaattovaara, 1999; Kaitovaara and Hyötyläinen, 2002, 2003).

According to the fore mentioned researches – that focused on the process itself – the processes involved a lot of information gathering, processing and transferring. Kaitovaara and Hyötyläinen (2002, 2003) even pointed out that the process would be interesting to examine from a knowledge management (KM) perspective. This study aims at doing just that. In the study the question will be approached both form literature point as well as from a practical case point of view. The two following sections 1.2 and 1.3, will describe the goals and structure in more detail.

Objectives of the Study

The goal of this study is to examine the service packaging process from a knowledge management perspective. The research objective is two fold:

1) To build, a draft knowledge management taxonomy for a service design and development process to be used in later studies, and
2) To find out, what have been the enablers for knowledge management in the service design and development processes?

Structure and Audience

To meet the objectives of this study, it is divided into five chapters. This first chapter deals with very basics of the study. It gives on overview on the subject at hand and outlines the research problem as well as objectives. Chapter number two concentrates on appropriate literature available from knowledge management. The third chapter presents the case company and its environment and the challenge that was sought an answer to. In chapter four a model for knowledge management in a service design and development process is built. Finally, chapter five deals with the summary of the findings, managerial implications as well as gives suggestions for further research. Figure 1 below illustrated the structure.

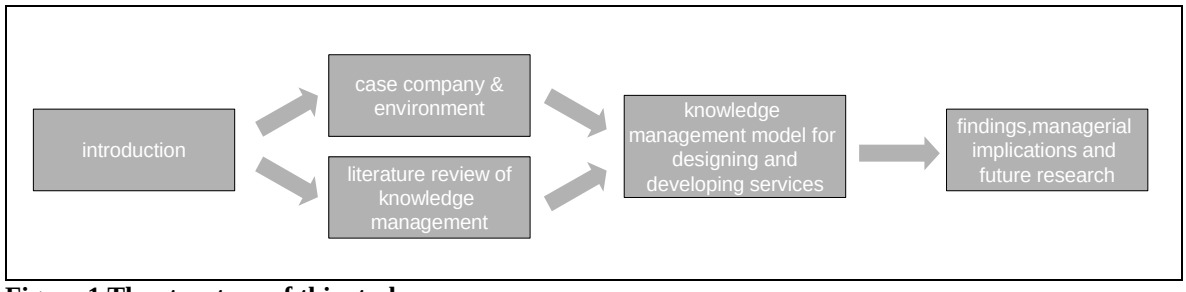

Figure 1 The structure of this study.

This paper is targeted to both academics as well as businessmen. Academics can profit from the draft knowledge management taxonomy built for the service packaging process, and use it to further study the service packaging process from a knowledge management perspective. Businessmen - especially development managers in ICT-service provider organizations - can profit from the practical cases of an ICT service provider to understand what enablers must be in places, in order to succeed in service packaging projects.

Knowledge and Learning Theories

Knowledge is an intangible source that can be either seen simply as an asset, with a possibility to harvest, store and share knowledge or in a more complex way, with combination of codified explicit and silent tacit knowledge or individual and social knowledge (Spender, 1996). Either way, knowledge is seen as a critical resource in the development of sustainable competitive advantage and firm growth (Woo et al. 2004). In order to benefit from knowledge, organisations must identify the existing knowledge from individual employees and guide the knowledge from them to the whole organisation (Spender, 1996). Hence, two core knowledge processes can be distinguished in knowledge management: knowledge creation and knowledge transfer (von Krogh et al. 2001).

Nonaka and Takeuchi (1995) explain knowledge creation, with the spiral process in converting tacit and explicit knowledge in their SECI model. Crossan et al. (1999) concentrates on organizational learning in combining the knowledge sharing process with organizational levels. And finally, dominant logic forms filters, through which knowledge has to pass in the way of being accepted as organizations common behaviour, action, and knowledge.

Challenges in Codifying Tacit Knowledge to Explicit Form

Knowledge is divided to two types of knowledge: explicit and tacit. Explicit knowledge refers to codified knowledge that is transmittable in formal, systematic language and is easily transferred and stored by using for instance information technology (see for instance Nonaka, 1994, Woo et al., 2003).

However, knowledge that can be expressed in words and numbers only represents a tip of an iceberg of entire possible knowledge packed in brains (Nonaka, 1994). In KM literature, this unexposed part of knowledge base relies, more or less, on Polanyi's theory of tacit knowledge (Stenmark, 2001). Tacit knowledge is installed in human brain and can be seen for example as expertise, understanding, professional insight formed as a result of experience (Woo et al., 2003). Because of its intangible and personal nature, tacit knowledge is hard to formalize and communicate (Nonaka, 1994).

Further defined, tacit knowledge belongs first to individuals and derives from what they have experienced. The unique knowledge may even be unconscious to the owners of the knowledge, which makes the codification to explicit form even harder (Crossan et al,

1999). Use of this implicit knowledge is sometimes associated with intuition (Boiral, 2002). This means that especially experienced workers may not figure out complex problems entirely rationally. Instead they are relying on hunches, recognising patterns and drawing intuitive analogies, and parallels to other seemingly similar situations (Koskinen, 2000).

From an organizations point of view, tacit knowledge could be an important contributory factor to the success of the company. However, codification and then utilization of this elusive tacit knowledge is difficult. Stenmark (2001) points out three reasons, what hardens the codification from the perspective of an employee or expert. Firstly (1), employees are not fully aware of their tacit knowledge. Secondly (2), there may not be a personal need to make it explicit, while the employee is already able to act by the guidance of tacit knowledge. And thirdly (3), employees may even feel that codifying their own tacit knowledge, they may loose a valuable competitive advantage.

Even though, codification of tacit knowledge is challenging, it is needed in organizations, when new ideas are brought from individuals' to organizations awareness. Nevertheless, codified tacit knowledge is not enough alone, also explicit knowledge resources such as data warehouses, written documents and guide books are equally needed. Combination of these two creates functional base for knowledge creation and transfer. (Nonaka, 1994).

