

CROSSING THE BORDERS OF KNOWLEDGE SILOS IN SERVICE SCIENCE AND BUSINESS NETWORK

KEY WORDS: Collective learning, collaboration, network, research, co-creation

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ABSTRACT

In large research organizations there is a tendency for new research projects to originate in knowledge silos. Applied research faces growing challenges of how to consider the needs of the customers, scientific knowledge and societally relevant questions in research projects. Service science is an emerging research interface, in which participation from different disciplines, such as design, business needed. In front of these challenges collaboration across the silos, hierarchical levels, disciplines and different actors is indispensable. We claim that multifaceted collaboration does not emerge without specific efforts. Cross-disciplinary research requires network processes for initiating learning, synergy and collaboration. We analyse a method aiming at co-creation in a multidisciplinary research network. We focus especially on how this interactive and co-creative process promotes the crossing of borders of knowledge silos.



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1. INTRODUCTION

Services, both as a business and as a science, are a rapidly growing sector, and they have a remarkable influence on processes and operations in companies and public organizations. Service science is an emerging research interface, in which actors from different disciplines, such as design, business management, social sciences and ICT solutions meet. Service research is a generic term covering a multitude of research fields such as service engineering, service marketing, service innovation research, service design, service quality and management, service operations management. In a new line of research, each discipline offers its frameworks, methods and tools, until it becomes like a scientific bandwagon, a new kind of theory-method package, which can be marketed as a solution for users of research and its funders (Fujimura 1988).

In large research organizations there is a tendency for new research projects to originate in knowledge silos². Applied research faces the specific challenges of how to consider the needs of the customers, scientific knowledge and societally relevant questions in research projects. Research on knowledge creation has referred to “ba” as a shared physical, virtual or mental space for emerging relationships (Nonaka *et al.* 2006). Spaces or states for sharing ideas, co-mingling and interacting between scientists, market and politics have also been called such as transepistemic arenas (Knorr-Cetina 1982), trading zones (Galison 1997) and agoras (Nowotny *et al.* 2001). Knowledge creation is a collective endeavour, which cannot be achieved by epistemological means alone. It unfolds by participating in cultural practices and becoming a member of a knowledge creation community and leads to reorganization of the practices of the knowledge creation community (Paavola *et al.* 2004).

We claim that collaboration across the silos, hierarchical levels, disciplines and different actors does not emerge without specific efforts. Cross-disciplinary research networks require processes for initiating learning, synergy and collaboration. We present such a method aiming at co-creation in a multidisciplinary research network. A process to establish Service Science and Business (SSB) network was launched at VTT Technical Research Centre of Finland in January of 2009. We focus especially on how this interactive and co-creative process has promoted the crossing of borders of knowledge silos.

VTT has traditionally focused on the development and application of technology. With its personnel of 2900 people, VTT provides high-end technology solutions and innovation services for a global market. However, VTT’s interests have recently extended to technology-based services, service business and service innovation research. In order to create the SSB network we conducted a workshop process, called *learning by foresighting and evaluating* (LIFE) (Halonen *et al.* 2010). LIFE aims at enabling future-oriented networking across organizational borders as a basis for continuous learning and innovation. The process enhances research culture that fosters learning in the network as well as shared and transparent planning of project proposals. It offers an arena for new face-to-face contacts inside and across organizations and hierarchical positions. It generates new “life” for the research area which is dispersed in the organization.

² We define knowledge silos as boundaries hindering collaboration across disciplines. The boundaries are due to different educational backgrounds, organizational units and their histories, and research paradigms (e.g. qualitative vs. quantitative approach, macro vs. micro level perspective).

Workshops aim at creating learning situations, in which the participants are able to see their research in a wider perspective than before. This expanded horizon means seeing research projects e.g. from the management's, customer's or research collaborator's point of view. The workshops are designed to help the participants of the SSB network to move forward in their zone of proximal development (Engeström 1999). This term refers to a situation and terrain of constant ambivalence, struggle and surprise, when the participants are about to create the next actions for the future. In this terrain, the possibility of *expansive transformations* (Engeström 2001) or as we call *creative shifts* may take place.

We analyse what kind of creative shifts has been taken place during the first year of activity of the SSB network, and what will be the future developmental challenges, which should be pondered among the actors of the network. To evaluate how the SSB network has developed, we analyze the development of the SSB network as a collective learning space with the help of activity system model. To foresee the potential future development paths of the network, we utilise the concept of zone of proximal development.

The process has developed the SSB network and produced new project initiatives as an immediate result. The participants have appreciated the opportunity to engage in dialogue across hierarchical and organizational boundaries. The network activity is unfolding towards multilateral interaction and cross-disciplinary co-creation between VTT staff and external stakeholders.

In service research, especially in the field of marketing, an animated debate is going on concerning underlying "logics" of service management and development (see Heinonen *et al.* forthcoming 2010, 2009). Service-dominant logic has been set against goods-dominant logic. Goods-dominant logic puts the production of goods in the centre, where as service-dominant logic highlights the service provided to the customer. In their articles Heinonen *et al.* (forthcoming 2010, 2009) argue that the service-dominant logic focuses on the production of the service by the service provider i.e. it is a service *provider*-dominant logic. In contrast to the provider centric perspective Heinonen *et al.* (forthcoming 2010, 2009) propose a customer-dominant logic shifting the emphasis from provider's offerings (*what service companies can offer that customers will prefer*) to customers' business and life (*what the customers do with the services to accomplish their own goals*).

This insight has interesting implications to service innovation activities in research organizations. Instead of focusing on how to involve customers or end-users in service innovation activities orchestrated by the research organization, researchers should focus on involving themselves in the customers' business and life. Deep understanding of customers' existing and future contexts, activities and experiences will then feed the innovation process. This shift of focus would imply adopting and developing new research methods emphasizing even more the demand of cross-disciplinary approaches in service innovation.

The first year of the SSB network has proved that there has been a need to create an arena for co-creation around cross-disciplinary research topics. We have provided a new forum and tools for people to learn from each others' experiences, define a shared strategy and initiate project proposals across the knowledge silos. However, one year is a short time to accomplish change in organizational settings, e.g. generate capabilities and mental models favouring co-creation of novel cross-disciplinary project proposals. Next years will reveal

the impact of SSB network on ways of doing research at VTT.

2. THEORETICAL AND METHODOLOGICAL FRAMEWORK

In this chapter, we present the theoretical and methodological framework on the basis of our study. First, we introduce the concept of knowledge creation as a process of collective creativity. Then we describe the model of expansive learning and how we have adapted the model in practice. We conclude illustrating activity system model and the concept of proximal development, which we utilise in the analysis of the SSB network's development.

