BestServ

Feasibility Study

Final Report

Teknologia teollisuus

Publisher
Technology Industries of Finland
Eteläranta 10
00130 Helsinki
tel. (09) 19 231
http://www.teknologiateollisuus.fi

Layout: Virma Oy, Kerava

Printed in Finland by
Savion Kirjapaino Oy, Kerava, 2003

ISBN 951-817-830-5

Content

Preface

The BestServ feasibility study was carried out by the research group in close co-operation with Finnish industry and TEKES. Project working and knowledge sharing were of great interest and inspiration to the researchers. The open atmosphere of the project and the project meetings were excellent for innovative working and the creation of new knowledge.

The BestServ project group would like to thank all of the participating companies as well as the individual service business experts of the companies and TEKES for supporting our analysis and research. Our special thanks are dedicated to our active management group members:

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Tiivistelmä

BestServ-esiselvitysprojektin tavoitteena oli selvittää erityisesti suomalaisten kone- ja laitevalmistajien palveluliiketoiminnan (Industrial Services, IS) nykytila ja hyvät käytännöt, luoda lähtökohdat yritys- ja yritysryhmäkohtaisten tutkimus- ja kehitysprojektein käynnistämiselle sekä määrittää suuntaviivoja palveluliiketoiminnan tutkimukselle ja tutkimusprojekteille. Esiselvitysprojektiin osallistui kahdeksan suomalaista yritystä: Metso Oyj, Wärtsilä Oyj, Vaisala Oyj, M-Real Oyj, ABB Oy, Tamglass Oy, Valmet Automotive Oy sekä Patria Vammas Oy. Hankkeen toteutuksesta vastasivat Teknologiateollisuus ry., Oy G. Andersson Management Consulting sekä VTT Tuotteet ja Tuotanto. Esiselvitys suoritettiin aikavälillä joulukuu 2002 ja syyskuu 2003, sen rahoittivat osallistuvat yritykset ja TEKES.

BestServ-esiselvitys perustui kirjallisuus- ja tutkimuskatsaukseen, kahdeksan mukana olevan yrityksen laajaan haastatteluun, viidentoista muun yrityksen haastatteluun, workshop-työskentelyyn ja aktiiviseen projektin johtoryhmätyöskentelyyn.

BestServ-tulokset voidaan kategorisoida neljään pääalueeseen. Ensimmäiseksi, tunnistettiin kone- ja laitevalmistajien keskeiset, lyhyen aikajänteen kehitystarpeet palveluliiketoiminnan alueella. Samalla määriteltiin myös hyviä toimintatapoja ja –käytäntöjä, joiden avulla yritykset ovat pystyneet toteuttamaan palveluita. Toiseksi, tunnistettiin teollisuuden tarpeisiin perustuen pitemmän aikajänteen tutkimustarpeet ja –alueet ja priorisoitiin ne seitsemään laajempaan tutkimusklusteriin ja tutkimusteemaan. Kolmanneksi, esiselvityksen aikana määriteltiin viitekehys palveluliiketoiminnan kehittämiseen ja organisatorisen muutosprosessin hallintaan tuotekeskeisestä toimintamallista asiakasarvokeskeiseen toimintamalliin. Neljänneksi, luotiin ehdotus ja viitekehys siitä, miten ja millaisella foorumilla palveluliiketoiminnan tutkimus- ja kehitystoimintaa tulisi edistää siten, että se tukisi yritysten liiketoiminnan kehittymistä, tutkimuslaitosyhteistyötä sekä T&K-rahoittajien toimintaa.

BestServ-projektin yhteenvetona voidaan todeta, että teollisuuden palveluliiketoiminnan kehittäminen on keskeisessä roolissa suomalaisten kone- ja laitevalmistajien keskuudessa ja sen merkitys nähdään liiketoiminnan kehittymisen ja kasvun suhteen erittäin suurena. Monet mukana olleet organisaatiot näkivät kuitenkin, että heiltä puuttuu palveluliiketoiminnan kehittämiseen tarvittavia työkaluja, malleja ja menetelmiä sekä palveluliiketoiminnan toiminnallistamiseen tarvittavia liiketoimintamalleja. Lisäksi keskeisenä kehityshaasteena nähtiin ”palvelukulttuurin” luominen ja jalkauttaminen osaksi organisaation toimintamallia ja kulttuuria. Yhtenä keskeisenä kehitysalueena edellisiin liittyen voidaan nähdä asiakasorientoituneen toimintamallin kehittäminen. Kehitystyön lähtökohtana olevan verkoston arvomalli yleisesti puuttuu. Palveluliiketoiminnan toteuttamiseen tarvittavien teknologioiden integrointi ja kokonaishallinta koettiin myös haasteena. Edellä oleva yhteenveto BestServ-projektin havainnoista muodostaa laajan pohjan ja tarpeen poikkitieteelliselle tutkimukselle, jossa täytyy yhdistää useita erilaisia tutkimusalueita ja näin luoda laajoja ja poikkitieteellisiä kehityskokonaisuuksia (mm. liiketoimintaosaaminen, teknologiaosaaminen, käyttäytymistieteet). Tällainen laajamittainen ja monitieteellinen lähestymistapa edellyttää myös uudenlaisia tutkimus- ja kehitystyön organisointimalleja, joiden avulla voidaan varmistaa uuden osaamisen syntyminen ja levittäminen. BestServ-esiselvityksen tuloksena esitetään, että laaja toimijoiden joukko käynnistää yhteisen teollisuuden palveluliiketoiminnan kehitysfoorumin, jonka tehtävänä on ohjata palveluliiketoiminnan tutkimus- ja kehitystoimintaa sekä osaltaan herättää ja aktivoida uusia käynnistettäviä aktiviteettejä. Kyseessä olevan foorumin tavoitteena on luoda uudenlainen oppimisympäristö keskeisille palveluliiketoiminnan kehittämisen intressitahoille.

BestServ-esiselvityksen tuloksena todettiin, että seuraavanlainen etenemismalli voisi toimia palveluliiketoiminnan tutkimuksen aktivoijana siten, että teollisuuden tarpeet muodostaisivat suunnan ja pohjan laajamittaisemmalle ja pitkäjänteiselle tutkimukselle teollisuuden palveluliiketoiminnan alueella.

- Teollisuuden palveluliiketoiminnan kehitysfoorumin käynnistäminen (Industrial Service Business Forum, ISBF) toimimaan yhteisenä oppimisympäristönä teollisuudelle, tutkimukselle ja T&K-rahoitusorganisaatioille.

- Teollisuuslähtöisten yritys- ja yritysryhmähankkeiden käynnistäminen valituilla projektialueille. Nämä hankkeet voivat toimia apuna tutkimushankkeiden suuntaamisessa ja käynnistämisessä.

- Teollisuuden palveluliiketoiminnan poikkitieteellisten tutkimushankkeiden käynnistäminen. Tutkimushankkeiden tulisi olla laajoja ja poikkitieteellisiä sekä tukea uuden liiketoiminnan ja innovaatioiden syntymistä.

- Varmistaa osaamisen kertyminen, jakaminen ja uuden tiedon syntyminen kansallisesti eri yritys- ja tutkimushankkeiden välillä. Tässä yhtenä mahdollistaja ja foorumina on teollisuuden palveluliiketoiminnan kehitysfoorumin toiminta.

0. Executive summary

The BestServ feasibility study was carried out **by eight Finnish machinery and equipment manufacturing companies**, Technology Industries of Finland, G. Andersson Management Consulting and the Technical Research Centre of Finland (VTT) between December 2002 and September 2003. The BestServ project was aimed at manufacturing companies. The **objectives** of BestServ were as follows: to clarify current Industrial Service business practices, to create concrete starting points for industrial-driven development projects and to determine guidelines for collaborative and academic research projects.

The BestServ **project was based on** literature review, deep analysis of the eight participating companies, interviews in fifteen other enterprises, common workshop and project management group working with specific Industrial Service business topics. The nature of BestServ was to review the current situation of Industrial Services and initiate discussion among industrial companies and research and development organizations.

The **main results** of the BestServ project can be categorized into four main groups. **Firstly**, the main industrial key issues, short-term development areas and good practices were identified. **Secondly**, the main long-term research and development areas were defined for further discussion and development. **Thirdly**, the preliminary business and technology framework as well as the organizational business transition process were defined for managing Industrial Service development in an enterprise context. **Finally**, a proposal for a national framework was formulated for managing collaborative short- and long-term research and development projects between industry, research and development organizations, industrial associations and financing organizations.

One conclusion of the BestServ project was the recognition of the importance of long-term development of Industrial Services in many arenas, both industrial and academic.

The development and implementation of new Industrial Services is taking place in all the companies interviewed. Many companies find that they still lack really successful business models and the right “Industrial Service mindset” throughout their organization. One reason for this may be customer-oriented Industrial Service development management and a lack of successful Industrial Service business frameworks.

The solutions of this industrial sector are also service business enablers for many other industries like pulp and paper, construction, automotive etc. That is why critical mass as well as national research and development activities are needed to ensure the competitive development of Industrial Services in Finnish companies. The ICT Cluster has also a highly significant role in providing support with enabling technologies and ICT Infrastructure. The proposed **road map for Industrial Service development** can be summarized as followed:

- Creating a common knowledge-sharing forum for activating and managing Industrial Service business development (Industrial Service Business Forum, ISFB)
- Defining the industrial-driven development projects that create the necessary industrial frameworks and models for service business research
- Activating the R&D resources for creating challenging and collaborative long-term research projects in the area of Industrial Services and innovation
- Ensuring continued knowledge-sharing between service business interest groups and the activation of Industrial Service business R&D projects

1. Introduction

1.1. Changing business environment

Paradigm shift

The engineering industry is currently undergoing a transition from being the product provider to being the provider of customer value and product-related value-added services (Clarke, T., Clegg, S. 1998). Enterprises have proclaimed and tried to undergo this transition but have failed in reality in several respects. Some of the product-related services are partly implemented with technological solutions, but most of the Industrial Services are only pilot schemes.

There is a paradigm shift from "ownership" to "access" and the potential sustainable growth of the business lies with services created and captured (Hyötyläinen et al. 2002; Jansson et al. 2003). Business related to Industrial Services tends to grow out of a commodity trap. This paradigm shift can be named as the "Framework of value transition". This framework covers the complete transition of the industry from "parts supplier" to "value provider" (see Figure 1). In other words, all the elements that a company or group of companies need to become an integrated product-service provider (Tushman & Anderson 1997; Bainbridge 1996; Hyötyläinen et al. 2002).

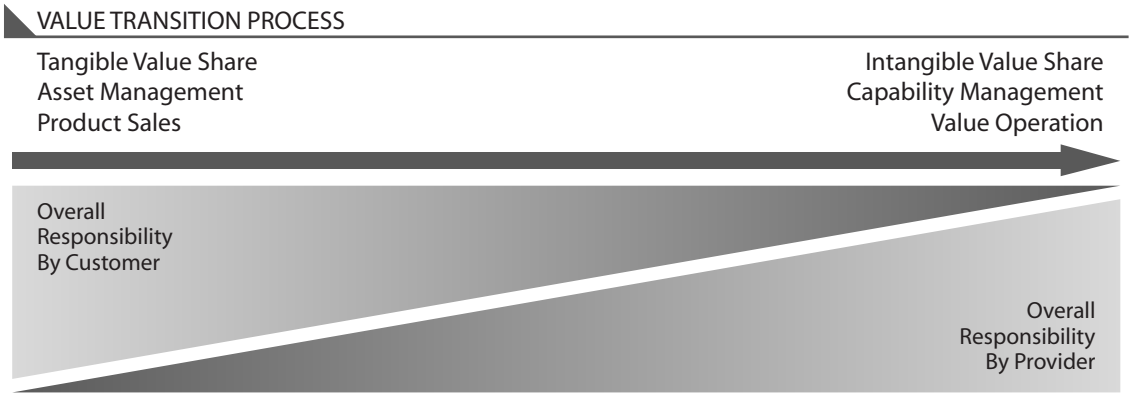

Figure 1. The framework of value transition.

The engineering industry is experiencing a dramatic transition in which products are changing into solutions. This means that customers have no capability to use these solutions without solution-provider services. Figure 2 depicts an estimate of mechanical industry breakthrough development. The estimate is based on the BestServ feasibility study and other reviews of different product and service concepts. This analysis has concentrated only on the concept level not on the business level.

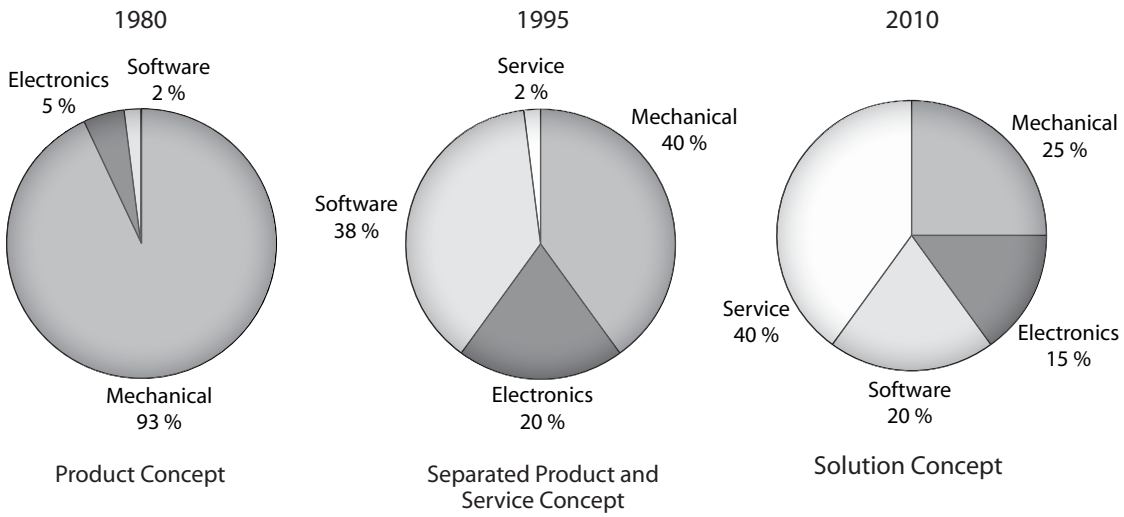

Figure 2. Breakthrough development vision of the mechanical industry.

Business structural change

There is a great need for most of the businesses to develop their product and service management in an open system architecture. The sustainable growth of the businesses relies on Industrial Services that corporations are offering to their customers. Business concepts are changing towards a knowledge-intensive and value-critical approach over the product life cycle. Products are increasingly embedding intelligence, and product and service modules are evolving in a dynamic relationship through a growing value network of partners. This means that the management and role of service and product architecture are becoming very important when managing increasing complexity. The enterprises of today are looking for methodologies and tools that will help capture aspects of a business and analyze these to identify and compare options for meeting the requirements of the business (Hyötyläinen et al. 2002). This enables the sustainable growth and development of the customer value offered. Complexity is increasing due to new generations of products, which are embedding intelligence with multiple functions in diverse operating conditions. The implementation of technologies is becoming multidisciplinary and the use of a knowledge base has rapidly increased. Systems interaction has become complex (Hemilä, J., 2002). Subsystems share and exchange information, communicate, restructure methods and track new tools. Service and product architecture and integrated modular concepts have become increasingly important to manage whole the business (Salminen V., Pillai B, 2001).