Four Modes of Knowledge Conversion

Nonaka and Takeuchi (1995) model (SECI model) the transformation of individual implicit knowledge into common external knowledge within an entity as a spiral process. According to Nonaka (1994), tacit knowledge and explicit knowledge are seen as mutually complementary entities and the dynamic interaction between the two types of knowledge is seen as a process, where personal knowledge becomes organisational knowledge. Interactions in organization encourage its individual members to develop new knowledge through new experience, and this makes the model dynamic. (Scharmer, 2000)

In the SECI model knowledge creation takes place through two interaction processes. First (1) is the continuous interaction of tacit and explicit knowledge, which is referred as knowledge conversion. In this interaction knowledge development comprise elements of both knowledge types and the key role is given to interaction of these types. The second (2) process concerns social interactions. Here the individual knowledge forms the crucial basis

for knowledge development but the organization is an important mediator. (von Krogh et al. 2001)

The two interactions are combined in the SECI spiral, where conversing knowledge takes place in four modes (see figure 2). The four conversion processes between the two types of knowledge are, socialization, externalization, combination and internalization. (Nonaka and Takeuchi, 1995)

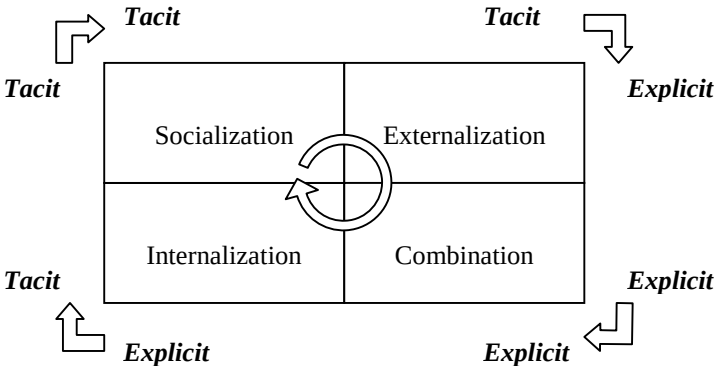

Figure 2 Four Modes of Knowledge Conversion. (Nonaka and Takeuchi, 1995)

Socialization is a first phase in knowledge creation. It is a process of creating common tacit knowledge through shared experience. Knowledge sharing is often done without ever producing explicit knowledge. Socialization is a field of interaction, where individuals share experiences and then learn through observation, imitation, and practise. (Nonaka 1994)

Second mode of conversion is externalization. Process contains articulating tacit knowledge into explicit knowledge, often with the help of metaphors, analogies, and sketches (Nonaka 1994). Because of its nature, tacit knowledge is difficult to convert into explicit knowledge (Boiral, 2002).

Combination is a process of assembling new and existing explicit knowledge into a systemic knowledge, such as a set of specifications or guidebooks for a new service prototype. Explicit knowledge can then be shared in meetings, via documents, e-mails, etc., or through education and training. In this process the newly created content is combined with existing knowledge and often materialized into something tangible. The use of

technology to manage and search collections of explicit knowledge is well established. A typical activity here might be to put a document into a shared database. (Nonaka, 1994)

The last knowledge conversion phase is internalisation. In order to act on formed information, individuals have to understand and internalise the codified knowledge of others. This internalisation involves creating own personal tacit knowledge. By reading documents from many sources, individuals have the opportunity to create new knowledge by combining their existing tacit knowledge with the knowledge of others. However, this process is becoming more challenging because individuals have to deal with ever-larger amounts of information. (Nonaka, 1994)

Organizational learning framework

Building of collective knowledge in the 4I model is based on four related sub processes - intuiting, interpreting, integrating, and institutionalizing - that occur over three levels: individual, group, and organization. Intuiting and interpreting occur at the individual level; interpreting and integrating happen at the group level; and integrating and institutionalizing take place at the organizational level (Crossan et al, 1999). The dynamic and layered aspects of 4I model are shown in figure 3.

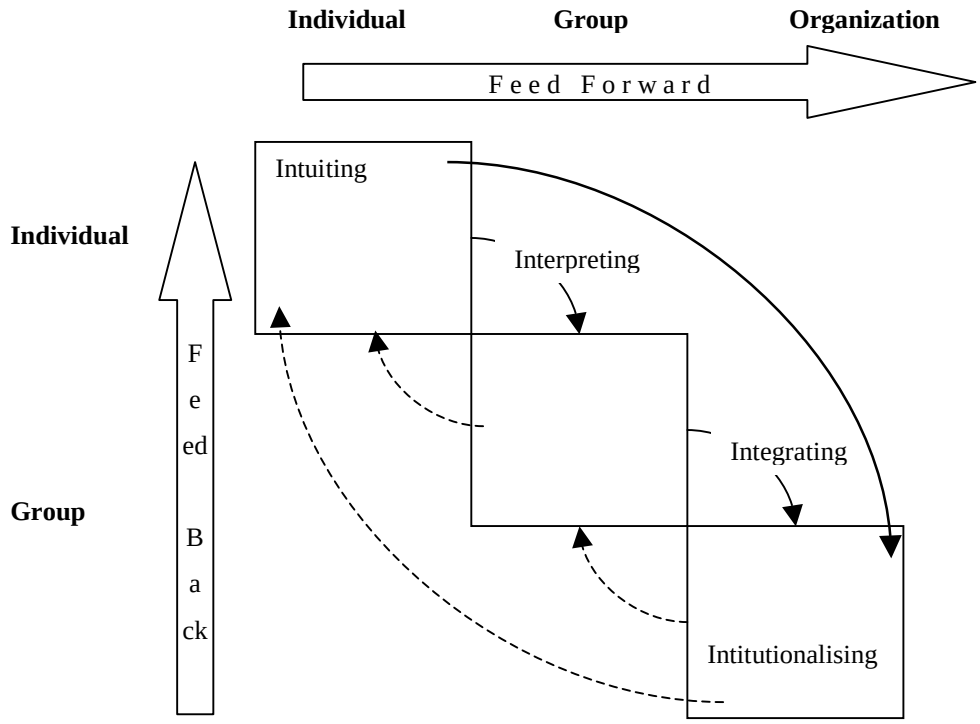

Figure 3 Organizational learning as a dynamic process (Crossan et al., 1999)