2.1 Knowledge creation as a process of collective creativity

Paavola *et al.* (2004) have described knowledge creation as a collective endeavour, which cannot be achieved by epistemological means alone. They argue (Paavola *et al.* 2004) that knowledge creation originates from participation in cultural practices and becoming a member of a knowledge creation community. According to Moran & John-Steiner (2003) collective knowledge creation means providing a *fruitful social venue for people on the edge of transforming their domains by providing scaffolding to expand social meaning within those domains*. In a shared problem-solving process, participants who have partial but different information about the problem in question improve their understanding collectively through social interaction, *new ideas emerging between people rather than within people*. (Paavola *et al.* 2004)

Aligned with Paavola *et al.* (2004), we consider the SSB network as a social process in which the subject of knowledge creation is a community rather than an individual. The network's activities are designed to enable collaboration, which is long-term, voluntary, trusting, negotiated, and appropriate for the projects to be shared (Moran & John-Steiner 2003). Such a collective knowledge creation process leads to reorganization of the practices of the knowledge creation community (Paavola *et al.* 2004).

2.2 Expansive learning

Expansive learning is one of the key concepts of cultural-historical activity theory, which considers human activity of today as a result of historical layers of activity. Thus earlier forms of activity can present either hindrance or resource or both to new forms of activity. When we are dealing with change, it is important to be aware of the historicity embedded in the human activity.

Expansive learning emphasizes the social nature of learning. Learning is not taking place only inside an individual's mind, but is embedded in the development of activity. The expansive learning approach is a reciprocal theory to sociocultural learning approach (e.g. Lave & Wenger 1991; Gherardini *et al.* 1998). It considers that learning takes place between people and in the working environment, in its situations, actions, negotiations and using of material artefacts. The theory of expansive learning is especially concerned with how the entire activity system is constantly in a transformation process. Expansion refers to the phenomenon of exceeding the initially given context of specific problems and refocusing on the wider context that generates those problems. *An expansive transformation*

is accomplished when the object and motive of the activity are reconceptualised to embrace a radically wider horizon of possibilities than in the previous mode of the activity (Engeström 2001, 137).

We applied the model of expansive learning as the framework of the piloting phase of SSB network, which consisted in five workshops organised during spring 2009 (Fig. 1, see also Halonen *et al.* 2010). We called this process *learning by foresighting and evaluating* (LIFE). LIFE aims at enabling future-oriented networking across organizational borders as a basis for continuous learning and innovation. The acronym LIFE evokes the vivid and interactive process that takes place between different stakeholders during the workshops. The process enhances new face-to-face contacts inside and across organizations and hierarchical positions. It creates new “life” for the research area which is dispersed in the organization.

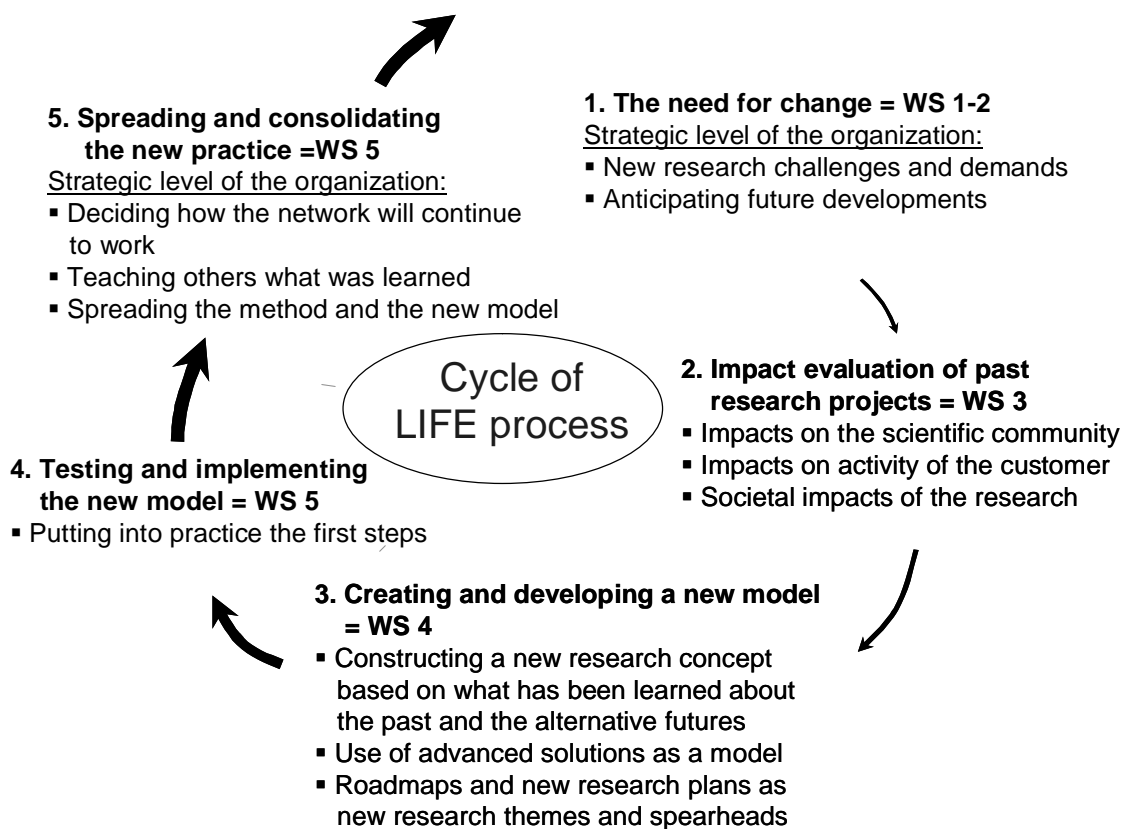


Figure 1. Learning by foresighting and evaluating (LIFE) cycle

The pilot process based on the LIFE method can be summarized in four steps. The first two workshops (step 1 in Fig. 1) gathered together managers from the Strategic Research unit, customer managers, and senior and younger researchers from eleven knowledge centres of VTT representing different scientific disciplines and knowledge of different industrial sectors. Participants started to form common understanding of service and what the future challenges and directions of the service research will be with the aid of roadmap method.

