DIMECC

FUTURE INDUSTRIAL SERVICES

FINAL REPORT 1/2016

DIMECC
PUBLICATIONS
SERIES NO. 9
2010 – 2016

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PREFACE

There is no business without service business!

The past years have changed radically the fundamentals of many industries and I am not referring to any new technologies, but the change on how the business is made globally. While business in many industries was based on selling products in the past, the business of today is more and more based on actual value selling with almost every company looking for new ways how to serve their customers in the most valuable manner. Servitization is inevitably becoming a necessity in every industry, changing fundamentally the way how value is created, marketed and delivered. This phenomenon is supported by rapid technology development, especially digitalization which opens new ways for rethinking businesses.

DIMECC FutIS program was created at the dawn of a wide industrial servitization period. Its mission was to serve pioneering Finnish companies in their transformation towards profitable service business. I am happy to see that the DIMECC FutIS results are now more topical than ever and there are more and more companies willing to exploit the great achievement of the program.

DIMECC's FutIS program was also a pioneer among DIMECC's programs as it was not traditional technology program, but a pure business program with an ambitious target to create a basis for totally new businesses, value chains and business operations. This development has required open discussions, multidisciplinary knowledge and the challenging of existing structures with radical new ideas.

The program has been able to create numerous great results and achievements which have significantly improved the Finnish companies' competence in service business already. These results continue to make an impact as a keen part of involved companies' business strategies enabling their businesses to grow with high profitability. DIMECC FutIS has shown the effectiveness of well managed co-creation also in business problems.

I would like to warmly thank all the program participants and our financial partner Tekes for your efforts – these great results would not exist without you and your effective co-operation. Especially, I would like to thank the program manager Mr. Pekka Helle for his excellent work as an architect of the co-operation between different companies and leading researchers.

We in DIMECC believe that none of us is as smart as all of us together – We just need to be led in a manner that allows making the most out of the work of us all. Our network-based approach enables dynamic multidisciplinary ecosystems which can effectively find opportunities and exploit them in an agile manner. This is a significant knowledge base and a powerful asset for effective innovation. If you want to develop and grow, you should accept that change newer ends. We in DIMECC see the changes as new business opportunities and we are committed to serve the strategic renewal activities of the industry also in the future.

Dr. **Kalle Kantola**

EVP Strategy
DIMECC Ltd.

Welcome to the world of industrial service!

Being a forerunner is more about the journey than about reaching a final destination. DIMECC Future Industrial Services – or FutIS in short – is no exception.

You are holding in your hand a booklet that showcases academic and service business development results created in the DIMECC FutIS program. The booklet is an outcome of the work of some 400 academic and business professionals involved in the DIMECC FutIS program during its 5 year duration. The aim of this booklet is straight-forward. It reports new insights, work processes and tools that industrial companies need during their journey into an era of industrial service business and intangible value creation.

All journeys have a starting point. For FutIS, that starting point materialized when prominent industrial leaders decided to launch an innovation program that was geared towards industrial service. Not towards technology or R&D, but towards business! This made FutIS the first exclusively business program in DIMECC portfolio and helped it break new ground from day one.

It is easy to see why our industrial leaders wanted to start DIMECC FutIS program. The business landscape was changing rapidly, and industrial service was taking center stage in that transformation. The founders behind FutIS were quick to work out the skills, process and tools development needs to capitalize on the change.

In due course, program contents emerged to deliver to the challenge. On program completion, companies would have developed skills to identify new opportunities in terms of customers' business – rather than product – performance. Similarly, being able to build services and solutions – both 'hard' and 'soft' – to capitalize on those opportunities would have become another key skill. Finally, being able to market and sell those offerings on their business value – rather than on their engineering qualities – marked another set of skills required in the new business landscape.

With these – and many other – skills development objectives, research in DIMECC FutIS became industry driven. Not in a sense of applied research, but in a sense of research and business development stemming from companies' strategic development agendas.

Due to its business nature, DIMECC FutIS quickly became a true test bed for co-creation practices. It did not take us long to realize that

research could not be isolated in 'laboratories' – as was the case with many past technology programs – but had to be carried out in tandem and often onsite with the business development realities of involved companies. I want to thank all project managers and work package leaders for 'keeping calm and carrying on' when faced with co-creation challenges that – at the time – seemed insurmountable. After all, as the saying goes: victory belongs to those who persevere.

Another characteristic of being a business – rather than R&D or technology – program was a clear demand for accumulating individual project results into broader, more complex and strategic knowledge platforms. How can we coordinate work across projects in ways that help companies tap into broader solutions? How can we build more systemic 'knowledge platforms' instead of mere projects? These are questions that focus on aligning project work horizontally for a greater purpose – a true test for any program and program manager!

My experiences from heading a large innovation program were sometimes humbling, often varied, and always educational. Past initial confusion that followed hopping on a moving train (with three work packages, 11 multi-million projects, and some 300–400 professionals onboard), it became clear that my main role would be that of a custodian of a co-creation spirit and appropriate co-creation practices.

Past program managers have likened the work of a program manager to that of a gardener. I now understand why. An innovation program needs a custodian with a sense of stewardship: a neutral third party whose work is to ensure that the entire garden – and not just select plants – grows to its full splendour. Oftentimes all it takes is an easy hand to make sure plants have what they need to grow. Sometimes a steady hand on the tiller is called for to make sure the garden keeps growing the way it is intended to.

I am proud to say that the bulk of program results lives up to the promise entailed in the DIMECC FutIS program plan. The academic results make a sizable 'splash' with over 250 high quality international journal and conference publications. The business results are equally impressive: 105 joint projects with customers, 125 changes to products or services and 169 changes to operating procedures and processes. In addition, the practical service business development book 'Renewing industrial service – Service development methods and tools' (in Finnish: *Teollisen palveluliiketoiminnan uudistaminen – Kehittämisen keinot ja menetelmät; www.teknologiainfo.net)* packs a punch with its practical processes, methods and tools for industrial service developers. Finally, the booklet 'Future Industrial Services – Pathways and tools for service business renewal' (www.hightech.dimecc.com) highlights the wider impact of the program for the academia, industry and society at large.

I want to thank you all – company and research institute professionals, work package leaders, project managers, our main funding partner Tekes, program management group members, and the industrious and competent staff of DIMECC Ltd – for your professionalism, commitment and team spirit.

Your will, skills and commitment are the very stuff that makes a forerunner spirit come alive on the pages of this booklet.

Thank you and all the best!

Pekka Helle

Program manager
DIMECC FutIS

SSAB & Valmet – Our innovation program 'manifesto'

DIMECC FutIS was the first true business – not an R&D or technology – program that was planned and successfully started by DIMECC. In addition, DIMECC FutIS has been internationally one of the first and largest programs to promote service business logic and competence as a basis for business transformation. But what has made FutIS truly exceptional is not its size alone, but its variety of topics, broad participant scope, unique working process and program duration. Taken together, these program characteristics make FutIS a genuine hotbed for industrial innovations that help the Finnish manufacturing industry put itself in the front row in the on-going transformation towards industrial service business.

But nothing worthwhile is easy and FutIS is not an exception. It takes time to build trust among program members. It takes mutual respect and understanding to find a good working balance between what makes companies and research institutes different: aims, nature and pace of work, and the nature of results. Finally, it takes an effort to develop co-creation practices that allow best teams to come together and do work that leaves a legacy.

Having gone through the learning experience, we want to share our insights and learnings for those who design and manage future innovation programs. This is our informal innovation program manifesto:

1. Long duration ensures big innovations.
   Big innovations require a surprisingly long time to mature. While building a trusted and stable ecosystem of actors takes time and is important, actual project work should aim at a faster pace and more freedom to fine-tune the course along the way.
2. Focus on solutions to business problems, not on project results.
   Aim to build comprehensive business innovations. This means combining individual project results into broader and more strategic solutions to pressing company problems. This is what programs are for – they help combine project results horizontally into larger solutions that directly link to companies' business problems. Ultimately, programs should strive to help build platforms.
3. Aim at work that lives up to best international standards.
   Have ambitious aims and keep abreast of what others are doing internationally. The only true ambition level is the one that takes your innovation work to the top internationally.

4. Create a safe haven from the demands of daily business.
   Use innovation programs to 'insulate' innovation team members from the stress, short-term focus and profit pressures of daily business.
5. Secure processes that help build awareness.
   Innovations are necessarily new to most people. This means most innovations face an uphill struggle informing, convincing and exciting decision makers. Great programs have a process in place that helps build awareness about new opportunities and gain access to the c-suite.
6. Ensure managed cross-breeding to boost variety.
   Cross-breed different perspectives, actors, and disciplines to make the most out of your innovation work. Do not be afraid to combine results from different innovation programs!
7. Be aware of trends, but bring a unique angle.
   Being familiar with trends such as digitalization is important. But it is equally important to bring your unique viewpoint to make the most out of the trend.
8. Bring in first-class professionals.
   Great innovation work comes from first-class professionals. Make sure your team is multi-disciplinary and has adequate industry insight and business experience. Average is not an option.
9. Focus on co-creation practices to boost innovations.
   Appropriate co-creation practices help make the most of your innovation program. They help bring together best experts in your ecosystem while aligning their efforts with your overall business challenge – not the other way around.
10. Aim to secure the attention of a broader business audience.
    The bigger your innovation program, the more important it is to secure the attention of a larger business audience. Doing that starts with having the mindset, the resources, and the process in place to communicate your results to a broader audience.