Organizational change

The paradigm shift from “ownership” to “access” also applies to the organizational business transition process that covers several business processes. New dimensions of organizational concepts and business models are forming at the moment as a result of this business transition process. Concepts and perspectives on learning and innovation have emerged in connection with discussion about enterprise networks (Hyötyläinen, 2000). The result is that product and service development is considered as a new arena for the co-operation of enterprise networks. New organizational forms of networks and information technology platforms are required to realize the potential of the new opportunities (Musgrave, J., Anniss, M. 1996; Hemilä, J., 2002).

As a result of this development, companies are moving closer to their customers, which entails the need for new product concepts and service models. A product requires services, and those services add value to the product (Tomlinson, 1997; Jansson et al. 2003; Hyötyläinen et al. 2002). Industrial services can be seen as the optimization of customer assets. Service business can be related, for example, to technological co-operation, process improvements, remote diagnostics and financial arrangements. Technology breakthroughs are speeding up the development of product concepts in some areas.

Corporations that are able to manage these challenges effectively will be the ones to succeed in dynamic market places where internal and external service providers will execute the implementation activities. Corporate management will respond to value recognition and networking (Hyötyläinen, 2000). Clusters of networked organizations are already collaborating around a specific technology and making use of a common architecture to deliver independent elements of value, which grows with the number of participating organizations (Salminen,V., Pillai, B., 2002).

Focus on solution development

This report is based on the BestServ feasibility study of service business in manufacturing industry. The main industrial findings of this study are presented in this report, as are the main research and development needs in the area as well as a research agenda for both industrial enterprises and research organizations and universities. Figure 3 outlines the integrated approach of the BestServ project, and the common level basic elements identifiable in service business. The core is a company's own structure, consisting of product and service configurations, business processes connected with operations, as well as the organizational competence and life-cycle management to handle them. All these activities are supported by solution and technology platforms. Whole the value network with customer- and network partners (suppliers, etc.) create the efficient business.

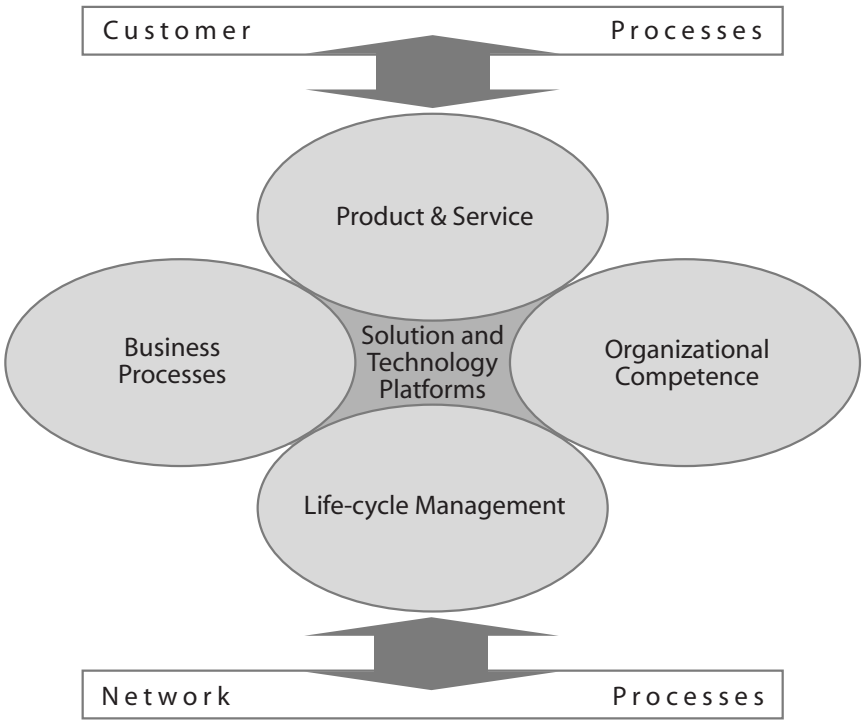

Figure 3. Integrated product and service management

1.2. Report structure

This report is structured as following:

– Chapter 2 briefly presents the BestServ project, its objectives and scope, as well as the analysis and research process.

– Chapter 3 presents the service business framework and scope used in this feasibility study.

– The main results of the analysis are presented in Chapter 4. The results are mainly presented from an industrial point of view, but a brief analysis of research competencies is also carried out.

– A short benchmarking study of research and development activities in the area of service business research is presented in Chapter 5. This short review covers Finnish and EU research.

– Chapter 6 presents the main generic research and development questions raised by the study. This chapter also outlines the preliminary project clusters for further preparation in activating industrial development activities.

– A preliminary framework and processes for parallel business and technology development are presented in Chapter 7 in terms of managing enterprise development in service business.

– Chapter 8 summarizes the proposal for managing Finnish service business research and development activities, and proposes some development instruments.

– Final conclusions and remarks are presented in Chapter 9.

– References are listed in Chapter 10.

2. BestServ feasibility study

2.1 Objectives

The Technology Industries of Finland decided to conduct a survey of service business in manufacturing industry. The feasibility study started with the following observations in respect of the provision of competitive service:

- It is an essential success factor in business
- It must be developed and managed as effectively as a physical product
- The development process is unclear or does not exist at all
- It is closely tied to daily business
- Information and communication technology is opening new opportunities and challenges

The purpose and objectives of the BestServ project were:

- To clarify the current practices and conduct of service business in manufacturing industries
- To determine the prerequisites for the start-up of potential or concrete best-practice development projects by companies or groups of companies
- To formulate guidelines to direct research projects and combine them in a collaborative way with company group projects

2.2. Research process and methodology

The project was a feasibility study, which included mapping of:

- companies' interest in the topic area and its sub-topics
- the current situation of interviewed companies and their recognized R&D needs
- the current international situation of service business in the field of industry and research
- the most important business models as a starting point for further development work

The realization model is described in Figure 4. Realization started by analyzing the current customs of selected companies. All companies in the co-ordination group were interviewed. Several key individuals from the companies participated in the group meetings and the results were formulated in companies' own workshops. Thematic workshops then expanded on the generic results.

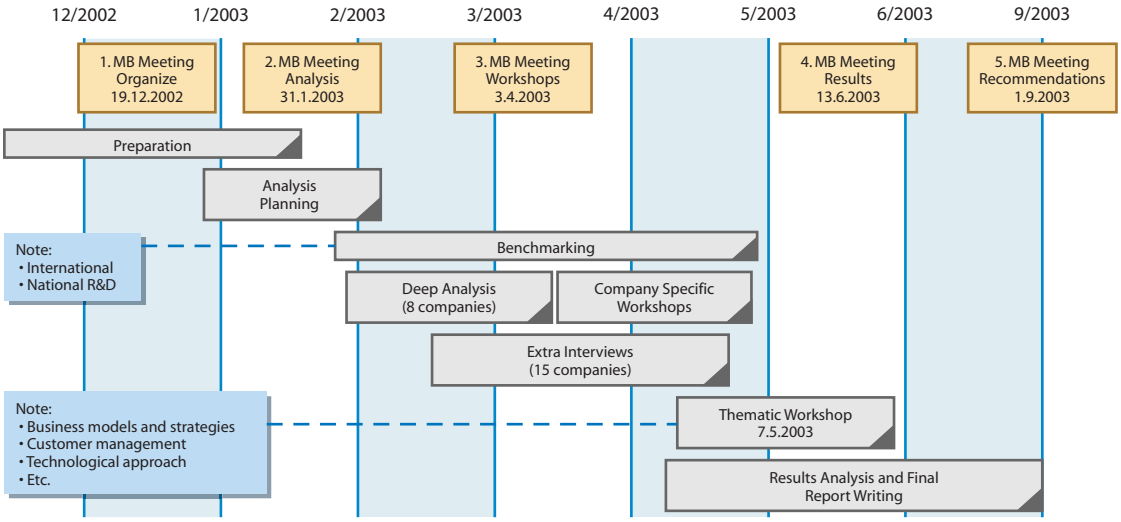

Figure 4. BestServ realization model, schedule and main tasks.

The main research methodology was based on interviewing, holding thematic workshops and analyzing the results. This approach was a process of individual activities but it also incorporated joint analysis at the end of the project.

The BestServ Management Group has a significant role in contributing to the different phases of the study and in guiding the research. Management group meetings were planned to inspire open discussion and the sharing of ideas between the participating companies. The management group reviewed the analysis, the workshop and the final report.

Altogether 23 interviews were conducted: eight detailed interviews with the BestServ participants (Table 1) and 15 shorter ones with other companies (Table 2), all leaders in their respective industries. The latter group also included four Swedish companies, selected for benchmarking purposes.

2.3. Resources and participating companies

BestServ was co-ordinated by Technology Industries of Finland and it was executed by experts from G. Andersson Consulting Corp., the Technical Research Centre of Finland and Technology Industries of Finland.

The eight active industrial BestServ project participants, represented a wide spectrum of industrial companies in different lines of business.

Table 1. BestServ participating companies.

COMPANY	BUSINESS
ABB Service	Industrial Services
Tamglass	Machinery for safety glass processing
Metso	Paper Machines
Valmet Automotive	Automotive Industry
M-real	Paper Production
Patria Vammas	Aerospace and Defense Group
Vaisala	Measurement Systems
Wärtsilä Power	Power Supplier

Table 2. BestServ additional interviewed companies.

COMPANY	BUSINESS
ABLOY Oy	Locks and door hardware
Datex-Ohmeda	Anesthesia systems, equipment and services
KCI	Overhead lifting solutions and maintenance services
KONE	Elevators and escalators
Lassila & Tikanoja	Environental and facilty maintenance services
Metos	Food production systems for professional kitchens
Metso Minerals	Rock and minerals processing equipment
Outokumpu Technology	Technologies and solutions for minerals production
Sandvik Tamrock	Mining, construction and rock processing equipment
Timberjack	Forestry machinery
Valtra	Farming tractors
YIT Installaatiot	Industrial maintenance services
Sandvik Coromant	Cutting tools for the metalworking industry
Securitas Direct	Security solutions for homes and small offices
SKF	Roller bearing solutions and services

Companies quite different in many respects were selected in order to represent a broad range of different IS needs and offerings.

- **Machinery – pure service**: 18 companies were suppliers of machinery or equipment, three companies were pure IS suppliers, two were a mix
- **Large – small**: the spread in revenues was very broad, from under EUR 10 million to over EUR 6 billion
- **Standardized – tailored services**: 12 companies' IS offerings were based on standardized concepts, three companies offered completely tailored IS solutions and eight offered both, depending on the customers' needs
- **Corporation – division**: 17 interviewees represented a division of a larger corporation, six represented corporate management

In addition to the interviews, information was collected through an e-mail survey on the importance of Industrial Service issues. 40% of the participating companies responded to the survey.

2.4. Research framework

The industrial analysis of the BestServ project was carried out by means of interviews and group discussion. The analysis framework was mainly business management-oriented together with some technology issues. One of the main topics of the analysis covered the needs and potential of collaborative research and development activities at different levels of influence (national, networks and supply chains, companies). The preliminary topics of the analysis framework were (the complete interview template is presented in Appendix A):

- Background facts about the company / division
- The role of service business relative to hardware business
- Development of new services and service business
- "Packaging" local service contracts for global markets
- Adapting global service products to individual customers
- Management of service organizations
- Support systems and resources
- R&D challenges and the need for service business

3. Service business overview and scope

3.1. Service business overview

Service business today is a fast-growing business area. Service business means different things to different companies. During the feasibility study the following different types of companies with activities service business were recognized:

– Companies with own products
– Service companies
– Contract manufacturing companies
– "Knowledge Brokers" (not many exist at the moment)

The type of company is not always clear, because large companies can have activities in many sectors and, for example, contract manufacturers have not always been considered to be service companies. Service business can be managed differently, because there can be different ways of doing business with other companies. In the feasibility study we discussed different levels of service business, when such levels are dependent on relationships between companies. Service business can be managed on different levels:

– Lines of business and clusters
– Enterprise networks and supply chains
– Single enterprises and bilateral relationships

In addition, various types of the services were found:

– Basic services
– Advanced services
– Knowledge services

During the BestServ feasibility study, the current state of Industrial Services was examined. Usually the services are traditional and they are closely related to the products delivered. The industrial companies often aspire to knowledge-intensive services, which usually require deep understanding of customer processes. These knowledge-intensive services, however, are only partly implemented.

Figure 5 presents one idea for clarifying Industrial Services and its areas of scope (adapted from Tamglass). The figure shows different areas of scope on which an industrial company could focus, and which could be the main service business areas. This is a common model, so it is dependent on core business plus modules that are relevant for the business in question.

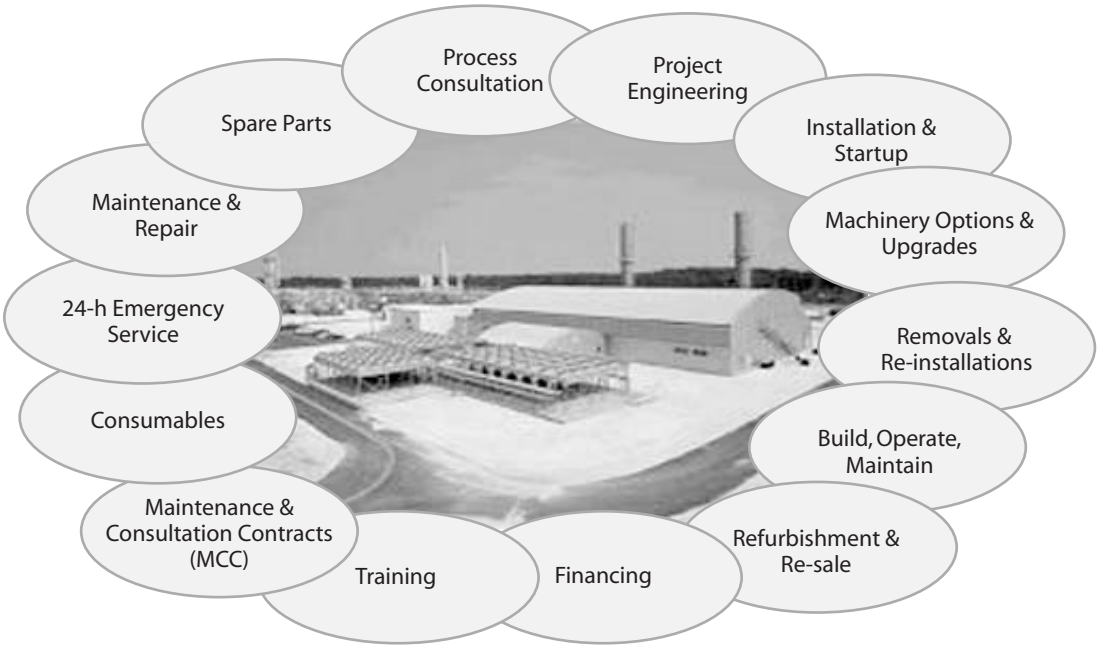

Figure 5. Scope of the Industrial Services (adapted from Tamglass and Wärtsilä).