The second step consisted in evaluating two previous service research projects conducted

by VTT. We utilized the method of developmental impact evaluation (Saari *et al.* 2008) which gives an opportunity to question the prevailing research strategy and its strengths and weaknesses. Three perspectives of the two project examples were illuminated in the workshop. The customers, the research collaborators and funding agencies were invited to the workshop to present their views on the projects to the researchers. The main purpose of the evaluation was to question the old way of conducting research. The qualitative impact evaluation of the two projects made their strengths and weaknesses visible. For example, there are still challenges to utilize the multidisciplinary expertise of the researchers in the best possible way. In the end of the workshop, the participants created new research themes based on what they had learned from the impact evaluation (the past) and roadmapping (the future) of the service research.

The next workshop was dedicated to constructing new research concepts based on the lessons learnt from the previous projects and the horizon of the future challenges. The roadmaps of the service research landscapes that were produced in the second workshop were developed further and focused on five future challenges, which were then utilized as starting points for delineating new project proposals and action plans. The aim was to dig deeper into the future of service research by refining the knowledge and organising, designing and planning concrete projects.

The last step of the piloting phase produced eight proposals with topics varying from service innovations in the public sector to global industrial services and service research methods. In the workshop, the proposals were sparred by external experts of service research and the management of VTT (see a case proposal in chapter 4). In this way the cycle was kind of closing up, the dialogue between the researchers and managers, and between collaborators and customers became actual again.

In its ideal form the cycle of expansive learning is presented as a sequential process, but in reality the process has an iterative character. Understanding emerges eventually through a series of attempts to explain and understand the object under study (Paavola *et al.* 2004). This is true also in the case of SSB network. After the piloting phase, we have continued and expanded network activities. The present paper is a follow-up of the cycle of expansive learning taking place after the initial piloting process.

Activity system

We use activity system as a unit of analysis (Engeström 1987). Activity system refers to a community of actors having a shared object for their activity. The activity system is oriented towards this shared object of unfinished nature. Subject of the system is an individual who is an active member of a community. The activity of the community is mediated by division of labour and rules. The actions taken by the individual and the community towards the shared object are mediated by instruments, which can be tools or signs. The model of activity system focuses the attention on the interaction between an individual, the instruments and the community as a whole (Miettinen 2002), thus providing a useful analytical lens for the analysis of a collective knowledge creation process. A change occurring in one element of the system creates tensions in other elements as well, finally involving the whole activity system in the change. In our analysis we do not focus on tensions, but on interactions and division of labour between the participants.

Zone of proximal development

We describe potential future developments of the network utilising the concept of zone of proximal development (Engeström 1999). This term refers to a situation and terrain of constant ambivalence, struggle and surprise, when the participants are about to create the next actions for the future. In this terrain, the possibility of *expansive transformations* (Engeström 2001) or as we call *creative shifts* may take place. According to Engeström (2001, 137), expansive transformation may be understood as a collective journey through the zone of proximal development. More specifically, the zone of proximal development has been formulated as follows:

It is the distance between the present everyday actions of the individuals and the historically new form of the societal activity that can be collectively generated as a solution to the double bind potentially embedded in the everyday actions. (Engeström 1987, 174).

John-Steiner (2000 ref. in Moran & John-Steiner 2003) has described the zone of proximal development in a very extensive manner as ‘*generative ideas emerging from joint thinking, from significant conversations, and from sustained, shared struggles to achieve new insights by partners in thought.*’

In the following we analyse the past and the present situation as well as potential future development paths with the aid of the activity system model and the concept of zone of proximal development

3. THE DEVELOPMENT OF SERVICE SCIENCE AND BUSINESS NETWORK FROM 2009 TO 2010

In this chapter, we describe the lifespan of SSB network focusing especially on how the network acts and learns as a community. Our observations and analysis are based on video recordings of eight workshops, in which we have acted as facilitators³. We have collected feedback from the participants via e-mail. In addition, we had access to statistic of on-going projects in the field of service research at VTT.

The first cycle of LIFE process took place from January to May 2009, according to the phases described in the previous chapter. After these first five workshops, the facilitators pondered together with the managers from Strategic Research unit of VTT how to continue the network activity. They decided to continue organizing of workshops, but not as frequently as previously. From May 2009 to April 2010 three workshops were organized. Their main idea was to increase both internal collaboration and external networking with the customers in the area of service research. However, the original idea to use the SSB workshops for evaluating past projects and initiating new boundary crossing projects was not followed in a rigid manner.

In the sixth workshop, a theme of *co-creation with the customers* was decided to become a

³ With the exception of Eveliina Saari who acted as facilitator in the first six workshops before changing workplace in the end of 2009.

new learning challenge for the coming year 2010. It was also a point, in which the facilitators, managers and researchers pondered how to continue the workshops. The participants were divided into sub-themes and ‘top chefs’ were nominated in order to share the agency of organizing activities in the network. Still, the facilitators were kept as main organizers of the workshops. On seventh workshop which ended the year 2009 *services’ futures - futures’ services* theme was pondered. In the workshop, different approaches and tools for service development, such as service design and the use of social media, were presented. By utilizing service design tools, the researchers had a chance to empathize with the customer's world. A customer visited the workshop presenting a concrete development challenge to the network. The latest workshop, number eight, opened up the year 2010. This was a strategy workshop in which the network had an opportunity to contribute to the ongoing technology strategy of VTT. In the workshop, a civil servant of the ministry was invited to stimulate the discussion of the future strategy for service research.

In the following analysis, we use the activity system model to depict the development during the first 14 months of the SSB lifespan.

3.1 SSB network in February 2009

In February 2009 (see Fig. 2), the network had circa 30 members from four R&D clusters (out of seven) and the Strategic Research of VTT. The facilitators and the management of VTT’s service research were the most active subjects of the network, because they organized the first workshops. The facilitators took the responsibility of the setting and the outcome of the workshop. Other workshop participants (researchers and customer managers) were part of the community.

During the pilot phase, all participants had a project number⁴ for which they could allocate their workshop hours. This showed that the organization considered the LIFE process like an investment on formation of a significant network. It also guaranteed all day presence and commitment of the participants to the workshop activities, as they could think it as their "real work". The language of the workshops was Finnish, because foreign researchers were not yet involved.

In the piloting phase we utilised methods and tools of expansive learning, developmental impact evaluation and roadmapping in the workshops. Participants came from eleven knowledge centres of the organization, therefore it was important to create an atmosphere of trust and openness. Each workshop was started with an inspiring and playful task in order to "break the ice" between people. In SSB network we experienced that laughing during those moments had the capacity to inspire, increase communication, and form social bonds between people (see Derk 1992). E-mail worked like a communication tool between the workshops, and the communication flow was mainly from facilitators to other network members.