We are happy to say that it has been a very rewarding journey to be a part of the FutIS program. At SSAB, we engaged FutIS to help us commercialize our steels. We drew on the work of a number of research teams that helped us ideate and develop a genuinely novel business model that we call a platform. It is exceptionally rewarding to see our own people get all fired up about the new platform-based business. We are really excited about the business opportunity!

At Valmet, we chose to target a number of different service development challenges. While none of the tasks were perhaps game-changing as such, together they imply a very serious improvement in our service

business development. Value-based pricing helped our service sales improve profitability. Another project helped us find new growth opportunities by understanding our service portfolio better. Yet another team helped us take a more coordinated approach to our agreement-based business. The capability audit helped us explore our solution business capabilities in a systematic fashion and to identify key development targets. All in all, we are very happy to have been a part of the FutIS program.

Although the DIMECC FutIS program has come to its end, the work continues. See you all in DIMECC's S4Fleet and Rebus! Value creation, relationships and Industrial Internet is what everyone is talking about – and for a reason. Let's make DIMECC a platform for business success also in the future!

Seija Junno
Business development director
SSAB

Juha Ojala
Global process owner
Valmet

Tampere University of Technology and Aalto University

DIMECC FutIS (Future Industrial Services) program planning was initiated at a time when Tekes Serve program and the BestServ project had just ended and the Finnish metal and engineering industry was increasingly awakening to the strategic possibilities associated with service-based value creation. While a lot of research and development had already taken place in the early 2000's on service processes and service business, the emphasis of previous research was laid on company-level studies, with their impacts and opportunities limited to single or only a few companies. An increasing number of companies in the Finnish metals and engineering industry was beginning to share an interest in understanding the opportunities for business growth and transformation related to service.

Thanks to DIMECC's and its shareholders' insight, research ideas for FutIS began to take shape. The timing was perfect: Universities and research institutes had already developed the basis for knowledge creation on industrial services. At the same time, industrial firms began to see the opportunities for collaboration among service business practitioners and researchers. In addition, the global scholarly community in the areas related to industrial service business was developing favorably. FutIS was initially intended as a five-year program with a dozen key partners and a budget of 5 MEUR. However, it raised a much broader interest and eventually grew into a consortium of over 30 partners and a budget of over 39 MEUR. Many companies established significantly bigger development programs associated with FutIS, to scale up their own service operations at the same time as they engaged in longer-term oriented research collaboration with universities and research institutes.

During the preparatory phase of FutIS, companies' rough ideas of interest were reflected upon the competencies and proposals of research teams in universities and research institutes. A key learning was that we needed to merge companies' goals with a clear research agenda – they could not be treated separately. After initial discussions, it became clear that companies were somewhat differently positioned concerning their phase of servitization: some companies were already highly advanced and had their interest in studying the enablers of efficiency in service operations, whereas some companies were either considering whether servitization fits their strategy in the first place, or innovating their service offerings towards new markets or for new technologies. Using three

work packages (service business mindset; integrated service development; efficient service operations) has proved logical and suitable as a mechanism to keep the big program focused and aligned with companies' unique needs.

FutIS program involved research teams that understood the particular requirements of a technology-centered context, demonstrated international ambitions in service business research, and brought in a unique capability profile that jointly became more than the sum of the components. The teams came from: Tampere University of Technology, Aalto University School of Science (4 teams), Aalto University School of Business, VTT, Åbo Akademi, and University of Vaasa. The teams portrayed a variety of interests in theoretical domains as well as a variety of methodological capabilities, enabling them to face demanding exploratory, analytical and constructive research tasks. Their mutual collaboration in and across the work packages has benefitted the entire program. The contributions of the research teams have appeared in a continuous flow of scientific articles, practitioner articles and presentations, and even books concerning service business.

FutIS activities have provided a variety of different opportunities for collaboration among researchers and the participating companies. The collaboration has involved a series of high-quality workshops, seminars and roundtable meetings that have focused on collective learning about service strategies, service operations management, service innovation, multi-party interaction in service systems and information technology – enabled transformation of service business. For researchers, the interactions have brought new thoughts, ideas and relevant conceptualizations for developing the primary research outcomes. For practitioners, they have developed capabilities and enriched applications of service-based business models.

Where many other programs and projects have sought immediate short-term impacts with one company or only a few non-competing companies and have been moderate in their scope and knowledge diffusion, FutIS has looked much longer into the future and affected companies' networks broadly. During the five year program, some companies have renewed their strategies, increased their service orientation and the volume of service-based offerings, some have experimented with new service activities, and even converted their ideas on how customer value is created. However, some companies have decided not to servitize their business but, rather, maintain their focus on goods-dominant businesses. Diverse strategic choices were expected as potential results in the participating companies and, through them, the program has improved the participants' capabilities to understand the grounds on which such decisions take shape.

At the universities, FutIS has made a significant impact not only in the formation and development of strong service-oriented research teams, but in affecting teaching and development of next-generation professionals. At Tampere University of Technology, new service ideas created in some FutIS companies have been used as material in teaching on service operations and innovations, both at the basic level and in advanced special assignments. New master's level courses have been developed, to ensure industrial service management capabilities among students of technology and industrial management. At Aalto University, the program has provided opportunities for industry-academia collaboration in teaching and management education by enabling the use of numerous visiting lectures, industry cases and real-life examples in courses dealing with industrial service operations, service business models and leadership in industrial organizations through the wide contact network of FutIS participants. In both universities (and of course other universities as well), several bachelor's and master's theses have been carried out, consequently feeding the industry with new experts able to develop industrial service business. FutIS program has offered relevant, rich and exceptional sets of research material for dozens of doctoral candidates that have developed their doctoral research within the program. These datasets have been and will continue to be converted into new scientific knowledge through dissertations and scientific articles. By the results gained through the FutIS program, Finnish industrial service researchers will continue to make an impact on the international research community over the forthcoming years.

FutIS has promoted the interplay of four main theoretical arenas instead of focusing on just one: service business strategy, service marketing, service operations, and service innovations. The research and development activities of FutIS have covered the entire lifecycle of service business, from the search of business opportunities and emergence of service-centric operations to developing the productivity of service businesses. Researchers have purposefully challenged and questioned the prevailing assumptions concerning service, value creation and business transformation in technology-based firms. The focus has been on the business opportunities provided by future industrial services – i.e., understanding of services that do not exist, yet. In this regard, the work has been built upon future uncertainties, opportunities and challenges that have been perceived by firms in their ecosystems. Sharing the participants' views on these uncertainties has promoted courage for the firms to enter the uncertain futures in a responsible and sustainable manner.

Through the five years of active interaction of different but like-minded actors, FutIS has become a network of friends and a forum for learning for Finnish researchers interested in industrial services. In addition,

it grew into a community of interest and a platform for collaboration for industrial actors. The five years of operation is a long enough time to establish a shared identity for researchers and practitioners, even if they operate in different locations. On the other hand, it is a short time for strategic transformation and international-level impact. We believe that FutIS has solidified the foundation for Finnish industrial service research to succeed internationally, established cross-university linkages that did not exist before, and assisted fruitful collaboration in a versatile network where all partners have learnt from each other. The contributions of numerous actors in this collaboration have fostered fruitful combinations of experiences and empirical insights with theoretical knowledge from the fields of operations management, strategy, information technology and service innovation. This cross-fertilization has fostered knowledge creation on the provisioning of industrial services, which will contribute to the international competitiveness of the Finnish metals and engineering industry not only during the active period of the program, but also during the years to come.

Miia Martinsuo
Professor
Tampere University of Technology

Risto Rajala
Associate Professor
Aalto University

DIMECC Future Industrial Services in a nutshell

Company partners:

Cargotec Finland, MacGregor Finland, Cembrit Production, Cramo Finland, Finnair OYJ, PrimaPower, Kone, Konecranes, Konecranes Service, Valmet (formerly Metso Pulp and Paper), Nokian Tyres, OP Palvelut, SSAB (formerly Rautaruukki), Ruukki Construction, Ruukki Metals, SKF Group, Stalatube, Suomen Lämpöpumpputekniikka, T-Drill, Vacon, Wärtsilä OYJ (formerly Wärtsilä Finland), YLE, Ahlstrom, ABB Marine Services, Outotec, Vexve,

Research institute partners:

Vaasan yliopisto, Tampereen teknillinen yliopisto, VTT, Åbo Akademi, Aalto University School of Science: Innovation Management Institute (IMI), Service Innovation Group (SEM), Logistics Research Group (LRG), Software Business and Engineering Institute (SoberIT), Aalto University School of Economics.