The current areas of scope of Industrial Services are presented in Figure 5, but these are not always relevant or are not even sufficient. Industrial services are commonly thought to be just after-sales services, not dealing with the whole life cycle of products. The most effective way of doing service business requires life-cycle thinking.

3.2. BestServ reference frameworks

3.2.1. Service business models

Through their IS offerings and operations, manufacturing companies position themselves differently in terms of customer intimacy. For practical reasons we have defined five different supplier positions or "roles" relative to the customer:

- Machine supplier. The focus of the business relation is on delivering a piece of machinery or equipment that fits the customer's technical specification.

- System supplier. The focus of business is on delivery of a system, e.g. a production line, which usually is designed for the specific customer's process and comprises a wider scope of supply than just one piece of equipment.

Both of these roles focus the supplier's activities on the customer's investment decision, with limited involvement in the remaining life cycle of the delivered unit.

- Maintenance partner. The focus of business expands to also include continued supplier involvement during the continuing life cycle of the delivery. This role adds contractual after-market elements such as spares and consumables agreements to the supplier-customer relationship.

- Performance partner. In this role the supplier is closely involved in operating the customer's technical process by taking part responsibility for the performance of the system, e.g. through availability warranties. This role requires the supplier to maintain at least a minimum of continuous on-site presence. The focus of the customer relationship is on securing the effective operation of the unit or production line.

- Value partner. The supplier is directly involved in the customer's business, e.g. through operate and maintain agreements, where the customer pays a pre-determined price for the actual output of the system. Both parties focus on profitable daily operations, and the supplier is responsible for the day-to-day operation of the plant or line.

Each one of these roles has its own business model and "mindset". When a supplier decides to take the step from one role to the next "higher" it faces tough challenges to both its technical and its business competencies. The supplier - customer-positioning decision is therefore a strategic one and must be prepared as thoroughly as any other strategic decision.

Each supplier role also requires its own typical IS offering. Table 3 shows examples of offerings related to these different roles. The supplier's competencies required for successful execution of the roles are shown in Figure 6.

Table 3. Examples of IS offerings in different Industrial Service supplier roles.

Capital Business		Industrial Services		
Machine Supplier	**System Supplier**	**Maintenance Partner**	**Performance Partner**	**Value Partner**
Installation & Startup	Project Engineering	Maintenance contracts	Performance contracts	Operate & main
Training	Turnkey delivery	Maintenance outsourcing	Performance planning	
Warranty repair	Rebuilds & Modenization	Spares & consumables contracts		
Spares recommend.	Helpdesk, Consultation			

In addition to "generic" engineering and manufacturing competencies a "machinery supplier" must have good understanding of the customer's purchasing process. A "system supplier" must add to this the ability to understand and interpret the customer's actual operations in its offering. The next step, "Maintenance partner" adds a new competency, professional maintenance management and work. As a "performance partner" the supplier often takes part responsibility for the actual daily performance of the system, this adds the customer's process to the list of competencies. Finally, as a "value partner" the supplier is involved in the customer's value generation, e.g. to provide electricity at a given quality and price. This then adds the customer's business to the list of competencies. In all of these roles "competency" implies a level of knowledge and experience that puts the supplier on the same level as the customer and opens the way for productive communication between peers.

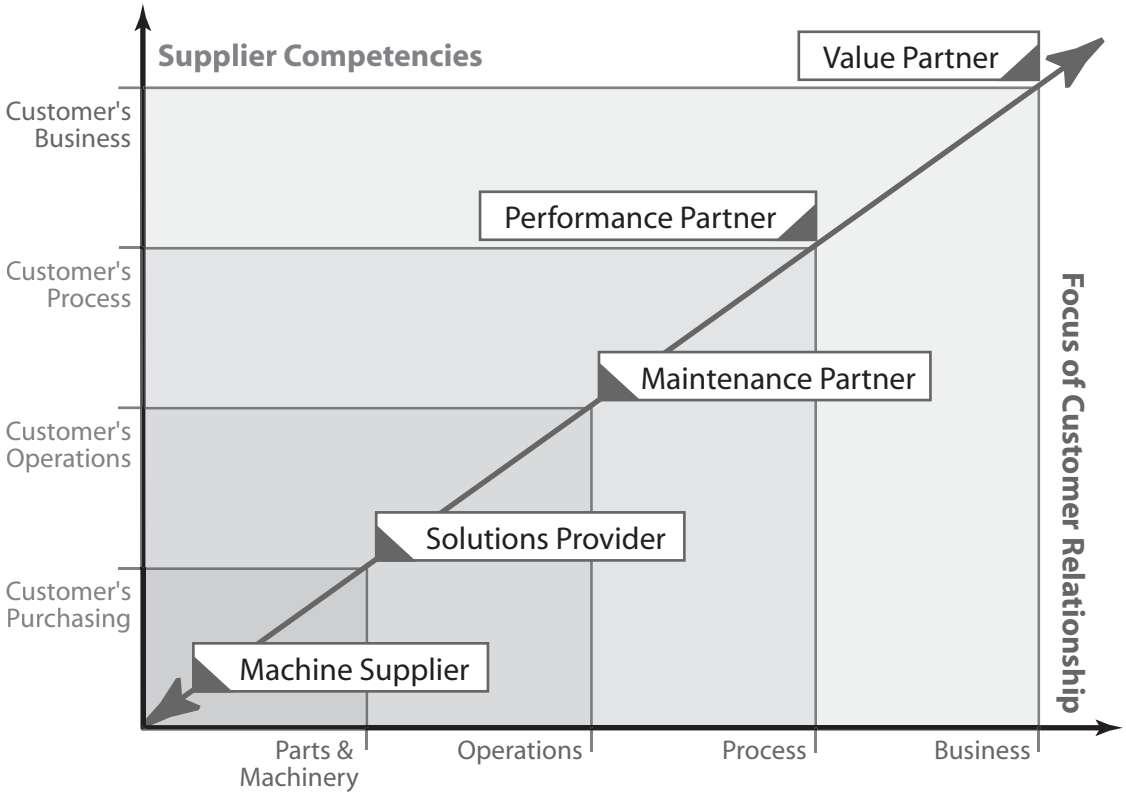

Figure 6. Supplier competencies and roles.

4. Main analysis results

4.1. Main industry drivers

Two main developments were mentioned in the interviews as driving suppliers from "machine supplier" towards "value partner":

- **Industrial customers face tougher competition** and respond by installing more efficient production processes. These are based on new and more advanced technologies than before; as customers focus on their own (increasingly downstream) core business this puts pressure on suppliers to take a bigger responsibility for and to get more deeply involved in the customer's processes. This is the main point in customer-driven growth of IS business.

- **Active open financial markets put pressure on public companies** to reduce the cyclical variations in their financial performance. The solution for machinery manufacturers is to substantially increase the share of the less cyclical or sometimes even anti-cyclical after-market in their total business. This is the main point in corporate-driven growth of IS business.

4.2. Issues of common interest in developing Industrial Services

In spite of the many differences between the companies interviewed, we found several development areas with areas of immediate common interest for most companies:

– Achieving profitable growth in IS business
– Offering an optimal value proposition
– Optimal positioning for customer intimacy
– Managing the transitions in various steps in IS role evolution
– Building synergies between machinery and service business
– Developing people and organization
– Managing the IS distribution chain
– Developing the IS offering
– Customer focus in operations
– Technologies to support IS business

4.2.1. How to achieve profitable growth in Industrial Services?

The logic of focusing on IS growth is compelling, but many of the companies interviewed have difficulties in achieving profitable growth in their IS business outside spare or consumable parts deliveries.
In the capital business customers often expect, free of charge, "embedded services" that come with the actual equipment or system delivery. In many industries this has become the established way of doing business and even leading suppliers are unable to "break the mould".

Machine or system suppliers that have succeeded in getting paid for "embedded services" have achieved this **by differentiating their capital offering depending on the content of IS included**. Examples are extended warranties or 24 h helpdesk availability. E-business solutions can help in "packaging" the IS as a tangible delivery that the customer pays for. Even without e-business, **"packaging" the IS offering,** i.e. with proper documentation such as checklists and service call reports, makes it appear more like a product that has a value and therefore also a price.

In the after-market business there is a natural understanding also on the customer's side that IS has both a value and a price. The suppliers' challenge is to develop and implement a successful business model.

- The starting point for any service business model is **to understand and measure the value of a service to a specific customer.** The consequence is the requirement that the supplier's organization must have a good understanding of the customer's operations and business. Companies that have succeeded in their after-market business often **recruit people from their customers' industries**, getting access to not only the industry knowledge but also to the industry network of their new employees.

Successful companies also work out, report and follow up concrete metrics of customer value and **measure customer satisfaction frequently and regularly**.

- A second important point is to **deliver IS in a cost-efficient way**. The first thing is to design and implement a cost-effective IS delivery system. Successful companies all have one key point in common: **comprehensive and continuous measuring and reporting**. Indicators include individual customer reports and surveys as well as "hard" financial numbers and operational reports. **Several companies made the point that measuring and reporting is the key to successful IS business!** The consequence of this point is that the IS offering of most companies must – at least to a substantial extent – be built around **standardized concepts adapted and applied locally**. This in turn requires effective documentation and training throughout the whole IS organization. "People and organization" are discussed further in Chapter 4.2.6.

Successful companies also have another aspect in common: **consistent and disciplined internal and external benchmarking**. Every company has decided its own set of metrics, but they all maintain the organization's focus on these metrics through regular benchmarking and review procedures.

- A third aspect in common for successful IS companies is **efficient logistics and communication** both within the company and with customers. The point has been made that whoever has the strongest logistics and communications system also has the competitive upper hand in the value chain. Excellence in logistics is in itself not enough for profitable growth in Industrial Services, but it is a "stage gate" into more advanced services.

Most successful IS (Industrial Service) companies are already heavy users of e-business over the Internet for this purpose, either through proprietary systems or in combination with shared portals such as www.endorsia.com, operated by i.e. SKF and Sandvik. Many also make use of GSM/GPRS-based mobile terminals for their field service organizations.

4.2.1. Understanding service value from the customer's point of view

Offering an optimal customer value proposition was rated a highly important IS issue by most participating companies. One of the challenges is to really understand the value of a service from the customer's point of view. "A customer doesn't buy spare parts or service engineers' man-hours, he buys high availability".

The success of any IS agreement depends on how well **the customer's real need** is reflected in it. When maintenance outsourcing agreements first became commonplace, invoicing was often based on actual working hours on the customer's site. Increasingly often these agreements are now based on performance in one way or another. One example is a maintenance outsourcing agreement where invoicing is based on the on-site availability and response time of specific maintenance resources. Another example is one where part of the invoicing depends on whether actual availability is better or worse than a pre-agreed standard.

Added business value can also be delivered outside the actual core service. Instead of invoicing the customer for every IS transaction separately, combining the activity invoices into one monthly invoice with detailed specifications reduces the volume of administrative work and costs for both parties.

One company makes communication with a major long time customer as easy as possible by locating the account manager on the customer's site, inside the customer's organization. If this kind of a solution is not feasible then integrated IT-solutions can lower the communication barriers and therefore strengthen the customer relationship. The "resident account manager" solution can work two ways, however: the supplier's account manager may begin to identify himself more with the customer's than with his employer's interest.

Any customer's value perception is a combination of rational and irrational factors. Changes in the customer's business situation or within the organization can result in shifts in value. Therefore **successful companies make a point of staying very close to their customers**, one example of this are regular assessment meetings based on a short checklist of the basics in the service agreement.

4.2.2. The level of customer intimacy

Growth in IS poses the question of optimal customer intimacy, how close the supplier is to the customer's business. This question contains both a positioning and a tailoring issue.

The positioning issue is a strategic one. Getting one step closer to one's customer requires new competencies and also new ways of operating. It is very important to make sure that the supplier's positioning strategy is supported by adequate competencies and processes, otherwise an overly "aggressive" positioning will backfire. One way to manage this risk is to use internal pilot units and learn from them how to operate in a new role. The other obvious one is to acquire successful companies that already have established their position "in the next step" and transfer their experiences and competencies to other units.

The tailoring issue is operational. "Pure" Industrial Service contractors in particular mentioned risks in account managers getting too close to their customers, so that it becomes difficult to manage the service portfolio in an efficient "industrial" way. Companies address this problem with good IS concept templates and manuals, sufficient training and accurate measuring and reporting.

4.2.3. Managing the transitions in IS evolution steps

Many companies refer to "developing a new mindset" in the organization as the main challenge in establishing new IS roles. This challenge is particularly obvious when a manufacturer's **business focus changes from capital business to service business.**

The notion of "developing a new mindset" is in itself controversial: it suggests replacing the old mindset with a new one, e.g. changing from "product driven" to "customer driven". **The risk in this notion** is that it leads to underestimating the importance of the company's continued high performance as a machine supplier, which is usually still the basis of market presence and profitability.

All companies tackle the challenge in their own way:

- One successful company has established **a corporate-level Service Business Area,** which operates independently, on an arm's length basis, from the machinery business. The Service BA expands its market base by acquiring service contractors which already have a "service

mindset" and can be good benchmarks. The arm's-length relationship between the machinery and service BAs reduces the risk of one mindset dominating the other.
- Another company has built the base of the new mindset through **a thorough and open in-house planning process,** which defined and communicated the new business model, its objectives and the new responsibilities within the organization.

A tentative outcome of the interviews is that the new "role" should preferably be assigned to a separate business unit which has enough room, resources and management support to develop its own processes, competencies and mindset. In this context **proper measuring, reporting and follow-up are critical.**

After the "big leap" to establish a service business mindset the next transition steps, e.g. from "maintenance partner" to "performance partner" can be managed with piloting and roll-outs. One point that was mentioned in the interviews was properly managing the risks in a new IS business role. Good practices:

- Acquire necessary competencies beforehand
- Measure, report and assess the first new service agreements very thoroughly

Transitions are seldom problem-free, and learning problems in the new business roles often raise criticism from established business units. **Top management's visible commitment to the new businesses, close attention to their progress and open communication between old an d new business units** can reduce these problems and help the new units through their first often challenging times.

4.2.4. Achieving real synergies between machinery and Industrial Service businesses

One of the expected advantages of a life-cycle customer relationship built on successful IS is that it builds synergies between the machinery and the service business, so that:
– Machinery is designed as a platform for profitable IS business
and
– Services will position the "hardware" better than the competition

However, due to differences in business objectives and mindsets, for example, this does not happen automatically. This is probably why **most of the participating companies consider synergies between "hardware" and "service" offering development an issue of high priority.**

IS operations have the potential of drastically increasing the information available to the machinery supplier unit on how its equipment is performing in different situations, and hence how it should be designed for optimum performance during its life cycle. Capitalizing on this potential requires proper on- and off-board monitoring and reporting tools, supported by "intelligence" in the products.