⁴ At VTT, all research work is allocated to different projects (i.e. project numbers) to which the costs are directed. VTT has used Enterprise Resource Planning (ERP) system since 2006.

SSB network:

Situation in February 2009

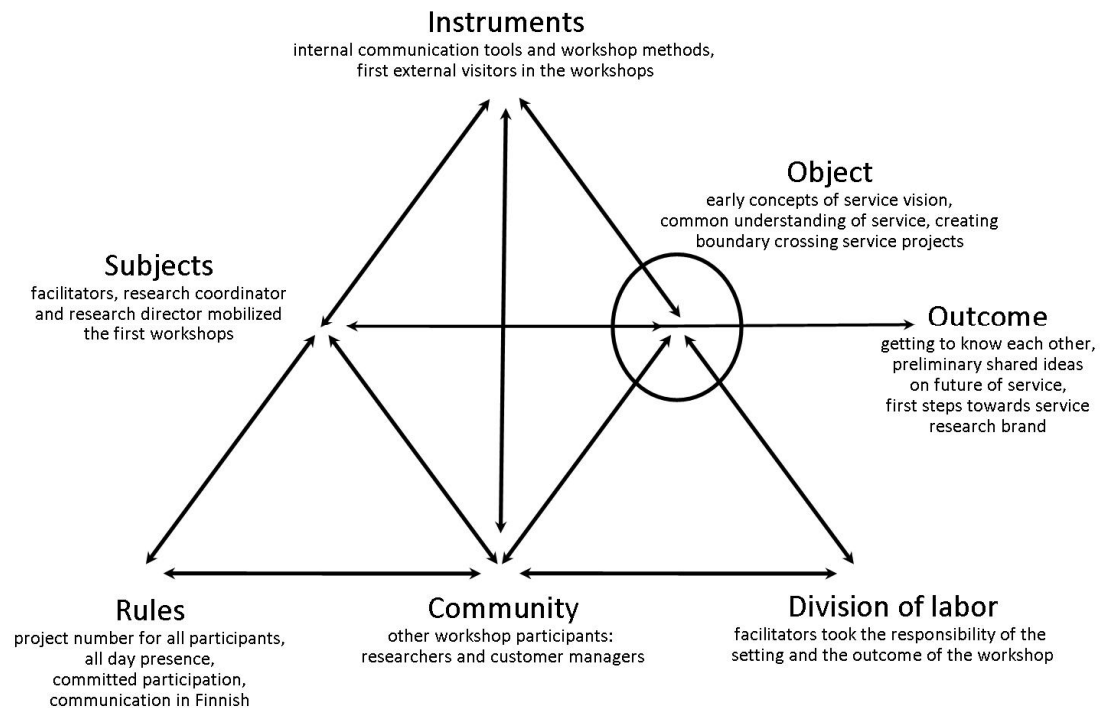


Figure 2. VTT's Service Science and Business network at the beginning of its activity in 2009

We corroborated the workshops by inviting professors from universities to share their ideas and experiences of service research. The external visitors had multiple roles: benchmarking, triggering novel ideas, as well as presenting potential research partners to VTT. Also, two company customers and a financier of the research participated in the workshops. Together with the network they evaluated collectively two pioneer service research projects.

At the beginning of the process the object of the network was to create a shared understanding of service research and develop a vision for VTT's service research. Another aim was to create boundary crossing service research projects. This line of collaboration was initiated from the beginning of the network activities. From the very beginning participants appreciated the new arena to engage in a dialogue across hierarchical and organizational boundaries.

The emergence of the SSB network was among the first signs towards VTT's service research brand. The external visitors became aware of VTT's service research activities during the workshops and carried the message perhaps to their organizations, other research partners and funding agencies.

The steering group in charge of allocating VTT's own funds to service research, changed its name in March 2009. Technology in the Community steering group was replaced by

Services and the Built Environment, which expressed that service research was officially part of VTT's strategy.

3.2 SSB network in April 2010

In April 2010 (see Fig. 3), more participants have become active in using the network to support their own work. The managers, researchers and customer managers have used the workshops as an arena for introducing topical issues, getting ideas and delegating tasks. The community has grown from initial 30 members to over 50 persons. Moreover, network's actual members represent not only R&D and the Strategic Research functions, but also Business Solutions and Support Services. Also many managers and directors across the organization have joined the network. This growth means also more heterogeneous participation in network activities. Some members are more or less passive, meaning that they are more recipients than active members in the workshops. However, these silent members may have an impact as informants, because most of them represent the middle and the upper management. External visitors from other universities and companies become potential partners of the network.

SSB network:

Situation in April 2010

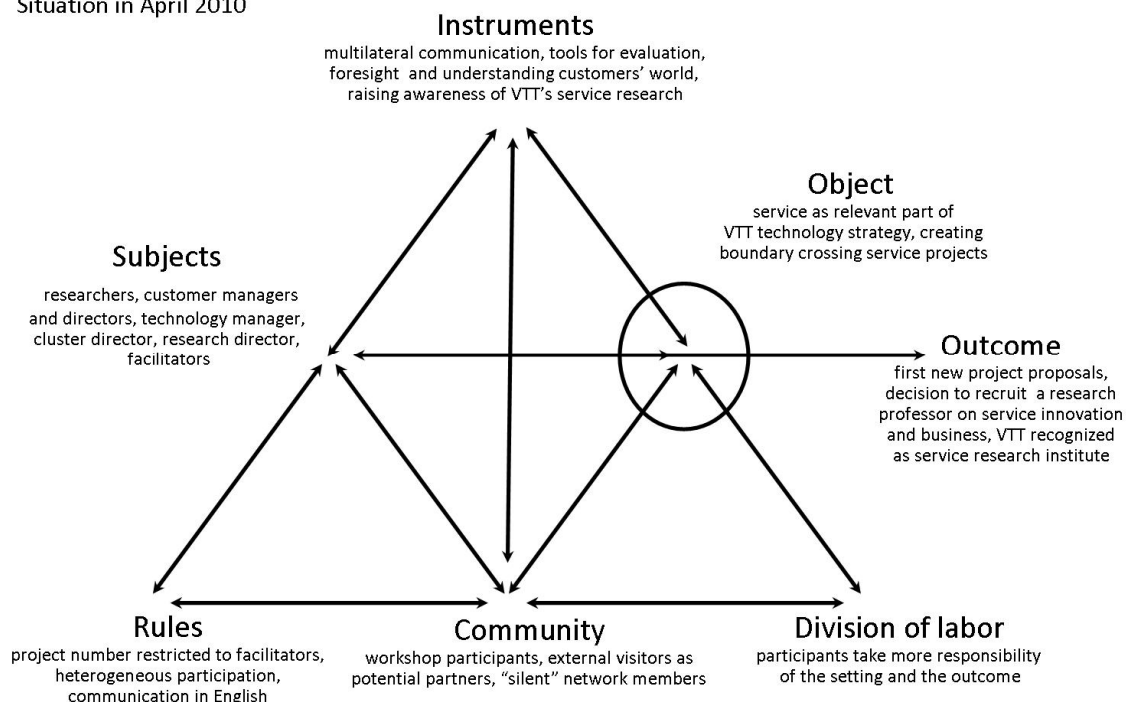


Figure 3. VTT's Service Science and Business network after one year of activity

Division of labor and rules have changed as well. The participants take more responsibility of the setting and the outcome of the workshops. However, this responsibility is not equally divided between the participants. The way of participating to workshops varies from the minimum of only listening to the key note speeches and then continuing to other duties to

the maximum of facilitating group discussions and transcribing the results after the workshop. After the piloting phase, the project number has been restricted to facilitators only. This rule was changed, because the networks activities should be so useful and connected to members own projects that they may allocate their time for those project numbers. We have received conflicting comments to this. On one hand, some potential members may not participate to the workshops for the lack of a specific project number. On the other hand, workshop participants have e.g. asked the slides of a group work made at a workshop or volunteered in transcribing the workshop results by themselves referring to use them in their ongoing projects.

Introducing new tools has been a relevant and intentional part of the learning process of SSB, and their use has been in line with the principle of double stimulation (Vygotsky 1978). The evaluation of previous projects was facilitated with an evaluation tool to consider impacts on the customer and scientific community. The roadmap tool provided a way of analyzing future changes. In addition, the customer's world became more understandable with the help of service design tools. All of these are available for the network participants for their own use.

We also continue to propose funny workshop warm-up exercises. In the last workshop we did an air guitar workout with loud music. An old timer of SSB who arrived late to the workshop asked if she had “lost the fun part”. She referred to this ice-breaking exercise which we organise every time. She was pleased to hear that she was just in time for that. Besides, the language of the network has shifted from Finnish to English. We as facilitators have been surprised that the change has not affected the vivid atmosphere and discussions. We take this as a sign of success in creating a safe arena for collective learning.

The communication has changed from unilateral to multilateral communication flows. An email alias was established for the network in spring 2009. For almost a year the alias was used mainly by the facilitators and the service research management to communicate events and news to other members of the network. Recently, other members of the network have started to use the alias to spread the word of service research related issues to the entire network. In addition, we have created a video on SSB network where participants reflect the need for horizontal service research network and the first year's activities. The video has multiple purposes. It can be used in internal communication at VTT, but more importantly, it helps raising awareness of VTT's service research among potential customers and research partners.

In the workshops we have extended the external visitors' participation even to ministerial level with insights from EU commission discussions. We have more and more speeches from our own experts. In a more concrete level, we have practiced in the network different service situations and understanding of customers' activity with a help of service design tools. A service design professor guided the network to practice different service situations by prototyping exercise that tested by acting those in situ. This helped to realize in a concrete level different roles and perspectives involved in service situations. Also a customer has participated to the workshop to discuss her development challenges. These represent attempts how the network's object is slowly turning towards customer-logic thinking.

In all, we can say that we have formed a learning arena and offered to a cross-disciplinary research network tools for pondering its goals and initiating innovative projects. In addition, the process has produced new project initiatives as an immediate result. However, these initiatives have not grown into projects so far.

The approval rate of VTT's service research proposals multiplied shortly after the pilot process (see the next chapter). The manager in charge of VTT's service research takes this as an evidence of the significant organizational learning that took place within the SSB network during the pilot process. Nonetheless, it seems to us that many of the projects were planned by researchers who were not yet involved in SSB workshops, that is why the workshops may not take credit of the success alone. The managers and researchers who were involved with the LIFE process seemed to spread the word inside VTT about an inspiring process. Other cross-organizational research networks at VTT consider conducting similar processes to foster innovation activities.

Service research has become more visible and relevant part of VTT's technology strategy during the lifespan of SSB. VTT's research and development work has traditionally been strongly connected to Finnish industry. However, the decreasing number of employees in industry and increasing number of employees in public and private services has recently moved the management's attention to these new service markets. This is true in a very concrete sense: for the first time service is one of the three main aspects of the technology strategy and the network was involved in elaborating it. VTT has also opened a post for research professor in service innovation and service business to be appointed in 2010.

4. FUTURE CHALLENGES OF SSB NETWORK; FROM INTERNAL COLLABORATION TO CO-CREATION WITH THE USERS OF SERVICE RESEARCH

Based on the outline of the development of SSB as a collective learning arena, the future development of the network seems to be dependent on how the network changes the previous mode of activity. Does the SSB network become an arena for initiating new projects and learning from past projects between researchers and users of research? It seems to us that we should evaluate:

1. How has the SSB network influenced on collaboration between researchers across the knowledge silos inside the organization?
2. Has the network initiated concrete and innovative cross-disciplinary project proposals?
3. Does the SSB network manage and develop capabilities to handle the customer-interface in a novel way?

4.1 Has the SSB network increased collaboration across the knowledge silos?

One evidence of change in internal cross-disciplinary collaboration taking place in service research projects can be seen when analysing project portfolios of VTT's Strategic Research. VTT's Strategic Research function steers and co-ordinates VTT's strategic research and technology development. The function is accountable for self-financed and

jointly funded research activities. Strategic Research is organised in different steering groups, which are subdivided into so called baskets. Services and the Built Environment steering group includes a basket dedicated to Service Science and Business. A good part, but not all, of jointly funded service research projects are coordinated by this basket. Figures 1 and 2 depict internal collaboration between jointly funded service research projects managed by the basket of Service Science and Business in 2009 (Fig. 4) and in the beginning of 2010 (Fig. 5)⁵.

Three clusters of Research and Development (R&D), and Expert Services function are drawn by a dash line. Circles represent knowledge centres which include a number of teams. Only clusters, knowledge centres and teams active in the field of service research are illustrated in the figures. Each project is indicated by a different colour. The text *Project x* indicates the leadership of a project and the lines collaboration between teams. If no lines are departing from a project, there is no internal collaboration taking place in the project.