According to Crossan et al (1999) the four sub processes are described as:

Intuition is a uniquely individual process. At its most basic level, individual learning involves perceiving similarities and differences, patterns and possibilities. It means that after the learned skills are repeated again and again, the learnt become tacit knowledge. Experts may not be able to explain their actions, their action base on unconscious knowledge or skills – on intuition. (1999: 526)

Interpreting is the explaining of an insight, or idea to one's self and to others. This process goes from the preverbal to the verbal and requires the development of language. This process spans the individual and group levels, but it does not extend to the organizational level. (1999: 528)

Whereas the focus of interpreting is change in the individual's understanding and actions, the focus of integrating is coherent, collective action. For coherence to evolve, shared understanding by members of the group is required. Same language, joint actions and shared practices are necessary for integrating process and initially it is informal. If the process is coordinated and routinized the learned actions or knowledge becomes institutionalized. (1999: 528)

Institutionalizing basically mean that individuals may come and go, but what they have learned as individuals or in groups does not necessarily leave with them. The learning that has occurred by individuals and groups are embedded into the organization including systems, structures, procedures and strategy. Tasks are defined, actions specified and organizational mechanisms put in place to ensure that certain actions occur. (1999: 529-530)

4I model describes organization learning as process, where the main stages are identified, interactions among the three levels of the organization are recognized and the influence of the individuals on the dynamic creation of knowledge is described as the feed back and forward elements. This means that learning is a continuing process, where previous knowledge can either enhance or prevent further development. The model also provides explanations on the links between creation of knowledge and its adaptation into shared standards, deeds, acts and performance. (Stevens and Dimitriadis, 2004)

Dominant Logic and Knowledge Creation

Knowledge creation has been described as a process of sharing knowledge among individuals and also describe as highly dependent on the context it's been created for and from (Nonaka and Takeuchi, 1995). Therefore, all new knowledge is not always useful to a broader range of people. The knowledge has to be insured as worthwhile to be adopted first by other individuals and finally by whole organization. This process can be called justification process, where the organization's dominant logic plays an important role as a filter on the way approval. (Von Krogh and Roos, 1996)

Justification is a dynamic process (see figure 4), where the new knowledge is rejected, returned or appropriated. Rejection happens, when the knowledge is not perceived as useful or relevant, since it does not contribute to the existing knowledge base in any useful way. But if the new knowledge has some valuable features, instead of rejecting it, the knowledge gets returned for further elaboration. Finally, if the knowledge is appropriated as commonly acceptably knowledge, it becomes existing knowledge, which can be seen as 'justified true believes'. (von Krogh et al. 2000)

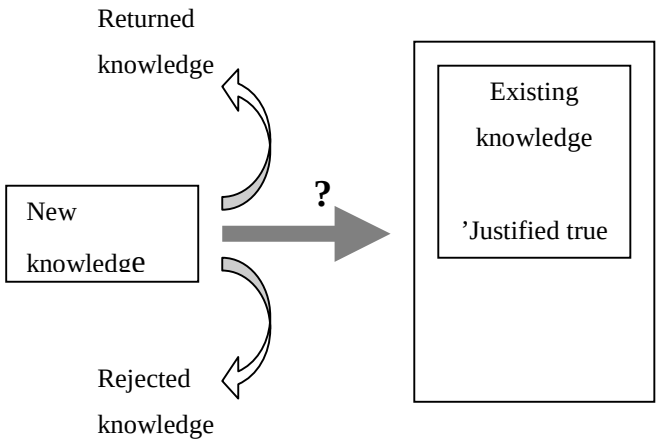

Figure 4 The locus of justification in knowledge creation (von Krogh et al. 2000)

In figure 4, von Krogh indicates with the question mark that justification is a diversified mechanism rather than a simple take it or leave it situation. This mechanism contains a method for filtering the incoming knowledge that is described as dominant logic. Dominant logic is the way in which managers conceptualize the business and make critical resource allocation decision (Bettis and Prahalad, 1995). Addition to this, Bettis and Prahalad (1995) continue that dominant logic is also an information filter, a funnel, where the relevant

information is incorporated into the organization's strategy, systems, values, expectation, and reinforced behavior. In this funnel, occurring of these incorporated aspects is seen as organizational learning. When organizational learning occurs, dominant logic is also slowly shaped to reflect the new learning. (Bettis and Prahalad, 1995)

On the other hand, von Krogh (2000) differentiates dominant logic as corpus of knowledge, images of knowledge and ideological values. Corpus of knowledge determines the implicit theories and understanding of the corporation and the business the corporation functions. This includes implicit theories about the core competence of the corporation and defining the business through method such as benchmarking. Images of knowledge specify the processes for knowledge creation, where the new knowledge is being explained through different patterns such as authority of presenter or the customized way of work. Finally the knowledge is evaluated through the ideological values, where the importance of the knowledge is reflected with the ideology corporate wish to emphasis. (von Krogh et al. 2000)

Von Krogh and Roos (1996) also add self-reference as part of dominant logic. They state that everyone has a unique set of experience that makes them see and react to things differently. In this sense all knowledge that is gained by a firm is developed through individuals' own justification process as well as organizations justification process.

Case Company

Description of the Company

At the time (2001 – 2002) of the cases the company was known as Sonera Juxto International Ltd. It focused on providing ICT services to companies of all sizes. Later on (during 2002) it and all the services it was offering were incorporated back to the mother company – Sonera Oyj. Approximately a year after that (2003) Sonera Oyj and Telia Ab announced a merger of equals. As the people that were involved in the cases as well as the services that the cases concerned are currently a part of TeliaSonera Finland, the case company will be referred to as TeliaSonera Finland. Figure 5 illustrates this development.