Program:

Duration	1.10.2010 – 30.6.2016
Budget:	35.1 M€
Company budget	17.7 M€
Research institute (RI) budget	17.4 M€
Number of companies	26
Number of research institutes	9
Number of projects and tasks	10
People involved	~300 – 450

Academic impact:

Number of academic publications:	131
Number of academic joint publications:	16
Number of conference publications:	108
Number of joint publications with companies:	5
Extent of international research exchange:	61 months

Service business development impact:

Number of joint projects with customers	105
Number of changes in products and services	125
Number of changes in operating procedures	169
Number of exployees involved in FutIS work	~250 – 400

SERVICE BUSINESS MINDSET

Service business mindset – the first part of the DIMECC FutIS program – investigated the service business oriented mindset and strategy of technology-based firms exploring new business opportunities with a focus on services. Prior research has often treated services as an add-on or complementary feature of products, whereas marketing-centered research encourages seeing them as a framework of new logic through which business should be examined. Industrial services in technology-based firms can neither be treated as add-ons because of their significant business potential, nor can they be viewed merely through a service-oriented marketing lens because of the significant dependency on the technological assets of both the service providers and customers. Instead, the adoption and expansion of services in technology-based firms must be seen as a long-term pursuit in which firms may need to alter their entire business logic to make services a viable business.

Service business mindset sought new knowledge at the intersection of industrial service operations and their business potential, along with unknown customer and market futures in company contexts where service business is being adopted and expanded. Service business mindset consisted of three research projects (figure), involves a network of 15 firms and three research institutes, and has engaged international universities in knowledge and research exchange.

Tuomo Eloranta
Tea Lempiälä
Jaana Näsänen
Jussi Pihlajamaa
Outi Vanharanta
Aalto University

RINE – Requirements for innovative environments in service business

Summary The RINE project studied the requirements posed by service development activity on the innovation environment of organizations. RINE examined the everyday practices of organizational actors involved in innovation activity in various positions and at different organizational levels. A particular focus was on collaboration practices at various stages of the development process, as well as the social dynamics underlying organizational transformation. The study deepens understanding of how organizational structures aimed at supporting organizational transformation toward innovativeness can be aligned with the actual practice of organizational actors. From the perspective of collaboration practices during the service innovation process, our results discuss the success factors and challenges of virtual innovation platforms, requirements of collaboration between service and product developers, challenges and success factors related to collaboration in partner ecosystems, and the integration of end user understanding into the service development process. At a more micro level perspective of organizational transformation, our results discuss the linguistic practices used in designing and furthering organizational change as well as the divergence of perceptions related to the objects of change.

PROJECT NAME

RINE

Service Business Mindset

Tuomo Eloranta
Aalto University

Driving service innovation using a virtual innovation platform

Short summary

Involving a company's entire workforce in innovation activities through a virtual innovation platform can be a very effective way to grow an innovative culture in the organization and generate good ideas for new services, products, and operational improvements. However, the implementation of such systems also requires careful planning and changes to other organizational structures of the company.

Motivation and aims

The finance industry has long been under a significant transformation and this calls for an openness to embrace new ways of working. In particular, new ways of soliciting ideas from people in the grass roots has become important. Virtual innovation platforms enable people to participate in developing ideas in a way that is not constrained by time, space or organizational role.

Results

The result comprises a virtual innovation platform where all employees can post their ideas for new services or operational improvements as well as browse and give feedback about the ideas of others. The virtual innovation platform works by providing an interface between company employees, those who are responsible for gathering innovative ideas, as well as those who are tasked with implementing the ideas. Using virtual innovation platforms successfully requires that people implementing the ideas are well integrated with and committed to the screening and evaluation of gathered ideas already during early phases of the process.

Application and impact

The introduction of the virtual innovation platform was a significant success, resulting in hundreds of new ideas that garnered thousands of comments during the first year of use. This helped the company transform its organizational culture into one that is more supportive of innovation efforts and to fine tune its organization to ensure that good new ideas are turned into innovations more readily. As a result, the company is better prepared to take advantage of various new business opportunities arising from the transformation of the financial industry.

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KEYWORDS: Innovation Management, Virtual Innovation Platforms, Employee-Driven Innovation, Idea Management

INDUSTRIES: Financial Services, Manufacturing, IT

PROJECT NAME

RINE

Service Business Mindset

Jaana Näsänen
Aalto University

Using myth has a twofold effect on organizational change

Short summary

Organizational talk is a focal point for creating organizational change. Workshops are popular ways to organize collaborative innovation activities and talk is a principal method for conducting the workshop. However, understanding how talk and especially spoken myths, contribute to the formation of organizational change has been less explored. In this project, we explored how using myths affects the way in which an organization intends to operate in the future. The results explain how using myths in the process of creating change has a twofold effect on finding novel solutions. The results help managers identify the situations in which it is useful to use myths. Doing so helps identify novel solutions to strategic decisions.

Motivation and aims

Talk is a central way to conduct work in organizations, especially for managers, and a great proportion of organizational change consists of talk in an interactional setting. This is why it is important to understand how taken-for-granted ways of speaking are disrupted in daily talk by legitimate new ways of speaking that allow organization to change.

Results

The result involves a framework that explains how organizational talk affects change in organizations. The framework explains how using myths (i.e. organizational talk) has a two-fold and even paradoxical nature when used to communicate strategic changes in organizations. On one hand, a myth may convey new ways of speaking that provide tools for producing different versions of an organization's future and a novel organizational identity for its members. For example, the new ways of speaking may allow organizational members to change their identity from a manufacturer to a service provider. On the other hand, a myth helps convey beliefs and norms as to how the organization should operate in the future. Such beliefs serve to provide a single and dominant version of the future, thereby excluding alternative ways for designing future solutions.

Application and impact

The findings suggest that persons amidst organizational change should be aware of the power of using myths when designing and communicating change. Using myths helps broaden current social worlds which – in turn – helps create and adopt even radical ideas about organizational change. When an organization's vision of change is fixed, using myths may help create novel ideas thus strengthening the vision. When the vision of change is open, using myths helps narrow down the number of available options and, ultimately, to produce a single and dominant version of the future. An important feature of myths is that they facilitate a transformation in how people talk about the future in ways that allow the organization to change.

Company comment

"The RINE project has provided us with valuable insights and research findings that have given us novel perspectives and concrete suggestions on how to design, communicate, and implement strategic change."

***Petri Home**, YLE*

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KEYWORDS: Transformation process, change, service organization

INDUSTRIES: General

PROJECT NAME

Service Business Mindset

RINE

Outi Vanharanta
Jaana Näsänen
Aalto University

Construction of resistance in spatial change

Short summary

Knowing how employees may resist an organization's transformation process helps plan and communicate the intended transformation better. The results of this study help understand how employees at different levels of the organization may use organizational artefacts differently to make sense of the transformation around them. The findings help managers make different employee perspectives to change explicit and to link the intended transformation to existing work practices. This helps managers plan and carry out more effective transformation processes.

Motivation and aims

Changing an organization's work spaces is today common means through which organizations aim at increasing collaboration between employees and enhancing their innovativeness. To make such transformation smoother and more likely to succeed, it is important to understand how different employee groups may make sense of the intended transformation differently. Even more so, it is vital that managers understand the different reasons for and ways in which employees may resist the intended transformation.

Results

The result involves a framework that explains how employees make sense of changes in their work spaces. The framework helps understand how managers and employees differ in making sense of changes in their work environment in different ways. First, employees tend to make sense of changes in their work spaces from the perspective of current working practices and existing values. Second, managers' strategy talk tends to focus on the future effects of changes in work spaces.

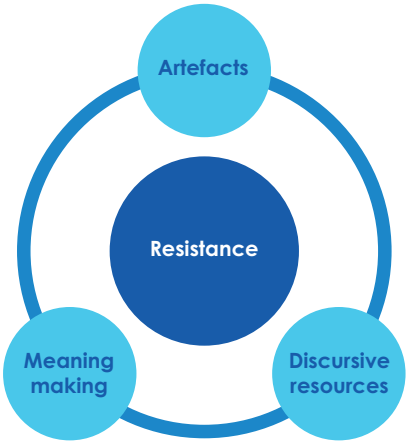

Figure 1. Construction of change resistance in spatial change

More specifically, the framework explains how managers' strategy talk is focused on altering organizational structures while not paying attention to changing employees' assumptions and meanings towards changing their work spaces. The table below summarizes the differences between strategy talk and employee talk in a specific company case.

Table 1. Differences between strategy talk and employee talk

	Strategy talk	Employee talk
Focus of talk	**Future working conditions and practices:** Why the future working conditions and related practices are superior to the existing ones.	**Present working conditions and practices:** how the change will deteriorate the possibility to employ current work practices.
Symbolic meanings	**Fixed workstations** limit collaboration and ad hoc encounters.	**Fixed workstations** represent acknowledgement, continuity of employment and respect onthe part of the organization for employees.
	Presence at the office allows for micro management.	**Presence at the office** is an important measure of productivity.
	Equal working conditions signify work place democracy.	**Equal working conditions** signify insensitivity with respect to different job descriptions.