One company has established regional "Maintenance R&D" units dedicated to the company's maintenance and modernization business. They works in parallel with and complements the "Machinery R&D" units.

Machinery offering development is naturally focused on the requirements of the machinery business unit. Achieving synergies between hardware and IS development therefore requires **well documented formal R&D processes** that specify how input and requirements presented by "the other side" are included in offering development.

A further way of building hardware and IS synergies is job rotation of people in different units. **One company referred to its skills profile database as a basis for identifying candidates for new positions**.

At least one company has taken a drastic step towards improved hardware-service synergies by **transferring sales of low price standard items from capital to service sales**, thereby allowing the capital business unit to focus on major sales opportunities.

Another tentative conclusion of the interviews is that "life cycle-based R&D" is an important topic for further research.

4.2.5. People and competencies

People, their attitudes and their competencies are also very often mentioned as the most important challenges outside the issue of "transitions" described in 4.2.4. Southwest Airlines, often quoted as a benchmark in service development, has made the point that *"you hire the attitude and you train the skills"*.

As already pointed out in 3.2.1 a manufacturer can move the focus of its customer relationship to the next phase only after acquiring the proper competencies, i.e. the level of knowledge and experience that puts it on the same level as the customer and opens the way for a value-adding partnership.

Every company addresses this challenge in its own way. Good practices mentioned in the interviews:

- **Specify also "soft" job requirements** (personality) for recruitment and promotions, not only skills and previous experience
- **Measure also customer satisfaction frequently and in detail**, not only the hard numbers. Many companies include customer feedback in performance reviews and use it as a component in remuneration schemes
- **Customer interaction training** is also given to people who don't work on the front line, this helps create a common language and business understanding throughout the organization
- **Provide proper tools**, such as technical support systems, customer call forms, etc. for people in direct customer interaction and also regular training in using them
- **Invest in and communicate a positive, distinct corporate image**. It helps overcome recruitment problems, as many jobs within the IS area are considered unattractive from the outside

These challenges are common to all companies which want to establish themselves as life-cycle partners for their customers. **There is an obvious need for much more education in Industrial Service skills** on all levels, from maintenance technicians to senior service management positions. Good experiences from networking between machinery manufacturers in the Pirkanmaa region suggest that **Tampere could be considered as a future centre of IS training and education**.

4.2.6. Managing the IS distribution network

As one of companies' key reasons for strengthening their position in IS business is the opportunity to develop life-cycle customer relationships, the default solution for IS "distribution" to end customers is over a corporate-owned frontline. Many Finnish companies are, however, niche players with a relatively modest volume spread over a great number of markets; their alternative is to consider IS partners or dealers. Even major corporations sometimes use a combination of a national sales and customer support company with local dealers.

Regardless of which model is used, **building and communicating a strong corporate identity** is an important way of differentiating oneself from "the local blacksmith" or "the local maintenance contractor"

Needless to say, proactive co-operation with all players in the distribution chain, applying practical metrics and objectives for win-win relations in business, is even more challenging when the distribution chain is not company owned. **An efficient logistics system is the backbone of co-operation**, and the supplier is in the key position for building a world-class system.

4.2.7. Industrial Services offering development

Developing and managing the IS offering is often different from that of "hardware offering". Very roughly, companies or their business units fall into one of two categories:
- Focus of growth is on selling the current product line to more customers: A very large number of customers and a relatively low product unit price. Hence a standardized IS offering
- Focus on growth is on doing more business with the existing customer base: A relatively limited number of customers, high "product" unit price, customized IS offering

Companies with **standardized IS offerings** can apply hardware-like R&D processes, based on stage gates or similar approaches. The IS offering is often included in the project specification of new hardware.

Companies with **customized IS offerings** favor working with a few common IS concepts while expecting the frontline to develop local adaptations. Internal growth is encouraged through different ways of internal benchmarking.

Some service-intensive companies mentioned a combination whereby new concepts are managed as major development projects with corporate involvement, while adaptations of existing concepts are encouraged and spread through internal benchmarking.

In all cases piloting is common practice, new services will be tested and fine-tuned in pilot units before roll-out. Co-operation with progressive lead customers reduces the risk for major mistakes and can speed up time to market.

4.2.8. Customer-focused mindset

Customer focus and "presence" in operations appears to be a distinguishing factor between companies with a high or a low proportion of IS business. This observation matches the issues of "understanding your customers' businesses" and "communicating with your customers".

Companies with successful IS business give customers high visibility throughout the organization e.g. with customer presentations as part of plant visits. Some companies organize for wide customer exposure with dual responsibilities of key managers, one for operational objectives and one for specific customers. Other points mentioned were securing and using direct customer feedback as a key performance indicator.

4.2.9. Technologies for Industrial Services

Technologies to support IS business were not mentioned among the most urgent issues. This does, however, not mean that technologies are unimportant, only that **management feels confident about the technologies currently available** or known to them.

Delivery of customer value, such as machinery availability, is increasingly often enhanced with built-in "smart" components or monitoring systems. These are either connected to on-site control rooms or in some cases also to off-site technical support centres.

Other already commonly used value enhancing solutions are built on offering customers direct Internet access to the supplier's systems, either directly or through multiple-supplier portals.

Cost-effective services can make use of, for example, wireless M2M communications over GSM or GPRS networks, mobile terminals for field engineers, remote service support centres and smart, built-in terminals for remote online monitoring.

One successful IS company mentioned the lack of standardized interfaces between different suppliers' equipment and systems as a major obstacle to more intensive use of ICT in IS operations.

4.2.10. In summary - good practices

Some key conclusions from the interviews are summarized below:

- **Customer needs & relationship**
  - Stay close to and communicate with your customers regularly, on many levels
  - Measure, report and follow up both customer profitability and customer satisfaction
  - Give key customers high visibility in your own organization
  - Recruit people with a practical understanding of the customers' needs

- **People and mindset**
  - "You hire the attitude and you train the skills"
  - Measure, report and follow up individual performance systematically -both from company's and customer's point of view
  - Use benchmarking to highlight best performances and practices
  - Train your people and provide easy to use tools to secure quality and consistency of service

- **Profitability**
  - Organize for arm's length co-operation between capital and IS business units
  - Apply clear and simple metrics and objectives for both
  - Protect your profit base in capital business
  - Highly efficient logistics is key for IS profitability, "there is big money in parts and consumables!"
  - Apply systematic benchmarking to keep focus on key issues and to highlight Capital - IS synergies

- **Innovation**
  - Develop new concepts centrally, implement and improve locally
  - Use pilot units for testing new concepts; budget and follow-up results
  - Spread innovations through benchmarking

4.3. The current state of Industrial Services research

Knowledge-intensive services are capable of stimulating various kinds of competitive advantage and productivity growth (e.g. Grönroos 2000; Rubalcaba-Bermejo, 1999). Despite their significant role in the developed economies, services have attracted relatively limited attention in innovation and technology research. In the evolving knowledge economy, the role of services is so prominent that their full acknowledgement is long overdue (Mintzberg et al. 1998).

Despite the voluminous work being done by both academics and consultants in the various fields, no concepts are available to guide manufacturing companies focusing on capital goods to change to proactive solution providers with dynamic, innovative industrial product-service business models. While the literature provides a range of approaches for a **product-oriented modelling of services** (e.g., Cagan 2002; Meffert 1994) – many originating in the marketing discipline (e.g., Donabedian 1980; Edvardsson and Olson 1996) or the field of industrial quality management (e.g., Hentschel 1992; Meffert and Bruhn 1995; Bullinger et al. 1994), an analysis of these approaches shows that they are narrowly focused, addressing only limited aspects. These approaches were developed within a certain functional context (e.g. quality management), certain scientific discipline (e.g., engineering), and/or certain industry context (e.g. financial services); thus they are not comprehensive and are lacking in relevance.

Industrial Services research is an important issue for developing **customer-oriented business models** to manage global competition in the area of the engineering industry. The main challenges for industrial development can be summarized for the following areas of research and development required:

– Lack of understanding of how, at a strategic level, capabilities and knowledge should be designed and managed to develop and sustain customized Industrial Service business models.

– Lack of understanding of how, at a strategic level, innovation and change should be managed to develop and sustain innovative customized Industrial Service business models.

– Lack of understanding of how, at an operational level, product-service architectures should be designed and managed to develop customized industrial product-service configurations

– Lack of understanding of how, at an operational level, industrial product-service offerings should be designed and managed over the industrial product-service life cycle

Lack of understanding of how stakeholder relations should be designed and managed in product-service based business models. Benchmarking results and other studies

During the BestServ project, limited benchmarking was done with research programmes in Finland and in Europe. Service business includes many areas (e.g. technology, business models, networking) and that is why the key words “service” and “business” could be found in many research programmes, despite the fact that there was not always any real “service business” research. Usually research programmes are focused on a specific area, with perhaps some connection to service business. Major research areas connected to service business are information technology, enabling technologies and business model research, and these areas are well organized in Finland and the EU.

4.4. Finland

In Finnish companies there might be many service business activities which are not public, so public-level benchmarking is emphasized. Of course companies are engaged in business development, and depend on their company business area; but they are also developing service business. The activities also depend on the type of company in question. As mentioned above, there could be several different service-oriented organizations (e.g. manufacturer, maintenance companies etc.). In TEKES programmes there are service business connections, but TEKES does not yet have a fully service business-focused technology programme. Technology programmes are under a specific technology area (like construction technology), and under any one technology area there could be many technology programmes, which have specific development aims. The following table presents the **technology programmes where there are some (technological, business model development, or other) connections to service business**. Specific information about each technology programme can be found on the TEKES website (www.tekes.fi).

Table 4. TEKES technology areas and technology programmes.

Technology Area	Technology Programme Name	Duration
Construction technology	CUBE – The Building Services Technology Programme	2002-2006
	Infra – Construction and Services	2001-2005
	Rembrand – Technology Programme	1999-2003
	Sara – Value networks in construction	2003-2007
Information and communication technology	EXSITE – Langattoman tietoliikenteen järjestelmäteknologiat	2001-2003
	FENIX – Interactive Information Technology	2003-2007
	LIIKE - Research Programme on Finnish Companies and the Challenges of Globalization - Business as Competition and Co-operation	2001-2004
	NETS – Networks of the Future, Technology programme	2001-2005
	ÄLY – Intelligent Automation Systems	2001-2004
Production and materials technology	ELO - E-Business Logistics	2002-2005
	MASINA – Technology Programme for Mechanical Engineering	2002-2007
	UTT – Business concepts for industries	2000-2004
	ProACT - The Research Programme for Advanced Technology Policy	2001-2005
Bio and Chemical Industry	Process Integration - Enhancing the Value Chain Management by the Process Integration Technology Programme	2000-2004

In Finland different schools (universities, business schools, etc.) provide **service business education**, and also some research and development projects, but it is hard to find information about different activities. Many of those research activities are also under TEKES technology programmes. TEKES technology programmes have included many R&D projects, but the following, from the UTT programme can be considered closest to service business: COINS, Future Care, Paper IXI. These were company-driven projects and included service business elements, but not common level national development.

4.5. EU

The EU had its **5th Framework Programme** (1998-2002), but this was not a specific service business programme. The situation in the EU is the same as in Finland, and most of the research programmes include service sector activities. FP5 had a multi-theme structure, consisting of seven Specific Programmes, of which four were Thematic Programmes

1. Quality of life and management of living resources (Quality of Life)
2. User-friendly information society (IST)
3. Competitive and sustainable growth (GROWTH)
4. Energy, environment and sustainable development (EESD)

and three were Horizontal Programmes, which underpin and complement the Thematic Programmes by responding to common needs across all research areas:

1. Confirming the international role of Community research (INCO 2)
2. Promotion of innovation and encouragement of SME participation (Innovation/SMEs)
3. Improving the human research potential and the socio-economic knowledge base (Improving)

Service business was mainly included in the thematic programmes IST and GROWTH. IST was a single, integrated research programme building on the convergence of information processing, communications and media technologies. IST had an indicative budget of EUR 3,600 million and was managed by the Information Society DG of the European Commission. Competitive and Sustainable Growth (GROWTH) was one of the four thematic programmes of the FP5. One of the service business projects in FP5 was EXPIDE (Extended Products in Dynamic Enterprises). EXPIDE included the same kind of ideas on which BestServ is focused.

The EU's **6th Framework Programme** will run in the period 2002 - 2006, and it includes activities in the field of service business. The EU has divided the research field into different areas of activity, with the most important being the IST and Nanoscience areas.

Table 5. Thematic areas and strategic objectives of IST activity area:

Thematic area	Strategic objective
Applied IST research addressing major societal and economic challenges	– Towards a global dependability and security framework – Networked businesses and governments – eSafety for road and air transport – eHealth – Technology-enhanced learning and access to cultural heritage – Applications and services for the mobile user and worker – Cross-media content for leisure and entertainment – GRID-based systems for solving complex problems – Improving risk management – eInclusion – Products and services engineering 2010
Communication, computing and software technologies	– Broadband for all – Mobile and wireless systems beyond 3G – Networked audiovisual systems and home platforms – Open development platforms for software and services – Embedded systems
Components and microsystems	– Pushing the limits of CMOS and preparing for post-CMOS – Micro- and nano systems – Advanced displays – Optical, opto-electronic, and photonic functional components
Knowledge and interface technologies	– Multimodal interfaces – Semantic-based knowledge systems – Cognitive systems
IST future and emerging technologies	– Proactive initiatives

The indicative budget allocated to the Thematic Priority Information Society Technologies for the duration of FP6 is EUR 3,625 million.

Table 6. Thematic areas and strategic objectives of Nano activity area

Thematic area	Strategic objective
Nano-technologies and nano-sciences	– long-term interdisciplinary research into understanding phenomena, mastering processes and developing research tools – nanobiotechnologies – nanometre scale engineering techniques – handling and control devices – applications
Knowledge-based multi-functional materials	– development of fundamental knowledge – technologies for production, transformation and processing – engineering support for materials development
New production processes and devices	– new processes and flexible and intelligent manufacturing systems – systems research and hazard control – optimizing life-cycles

Now, within the EU's 6th Framework Programme, there is a joint call in the IST and Nanotechnologies priority and activity areas entitled **"Manufacturing, products and services engineering in 2010"**, the objective of which is:

"To strengthen further Europe's competitive position by developing collaborative technologies and methodologies for extended service and product development approaches, including associ-

ated services and distributed global manufacturing organization. Community funding should help integrate, in a global context, fragmented European and international (e.g. IMS) RTD efforts in product and process design, and to focus on new holistic product/service concepts."

Products and services 2010 is focused on:

"Technologies, engineering methodologies, novel tools, methods and work environments that facilitate collaboration, creativity, resource use efficiency through holistic approaches to products and associated services. Work will consider all product value creation stages, from conception, design, configuration, to production, delivery maintenance, and disposal, as well as work organization and the work environment."