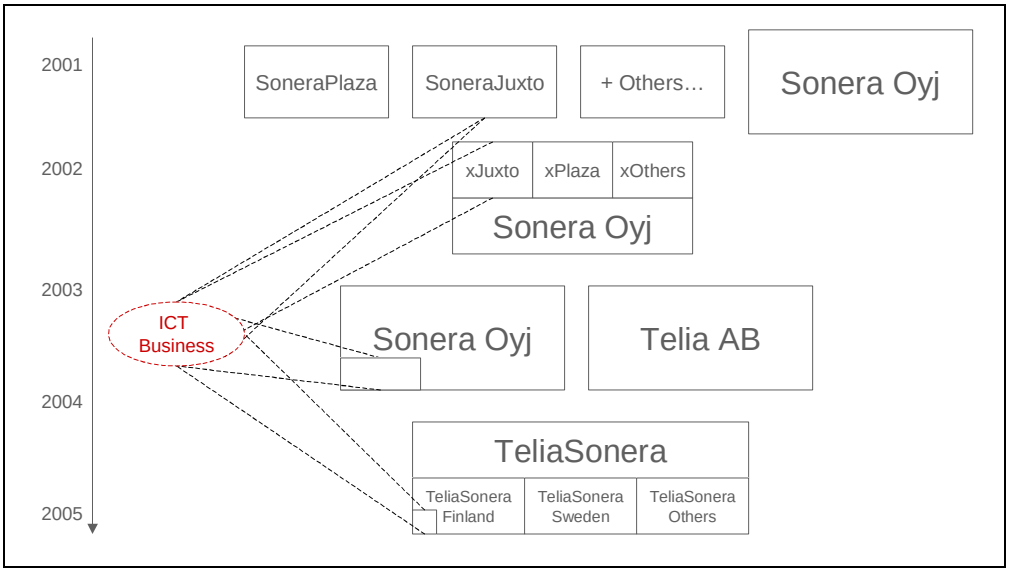

Figure 5 Short-term history of TeliaSonera and of its ICT focus.

Roughly the same focus on the ICT business is still the same within TeliaSonera Finland. As the cases are dealing with ICT services, that will be the main focus in TeliaSonera Finland that we will be focusing on.

TeliaSonera Finland operates in field of telecommunication services. The yearly revenue of TeliaSonera Finland is around 2 billion €. The share of ICT business is around 70 M€ depending on the classification of ICT (70M€ does not include any traffic charges). TeliaSonera Finland currently employs around 6000 people.

IDC (2003c) categorizes ICT services belonging to three main groups: 1) project services (consulting, system integration & custom application design), 2) outsourcing (custom outsourcing & xSP services) and 3) customer support services (deploy & support services and training). Market-Vision (2003c) uses a little bit broader categorization as they divide ICT services in to 1) hardware and software support services, 2) consulting services, 3) training services, 4) application development, integration and implementation services as well as 5) management services. Although the categorization differ a little bit the content is pretty much the same.

TeliaSonera Finland has quite wide ICT offering. The offering covers everything from data and voice networks, to workstation and server management all the way to horizontal application platforms. To use the categorization of Market Visio (2003c) TeliaSonera

Finland offers three types of ICT services: 1) hardware and software support services, 2) consulting services in a relatively small scale, and 3) management services, which form the very core of their offering.

The ICT services offered by TeliaSonera Finland are targeted to the whole business-to-business segment from SMEs and to large enterprises. The relationships to customers in this area are generally long term in nature. Length of the contracts is usually a minimum of two years and they often comprehend several individual ICT services. As the relationship with the customer grows and develops in time, more complex and sophisticated services are adopted by the customer. As a customer grows the set of services from one particular service provider he also becomes more locked-in to that particular provider. This in turn makes it very challenging to gain those customers that have already chosen another ICT provider.

Research Methodology

The empirical material was collected during seven cases of packaging ICT consulting services that were conducted during 2001 and 2002. One of the authors (Hyötyläinen) acted as a project manager in all the seven service development projects, where ICT consulting services were designed and developed.

The selected method for the cases is action research (AR) with constructive research approach that is of interpretive nature. AR differs from case study as theory is developed bivalently: theoretical understanding of both the object to be tested and understanding the change process associated with the process of testing. The main differentiator between the methods is the role of intervention on the same research topic. Action researchers are encouraged to adopt an interpretive assumption and use more qualitative approaches.

According to Susman and Evered (1978) AR can be viewed as a cyclical process with five phases:

1. *diagnosing,* identifying or defining a problem;
2. *action planning,* considering alternative courses of action for solving a problem;
3. *action taking,* selecting a course of action;
4. *evaluating,* studying the consequences of an action;
5. *specifying learning,* identifying general findings.

This type of research has been the target of criticism from positivists (Kock et al., 1997). Nevertheless, AR offers an opportunity to understand a phenomenon in its context. The general aims of the approach are to contribute the research as well as the practical concerns (Baskerville, 1999; Baskerville and Wood-Harper, 1998; Checkland and Holwell, 1998; Järvinen, 1999; Stowell et al., 1997; Susman and Evered, 1978; Yin, 1984).

In terms of research design, constructive approach can be defined as managerial problem solving through the construction of models, plans, organizations etc. Constructions refer here to entities, which produce solutions to explicit problems. (Järvinen and Järvinen, 1995; Järvinen, 1999; Kasanen et al., 1993) Interpretive research can help researchers to understand human thought and action in social and organizational contexts (Klein and Myers, 1999).

Starting Point and Reasons for Change

The cases that will be presented in this study focused on the second area of the ICT business that TeliaSonera Oyj is involved with – that is the consulting services. At first the consulting organization that was producing consulting services was operating only internally. As the organizational and environmental changes in the business context - a change from an internal service provider organization (providing internal services to other units of the company) to the external one dealing with real "paying" customers – took place, changes for the consulting team were inevitable. Basically, the service offering of the organization was seen to need efficient development efforts.

As the ICT consulting service offering was examined, it was determined that in general the consulting services were quite hard to grasp outside the consulting organization. For example the sales unit found the ICT consulting services quite hard to sell: they did not know what the kind of ICT services the consulting organization provided, and with what price. Moreover the consulting organization itself felt that the quality of the services should be improved as they are now dealing with outside customers and that the service should be produced with a greater efficiency. In addition the management felt that the knowledge was maybe a little bit too much bounded with individuals.