Application and impact

The findings help managers plan transformation processes better. Firstly, the findings help understand how different employee groups may make sense of the transformation around them differently. Knowing why some employee groups may resist the intended transformation helps managers make the perspectives of each involved employee group explicit at the onset. Secondly, the findings help link the intended transformation to existing work practices. This helps managers communicate what is changing and how the change affects peoples' work.

Company comment

"The project helped make the differences between strategy talk and employee talk more visible. This revealed to us just how complex and subtle an underlying resistance to change can be. Based on the findings, we were able to plan the next steps of our transformation process in a way that allowed bridging the gap between change initiators (i.e. managers) and change receivers (i.e. employees)."

Petri Home, *YLE*

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KEYWORDS: Organizational transformation; resistance; materiality

INDUSTRIES: General

PROJECT NAME

RINE

Service Business Mindset

Jussi Pihlajamaa
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Front-end development in partner ecosystems

Short summary

Organizations are striving to develop new kinds of collaboration platforms in order to find solutions to increasingly complex business problems. The results help identify a number of challenges and tensions related to operating in such a partner ecosystem. Openness tension, motivation tension, and legitimization tension are examples of such tensions. The findings help managers become aware of potential tensions when developing an ecosystem innovation strategy, and to devise practices and processes that help reduce such tensions.

Motivation and aims

The purpose of this study was to identify challenges and supportive elements of front-end development in a collaboration platform (partner ecosystem). The need was related particularly to widening the scope of innovative activity for furthering service development in partner ecosystems. The purpose of the study was to find ways in which service development could be better supported in partner ecosystems. By interviewing different parties in the development ecosystem of which SSAB has taken part, we identified the central challenges related to this activity, as well as ways in which it could be improved.

Results

The results of this project are two-fold. First, the result involves a set of tensions that characterizes joint development in the front-end phase of the innovation process:

1. **Openness tension:** This tension involves disclosing enough information to keep the discussion fruitful and moving forward while being mindful of not giving up anything classified. This was regarded as hindering the development of a fruitful discussion as participants were careful about sharing their organization's information.
2. **Motivation tension:** This tension is about striking a balance between how much effort should be put into the joint discussion if concrete outcomes were uncertain. However, to some degree general level

discussions need to be conducted in order to identify common goals and interests. Due to the differences in maturity levels, the partners in the ecosystem sometimes felt they were helping others in solving problems they themselves had already solved and thus the benefits of such discussions were seen as one-sided.

3. **Legitimization tension:** This tension is about assigning resources within organizations for ambiguous and emerging activities. Lack of legitimacy with respect to front-end activities and particularly ideation outside the organization hindered the commitment to these activities. Thus, the effort would need to be structurally recognized to find legitimacy within the organization. The challenge lies in getting the organization to commit to the joint development effort while maintaining the level of flexibility required when dealing with ambiguous and serendipitous efforts.

Second, the result involves elements that help overcome the three identified tensions and, in so doing, support developing a more systematic innovation ecosystem strategy. The elements are depicted in the table below:

Table 1. Elements of supportive innovation ecosystem strategy

Elements of Supportive Innovation Ecosystem Strategy	
Business oriented information management	• Managing information in new ways resulting in improved alignment between technology initiatives and business goals. • Identification of own latent potential.
Innovative champions, networkers and brokers	• Searching systematically potential and unexpected partners. • Collaboration platforms like UXUS and FutIS. • *"All the best partners are found by chance. The only way to make progress is to improve the possibility of chance – serendipity."*
Knowledge and understanding of partners and ecosystem risks	• It is important to recognize the maturity and interests of potential platform partners. • It is important to understand the limitations caused by competition. • Identifying the right partners for different stages of the innovation process.
New kinds of innovation processes and practices	• Radical, agile, experimental, fast failing, and learning. • Flexible agendas and decision-making. • Utilization of different kind of organizational resources (beyond R&D). • Establishing formal projects with external partners for ideation experimentation to gain legitimacy.

Application and impact

The findings help identify tensions that hamper collaboration among members of a collaboration platform. In addition, the findings help actors critically examine their own practices and procedures, as well as how they impact collaboration. More generally, the findings help managers plan joint development efforts with external partners more effectively and systematically.

Company comment

"Identified issues are very recognizable in our organization. One challenge is how the debate will go through the entire organization and how are we able to find common areas for development. An interesting solution would be to launch a several-month agile and experimental project together with selected internal and external partners and search for new development and business opportunities."

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KEYWORDS: Ecosystem, front-end, collaboration platform

INDUSTRIES: General

PROJECT NAME

RINE

Service Business Mindset

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Improving the integration of technology and service developers

Short summary

Traditionally, challenges in integrating service and technology development are often attributed to lack of customer orientation in technology-focused innovation activities. The results of this study show how this dichotomy is actually unfounded and how both service and technology development can be highly customer-focused but in very different ways, which can create conflicts between the two activities. The findings help managers bridge the conflict, thereby increasing the innovation capabilities of manufacturing organizations.

Motivation and aims

Developing services that are related to high-tech products requires significant input from the developers of such products. This is why it is important to make collaboration between service and technology developers as smooth as possible and to manage potential tensions between the two groups proactively. The purpose of the study was to find new ways to improve the collaboration between service and technology development.

Results

The study involves a framework that helps explain potential tensions between technology and service developers. First, the framework shows that technology and service developers follow different logics. While technology developers aim at customization, service developers aim at standardization. Both logics are customer-oriented, but in different ways. Customization is largely about meeting the unique needs of specific customers, while standardization aims to improve the quality and speed of service delivery to all customers. The challenge is that the two logics can be contradictory, forcing service and technology developers into compromises that may create tensions. The key to managing these tensions is to understand that both logics serve an important purpose for the company. While customization facilitates renewal of technological offerings, standardization achieves operational efficiency.

Second, the framework demonstrates that while service developers require input from technology developers, the fruits of the work of service developers is not visible to technology developers. This may create a feeling of asymmetry, and lead to tensions between the two groups. It is important that managers give both groups the recognition and respect they deserve.

Application and impact

The findings help managers recognize that service and technology developers are both customer-centric in their unique ways. The findings help managers take measures to bridge the potential conflict between the two groups. First, managers do well to recognize and respect the work of both groups. Second, they can change how members from the two groups meet and interact with each other. Doing so helps improve how service and technology developers work together and – in so doing – improve the innovation capability of the entire organization.

Company comment

"The research aimed at recognizing challenges and opportunities in the use of social media for connecting expertise globally and especially in the interface between product development and services. The research provided findings that could feasibly be implemented in day-to-day work to further improve cooperation, both functionally and globally."

***Mikael Jåfs**, Director R&D, Outotec*

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KEYWORDS: Innovation Management, Collaboration, Customer Orientation, Design-for-Service

PROJECT NAME

RINE

Service Business Mindset

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Transition-driven transformation in enhancing innovativeness

Short summary

Transformation processes aiming to enhance the innovativeness of organizations are often change-driven. This means that organizations emphasize structural changes as a means to alter organizational practices. However, putting the focus exclusively on structure runs the risk of omitting human factors. The results of this work help managers plan transformation processes that genuinely address both structural and human factors. Doing so helps managers plan more effective transformations.

Motivation and aims

Organizations aiming to enhance their innovativeness often focus on structural changes. This makes their transformation process change-driven. However, failing to address a process of transition – that is, how individuals re-orient their work practices and underlying assumptions and values – sets organizations up for failed transformations. This makes it crucial to know how to build a holistic transformation process that involves both structural issues and issues that relate to employees work practices, assumptions and values.

Results

The result involves a 7-stage process model called transition-driven transformation. The model has two functions. First, it helps understand transition as the missing part of traditional transformation processes. While change implies changing the structure of an organization, transition implies a re-orientation in an individual's assumptions, values and daily work practices. For a transformation process to place successfully, both change and transition are needed.

Transition requires management attention and additional investment. This means that prior to and simultaneously with the implementation of a new structure (i.e. change), everyday work practices and underlying assumptions and values of organizational members (i.e. transition) need to be considered.

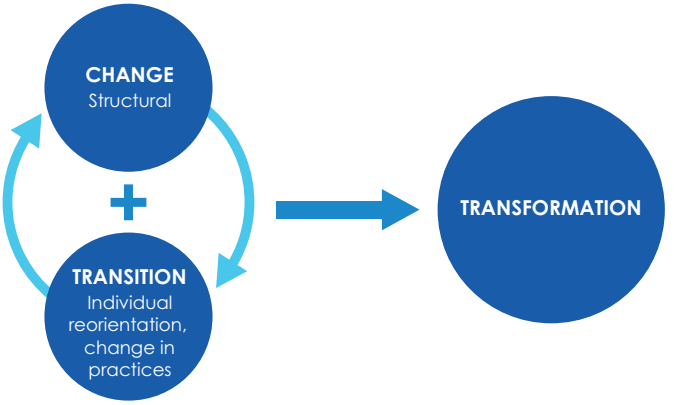

Figure 1. Elements of transformation

Second, the model outlines a 7-step process that helps make transition a legitimate part of a transformation process.