The indicative budget allocated to the thematic priority Nanotechnologies and nanosciences, knowledge-based multifunctional materials and new production processes and devices for the duration of FP6 is EUR 1,300 million. The evaluation is still in progress during the writing of this BestServ final report, so there is no information about the projects to be funded.

5. Proposal for service business development framework and methodology

One of the **main challenges** for managing technology-intensive business development and new business creation is the **parallel management of both the business concepts** and processes **and the technological solutions** that are related to the business development (e.g. Bainbridge 1996). One of the current obstacles for Industrial Services development and implementation has been the strong technological approach that has been considered in many cases. Most of the service-related business concepts are somehow based on technological applications and they are usually developed from a technological point of view.

As has have been discussed earlier in this report, the **importance of customer value** is the crucial factor in Industrial Services. This means that the technological value is nothing unless it has meaning and value to the customer, that all Industrial Services development should be based on pure business benefits and real customer value, and that business and technological development should be parallel processes.

Road maps and development frameworks are useful tools for managing technological development over the longer term. They have been used for different purposes to manage technological development and solutions. The road maps can be formulated on different levels to assure the relevance and development of technology choices.

In this BestServ feasibility study we have identified that **road-map tools and development frameworks** are also useful for Industrial Service development. We have further developed existing road-map models to fit Industrial Service development better and we have also integrated the organizational transformation process as a part of business development together with long-term road maps. Basic models and frameworks for Industrial Service business development are presented in the following chapters. Our reference models and frameworks consist of three main models:

- **Business development framework.** This model is a set of important questions to guide business development and the creation of new value-added service concepts for existing and new customers.

- **Technology development framework.** The technology road-map model is based on the answers to the business road map. This technology road-map model is also a set of technology-related questions to guide long-term technology choices and investments.

- Management of the **organizational business transition process**. The organizational business transition process is the framework for the implementation of the business change, putting new business concepts into practice and operative use. This transition process is based on organizational change management and it can be seen as the implementation of an organizational system with business process and technology implementation.

- Management of **new Industrial Service development process**. This model is based, for example, on the gate-model of development of new products. The purpose of this model is to identify aspects and issues that are important for managing successful and customer-oriented service development.

5.1. Business development framework

The idea of the **business development framework** is to manage the business model development to promote successful service business concepts and solutions. The purpose of Figure 7 is to depict the process for promoting the right business concept at the right time in the targeted markets. Figure 7 consist of different questions, and by answering those questions companies can focus on and direct the correct development activities. The development framework is a continuous loop and the result of that loop should be new innovative business concepts for managing business.

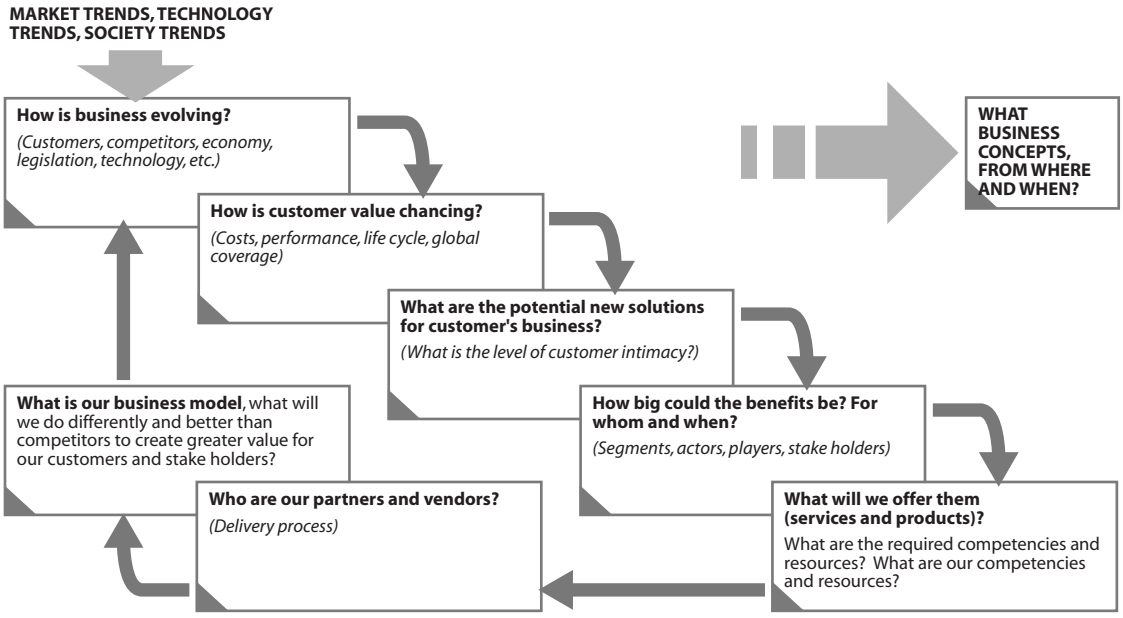

Figure 7. Business development framework.

The main question for service business strategy is the **evolution of the customer's business.** This means the changes in the customer's values that should be captured with the new service solutions. There are the different market trends (e.g. technology, market and society trends) that are changing business. Companies competing within the Industrial Service business market should track the **potential and value** of the benefits the customer may get from the services. Based on the expected values, the main concept of the service offering should be designed. This applies to the **service offering concept** as well as the offered products. The Industrial Services distribution networks should also be designed to meet the customer service level and its requirements. Based on these main Industrial Service business development components, the expected **business model and concept** can be agreed to promote the designed services and products.

5.2. Technology development framework

Based on the designed business concept and model, the technological choices for supporting the Industrial Service business should be addressed. In the past, the development of Industrial Services has mainly been technology-oriented, without successful business implementation. It had been expected that the technological solutions themselves would provide the added value to the customer. One of the main drivers for developing technological solutions for Industrial Services

should be a business-oriented road map that identifies the service business development trends and changed customer expectations and values. Figure 8 illustrates a preliminary **framework for** managing business-oriented **technology development**. The technology road map process presented in Figure 8 is also a continuous loop, but now the first effect of development is coming from the company's own business road map.

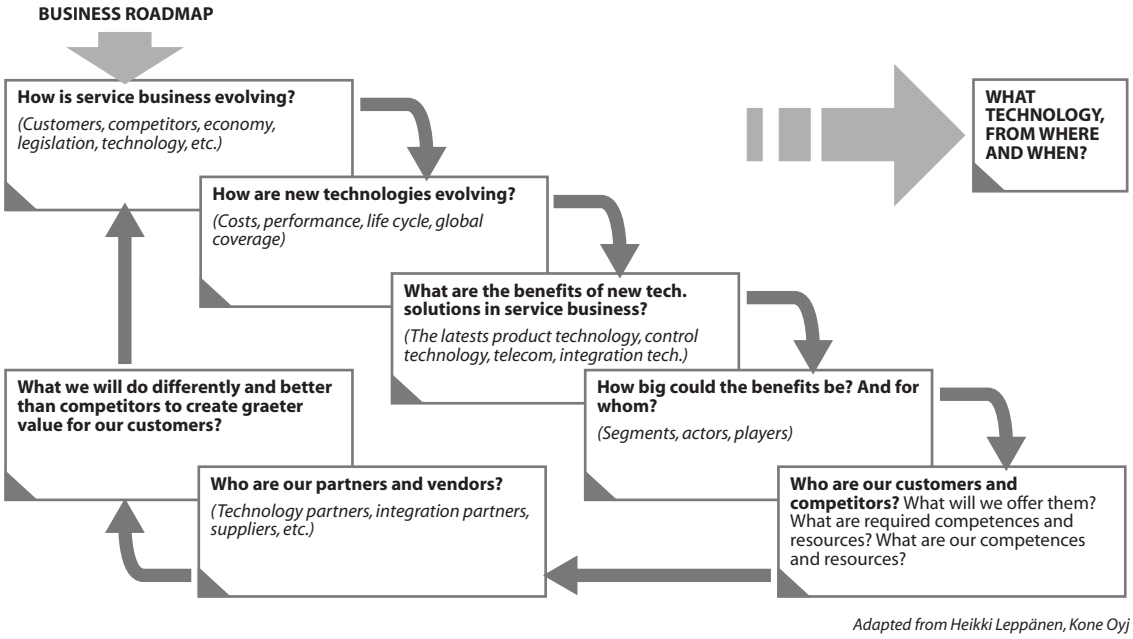

Figure 8. Technology road map process.

In developing Industrial Service business technologies, the real challenges are in creating and managing solid ICT architectures and the integration of different kinds of applications and solutions like operative systems (e.g. ERP), field devices, telecommunications and remote systems. The integration and implementation of large ICT architectures is a significant investment. That is why the customer's added values should be addressed to avoid risks.

5.3. Organizational transformation process

The development of **service business requires people**. Organizations and their **employees are in a key position** to make structural change in business possible. From the organizational standpoint, service business development needs organizational transformation. There are many different attitudes, opinions and cultural aspects that explain why business development is hard to facilitate. An organization should change to make service business effective and also to turn services into real business for a company. Figure 9 presents a framework for the organizational transition process. The framework outlines different tasks that organizations should complete to achieve organizational transition and effective new service business. **The first step is to clarify different Industrial Service reference models.** The reference models are needed to clarify how other companies have done, so the first step is similar to benchmarking. There is no sense in creating new models if there are suitable models already being developed. Of course none of the models are directly suitable, but after analysis there could be common ideas worth adopting in one's own business development. After reference-model analysis, organizations should understand and test customer values. When it is clear what the customer's needs and requirements are, organizations can build their

product and service offerings to fulfil customer needs. That step includes segmentation as well as new product and service architecture development. The next step in the organizational transition process is business model implementation, which requires new mindsets and competencies. That step is the definition of the organizational business transition process. The following step is the development of a collaboration network, where operations with customers and partners should be managed. Business process definitions come after the development of a collaboration network. Then organizations have an almost complete framework for new service business. The last step is architecture creation based on the earlier phases.

Figure 9. Framework for organizational transition process.

Following the framework presented in Figure 9, organizations could manage their transition process. The time frame in every case should be clarified: it depends on organizational capabilities.

5.4. New Industrial Service development

New **product development** has several methodological process models and tools that are designed for product development from idea to market introduction. Many of these product development processes and methodologies are based on traditional state-gate approaches and they are widely implemented in organizations and operational quality systems. Product development processes of industrial companies are quite systematic approaches to managing cross-functional development processes. Usually they also have some aspects related to services development in support of the products.

According to the BestServ project, almost none of the analyzed companies have a systematic methodology for **Industrial Service development**. Usually the services are developed "ad hoc" and they are not systematically tested with leading customers and expected markets. Many of the companies concede that a service development process should be developed and implemented for operational use to enable management of the cross-functional information and knowledge collected during the product life cycle. The main challenges in the service development process are related to the lack of understanding of successful new service development and innovation management. Industrial services are closely linked to customer processes and without a comprehensive understanding of customer values it is not easy to develop value-added services. It is expected that systematic **parallel product and service development** management could be beneficial in managing the experiences that are collected during the operational use of the products. This kind of life-cycle management could promote life-cycle innovation and learning. Such knowledge could then be exploited in new product and service development.

During the BestServ project a preliminary **new service development** model was developed, based on analysis and discussion with the participating companies. This model focuses on new service development in co-operation with the customer. The model is based on both business strategy (product and market management) and gained knowledge and learning. The preliminary model is depicted in Figure 11. The new service development process is based on **strategic business management** focused on maximizing customer value. This is achieved by understanding the customer business logic and operative business processes. The main idea behind the maximization of customer value is market- and business-based customer segmentation with a modular offering structure that combines the products and services required for each customer. The modular design of offering structure is a continuous process that should focus on solution deliveries. This kind of modular offering can be based on life-cycle innovation of **solution life-cycle management**. Solution life-cycle management is based on business intelligence and related knowledge and information.

Our **new service development process (NSD)** is divided into five main phases, each of which interact with customers. The NSD is presented using co-ordinate axes. The Y axis depicts the market intimacy of the service and the X axis presents the time perspective of the new service development process. The NSD process is based on customer-value creation. This means that companies should have a **common value model** for discussion with the customer about the potential value of the new services for customer business (e.g. process improvements, cost-effectiveness or new product features). The NSD model also contains some examples of issues that are important for each phase of the development process.

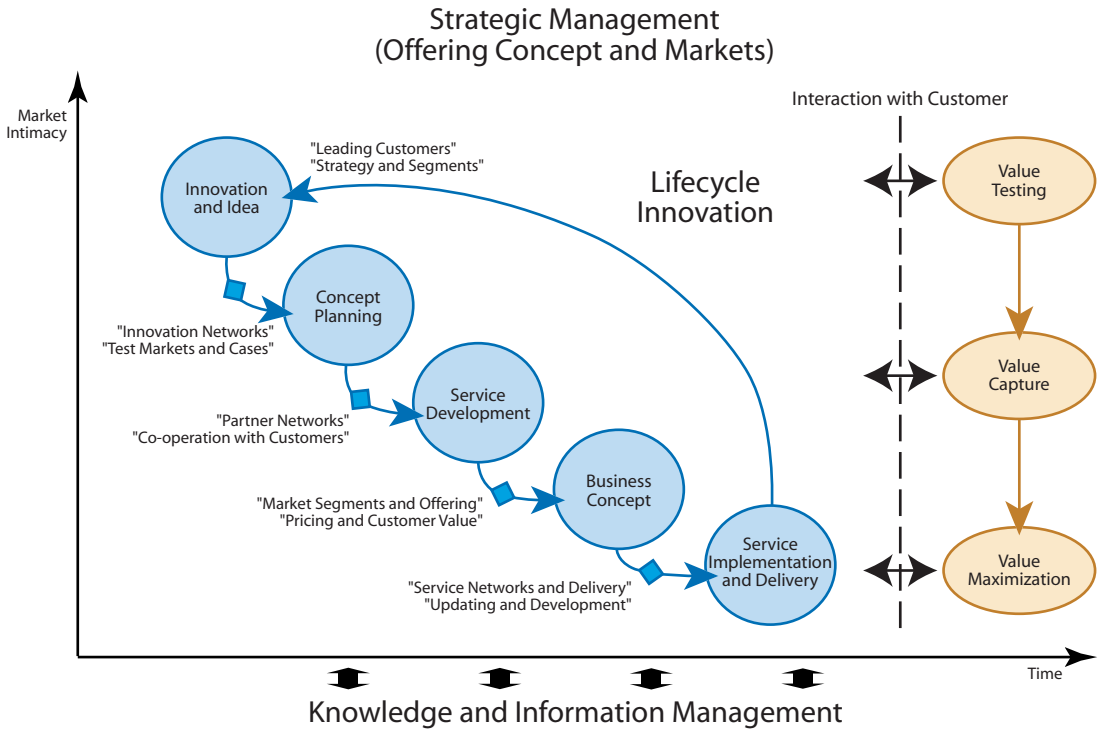

Figure 10. New service development process (NSD).