Altogether, the goals aimed at 1) greater efficiency, 2) better quality and 3) capturing the intellectual capital of individuals. This led to a series of seven development projects that

were all packaging consulting services. The first case was dealing more with packaging an existing ICT consulting service and the six following ones with developing a totally new packaged consulting service. The next chapter will describe these cases and their results in more detail.

Service Design and Development Projects

[The outcomes of the ICT consulting service packaging projects are shortly described here in an extent and detail that will not be harmful for the case company from a competitive point of view.]

The first project dealt with developing an existing ICT consulting service further by packaging it and the six latter projects with designing and developing new ICT consulting services from scratch. All the seven projects as well as the final ICT consulting services were pretty much identical in structure.

Susman and Evered (1978) consider all five phases to be necessary for a comprehensive definition of AR. Although there are a variety of different research forms within the class of AR approaches (see e.g., Lau, 1997), this five-phase process was adapted straightforward for this study. As described earlier in chapter 3.3 the ICT consulting organization was facing certain challenges (1. diagnosing), and actions were planned to respond to them (2. action planning). Actions were taken (3. action taking) in the form of the first design and development project. The results and experiences from this first project were then evaluated (4. evaluating) and results were identified (5. specifying learning). Based on the results from this first project the used method and approach was then further used also in the six following projects.

In this paper, only those activities in the process are examined that are performed after the project has been decided to be launched. So the questions essential prior to the project start such as how the original idea is developed into a project or how the project manager is selected are not explored. The design and development project is considered to end when (= just before) the ICT consulting service is rolled-out. The four main steps that were identified in the projects are illustrated in the figure 6.

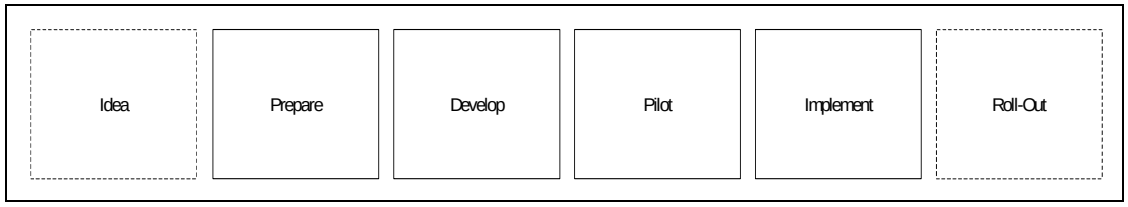

Figure 6 Main steps in the design and development process (Kaitovaara and Hyötyläinen, 2002).

Before the idea has been formulated into a form of a project, the *prepare* step is needed for a well-defined ICT consulting services offering, and the project for this effort is started by setting up a core development team. In the step of *design & develop*, the team defines the content and gathers information, which can be also used for marketing purposes. Hence, the ICT consulting service is created and documented, and the implementation processes are defined. Based on the experiences and feedback in the evolutionary *pilot* step, the ICT consulting service is modified. In the *implement* step, internal activities will secure the fluent roll-out of the finalized ICT consulting service.

These four main steps are further divided into 12 phases. The whole process is depicted in the figure 7 below (adapted from Kaitovaara and Hyötyläinen, 2002).

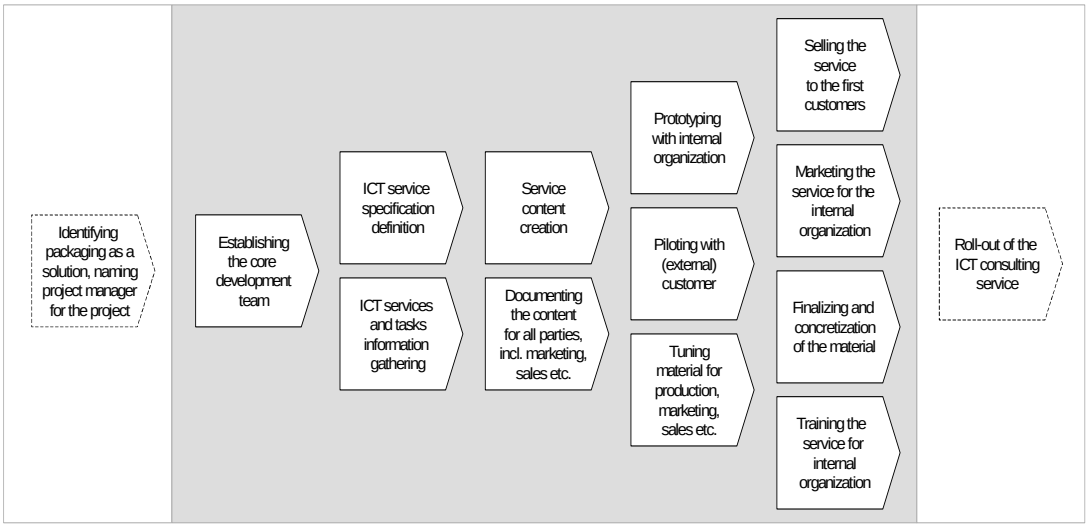

Figure 7 The process in the case of ICT consulting services.

The design and development of ICT services starts with the establishment of the core development team and it is considered to end when the ICT consulting service is rolled-out. The phases that lie on the same vertical level can be completed more or less

simultaneously. Table 1 describes the phases more accurately (adapted from Kaitovaara and Hyötyläinen, 2002).

Table 1 Description of the phases in a design and development process of an ICT consulting service.