1) Analyze assumptions and values underlying the goals of the transformation.
2) Identify relevant stakeholders in the transformation.
3) Analyze a) current work practices (what people actually do and why) and their meaning with respect to each job description as well as the wider context; and b) the meanings, assumptions and values attached to the objects related to the transformation.
4) Identify aspects that need to be considered when planning the communication and implementation of the intended change. This can be done by analyzing possible gaps between the results of phase 1 and 2.
5) Identify transition needs and means. This can be done by analyzing the results of phases 1, 2 and 3.
6) Find and communicate links between "new" and "old". Doing so helps make transformation understandable and legitimate.
7) Implement the transformation.

Application and impact

The findings help organizations make transition a legitimate part of their transformation processes. Doing so helps them address human aspects of transformation in addition to structural aspects. The immediate benefit is that managers learn to introduce systems that become established in employees' everyday practices more easily. A more overarching benefit is that organizations learn to make transformation processes more likely to succeed.

Figure 2. **Transition-driven transformation**

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KEYWORDS: Transformation, innovativeness

INDUSTRIES: General

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SBC– Service business capabilities in technology-based firms

Short Summary

Service business capabilities (SBC) project dealt with the transformation of systems, processes, and competences needed in industrial firms' mindset, strategies, practices, and customer and supplier interaction when they move toward service business. The project cast light on four main topics: product-service systems oriented toward a customer's future, customer-oriented service offering development, co-creation in customer and supplier networks, and strategic change towards service business (figure 1).

The findings help industrial companies understand their challenges and opportunities for servitization along a process of evolution. In addition, the findings help manufacturing companies develop services and service business in-house and in collaboration with customers, suppliers, dealers and various third-party actors such as designers and contractors. The involvement of network actors in service development helps the manufacturing firms to improve the image of services, customers' service adoption, and the likelihood of the customers' purchasing decision for the manufacturer's goods. Finally, the findings revealed that not all manufacturing companies choose to servitize.

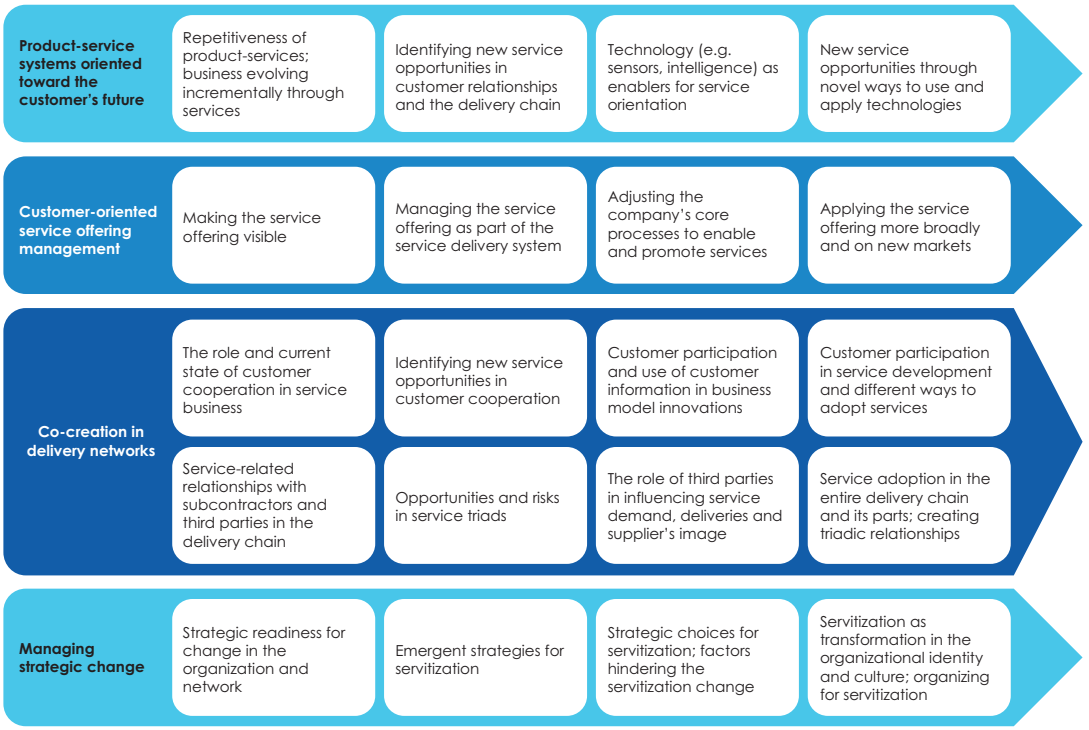

Figure 1. Summary of phases covered in the evolution of service business capabilities

PROJECT NAME

Service Business Mindset

SBC

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Requirements and prerequisites for the servitization of manufacturing companies

Short summary

Servitization holds a great promise for many manufacturing companies. Yet, servitizing a goods-centric firm's manufacturing business requires a considerable effort. This makes it crucial for managers to know what is required for successful servitization to take place. The findings of this study help manufacturing companies review whether they have the required managerial support in place, and whether their business context and operative processes are conducive of servitization success at the early phase of servitization.

Motivation and aims

Servitization requires a considerable effort of time, money and energy from goods-centric firms. Few companies know in advance what requirements and pre-requisites are needed for the early phase of servitization to be successful.

Results

The result involves a framework of factors that impact industrial companies' readiness for the early phase of servitization. The framework explains successful servitization as a function of two related phenomena.

Figure 1. Requirements for the early phases of servitization of manufacturing companies

Managing the servitization change. First, the framework explains successful servitization as a result of capacity to manage the servitization change. Because servitization is a significant change for a traditional manufacturing company, a strong management commitment is required to succeed in the change effort.

Another requirement on change management relates to managing constant changes in early-phase servitization. Typically, early phase servitization implies that there are many change efforts going on simultaneously or one after another. This poses a threat as employees may grow tired of on-going change. On the other hand, early successes may alleviate a sense of being over-burdened with changes and raise interest and excitement instead.

Pre-requisites for servitization. Second, the framework explains successful servitization as a function of additional three pre-requisites. Production maturity implies that companies need to have a production culture that is geared towards service, that production quality is at a high level, and that the work culture supports services. Selling services implies that companies have their sales process, capabilities, culture as well as offering geared towards services. Furthermore, companies aiming to servitize their offering need to have a solid enough financial situation. This allows funding servitizing efforts even when the overall economy is in turmoil.

Application and impact

The findings help industrial companies evaluate their servitization capacity better. The findings help consider whether their management has the change management capacity, skills and energy to deal with servitization change. On the other hand, the findings help consider whether they have the required production maturity, sales skills and financial stability to succeed in the servitization challenge. Overall, the findings help manufacturing companies make better choices regarding whether to pursue servitization or not.

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KEYWORDS: Servitization, manufacturing companies

INDUSTRIES: Manufacturing companies

PROJECT NAME

Service Business Mindset

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Konecranes

Customer's new technology adoption drives supplier's service innovations

Short summary

Service innovations hold a great promise for manufacturing companies expanding their service business. Yet, few companies know how to use their customers'adoption of new technologies as a source of new service business. The findings of this study help manufacturing companies recognize different stages of technology adoption as an opportunity for service innovations. The findings help manufacturing companies adopt service business faster and with lower costs.

Motivation and aims

Service innovation is often approached from a service-centric perspective. Yet, knowing how customers adopt new technologies helps identify novel opportunities for new and more advanced services. This represents an untapped service business expansion opportunity.

Results

The result involves a framework that helps reveal service innovation opportunities during a customer's technology adoption cycle. The framework uses episodes and events along a customer's technology adoption timeline. As presented in Figure 1, each event on the timeline is a service opportunity for the service-oriented manufacturing company. Every time the manufacturing company and the prospective customer company meet, potential service needs of the customer company may emerge.

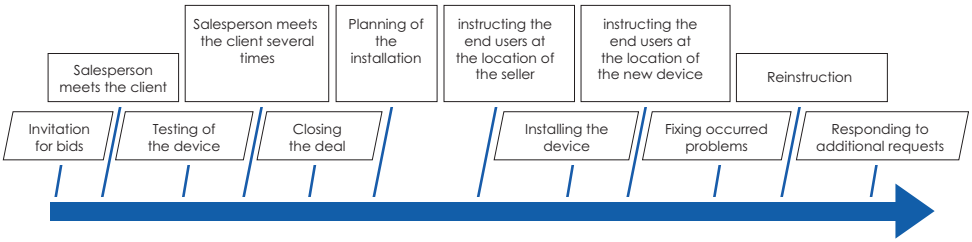

Figure 1. Service innovation opportunities during a technology adoption timeline

Invitation for bids. Being invited to bid creates service opportunities. The request-to-bid provides the manufacturing firm with crucial information on opportunities to help train, install, or maintain the novel technology. Tapping into the opportunity calls for carefully analyzing the invitation to bid as well as the customer's technology use and operations.