The decline from three R&D clusters and the function of Expert Services (in 2009) to two clusters involved in service research projects in 2010, is due to only one project led by Technologies and Services for Buildings knowledge centre. The number of projects has increased from 8 to 15 projects. This is due to an excellent success in TEKES (Finnish Funding Agency for Technology and Innovation) call on service research projects (Serve programme) at the end of 2009. In addition to a major quantity of projects, also internal collaboration between projects has seemingly intensified: sporadic project collaboration in 2009 has grown into a tight network of collaboration in 2010. Especially Industrial Systems cluster has multiplied both quantity of the projects and collaboration between teams. In ICT cluster the number of the projects has not increased significantly. However, the direction of the collaboration has experienced a radical change: collaboration between cluster's own knowledge centres has ceased while collaboration with Industrial Systems has intensified.

Reasons for such changes are multiple. TEKES's Serve research programme emphasizes non-technological areas of service innovation such as new solutions in the customer interface, new distribution methods, novel application of technology in the service process, new forms of operation with the supply chain or new ways to organize and manage services. TEKES also explicitly asked VTT to incorporate some project proposals into one thus creating internal collaboration *perforce*. Research coordinator in charge of VTT's jointly funded service research projects found the SSB network valuable tool for coordinating the proposals for TEKES call. He told that SSB network *made his life easier*, because it helped improve the content of the proposals as well as cut down overlaps and avoid competition between the proposals.

⁵ N.B. Projects presented in the figures do not represent the totality of service research projects. Unfortunately we have not had access so far to a more comprehensive set of data concerning internal collaboration at VTT. Our data is extracted from project plans, therefore we cannot evaluate the effective quality and intensity of the collaboration between projects. There are two projects which are present in both years. The figures do not say anything about external collaboration taking place in the projects. External collaboration is required of all jointly funded projects. Thus crossing of disciplinary boundaries can also be done by external collaboration. Finally, collaboration taking place between knowledge centres or clusters does not necessarily indicate cross-disciplinary character of a project. The reason might lie in organizational changes, which have divided former team mates in different organizational locations.

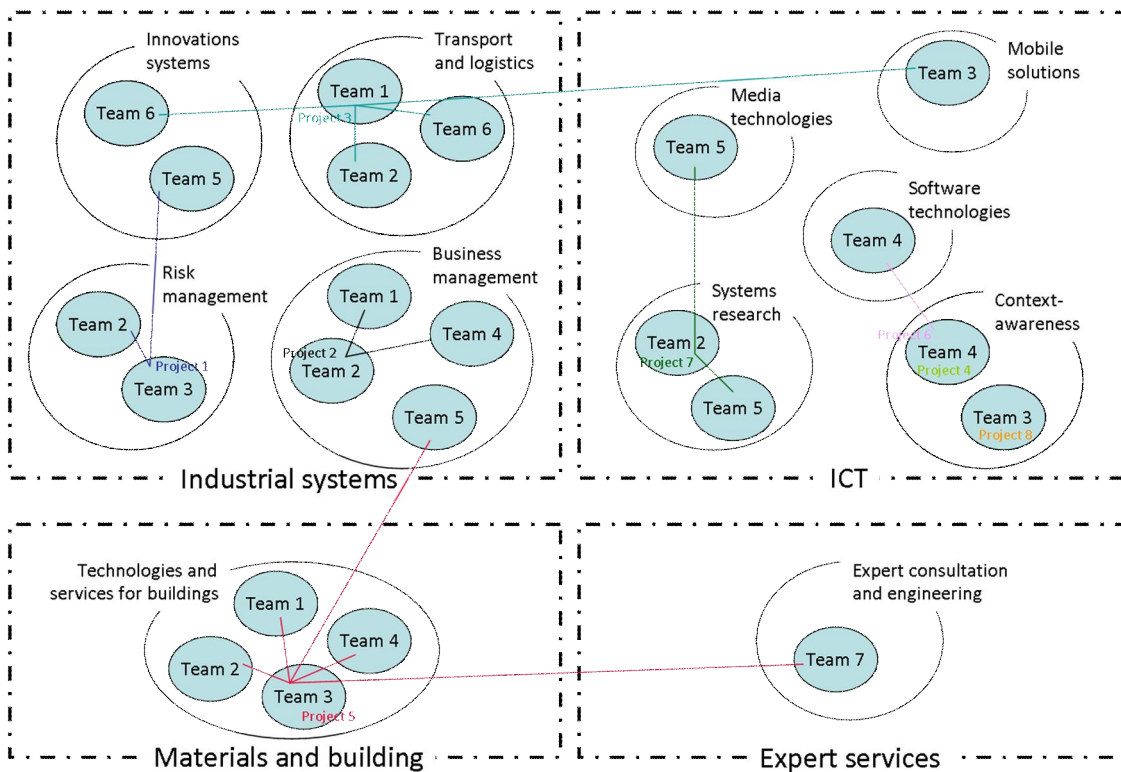


Figure 4. Internal collaboration between eight jointly funded service research projects at VTT in 2009