Phase	Description
Prepare Establishing the core development team	Before the actual ICT services packaging project can start, the core development team has to be established. This is most likely an activity for the project manager to do. The members of the core development team should represent all the necessary parties that are needed when offering the ICT consulting service after its roll-out. In this way, all necessary standpoints are taken into account.
Design & Develop Service specification definition	The core team sets target specifications, by reviewing issues such as market potential, customers and the business logic, for the upcoming ICT service on consultation. This phase sets boundaries and aims at a common understanding of the goals among the project members.
Design & Develop Services and tasks information gathering	It is often possible that there are some preliminary ICT services and tasks to start with. Hence, related information and knowledge on the particular consultation is gathered around the organization by the core development team. Based on this, an overview is generated on what already exist and what has to be created. Also information concerning the particular business area should be gathered. This information will form the basis for the high level concept and specification.
Design & Develop Service content creation	The content, including such issues as the theories on the current consultation subject, methodological issues, pre-defined delivery and implementation processes, and a set of questions for the customer are collected, and - as needed - developed. The purpose of this phase is to define the overall methodological framework as well as the actual content.
Design & Develop Documenting the content for all parties, incl. Marketing, sales etc.	After the content and framework of the consultation product are specified and developed, those ideas are put on a paper. Also material for internal and external marketing and sales efforts are created e.g., easy-to-understand slides, brochures, and reports. This phase helps the knowledge transfer that has to be conducted in situations such as training the usage of the ICT consulting service or internal communication purposes.
Pilot Prototyping with internal organization	ICT consulting service can be prototyped with internal organization, in order to test and evaluate its usability. This phase has its affect to the content of the ICT consulting service and it acts as a general rehearsal for the external piloting phase. Its purpose is to make sure that no essential issues have been forgotten.
Pilot Piloting with (external) customer	Piloting with external customer or customers gives valuable feedback of the ICT consulting service – such as the ICT consulting service delivery time and the content suitability for the customers - for the core development team based on the market perspective. This is a very essential phase, since thus far the team has been dealing with the development – without just any specific external view on the subject. This phase also has great motivational aspects in the form of confidence and trust.
Pilot Tuning the material for marketing, sales etc.	The documentation is revised according to the feedback gathered from the internal organization and the customer. The material is also fine-tuned to pass the possible ICT service provider organization's brand demands so that it can be externally marketed.
Implement Selling the service to first customers	Before selling to the internal organization, the product has to be sold to first real customers. This will increase the credibility of the ICT consulting service, as it can be proved that it really responds to the market demand.
Implement Marketing the service for the internal organization	Changes on organization's existing ICT services and tasks, especially those that are described as people-processing professional services with a high expertise ICT component, needs to be sold for the rest of the ICT service provider organization. This phase will increase awareness of the developed ICT consulting service and its delivery process.
Implement Finalizing and concretization of the material	When the product is being sold to the internal organization, there will emerge discussion and feedback that has to be incorporated to the final version, so that it will get the internal organization's approval. In this finalization and concretization phase the difficult service is transformed into as a concrete service as possible for the customer.
Implement Training the service for the internal organization	After the ICT consulting service is concretized, it has to be trained to the people that will be dealing with it. The purpose is to ensure that those people will have wide enough competence and expertise to carry out their part on its delivery process. In this training phase also all the documentation will be handed out.

The final ICT consulting services were basically well-defined and easy-to-understand template packages to be communicated for both the targeted customers and the employees of the case organization. With a pricing model and a service description, customers know what is included in the particular ICT consulting service and what it costs.

The actual document templates of the packaged ICT consulting service were divided into three different types – reflecting their depth – 1) framework, 2) process and 3) document. The framework (1) type covers service descriptions, various presentation slides, and price lists. This material mainly helps explaining and depicting the approach and context of the service product. The process (2) templates is used to describe the different phases of the process in process charts, the associated tasks and corresponding task descriptions - such as responsibilities, inputs, outputs etc. The document (3) templates were divided according to the different phases. These templates included namely instructions and the actual questions. The overall number of documents in the template package was close to a dozen.

In terms of the packaged ICT consulting service's implementation process the customers will first receive a certain amount of preliminary work that is related to the content of the forthcoming workshop. Subsequently, the consultants arrange a workshop for the customers within their premises, and the consultants create various notes based on the customers' responses to their questions. Afterwards, in a fixed delivery time, which is already informed to the customer during the sales phase, the consultants create with a certain methodology new documentation and slides. In the last meeting with the customers, the consultants arrange a presentation gathering in which they give the results of the consulting study and proposal for the future development efforts and projects. These outcomes were not supposed to be left on the shelf but for real use for the development projects to come. The preliminary works to the customers, the workshop with the related questions, the agendas for the workshop, and the presentation gathering, as well as the structure for the contributions are all a priori defined - as ready as it is possible for the future customer cases.

Knowledge Management Taxonomy and Enablers for an ICT Consulting Service Design and Development Process

In here the purpose is to unite the KM models examined in chapter two as well as the practical experiences from the design and development cases. All the three frameworks are united into a single model in figure 8.