Closing the deal. Closing the deal offers another opportunity to identify new service needs. Doing so helps sales and service staff identify services the customers may need in the future. The key lies in paying careful attention to the behavior and talk of customer representatives.

Using the technology. New service opportunities can also be found when fixing malfunctions or problems the customer may face. In addition, responding to other usage problems such as maintenance, upgrades and renewal present an opportunity.

Application and impact

The findings help manufacturers approach their customers' adoption of technology as a service opportunity in two key ways. First, the findings help manufacturers address both expressed and latent needs. Second, they help manufacturers target different groups of professionals within the targeted customer organization.

Company comment

"We have noticed in practice that service innovation opportunities appear in various phases of taking new technology into use at customer sites. While the adoption process proceeds, not only does the customer's possible target group change, but also the vendor uses different experts in the sales and delivery process based on the competence needs of each process phase. This creates a challenge in recognizing the service opportunity and to respond accordingly. Conventionally, sales peopleare sensitive to the customer's needs, while for example a technician involved inequipment commissioning may be focused on technical issues. The nature of the emerging service opportunities may vary along the technology adoption timeline. An effective way to realize the opportunities would require everybody involved in the process to be an active player in service development and selling, despite their main role. This will mean new development needs, such as in training and work scope."

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KEYWORDS: Technology adoption, service opportunity, service innovation

INDUSTRIES: Manufacturing industry

PROJECT NAME

Service Business Mindset

SBC

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SSAB

Improving a supplier's position in project network through services

Short summary

Developing relationships through services may help component suppliers re-position themselves in their network, and to influence the customers' purchasing decisions. The challenge is that few component suppliers have close or contractual relationships with the customers that decide on component use. Many components are procured through competitive tendering by the system manufacturer. The findings help component suppliers learn about the opportunities that designers and contractors can have in influencing the customer's purchasing decisions. This helps component suppliers offer services to designers and contractors and, in so doing, develop relationships that improve their position in the project network.

Motivation and aims

Component suppliers do not necessarily know how to offer services to designers and contractors in their network and, thereby, how they can improve their relationships with their customers. The findings help component suppliers offer their expertise toward designers and contractors and influence the customers' purchasing decisions.

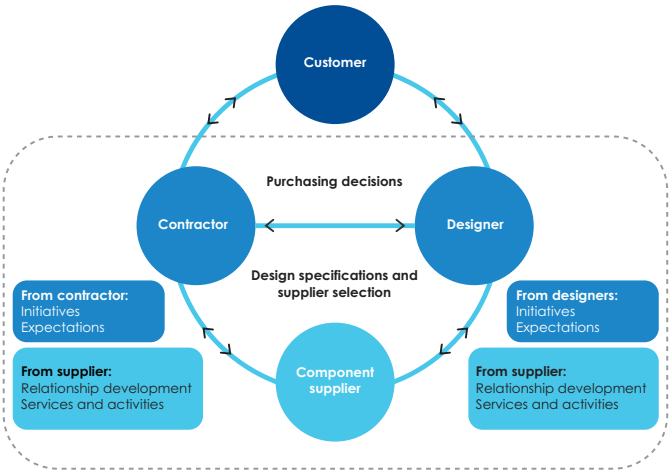

Figure 1. Influencing purchasing decisions through designers and contractors

Results

The result involves a framework that helps explain how industrial customers' purchasing decision are influenced by contractors and designers. Designers (i.e.; architects and structural engineers) help industrial customers specify designs for intended offerings. In addition, they may influence how the main contractor and its suppliers are selected. Contractors help their end customers by developing and building their investment goods. It is important that information and expertise of the component suppliers is available at the right time during the design process.

The framework illustrates how component suppliers can use services to target designers and contractors during the specific phases of a project's lifecycle and potentially improve their position in the project network.

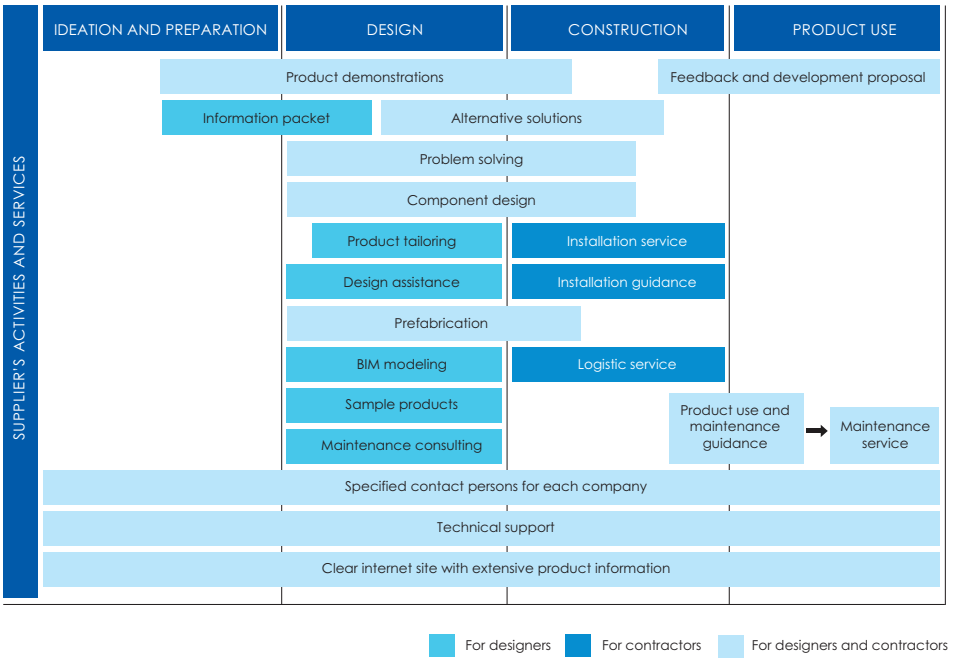

Figure 2. Supplier's services towards designers and contractors

Application and impact

The findings help component suppliers take a more proactive stance towards designers and contractors. Doing so helps them influence the end-customers' purchasing decisions. This calls for developing specific service offerings for the two groups. Component suppliers can develop services that help designers be aware of, choose and promote the supplier's components. Similarly, they can develop services that help contractors with the logistics and delivery of required materials. Beyond individual

companies, the findings help foster a closer collaboration between suppliers, designers and contractors within the project network. This helps reveal and enable new service innovations, thereby promoting a transformation of the entire industry.

Company comment

"Participating in FutIS with experienced researchers has revealed many new possibilities for our business development and R&D. Many new ideas have been shared and discussed with the company partners. In this research, the expectations of third parties showed the direction to our development work with them. The research indicated we could help our customers as well as designers and contractors in the ideation and usage phases and find new service business potential."

***Pasi Koskela**, Supply chain engineer, Cembrit,*
***Sami Packalen**, Marketing and sales director, Stalatube,*
***Seija Junno**, Director business model development, SSAB,*
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KEYWORDS: Services, Relationship development, Construction industry

INDUSTRIES: Construction

PROJECT NAME

Service Business Mindset

SBC

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Using customer, retailer, and seller insights in service development

Short summary

Manufacturers' goods-related services are typically delivered through a retailer network. The different actors in the delivery chain need to be engaged in developing services, because they all have their own divergent potential for creating service ideas. Manufacturers' knowledge of customers can become blurry when only retailers have a direct contact with customers. The findings show that the different actors provide different service ideas. Companies must carefully plan which delivery chain actors they want to involve, and how, in service development.

Motivation and aims

The aim of the study was to find out what kinds of ideas different actors can provide for a manufacturer's service development. Insights were gathered from service users, retailers and sellers. The Hakka Guarantee offered by Nokian Tyres was used as a case service. The Hakka Guarantee is a unique benefit for customers owning Nokian Hakkapeliitta or Hakka tyres. It is valid for one year in Finland, Sweden, and Norway and offers peace of mind to customers by guaranteeing a new free tyre for one damaged beyond repair.

Results

When developing a service, it is important to have in-depth knowledge about end-customer needs and wishes in order to construct an offering customers will be eager to adopt. When the service is distributed through retailers, they not only receive direct customer feedback but also can influence a customer's willingness to adopt services. Therefore, using both customer and seller insights in service development can create easily marketable services that are responsive to customer needs.