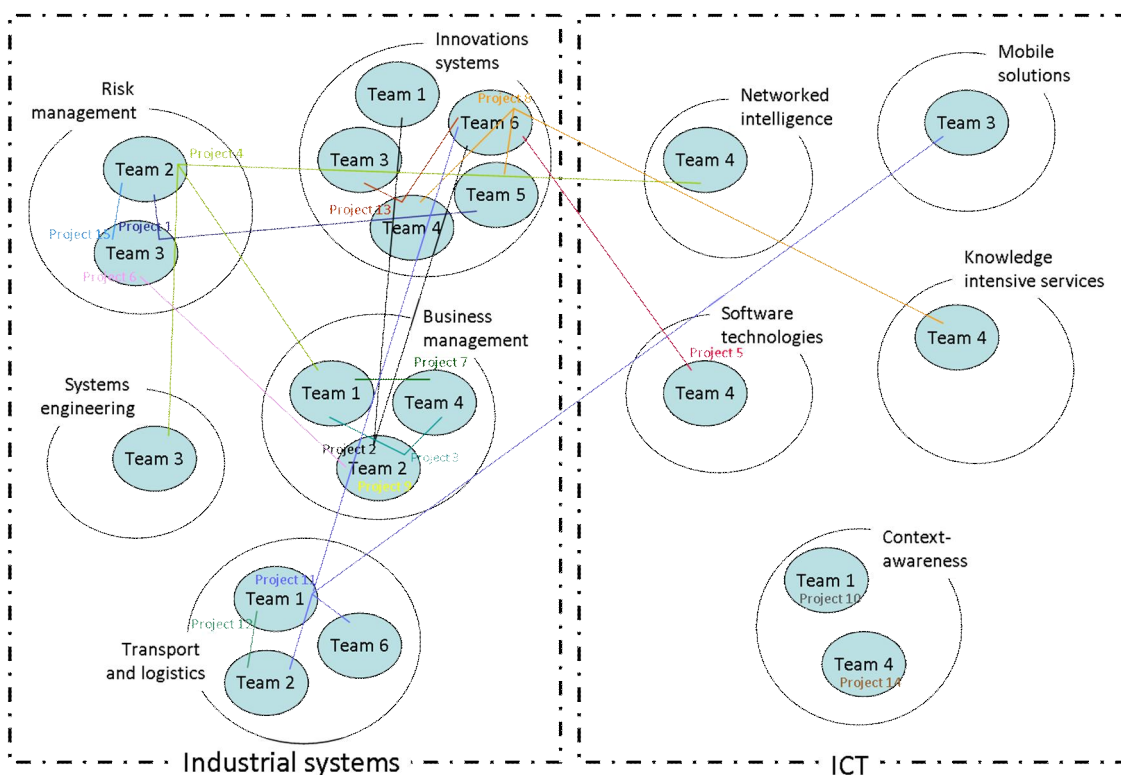


Figure 5. Internal collaboration between 15 jointly funded service research projects at VTT in January 2010

In addition, the rise of Innovation Systems' activity in service research is partly imputable to the SSB network as well. All the facilitators and many of the participants work as researchers or customer managers in that knowledge centre. Active network participants come also from knowledge centres of Transport and Logistics and Business management. Although these knowledge centres were active in service research already in 2009, we can assume that the growth of internal collaboration is at least partly related to SSB network activities. Further analyses should be made about the service research projects funded by other steering groups' project portfolios. Especially ICT steering group contains many such projects. All in all, based on the data available so far, it seems that during the lifespan of SSB the collaboration across knowledge centers has increased in the service research projects.

4.2 Has the SSB network given a springboard to innovative cross-disciplinary project proposals?

One of the aims of the SSB pilot process was to promote innovative cross-disciplinary projects across organizational borders. In the fourth workshop the participants were encouraged to form new groups to work on such project embryos. In the fifth workshop eight project proposals were presented and they were evaluated in two teams. The Manager from Strategic Research and two professors from other research organizations were also asked to give their feedback and evaluate whether the embryos were feasible. Here, we focus on a story of a project proposal called TRANSMED. The story is based on experiences of the authors, video recordings and material of the workshops, and an e-mail interview of a researcher, who was involved in developing the project idea.

Case: TRANSMED

The idea of the project emerged, when researchers from innovation management, transport and logistics, and business management got together after the 4th workshop, in April 2009, in order to develop a project proposal, which would concern service innovations between public and private sector. After a lively conversation, two researchers from transport and logistics introduced their previous project idea, which had not recently proceeded, because one of its original "owners" had changed her workplace. The idea combined three aims: 1) How to encourage people to save energy in their daily travel and consequently diminish their carbon footprint, 2) How to encourage people to use more public transport and 3) How to simultaneously affect employees' health and wellbeing by increasing their daily exercise through changes in work travel e.g. into cycling and walking.

The novelty and potential of the idea was soon realized in the group and everyone wanted to contribute to this cross-sectoral service innovation idea. The meeting got more intense and the atmosphere got enthusiastic. Ideas about relevant partners, knowledge needed and potential funders of the idea were added to the proposal.

In May 2009, the TRANSMED proposal was presented in the fifth SSB workshop among the other ones. The evaluation aroused emotions between the presenters and the evaluators. The external visitor doubted the relevancy of organizational incentives to intervening on how people should move or what kind of transportation they should use. Surprisingly, most of evaluators agreed, that the project idea was not mature enough to be continued. The group, who had participated to innovating it, was astonished about the feedback. They felt that more conventional ideas were accepted and encouraged more easily in the evaluation.

In November 2009 two researchers from transport and logistics and two from innovation management decided to set a meeting to evaluate once more the TRANSMED proposal and develop it further. This time the group (of nine participants) was even more cross-disciplinary. Researchers from mobile solutions and energy systems were invited and more researchers from transport and logistics were involved in the meeting. The group learned that there already existed pilots on intelligent carbon calculators and their use in mobile phones, so the potential platforms even for a more complex service innovation were already in progress, at least in terms of technology. The participants were eager to continue planning the project, although the service concept was still undefined. The meeting run out of time before it was concretely decided who would be responsible to continue TRANSMED.

In April 2010 we contacted a researcher from transport and logistics who had been involved with the new project idea and asked its current situation. She told:

“There is still a societal need for this project embryo and the multi-sectoral nature of it makes it a novel idea. However, the idea is “in quiet waters” at the moment. The project idea is extensive and multisided, thus it has been difficult to point out where to begin and figure out how to concretely get started. In addition, the idea has not had a dedicated “owner” among us researchers. Two “mothers” of the initial idea have changed their jobs, and the time resources of the rest of us have been quite limited. ...I see that the idea still has a potential to develop into a good project, but to make it happen, it needs a devoted project group, clear division of labour and milestones how to proceed. ...Now we just need a dedicated owner, who would go forward with the help of the project group. This may be challenging.”

This development effort of a cross-disciplinary project for creating a cross-sectoral service innovation shows how fragile an innovation idea and its path from an idea to a concrete project really is. A project embryo, which can not be managed inside a sole knowledge silo may face the challenge of innovation agency: who becomes the owner and most responsible person of carrying the process through obstacles?

Innovative and cross-disciplinary project ideas may face the most resistance from the management side, because they involve risks of a failure. The case also showed, that the collective learning arena of SSB may promote encounters of researchers from different organizational units for initiating project ideas for solving broader societal or customer's questions. In this case, the network set a motive to innovate such projects and offered a safe arena to evaluate them. The SSB network may provide a home base and springboard for cross-sectoral projects by giving time, space and tools to create them in the first place. However, these fragile ideas may need special attention and a committed project owner in order to proceed.

4.3 Does the SSB network promote co-creation with the customers?

We evaluate and discuss the potential of SSB network as a learning arena for both researchers and customers. Few years ago, VTT established customer manager roles for intensifying initiation of projects with customers. Usually the customer managers in the organization work partly as senior researchers, and partly they have a responsibility to support the preparation of large scale customer projects together with researchers in defined industries and customerships. In addition to searching customer needs, they construct new customerships and market VTT's research and service offering. Because the customer managers need to identify relevant knowledge and expertise in the organization for

coordinating a suitable mix of capabilities for the customer's needs, we expected that the network would help their work.