One of the main components of the model is the continuous interaction with the customer about the developed services. The interaction is based on the common value model. The value management process, which is composed on three main phases, can depict the interaction process. The phases are **Value Evaluation/ Assessment, Value Creation and Value Maximization/Delivery**. The value creation process can be divided into phases:

- In the first value model phase (value evaluation and assessment), the potential for new service value is discussed and tested with customers (e.g. leading customer group). As a result of this phase, a value proposition is made to the customer.

- In the second phase (value capture) the value of the service being developed is captured by the service concept that concretizes the value for the customer.

- In the third phase (value maximization and delivery) the proposed value is delivered to the customer by means of the new and innovative service.

The first phase of the overall NSD process is **Innovation and Idea** management. This phase contains techniques and tools for managing idea generation and screening different sources (for example customers or field technicians). The main objective of this phase is to manage the wide range of ideas and evaluate them based on business and offering strategy. The idea evaluation and screening should be a cross-organizational process. In this phase, the potential value for a new customer should be tested in co-operation with the customer.

The second phase of our model contains the overall **Concept Planning** of new services. Concept planning means high-level planning of basic features of the services, decisions about the standardization of tailoring issues and the enabling of technology infrastructures. This phase is targeted to decide the potential and the development activities of screened services. An important issue is also the relationship with the product business and current installed base. The concept-planning

phase is highly related to the co-operation innovation network that a company has. Useful tools are service test marketing and case planning. This phase is also a kind of potential service concept for testing customer value.

In the third phase, preliminary **Service Development** and engineering is carried out. The main issues in this phase are related to the detailed planning and conceptualization of developed services. This phase contains the specification of detailed services and also issues relating to the customer offering. The modular development approach should ensure the management of different market segments and customers. Close co-operation with service partners and customers are the key factors in ensuring the personalization of developed services. Service development can be seen as the main development phase of new services, customer added values and revenue logic. Service development is usually connected with enabling technologies in managing service levels and communication. This service development phase is that of customer-value capture for the basis of preliminary business concept planning.

The fourth phase of the new service development process is the detailed **Business Model** and operative process planning. In this phase, service market introduction and commercialization is planned based on the created business concept and models. The business model contains the service offering model for market and customer segments, pricing, personalization and tailoring of the services. Based on the business concepts, detailed service processes are planned to support the successful implementation both locally and globally. An effective service business model and effective operative processes ensure the maximization of customer value.

Finally, the **Service Implementation and Delivery** phase takes place in this new service development process. In this phase the developed services are implemented locally and globally. The idea of this phase is to assure the cost-effective implementation of the developed service. The important issues to manage are related to service network creation, management and updating as well as the organizational design of service business processes. In many cases there are technological solutions designed to support service processes. The profitable implementation of technology (e.g. operative systems, remote diagnostics or mobile solutions) requires standardized business processes and interfaces between the systems. This means open platforms and standards for service processes (e.g. service hubs).

The new service development process was depicted as a model of an activity process. In the real world, the different phases are usually parallel and in some cases not all the phases are present. All the depicted phases have several sub-processes ongoing during service development. For new service development, product and **service life-cycle management** is essential and important. Connections between the different life-cycle phases should be managed to transfer the accumulated knowledge and information within and between the services-related organizations and companies. This means a **cross-functional approach** to organize and manage the overall and comprehensive business development of the companies. This in turn means that, within and between organizations, product- and service-related information and organizational practices should arrange to ensure that **innovation processes** and development of accumulated knowledge are enabled. These arrangements and processes may promote continuous life-cycle innovation for new service and product development.

Product development processes are currently widely used in industrial companies. The main development challenges of new service development are related to a lack of the systematic approaches and tools to manage the service development process. The real challenge for industrial companies is to manage the customer service level by offering the optimal customer-specific application. This means the optimal combination of products and services to apply to the selected service level.

6. Main development areas and topics of service business development

6.1. Industrial Service business development areas

According to the industry-driven and -oriented BestServ feasibility study, the main development areas of Industrial Service business can be derived from structural change in the businesses of participating companies. Industrial Services can be seen as a strategic intent on the part of all the BestServ companies to manage global competition and the evolution of current business models. This approach leads to the overall management of the customer offering through life cycles, from both a solution and a customer viewpoint. The main "mega" development areas are related to the following generalization, derived from the industrial development needs presented on the Chapter 4.

- According to the companies studied, argumentation of the benefits of Industrial Services is difficult for many of the companies. The main challenge for this may be the lack of a shared **value model** of Industrial Services. The shared value model enables the discussion about the potential benefits and values to be captured by the services.

- Industrial Services are usually based on the current product architectures and not on comprehensive management of customer needs and values. This kind of customer-oriented approach needs **a solution architecture** that combines both product and service offering and enables efficient market and segment management.

- Industrial Services are difficult to structure and manage by the companies, which complicates the creation of new and **innovative business models**. This means that companies should have overall reference business models for Industrial Services (earning logic, business strategy, organizational models etc.). The efficient development and use of IS reference models enables the continuous innovation of Industrial Services.

- At the moment, many Industrial Services are traditionally oriented, while the need is for **knowledge-intensive services** (e.g. consultation, proactive maintenance etc.). The development of knowledge-intensive services requires a deep understanding of customer processes as well as the development of one's own competence. These require the reinventing of the customer offering and the related business model.

- On the common level, technological solutions (e.g. telecom, automation, operative systems) are mainly developed to support separate operations and processes. The main development challenge is related to architectural **management of technology integration.** The overall Industrial Service business technology architecture should also be defined.

The presented development areas together create a need for a solution life-cycle concept that means life cycle- and customer-oriented approaches to managing the customer offering.

All these development areas create a great need for systematic research and development activities, which should be organized to manage the global competition and the creation of innovative business models and customer values. The following chapters summarize the main development areas under the project clusters supporting a collaborative approach to research and development.

6.2. Main service business short- and long-term R&D topics

Main short-term (immediate) development areas determined by the industrial survey have already been introduced in section 4.2. This section concentrates on long-term development activities and system development in the face of a business culture that is changing towards Industrial Service business. This section also introduces the analysis of the main R&D focus areas from a system point of view.

During the survey we recognized that most of the companies needed to adapt their business according the **paradigm shift** from ownership to access and that potential sustainable growth of business lies in services created and captured. The framework of value transition means a transition from parts or machine supplier to value provider. Then the most essential factor is an adaptive business transition process. There will be a continuous change in business models, which can be run according to the analysis of the rough value and evolving business models. It is difficult to manage this transition without system understanding and a well structured, customer-value based, process for business transition.

The development topics should be understood as a system, with subsystems and individual R&D topics dependent on each other. It is only possible to concentrate on a few topics at the same time in any given business network and individual enterprise. Prioritizing according to changing system requirements is essential. It should be remembered that everything is changing when moving towards service-oriented business. Results in one development area influence on requirements that develop another. Business system understanding should support continuous prioritizing.

The following is a list of the main recognized R&D topic areas:

1. Strategic Management
- Strategic positioning for Industrial Service and alignment over the life cycle
- Business Transition Process
- Business Model and Service Business Strategy Evolution
- Portfolio Management, Competence Management

2. Customer Value Management
- Value Assessment Practices (e.g. Methodology of Real Options)
- Life-Cycle Earning Potential (How to determine the potential service level?)
- IS Offering Development

3. Operational management
- Re-Engineering of Networked Processes
- Complexity Management
- Life-cycle Learning and Innovation
- Personal vs. Organizational Knowledge Management
- Operations Management
  (life-cycle costs vs. life-cycle earnings)
- IS business operations
- IS delivery
- IS logistics and communication
- Managing the IS Network
- Uncertainty turned to Risk Management

4. Product and Service Modules and Architecture
- Tangible and Intangible Offering
- Service and Product Architecture and Dependency Management
- Service and Product Platform Management

5. Product and Service Configuration
- Optimized Offering to Selected Market Segment
- Market Segmentation

6. Contracting and Legal Issues

7. Organizational and Industrial Culture

8. Common Semantics
- Information Model and Ontology

9. ICT-issues; Business in Open System Architecture

6.3. Preliminary project clusters

The main long-term focus areas when developing Industrial Service business were analyzed after the industrial survey. Figure 11 illustrates the R&D topics from a system point of view. The basic idea is that various development areas are dependent on each other.

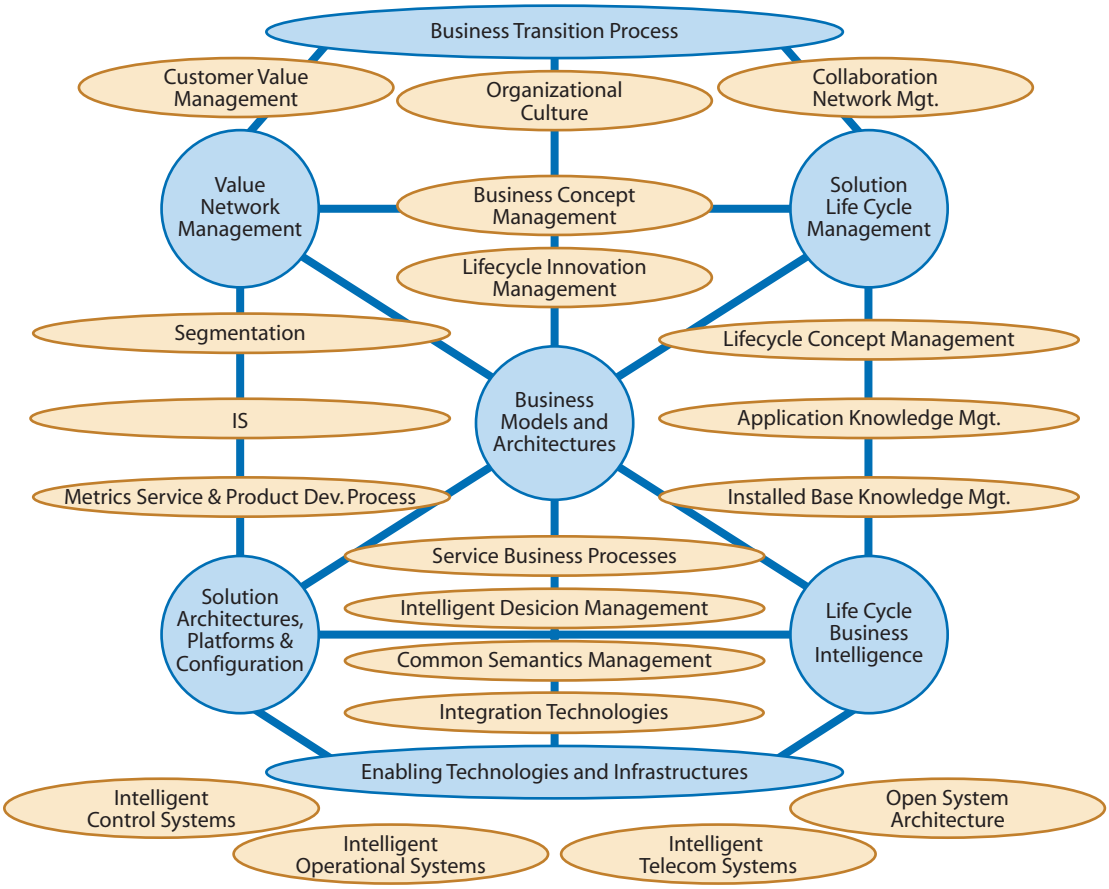

Figure 11. Main project clusters and specific R&D themes.

During the analysis phase, seven interrelated R&D areas through which project clusters could be built up were categorized:

- Business Transition Process
- Value Network Management
- Solution Life-Cycle Management
- Business Models and Architectures
- Solution Architectures, Platforms and Configuration Management
- Life-Cycle Business Intelligence
- Enabling Technologies and Infrastructures

Each of these areas is important by itself in changing business culture, but the great change will be encountered when all of them are developed for the new business culture. The problem here is where to start and how to prioritize.

6.4. Description of project clusters and background discussion for R&D Projects

There are many reasons for change in business culture nowadays, the main explanation of which can be found in section 1.1. The market situation, however, is leading to a value transition in the value network. **Business has to be managed in a continuously changing environment.** The most important change is the life-cycle consideration.

6.4.1. Value network management over the solution life cycle

There is a great need for a new approach to life-cycle management. This will be based on a value model supported by all stakeholders. Because the main partners in a **value network** are at some level responsible for customer business, customer value management becomes even more important. **Organizational culture** becomes more networked and value-oriented. Value has to be created, evaluated, captured and finally maximized and delivered over the life cycle of a customer application. This cannot be achieved without excellent collaboration network management. Continuous uncertainty should be changed into risk management. Also social capital becomes essential among other sources of capital. Dynamic relationship management will be needed, especially as some of the business network partners will change over the life cycle. There will also be certain requirements on new methodologies for life-cycle communication. An installed base application requires continuous maintenance and renewals to maintain application competitiveness in the customer's operational and business process. The main development areas of the cluster are related to following topics of research:

- Customer value model (products and services)
- Earnings potential (logic)
- Collaborative models between customer and IS suppliers
- Management of service networks
- Risk management
- ...

6.4.1. Business models and architecture supporting the business transition process

The business transition process with suitable metrics is the one of the most essential development areas. Continuous Industrial Service development requires parallel development of both **business architecture** and **ICT architecture**. A well understood and structured business model supporting business architecture is a very important strategic tool when business is evolving according market requirements. Life-cycle innovation needs new approaches and leads to business-concept management. In future, it will be possible and essential to sell business models based on the available architectural structure of a company. The main development areas of the cluster are related to the following topics of research:

- Service business strategies
- Business concepts
  - o Markets
  - o Products, services
  - o Resources
- Life-cycle innovation management
- Pricing of services, profit sharing
- Service business operations management
- ...

6.4.1. Solution architectures, platforms and configurations

Solution architecture is at the heart of business alignment. **Solutions consist of service and product elements**. When there are reusable elements in the architecture it is easier to build up new ones. Customer and functional requirements, features, modules, components and interfaces build the core structure of an enterprise solution structure. It is important to have an integrated service and product development process to create new offerings according both requirements. Service and product platforms supported by the solution architecture are used in the solution and customer configuration. The main development areas of the cluster are related to the following topics of research:

- Customer requirements management
- Product&Service architectures and configurations
- Market and customer segmentation
- Industrial service development process
- ...

6.4.1. Solution life-cycle management and the supporting business intelligence system

A life-cycle business intelligence system is important when the competitiveness of a customer application has been secured. A life-cycle business intelligence concept needs to be created **to combine application knowledge and organizational knowledge** in the value network for life-cycle information management. An intelligent decision management system will also be needed to support the new product and service element development. This is a parallel activity to development competence, service and the product as a whole. Development and other operational processes such as IS delivery, business logistics and communication will alter due to the changes in offerings and targeted market segmentation. Solutions are embedded and completely mechatronic. The main development areas of the cluster are related to the following topics of research:

- Management of product&service life cycles (profitable)
- Life-cycle concept management
- Service metrics (performance, value)
  - Application know-how management
- Installed base management
- Contract and co-operation management
- Collaboration network management (innovation, development, delivery)
- Management of life-cycle information (market, customer, technology, suppliers...)
- ...