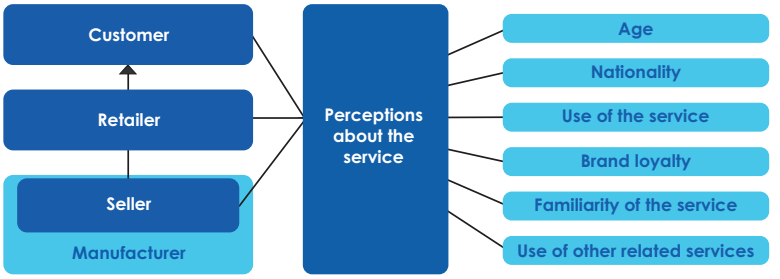

Figure 1. **Illustration of the study**

Application and impact

Services can provide the company an opportunity to be in direct contact with end customers, thereby enabling the acquisition of knowledge about them to better meet their service needs. The results highlight the importance of considering both end customers and retailers when planning and introducing new services. As many manufacturing companies utilize retailers in their sales processes, it is important even in the planning phase to consider how retailers will sell these services and ensure the service is intriguing to the end customer. To be successful, services need to be superior and provide a competitive advantage through satisfied customers. This study helped the case company understand their customers and the complexities of introducing new services. In the future, the company is better equipped to deal with the challenges of service development.

Company comment

"FutIS gave Nokian Tyres an interesting opportunity to study the complexity of service offerings with the professionals of TUT.
We gained a lot of new ideas and learned from the projects of other member companies in the seminars organized by DIMECC."

***Tuija Aro**, Business Development manager of Nokian Tyres*

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KEYWORDS: Service development, customer, retailer, insights

INDUSTRIES: Manufacturers offering services for end customers through retailer network

OIS – Organization of Industrial Service business

Organization of Industrial Service business (OIS) aimed at creating new knowledge on the organization of industrial service business. As such, the project concentrated on the organizational change in servitization. The process of servitization is known to interplay with strategic position, operation, and organization. This has implied studying and developing four broad service topics: service organization and customer co-creation, service (organization) capabilities, servitization process, as well as effects of service technologies on service organization.

Figure 1 illustrates the collection of core OIS topics. In addition, the figure illustrates servitization research taking place across a variety of units of analysis: value systems, inter-organization service interactions, intra-organizational service interactions and inter-personal service interactions), as well as utilizing both objectivist and subjectivist research designs. The findings will help industrial companies tackle their organizing issues when building industrial service business.

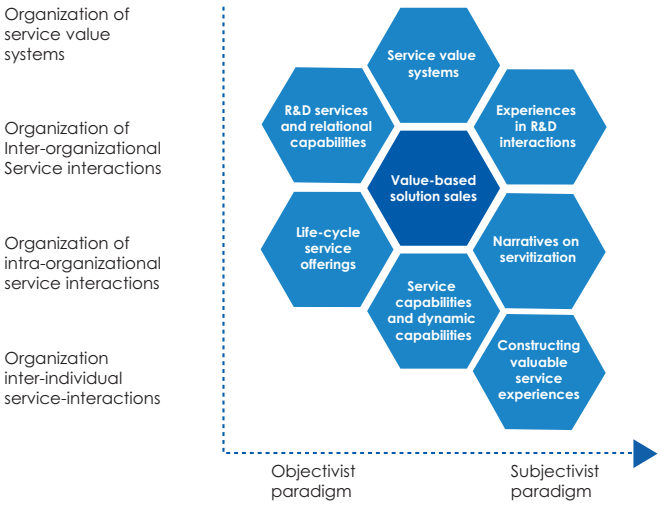

Figure 1. Key topics in the research on Organization of Industrial Service business

PROJECT NAME

Service Business Mindset

OIS

Tuomas Huikkola
UVA

New service-product development, commercialization, and productization

Short summary

For many industrial companies, offering services is a means of improving profits and growth. Yet, developing new service-products brings about a risk of a "service paradox". Service paradox describes a situation where providing additional services does not translate into equivalent company results. Resolving the service paradox requires standardization, modularization and productization of services.

Motivation and aims

The construction industry has traditionally slowly adapted to new innovations as price-based competition has overridden the new innovations. However, some customers have seen the benefits of sourcing larger customer solutions from few suppliers, thus facilitating suppliers' innovativeness. The case company is a company that has attempted to differentiate itself in the construction industry by developing new customer solutions. Both the supplier and its customers have viewed these solutions as potentially attractive because they provide opportunities to avoid price-based competition, increase service innovations and decrease customers' transaction-costs.

Results

The results of this action research indicate that developing, commercializing and productizing service-products is far from easy. Developing services may not be attractive in the short run for a number of reasons. First, developing services moves the focus away from the existing business. Second, companies may face difficulties selling their new services. Third, customers may be hard to convince or even skeptical about the benefits of new services. Fourth, developing services requires that a traditional manufacturer develop new competences. Manufacturing companies can overcome these challenges by

1) securing top-management support,
2) arranging development-team meetings regularly,
3) appointing a dedicated development-manager and
4) following up on the development of new services constantly, and
5) by making sure the new services are standardized and modularized.

Application and impact

New service-products have become vital for the case company as they account for a remarkable share of the company's total turnover today. The service-products are also less sensitive to traditional business-cycles and provide opportunities for higher margins than traditional equipment rental business. New service-products also differentiate the case company from other equipment rental companies.

Company comment

"Our goal is to expand our markets, develop our services more purposefully and search new ways to serve our existing customers better."

***Kai Palmén**, Development Manager at Cramo Finland Oy*

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KEYWORDS: New service development, new service piloting, new service launch

INDUSTRIES: Product and system manufacturing firms

PROJECT NAME

Service Business Mindset

OIS

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Developing a project delivery model for efficient solution delivery

Short summary

The development and implementation of a new "project delivery model" in a traditional product-oriented company can enhance the reliability of delivery, quality and customer-solution orientation in the company. However, this change demands dedicated internal resources for process development and facilitating "hands-on role" of the third parties in the process.

Motivation and aims

The tube processing industry has traditionally focused on delivering a variety of relatively standard machines and add-on services for their clients. However, many customers have started to demand larger customer solutions in the recent past. In order to keep its position in competitive tube processing markets, the case company decided to develop, pilot and implement across the whole organization a new project delivery model.

Results

The results show that especially an organization-wide implementation of a new project delivery model can cause a variety of tensions between different departments in the organization. However, the clear result of this action research is that these challenges can be solved by

1) dedicating an own resource to internal process development,
2) developing collaborative practices including shared benchmark trips, problem solving workshops,
3) using visible and shared project management tools and
4) by customer piloting including bringing in "customer voices" to strengthen the sense of urgency in this type of organizational change.

In this change the "hands-on" role of the "third parties" such as researchers, consultants and representatives from the same branch can have a significant facilitative and strengthening role.

Application and impact

Despite having been a challenging process, implementing the new project delivery model proved clearly beneficial for the case company. These benefits were documented in a large customer pilot. The new project delivery model has made both internal communication between different departments and communication with customers easier and more flexible. This has improved the overall reliability of delivery and quality. The project delivery model has also helped the company to gear its organizational culture towards customer-solution orientation. As a result, the company is now better prepared for new business opportunities in the future and in particular with larger customer deliveries.

Company comment

"In this type of project it has been quite valuable to have outside help to speed up the internal discussions, present some tricky questions and also to get some fresh insights from other companies in the same type of business. Especially the benchmark trips opened our eyes and verified our thoughts that we are heading to a right direction in our change."

***Anne Hanka**, CEO, T-Drill*

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KEYWORDS: New service development, organization of services, process development and implementation, project organization

INDUSTRIES: Product manufacturing firms

PROJECT NAME

OIS

Service Business Mindset

Anne-Maria Aho
SEAMK
Esko Petäjä
Prima Power

Development process for a remote service-product

Short summary

To manage the shift from manufacturing to service, industrial companies need a new service model. Building and implementing such a model requires a development process that is specific to service. Through such a process, people learn to align their mindset, as well as their company's offerings, processes and competencies. This project builds on action research on developing a new remote service in a real life case company. The result involves a framework that illustrates key elements of change when developing a new service model. The findings help industrial companies to transition from being a manufacturer into being a provider of product-service systems.

Motivation and aims

Although services hold promising potential for many industrial companies, building a service business can be challenging. This is particularly true because the process of transition is unknown at the onset. This makes it important to know what elements change and how during such a process. The result of this project involves a framework that illustrates key elements of change as industrial companies develop their new service models. The findings enable companies to embrace their transformation into service with confidence.

Results

The result involves a framework that illustrates key elements of change when developing a new service model. The elements are described below:

- **Service mindset.** The framework illustrates the importance of developing an appropriate service mindset early on. In the case company, workshops were organized to demonstrate the importance of service mindset.
- **Service concept.** Developing a new service concept involves defining and documenting sservice packages, developing internal processes, as well as agreeing on roles and tasks.

- **Engaging personnel.** To introduce the new service business model to personnel, it is important to engage them with learning and development tasks. In the case study, software developers and sales managers were given development and learning tasks about value delivery and value capture of the new service. The method for delivering the training was through teamwork, evaluation meetings, and short lectures.
- **Service processes.** A new service requires that existing processes be aligned and new ones be created. In the case study, service processes were developed to ensure continuous support for customer processes and guaranteed uptime. In their most advanced form, the processes would allow the case company to take over customer activities and provide the customer access to business outcomes. The work involved modelling, designing and documenting new service processes, and involved people from different functions.
- **Service launch.** Internal training helped prepare cross-functional teams for the service launch. The teams involved people from sales, project management, installation, start-up, training, local service, and global service.
- **Service competencies.** The new business poses considerable demands on new competences. First, the case company needed to develop capabilities for understanding customer needs holistically. Second, it needed the competencies to integrate the needs into a customer-specific solution. Third, it needed cross-functional competencies to integrate a diverse set of product and service components into the solution. In order to support this, the case company created a competence management platform including training modules and platforms for knowledge sharing.
- **Data analytics and use of big data.** The final element of change pertains to using data analytics in a way that enables service provision.