We interviewed by email four customer managers, who had recently participated in the SSB workshops. In the interviews, we firstly asked their primary motive for taking part to the process. Secondly, we wanted to find out how SSB networking process had supported their work. And thirdly, we asked what kind of future opportunities they saw regarding to the relationship of the network and their own work.

As a primary motive for the customer managers to take part to the process can be summarized as “a desire to participate in a process that concerns services and service innovations in the organization”. Customer managers were unanimous in their opinions that SSB had supported their work, as the following excerpt from an interview describes:

SSB has helped me to conceptualize the knowledge and expertise VTT has on services, its current state and helped to understand the research vision.

The *benefits* of the process from the customer managers' perspective can be summarized into four main points as follows:

1. Networking inside the organization among people with similar interest was felt to improve. New contacts were created and better information sharing among researchers and actors from different organizational levels was detected.
2. Creation and support for shared innovative thinking in service development and creation of new networking practices in the organization.
3. Perceiving the big picture of VTT's know-how, offering and vision in services.
4. An opportunity to network with some potential partners from outside the organization and inspiration from their presentations to customer managers own work.

Mainly customer managers told that their primary motive to participate had not changed during the process. They were willing to participate in the future to a process were they can have an impact on organization's strategic decision making regarding to service research. Involving customers more to initiating new projects was looked for in the future, as a customer manager related:

Somehow we should create more extensive dialogue with the customers on the process. They are the ones who are telling us development needs and current challenges in their work. Of course in the beginning of the networking process it is necessary to “rally our troops” internally, but this phase shouldn't take too long.

The main *development suggestions*, based on interviews of the customer managers can be categorized as follows:

1. The networked way of acting could be generalized to other parts and horizontal themes of the organization. Customer managers understanding had strengthen how hard work and much time cross-disciplinary networking aiming at mutual goals and project initiatives require.
2. More extensive dialogue with customers and potential partners should be created.

3. The network should be able to create joint research and customer projects. This turns the focus from the organization's internal work and to work with the customers.
4. Network could be used various ways in marketing and brand creation.

According to customer manager's interviews, networking inside the organization had been improved. On the other hand, in the future, the customer managers wanted the network to develop towards an arena where to meet customers, discuss their needs and use these as a basis for new project initiatives. This reflects the zone of proximal development of the SSB network as a potential co-creation arena between researchers and customers.

This is a good point to ponder, how the customer managers could orchestrate the network, bring new project initiatives, needs from customers and customer contacts to the workshops. In such a way the agency of the customer managers would grow as innovation initiators and network facilitators. The network would offer them a space, arena and tools to do the job they are supposed to do in the interface between researchers, managers and customers. This resembles the "trading zone" concept of Peter Galison (1997), or a concept of "a transepistemic arena" referred by Karin Knorr-Cetina (1982). In order to mix different paradigms and form mutual benefit between researchers, customers and funders of research, we need places, new ways of organizing the collaboration, tools and a trustful atmosphere for interaction.

5. CONCLUSIONS

To conclude, the evolution of SSB network has proved that a research organization needs new kinds of collective learning arenas, between researchers from different organizational units and the potential users of research. Learning by foresighting and evaluating (LIFE) has been a promising method to initiate a continuous way of innovating between researchers. However, after one year of activity, it faces a new challenge: how to keep it alive and meaningful for the participants? A research organization, such as VTT, aims to develop business, technology and product processes in customer organizations, but it is as significant to develop its own innovation process.

Our preliminary analysis about the development of the network showed that it may have increased or at least influenced favourably on the collaboration across knowledge silos between researchers. The organized workshops have brought a space for the dialogue between the management and the researchers e.g. to clarify the strategy in the new field of service research. The workshops have offered an arena to evaluate projects and learn from them. What is more, the workshops have provided a meeting point for researchers to innovate projects across the knowledge silos. However, as our slice of analysis described, a journey of a cross-sectoral innovation is often tough. Without a motivated and persistent owner or caretaker, the idea may disband.

We have learned during the life of the SSB network, that communication and learning between people may take different modes. We have outlined the different alternatives with the help of a table, which is borrowed from knowledge management approach and modified for our purpose.

	Knowledge in people	Knowledge in practice
Emergent	Sharing: SSB as an arena for guiding novices	Collaborative exploration: SSB as an arena for co-creation and learning between researchers, managers and customers
Canonical	Transfer: <i>SSB network</i> e-mail alias for information dissemination	Adoption: SSB as an arena for adopting best practices, learning methods and solutions across projects

Figure 6. Knowledge flow and boundary crossing in SSB (modified from the figure of Hong, Snell & Easterby-Smith 2009)

The white square refers to the simplest way of using network as a channel for informing colleagues about events, publications, conferences etc. Concept *transfer* describes the flow of knowledge in this case. The concept *sharing* refers to the possibility of using SSB as an arena for guiding novices, learning from seniors. Our analysis did not yet touch this issue. However, there has been discussion about starting a doctoral school under the title of service science at VTT. In this sharing mode the knowledge changes and accumulates as people interact.

The concept of *adoption* refers to a mode in which activity of practice may develop by adopting best practices across the contexts. For example in SSB, evaluation of projects may help adopting methods and solutions from one project to another. Perhaps the most challenging mode of learning is SSB as an arena for *collaborative exploration* between different actors such as researchers, managers and customers. So far the SSB network has provided a meeting point for co-creation between researchers, but involving customers to co-creation has taken place only inside the projects. With gray colour we have pointed out the zone of proximal development of the SSB network. We plan to use this table as a tool for reflecting the current state of SSB network as a collective learning arena with the strategic research and customer managers.

Questions which should be pondered are: Who will facilitate or manage the SSB network in the future? What kind of division of labour should be made between the management, customer managers and facilitators? Should the customer managers take the agency in the SSB network, and start using it as a forum to initiate new projects in service research field? One of the duties of customer managers is to orchestrate internal and especially external communication. They are also in continuous interaction with the customers, which gives them an opportunity to invite them to workshops easily.

In the zone of proximal development of SSB, we see that the network has a challenge of involving customers into creation of new service research projects. This kind of customer-dominant logic suggested by Heinonen & al. (forthcoming 2010, 2009) requires new tools and ways of working for the researchers to be able to empathize with the customer's world. It forces the researchers and managers change their perspective radically. Services may not be designed in laboratories inside research organizations, instead researchers should dive into customer's and even to end-users' lives.

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