6.4.1. Enabling technologies and infrastructures

Finally it is essential to develop methodologies, solutions and customs in information and communication management in a value network. Research and development of enabling technologies and infrastructures is a parallel activity alongside the others presented above. We need new integration technologies to get intelligent control systems, intelligent operational systems, intelligent telecom systems and an open system architecture to fully support the operational Industrial Service. There will be a need for new types of remote diagnostics and wireless systems. New types of business hub systems will be developed to support fluent collaboration in a value network. Common semantics management is essential and should be developed for Industrial Service-oriented, knowledge-intensive business. The main development areas of the cluster are related to the following topics of research:

- Intelligent controls systems, automation
- Operative systems
- Telecom systems
- System integration technologies
- Open system architectures
- Intelligent decision-making
- Common semantics
- ...

Figure 12 presents the technology issues. The figure reveals how many different systems there are in use. Technology is used in companies' internal functions (like ERP and other management systems) and systems are engaged in information sharing at all levels of companies, from top to bottom. Again the systems are connected to each other but real visibility through the organization has not been created. Also there are connections to external systems, through different business integration systems or mobile technologies.

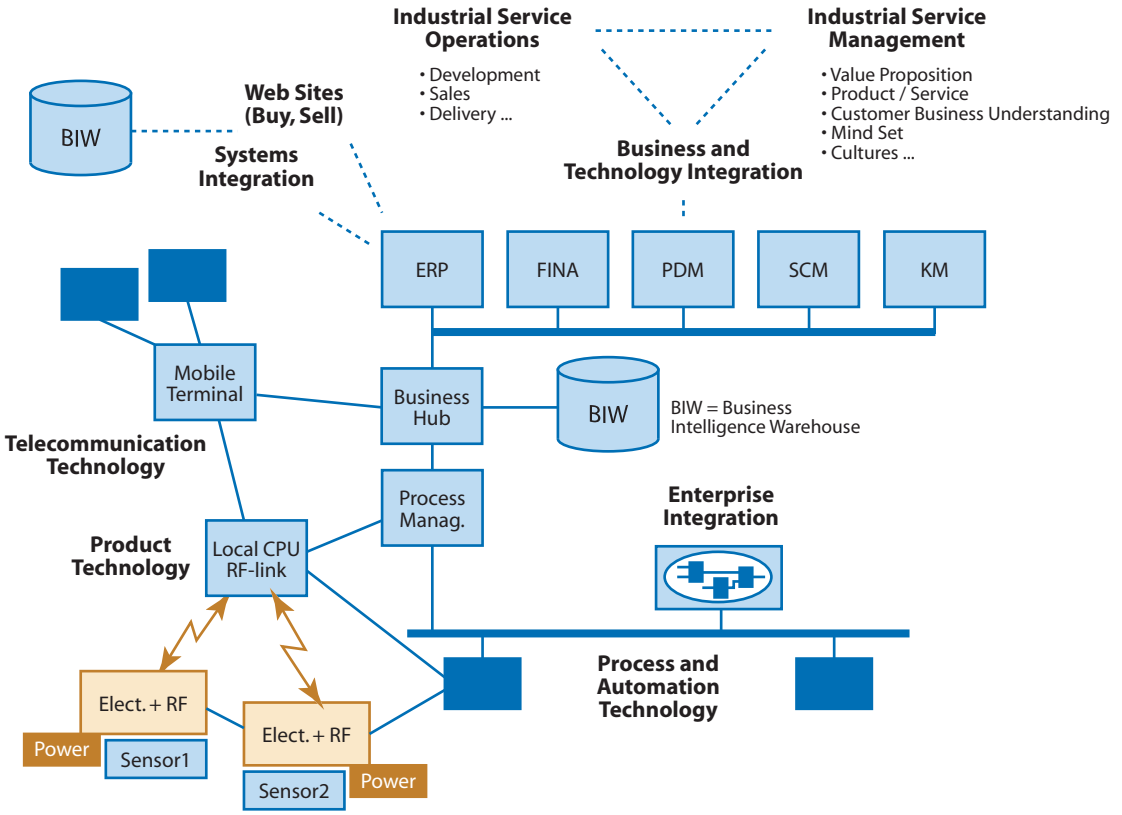

Figure 12. Technological architecture for Industrial Services.

7. Guidelines for managing Finnish service business development in technology industries

There is a need for service business development in many industries, as revealed by the BestServ feasibility study. In Finland there is a need to create a real **technology programme** in the area of industrial service business. There has been some activity at a national level, but no technology programme fully focused on industrial service business. The BestServ feasibility study has highlighted some key issues, which should be resolved. There is a need for a few **industrial cases** where common models could be developed. The service business development challenges are hard to solve theoretically and the starting point for development projects should be the change in target companies' business. Figure 13 describes the starting point for research activities on Industrial Services; the direction for long term R&D comes through collaboration with enterprises through industrial experiences and application knowledge. A basic framework for development projects should be defined through a few development projects and that, in turn, will generate a framework for a technology programme.

The national level is not the only way in which development projects might be funded or organized. There are other instruments for development activities than national technology programmes:

- EU / IMS development programmes
- Benchmarking and co-operative learning

In the benchmark section of this report, there are some information about EU activities, and there is an opportunity for Finnish companies to benchmark and engage in development with European organizations.

Figure 13 presents ideas on how development projects should be handled and a framework for service business development activities. The innermost circle is "fundamental research". The basic research should be done in every case before the second circle, which is "R&D" activity. The starting point still should be the structural change in business. The demonstrations could be done after R&D activities and after that industrial training could be carried out. The last phase in terms of development projects is implementation. There is feedback on development activities, so this information and other aspects learned could be used and new innovations created based on earlier results. The development activities should be continuous loops.

The development framework also presents different project clusters. The clusters could be different focus areas of service business, where the development actions are continuous circles as presented in Figure 13. The Industrial Service Business Forum is one new instrument in national service business development. The Industrial Service Business Forum and different industry and research projects are presented in the following chapters.

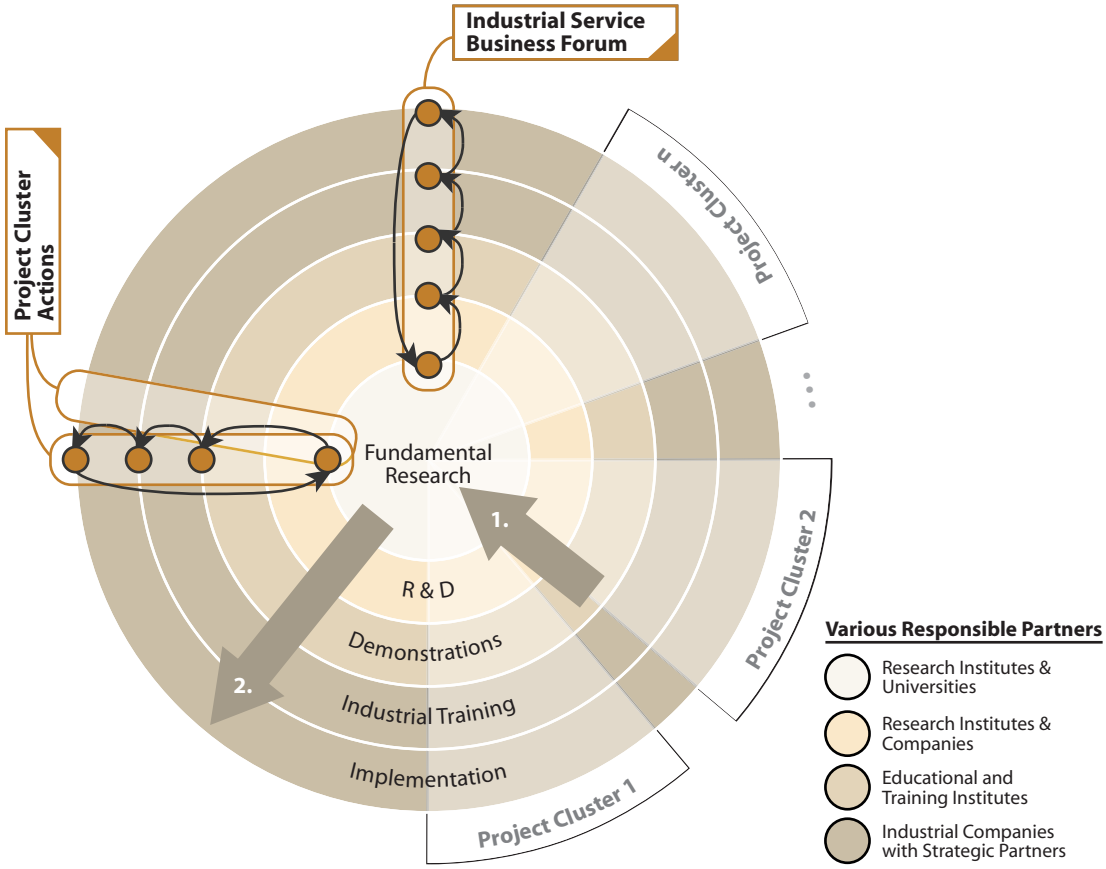

Figure 13. Industrial Services development framework and instruments.

7.1. Specific industry and research projects

The main objective of BestServ is to offer ideas and impulses for machinery and equipment suppliers to start new **IS development projects**, either on their own or as participants in multi-party projects. Based on the interviews and other discussions, the contents of Chapter 3 show areas which have a degree of general interest. It is, of course, up to individual companies to draw their own conclusions and take their own initiatives for actual development projects.

Another important BestServ objective is to encourage universities and research institutions to take up research projects in the IS area. Here also the contents of Chapter 3 show areas which could be subject to further research.

TEKES has indicated that industry and research projects which aim at developing new solutions in IS business can receive TEKES financing, provided normal criteria of novelty and risk are met.

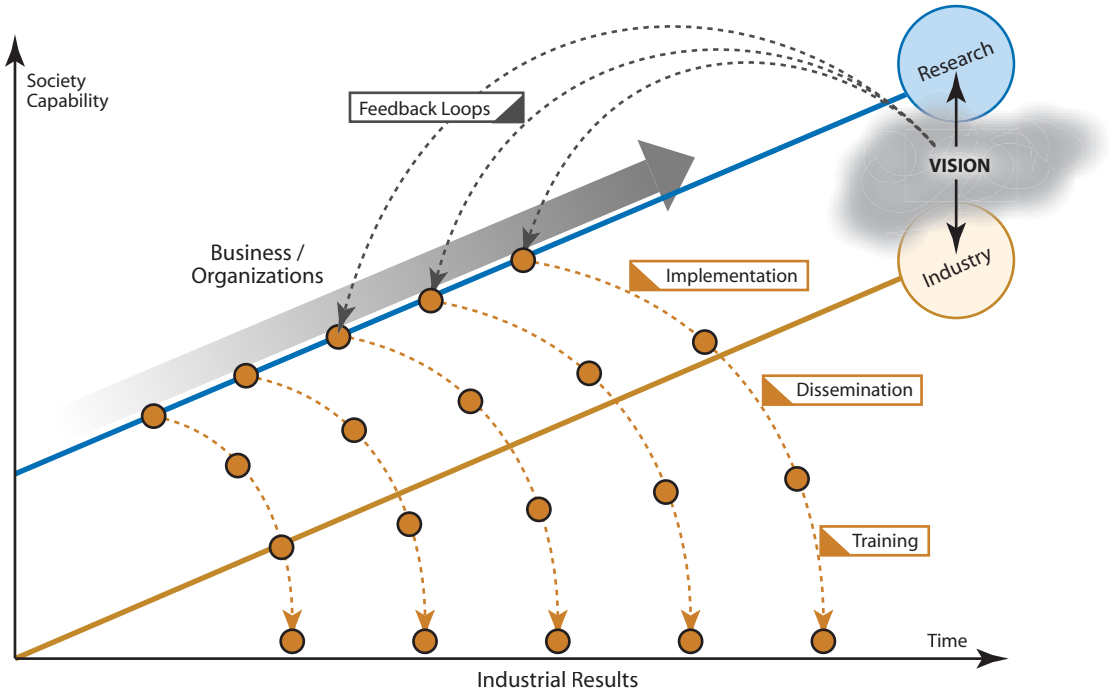

Figure 14. Increasing society's Industrial Services capability through a collaborative mechanism between industry and research.

The aim is that a few industrial development projects will have the same themes, and that these projects will belong to the same project cluster. There could be several different project clusters and these could be connected in service business forum, which is presented next.

7.2. Finnish Industrial Services Development Forum

The eight BestServ participating companies and Technology Industries of Finland suggest that a forum for the exchange of ideas and experiences in IS business could be useful as a common reference group for directing future research and development in the IS area.

The objectives for the common IS forum can be divided as following:

- Knowledge sharing between IS forum members
- Guiding national development
  - Evaluating R&D projects
  - Activating industrial-driven projects
- Updating the Industrial Service oriented road map

The IS forum could be managed by Technology Industries of Finland under the coordination of Technology Development Centre, Tekes. During the first trial year it is acting as a round table forum rather than as a permanent working group within Technology Industries of Finland. It would be open to all parties that play an active role in developing new, internationally competitive IS competencies and solutions. The participants can be industrial companies, research organizations and universities, consultants and financing organizations. An extensive group of members would ensure broad knowledge sharing and ideas exchange. It is expected that the IS forum will start operating by November 2003.

Industrial Service Business Forum is expected to have some of the following tasks:
Generic facilitation on following topics
- Common terminology creation for Industrial Service area
- Giving comments and direction for Industrial Service oriented education
- Collaborative training campaigns
- Mental mindset towards solution business
- Knowledge and Case Study Sharing between Forum Members

Discuss on Strategic and Business Related Topics and support methodology creation for
- Strategic Framework for Solution Business
- Business Model and Business Architecture Framework
- Business Transition Process Framework
- Organizational Change for Industrial Service Related Mindset

Creation of R&D Oriented activities
- Establish Research Area for Industrial Service Business
- Analyze ongoing development and research
- Guiding the International Benchmarking
- Giving direction for the new National R&D
- Activating of Collaborative Industry Driven Projects
- Gathering and Formulating Needs for Research on Industrial Services
- Evaluating of R&D Projects
- Encourage University Collaboration across Traditional Boundaries
- Creating and updating the Industrial Service Roadmap

The service business forum will be interested in development projects. The forum will have its own leader and it will consist of industrial companies, research, financing and consultant organizations. The main idea will be to activate R&D activities. The next level will be research projects, which will be specially targeted long-term R&D. Research projects will be linked to different themes and development clusters that have a broad view of service business. The R&D industrial projects will have some specific themes and projects of the same kind will form a project cluster.

7.3. International benchmarking of training & education resources

Finnish companies make extensive use of the services of international management training and education resources in addition to domestic ones. It would be useful to map leading resources in **IS business training worldwide** in order to secure world-class management development also in this area.

This benchmarking study would map the available resources and their profiles and would also suggest the areas on which Finnish business schools should best concentrate for their international competitiveness.

One benchmark opportunity is to communicate with the Concordance board, which is an EU-funded Network of Excellence project. VTT is a core partner and Technology Industries of Finland is an industrial partner in Concordance, and it would be easy to share knowledge between Concordance and ISBF.