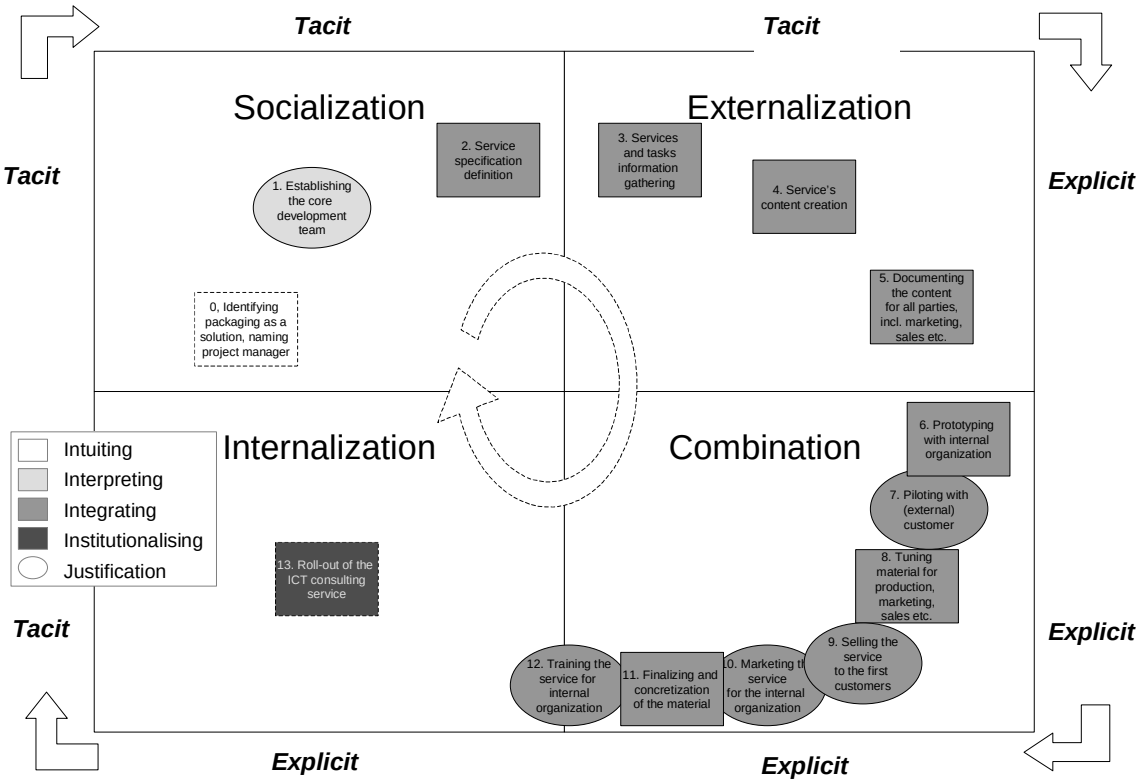

Figure 8 Taxonomy for examining knowledge creation and transfer in a service design and development process.

As can be seen Nonaka's and Takeuchi's (1995) SECI model forms the foundation of the taxonomy. In addition the framework of organizational learning (Crossan et al, 1999) as well as the principles of justification (Von Krogh et al. 1996) are embedded to the model. This combination of the three different models provides a quite comprehensive taxonomy to be used for examining the design and development process from knowledge creation and transfer perspective.

The different phases of the design and development process – including the first idea phase as well as the last roll-out phase – are mapped to the model according to the dimensions of tacit and explicit information. The level individual, group and organization, is illustrated with different colors that are explained in the legend. Phases that involve justification are of round shape.

In chapters 4.1 and 4.2 the design and development process is examined in more detail. The practical cases combined with the aspect of justification in chapter 4.3 provide insight of the practical enablers of the design development process.

Explicit vs. Tacit Knowledge in the Design and Development Process

The figure 8 illustrates which phases involve explicit and which tacit information. The two first phases of the model (1. establishing the core team and 2. service specification definition) deal mainly with exchanging tacit knowledge. The phases involve a lot of brainstorming, sharing successful experiences and generating new ideas. Especially idea generation is a typical step that requires a lot of tacit knowledge since ideas mostly originate from intuition.

During phases three to five (3. services and tasks information gathering, 4. services content creation and 5. documenting the content for all parties, incl. marketing, sales etc) the tacit knowledge get transferred into explicit form as the ideas and experiences get turned into different documented processes, tools and manuals.

All the remaining phases from 6 to 12 deal mostly with explicit information as the newly designed and developed service gets prototyped, sold, marketed and sold to the internal organization as well as to customers.

When the new serviced is finally rolled-out and the people that will produce it, will learn new skills and acquire new tacit knowledge that in turn will lead to continuous circle of knowledge creation. This last step of the process also brings the important continuity perspective (Vandermerwe, 1994) to the design and development process.

Design and Development Process from Knowledge Creation's Point of View

The four modes of knowledge conversation are well represented as the project goes through from the establishment of the core development team to the IT roll-out phase. All four conversions are necessary for the creation of knowledge (Nonaka et al. 1998).

In the project, three first phases are considered to be sharing of tacit knowledge of individuals in the core team. In socialization, communication between the core team is

mostly based on sharing experience of core team members and is mostly based on feelings and hunches. Therefore, it follows Nonaka's (1994) description of socialization as being a process of creating tacit knowledge through shared experience. The face-to-face interaction among core team members provides an important advantage in pursuit of sharing of tacit knowledge (Mascitelli, 2000).

The second mode of knowledge conversion is externalization, where tacit knowledge is articulated and translated into forms that can be understood by other members of the project (Nonaka et al. 1998). This means that through conversations and meetings of core group the content of IT service is accurately explained and documented so that mutual understanding of the service is formed and feedback from other parties can be then asked in next mode of SECI model.

Externalization leads to combination, where the core group's external knowledge as well as external knowledge of interest groups, such as internal and external customers, are in conversion, with the help of a prototype. As Nonaka (1994) puts it, in order to benefit from new knowledge (here, IT prototype) it has to be combined with existing knowledge. In this sense, interest groups' knowledge is used in tuning of prototype and also change of existing knowledge happens, when the project is sold to internal and external partners.

Last steps of project, internal training and roll-out of the product, approach the final mode of knowledge creation model – internalization. Internalization means conversion of explicit knowledge to individual's tacit knowledge (Nonaka, 1998). In here, internalization means that newly created explicit knowledge in the form of IT service product is converted to individuals' tacit knowledge. Learning by doing, training and exercises are important to embody explicit knowledge (Nonaka et al. 1998). Also coaching and mentoring are seen enablers for internalization (Lubit, 2001).

Design and Development Process from Organizational Learning's Point of View

In 4I organizational learning model the four related sub process – intuiting, interpreting, integrating, and institutionalizing are combined with organizational levels – individual, group, and whole organization. In IT service project most of the phases occur in group level as integrating process, where shared understanding is formed through dialogue and joint actions as Crossan and Berdrow (2003) describe.

On the other hand, individual learning is taking place in the very first two steps of the project. Intuiting happens, when individual person first visualizes this project and then when the project manager chooses other members for the core group. These actions base much to individuals' own hunches that are subjective and rooted in individual experience. Interpreting can then be seen happening, when project manager explains personal insights through words and actions to other members of the group.

Finally institutionalizing can be seen to happen, when the IT consulting service product is roll out to use. According to definition of institutionalizing, absence of one core person does not affect the organizations functionality (Crossan et al. 1999). In this project know how of individuals is packed to IT consulting service product. Therefore, roll out of this product can be seen as institutionalizing.