7.4. IS education in Finland

Finnish universities and schools offer high quality research and education in technology areas. However, very few of them have major programmes that focus directly on IS business needs.

It is important to increase the “IS business content” in education for all levels of industry jobs, from service technicians to top management positions.

8. Conclusions and recommendations

8.1. BestServ summary and conclusions

Engineering companies have a strategic role in creating radical innovations. Engineering companies create systems, components and Industrial Services for customer processes. In many cases they have to be involved with **the breakthrough phase, radical innovations of customer processes**, required systems and Industrial Services. Figure 15 illustrates the solution engineering opportunities in Industrial Service implementation on many fields of industry. Generic theories, methodologies and tools of knowledge based business and also solution principals are similar to various industrial sectors.

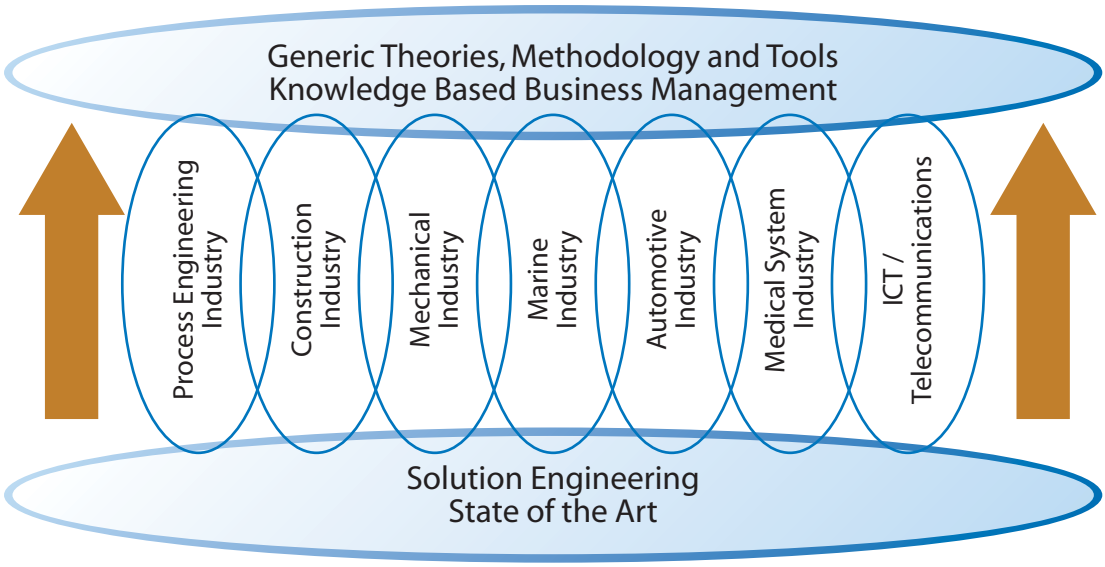

Figure 15. Solution engineering opportunities in Industrial Services implementation.

The BestServ feasibility study was carried out by eight companies, the Technology Industries of Finland, G. Andersson Management Consulting and the Technical Research Centre of Finland (VTT) between December 2002 and September 2003. The objectives of BestServ were as follows: to clarify current Industrial Service business practices, to create concrete starting points for industrial-driven development projects and to determine guidelines for collaborative and academic research projects.

The BestServ project was based on literature review, deep analysis of the eight participating companies, interviews in fifteen other enterprises, common workshop and project management group working with specific Industrial Service business topics. The nature of BestServ was to review the current situation of Industrial Services and initiate discussion among industrial companies and research and development organizations.

The **main results** of the BestServ project can be categorized into four main groups. **Firstly**, the main industrial key issues, short-term development areas and good practices were identified. **Secondly**, the main long-term research and development areas were defined for further discussion and development. **Thirdly**, the preliminary business and technology framework as well as the organizational business transition process were defined for managing Industrial Service development in an enterprise context. **Finally**, a proposal for a national framework was formulated for managing

collaborative short- and long-term research and development projects between industry, research and development organizations, industrial associations and financing organizations.

At the moment, many **industrial companies** in manufacturing and engineering sectors are strongly developing their tangible and intangible services. It is expected that business growth can be achieved by implementing different kinds of value-added services. All the BestServ project companies have strategic objectives for Industrial Services development. According to the feasibility study, the main industrial development challenges are related to the comprehensive management of customer value, business concepts and technological infrastructures. Today, many industrial companies are implementing basic services such as remote diagnostics, proactive maintenance or technical consultation. The development targets of the companies are knowledge-intensive services that are related to the customer's business knowledge and performance improvement. The main and common industrial challenge is to manage the Industrial Service innovation process from collaborative idea to implemented service. This life-cycle innovation requires a comprehensive approach to business model, processes, organization and technologies that are designed for Industrial Services. Usually this means the **business transition** from "product supplier" to "value or performance partner".

One of the main challenges for industrial companies is the development of business model services and delivery processes as well as enabling technology infrastructures. Preliminary service business development frameworks were created during the BestServ project. The preliminary frameworks are based on road map methodology and tools. The frameworks are various tools for cross-functional discussion and collaborative working. The **business development framework** can be seen as a preliminary framework for Industrial Service business model development (customer value, business model, collaboration network, etc.). The **technology development framework** is based on the business model and it is aimed at developing the technological infrastructures and applications to support Industrial Service. The **business transition process** from "product supplier" to "value or performance partner" can be seen as a service business development framework. This transition process contains an organizational approach for business model development and implementation.

The **national research and development activities** in the area of Industrial Services have been recognized as an important area of focus in several national innovation organizations (financing, industry and research). The long-term research competence is not very strong at the moment in Finnish research organizations and universities. The R&D competence is mainly very focused, but some comprehensive and architectural approaches are needed. Projects in the area of Industrial Services have been part of many technology programmes, but usually the research project has been focused on some individual and narrow area. The customer-oriented nature of Industrial Services requires the **broad R&D competence** that covers e.g. business management, organizational and cultural issues, value and innovation management, information management and technological concepts.

Research and development has been mainly industry-oriented in recent years. As shown in the BestServ project, comprehensive long-term research projects and competence in Industrial Services are virtually lacking. It is expected that new kinds of collaborative and **cross-scientific approaches** for research on Industrial Services are needed. An **Industrial Service Business Forum** (ISBF) should start guiding the development of Industrial Services and R&D competence. The ISBF will integrate all the interest parties in the area of Industrial Service development. The main interested parties are industrial companies and organizations in several industry sectors, R&D financiers, research organizations and consultants. The main objective of the ISBF will be to act as a knowledge-sharing forum for interest groups. This knowledge sharing will enable common discussion and benchmarking between the interest groups and will also be a forum for activating important research and development projects. According to the BestServ project, many of the companies consider industrial benchmarking to be very useful for introducing new service business concepts and models. The companies pointed out that the research and development

projects are too research-oriented and lack the required industrial relevancy. The Industrial Service Business Forum can also be seen as an informal co-ordinating group for both research- and industry-oriented projects. The ISBF will also constitute a new approach to managing technology development programmes.

Figure 16 presents a preliminary framework for the management of Finnish Industrial Service business development through the Industrial Service Business Forum. The ISBF can be seen as an interest group and knowledge community for companies, research organizations and financiers to activate and guide Industrial Service development. Industrial Service development activities should be both collaborative, enterprise-driven development and long-term cross-scientific research that combines the various sectors of the relevant research traditions and themes (management, technology, psychology, etc.).

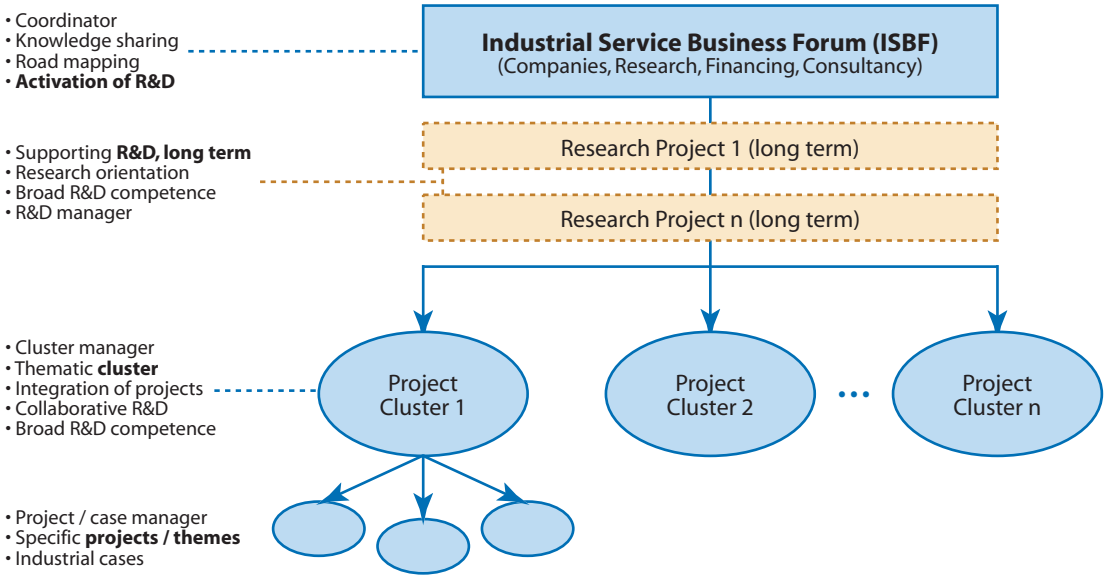

Figure 16. Service business forum and connection to R&D activities.

8.2. Recommendations

As a conclusion of the BestServ project, the importance of the long-term development of Industrial Services was recognized in many arenas, both industrial and academic. The development and implementation of Industrial Services are currently ongoing processes in many companies, but successful customer-value development and customer commitment is still for the most part lacking in the area of Industrial Service development and implementation. The main reason for this is the lack of suitable reference models and development methodology. Industrial Services may be a competitive edge for Finnish manufacturing and engineering industry. The solutions of this industrial sector are also the service business enablers for many other industries like pulp and paper, construction, automotive etc. That is why critical mass as well as national research and development activities are needed to ensure the competitive development of Industrial Services in Finnish companies. The proposed **road map for Industrial Service development** can be summarized as follows:

- Creating a common knowledge-sharing forum for activating and managing Industrial Service business development (Industrial Service Business Forum, ISFB)
- Defining industry-driven development projects that create the industrial frameworks and models needed for service business research
- Activating R&D resources to create challenging and collaborative long-term research projects in the area of Industrial Services and innovation
- Ensuring continuous knowledge sharing between service business interested parties and the activation of Industrial Service business development R&D projects

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Appendix A
Issues in service offering development

To be included in BestServ participants' interviews

The challenges in service vs. product offering development are different in many respects. This checklist is intended to cover the most important challenges from the point of view of developing globally competitive and profitable services.

The analysis is carried out through interviews. For some questions, you can also rank the importance of the question (1 to 5) for the company as well as the current performance ratio (1 to 5).

1 Background facts about the company/division

1.1 Evolution path of your company's service business

- Service business starting points
- Roles of service business in the organization
- Main milestones in service business development

1.2 Service business definitions

- What is the scope of your service business
- What is the nature of your service business
  - Reactive (activated by the customer)
  - Proactive (activated by the organization)

1.3 Total business relevant to BestServ:

- Divisions and businesses covered by the analysis
- Volume, €
- % outside Finland
- % outside Europe
- Profitability, % NR
- Growth trend, %/a

1.4 Service business relevant to BestServ

- Volume, €
- % outside Finland
- % outside Europe
- Profitability, % NR
- Growth trend, %/a
- Vision, end of 2005

1.5 Size & reach of service organization (rough numbers)

- Number of people providing service
- Number of active countries
- Number of company owned service units/hubs
- Number of external service dealers

1.6 Market development and competition in service business

- Market growth trend, %/a
- Ranking order of competitor groups:
  - o Traditional competitors from "base business"
  - o New competitors from other industries
  - o Customers' in-house operations

1.7 Types of service business concepts (ranking order)

- Decentralized/local
- Centralized/global
- Combination of above

1.8 Driving force for service business development

- Head office
- Customers
- Competitors

1.9 Importance of ICT for service business (ranking order):

- Telecommunication / Mobile
  - Internet/intranet
  - Telematics
  - GSM/GPRS communication
  - …
- Operative ICT -systems
  - ERP (Enterprise Resource Management)
  - SCM (Supply Chain Management)
  - CRM (Customer Relationship Management)
  - PDM (Product Data Management)
  - …

2 The role of service business relative to hardware business?

2.1 Relation: arm's length c. integrated

- Now
- In 3 years' time

2.2 External vs. internal revenues of service business

- Now
- In 3 years' time

2.3 Servicing competitors' products

- Now
- In 3 years' time

2.4 Highest level of specific service business responsibility

- Now
- In 3 years' time

2.5 The role of service business for the business

- Core function
- Support function

2.6 Segmentation of service business

- Customer based
- Regional based

3 Development of new services & service business

3.1 General business development

- Development of business in general
- Development of solutions (products and services)
- Development of services
- Life cycle concepts

3.2 New service product decisions - who & how

- Product decisions
- Recruitment decisions
- Investment decisions

3.3 Service product development process

- Central, regional, local service R&D (ranking)
- New service business generation from (ranking)
  - o Local individual contracts
  - o Regional/global service products
- New service product generation (ranking)
  - o Based on proven local contracts
  - o Based on "Greenfield" ideas/proposals
- Formal process vs. ad hoc decisions (ranking)
- Use of stage gate decisions?
- Documentation

4 "Packaging" local service contracts for global markets

Responsibilities for:

- **idea submission/collection**
- concept definition & business case
- Procurement of hardware included, e.g. instruments, terminals,..
- documentation
- marketing
- delivery & quality
- Follow-up & support of new service products
- Personalization of services

5 Adapting global service products to individual customers

Responsibilities for:

- Local service engineer/technician
- Local service managers
- Local account managers
- Region

6 Management of service organizations

- Local, region & global organization responsibilities?
- Setting targets & reporting: local, regional, global
- Developing service skills & business culture
  - o training % development
  - o Recruitment
  - o Performance metrics
  - o Outsourcing & in-licensing

- Handling local & regional differences in
  - o Education & skills
  - o Languages
  - o Business practices
- Global use of special skills
- Management of co-operation organizations

7 Support systems & resources

- Global accounting
- Local accounting
- “Fair accounting” of combined service - hardware business
- Use of global customer knowledge database

8 R&D challenges and needs from the service business point of view

8.1 Company related R&D needs

- Business model and strategy development
- Customer management
- Life cycle management
- Co-operation network management
- Product and service business management
- Technology and ICT
- …

8.2 Service business R&D competence

- Business strategies and models
- Marketing
- Management and leadership
- Business process development
- Psychology
- Technology
  - – Product technologies
  - – Remote control
  - – Mobile applications
  - – ….

8.3 National and international development instruments

- National technology program
- EU integrated projects / IMS activities
- Network based development activities
- Company specific development projects
- Benchmarking projects
- …