Dominant Logic and Justification in the Service Design and Development Process

There were five phases in the design and development process in which some form of justification took place. In other words, if any one of these phases would fail, the whole process could be endangered. If the idea was not successfully sold or bought in each and every one of these phases the project would end there and the new service would not be launched. These phases were: 1. Establishing the core team, 2. Piloting with (external) customer, 3. Selling the service to first customers, 4. Marketing the service to internal organization, and 5. Training the service for the internal organization. In the following sections 4.2.1 – 4.2.4 the underlying dominant logic in each phase that determined whether the projects were justified will be examined.

Establishing the Core Team

Before the core team began with the projects, the idea of the need for a design and development efforts had to be sold to them. Basically what the projects meant for the members of the core team was more work. So in order for them to be fully motivated they had to be convinced of the projects' benefits. The projects were sold by the management, as a new way of working that would enable the core group to work much more efficiently. The core group was also told that the sales organization is able to sell the ICT consulting services more easily and thus create more demand for consulting resources.

The dominant logic of the core group to justify the new approach (service design and development) was actually quite obvious: they needed to be convinced how the projects helped their practical work and how they also were able to increase the level of valuation of their work (=consulting) in the company.

Piloting with (External) Customer and Selling the Service to First Customers

The piloting phase as well as selling the service to the first customers phases, are quite similar in terms of justification. The justification process of the customer whether pilot of real is quite the same and obvious as it resembles a common sales process. The customer simply wants to know how the service that he is being sold to, helps him or her to increase his or her profits. Respectively, the dominant logic behind the justification is to be convinced of the benefits of the service.

Marketing the Service to Internal Organization

After the service was sold to the first customers it needed to be marketed to internal organization. The people involved in this phase were mostly of higher status (vice presidents, sales directors etc.). Reason for doing things in this order was also part of the dominant logic in marketing phase. As with the core team, the internal organization that the services were marketed to also needed to know, what this can do for them before they were ready to buy the idea. But in addition, these people also wanted act as a sort of gatekeepers in a way that they wanted to have their fingerprints to the services.

The dominant logic in this phase had two dimensions. First, as before, these people needed to know how this new service would enable them to achieve their goals more easily, and second, they wanted to validate their role in the line organization.

In practice the latter part of the dominant logic became visible when it was first attempted to train the service for the line workers, before getting the “approval” from the line directors. This order led to nowhere no matter how enthusiastic the line workers were of the new services.

Training the Service for the Internal Organization

Justification takes place also in the last phase of the design and development process – that is, training the service for the internal organization. At this phase, the people that the service was trained for were mainly sales people. For them the most crucial question was, whether there was a sufficient demand for the particular service. In other words, would this increase their sales results. Secondary questions were also raised about how easy it would be for them to be able to sell the service.

The basic dominant logic in this phase was the same as with the previous ones, to convince people – that are involved – of the benefits for them. In here, the sales people wanted know how this idea (the new service) was able to help them achieving their goals easier, that is, to bring more sales to them.

Conclusions

Summary and Findings

Systematic service design and development has been seen as an answer to ongoing demands for 1) greater efficiency, 2) better quality and 3) capturing the intellectual capital of individuals in service organizations, such as TeliaSonera Finland. At the same time knowledge management and especially harvesting tacit knowledge have rose to special attention, when organizations try to benefit from intellectual capital of its employees as well as gaining a competitive advantage that is hard to copy. This paper connects those in order to better understand the service design and development process. Knowledge management is therefore seen as a way to better understand the whole process and its enablers, which can ease the process if the dimensions of knowledge are figured out.

This paper has three main findings. First, knowledge is formed from both tacit and explicit knowledge, which are both needed in the process of designing and developing new ICT consulting service. In this service creation, codification of tacit knowledge is founded to be challenging, but nevertheless it has a profoundly crucial role. Especially the core group's tacit knowledge needs to be codified, so that the know-how can be utilized further on in the process (Koskinen and Vanharanta 2002).

Second finding is that the process can be seen through a conversion between tacit and explicit knowledge in different levels of organization. SECI model and 4I model makes it

possible to view the whole process from the first step to roll-out phase from knowledge creation as well as organizational learning perspectives. This taxonomy makes it easier to understand different forms of knowledge and its importance in this process.

Third finding captures the possible showstoppers of the whole design and development process as far as justification is concerned. Dominant logic forms the deduction base of the filter person and therefore it has to be recognized. This finding supports the idea, that if the core team has the same dominant logic as the interest groups, the funnel is then easier to pass through (Bettis and Prahalad, 1995).

Managerial Implications

Managers first need to understand that main part of individual's knowledge is hidden tacit knowledge, which needs to be codified to some explicit form (talk, written documents) so that it can be utilized. This applies to all individuals from the manager him/herself to all employees. At the same time managers need to make sure that codification will not lead to bureaucracy that is an excess of documentation (Boiral, 2002). When it comes to codifying tacit knowledge, it is also worth to notice that when knowledge becomes transferable inside organization it also becomes transferable outside, while competitors may copy the competitive advantage (Boiral, 2002).

Second, managers can use the taxonomy to gain better understanding of different knowledge and also see what phases has to be gone through in knowledge creation so that organization benefits from individuals knowledge. Through this understanding managers can create surroundings that encourages free exchange of different knowledge.

Finally, project managers who lead this type of processes have to understand that there are persons, who act as filters in the feed-through of creating and developing new services. This means that if the process is not explained to them in the way that supports these people's justification process, they may not adopt the new service. In order to manage these filters, project managers needs to be aware of the dominant logic and understand it.

Further Research

There are two main streams for further research. First, the practical cases require a lot more thorough investigation and analysis than what has been able to be done here. The level of

analysis used here just began to grasp the most obvious findings, and we believe that a lot more is achievable.

Second, the KM taxonomy for service design and development process created here provides a good basis for further research. As we argued, it provided a good overview from the knowledge management perspective to the process, but still, we think that the framework need a little bit more work to be finalized.

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