Application and impact

The findings help industrial companies understand the development process that is required when building a new service. Doing so helps them identify and plan for development issues in advance. This helps build more effective development processes and – ultimately – make transitioning into service business smoother and more likely to succeed.

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KEYWORDS: New service development, new service launch, organization of services, remote monitoring, data analytics

INDUSTRIES: System and solution providers

PROJECT NAME

Service Business Mindset

OIS

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UVA

Creating a life-cycle service portfolio and processes to support it

Short summary

Industrial companies look to life-cycle services to help engage with customers across their entire range of service needs. Doing so holds a promise of increased share of customer's business, higher revenues and better margins. This project took place through a real-life case study of an industrial company that aimed to develop a life-cycle service portfolio, as well as processes to support it. The result involves a framework that illustrates key elements of a life-cycle service portfolio. The findings help industrial companies identify issues that help plan and manage more effective processes for building life-cycle services.

Motivation and aims

Life-cycle services hold promising potential for many industrial companies. Yet, building a life-cycle service business can be challenging. This is chiefly because most companies are not aware of what is required to build a successful life-cycle service. This highlights the importance of knowing what elements change and how when building such a service. The result of this project involves a framework that illustrates key elements of change as industrial companies develop new life-cycle services. The findings help industrial companies transition into service business with confidence.

Results

The result involves a framework that illustrates key elements of change when building a life-cycle service. The elements are described below:

- **Conceptualizing and piloting new service packages.** In the case company, the work involved conceptualizing and piloting with target customers service packages called ÄssäTuki, ÄssäTuki+, ÄssäStart and ÄssäStart+.
- **Developing and piloting a remote monitoring and diagnostics service.** The case company developed and piloted a remote monitoring service called ÄssäControl to support remote operation and measurement.

- **End-user help desk portal.** The case company developed ÄssäTuki – an end-user help desk portal – to create awareness and interest towards the service, as well as to help solve problems. The portal contains product manuals, quick guides, videos, and other support materials created in the FutIS project. ÄssäTuki is also a marketing channel for Lämpöässä service packages and includes a communication channel to Lämpöässä Service operators.
- **Profitability analyses for service task execution.** The case company carried out profitability analyses to support decision-making on service business development.
- **A network of domestic service partners.** A network of service partners was developed to outsource selected service tasks to service partners in certain areas of Finland. This helps the case company to take on and carry out more service tasks.
- **Company internal process development.** Internal processes were developed to support service business and subcontracting of service tasks. These processes have been audited.
- **Deployment of customer relationship management.** A CRM system to manage all customers was developed. It contains information about all the devices manufactured by the company including service and repair tasks. The CRM aligns with company processes for service task execution.

Application and impact

The findings help industrial companies identify what elements are crucial when developing a life-cycle service, as well as processes that support it. This helps them develop and commercialize their new life-cycle services more effectively. Ultimately, the findings help make transitioning into service business easier and more likely to succeed.

Company comment

"FutIS program has helped us develop a life-cycle service portfolio and also to build a domestic partner network to support our service business. Now we can provide our end customers a variety of life cycle services and effective support to their products. This is a real competitive advantage to us."

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INDUSTRIES: Product and system manufacturing firms

PROJECT NAME

Service Business Mindset

OIS

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Becoming a customer solutions provider

Short summary

Servitization is a long and not straightforward process, and typically requires steps forward and backward. Being aware of drivers, challenges and potential solutions can make such transformation smoother and more likely to succeed. This project focused on an industrial case company and its transformation towards customer solutions provision. The result is a servitization framework that helps industrial companies identify and make visible challenges and development needs along such a journey. Ultimately, the framework helps facilitate decision-making and planning while servitizing a business.

Motivation and aims

Servitization holds a great promise for many industrial companies. Yet, being able to foresee and plan for an effective transformation process is difficult. The project aimed to develop a servitization framework that helps identify and make visible change drivers and potential challenges during such transformation. Such a roadmap and its critical incidents and conflicts, as well as changes in key people, company structure and strategy, offers important insights for future decision-makers and business planners.

Results

The servitization framework illustrates three main servitization changes, each of which involves specific challenges and strategic decisions. Because the case company is a considerable player in the marine/shipping industry, the first key change involves alterations to the whole industry structure and power relations (involving challenges with yards). The second change drastically affected the case company's identity and brand as an emerging 'solution seller' in the value-network. The third change precipitated further drastic changes in developing new competencies and 'unlearning' old ones.

Part of this learning was due to aggressive mergers and acquisitions (involving integration challenges), but there were also considerable investments in competency development for developing life-cycle-based maintenance contracts and related sales tools. In addition, the earning

logic and main business (shipping industry) was transferred from a transactional paradigm to a relational paradigm where business value stems from increased life-cycle revenues and decreased life-cycle costs of the installed base. The figure illustrates the three key main servitization changes.

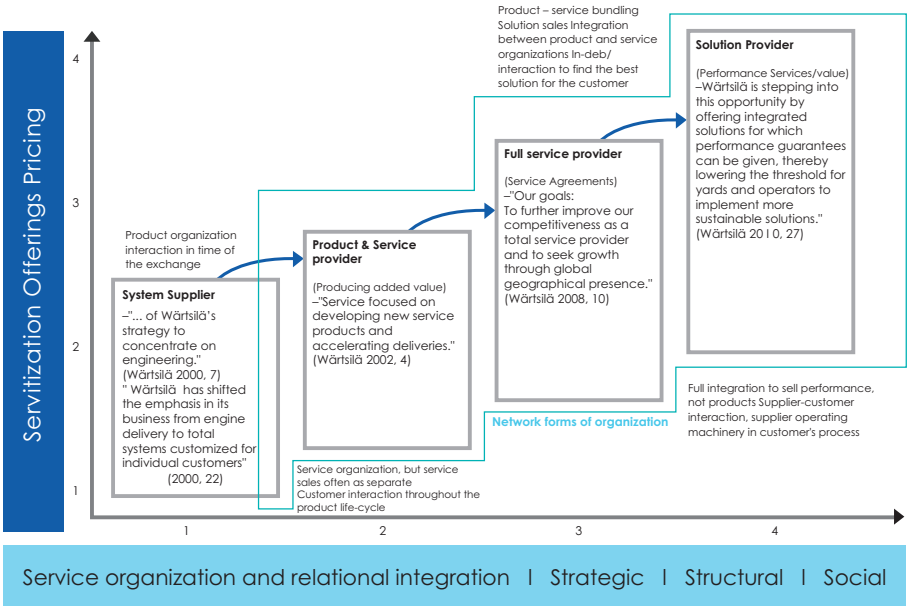

Figure 1. The case company's movement towards solution provision (adapted from Blomqvist 2013).

Application and impact

The framework and the analysis of key servitization changes instigated lively discussions and increased self-awareness among case company managers. To company's management, this approach brought up new knowledge about servitization that was not touched at this level before. Overall, the framework and the resulting analysis demonstrate being an important tool for guiding the brainstorming and facilitating future decision making processes. This helps make future servitization processes more effective and likely to succeed.

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INDUSTRIES: Solution providers in the manufacturing industry

PROJECT NAME

Service Business Mindset

OIS

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Conducting a competitor analysis on spare parts business

Short summary

Understanding the competitive dynamics in any company's after-sales market is of strategic importance. Yet, competitive information is often difficult to collect and it ends up being stored in scattered locations. This makes it unavailable for use. This project focused on an industrial case company and aimed to develop a hands-on approach and tools for conducting competitor analysis in the field. The result involves a model for systematic competitor analysis, as well as an IT tool that that provides key information for designing market and pricing strategies.

Motivation and aims

After-sales markets are typically intensely competitive. Both legal and pirate providers offer components and maintenance services to the case company's installed base. Because sales of spare parts represents over 50% of total service sales for the case company, a detailed understanding of the competitive dynamics was of strategic importance. Yet, competitive information was not easily usable for decision-making purposes. The main objective of this project was to develop an approach and a tool where relevant information could be stored, managed, and used for design and pricing purposes.

Results

The main result is a model for systematic competitor analysis, as well as an IT tool built upon a database with information on over 270 competitors. The model and IT tool use information from websites and sales reports from all around the world. With this automated tool, an operator can quickly analyze the characteristics of competitors (e.g., type of spares and geographical region) while organizing them in strategic groups. Results are presented in a dashboard that works based on a set of interlinked Excel spreadsheets.

Application and impact

With this automated tool, the operator can quickly analyze the characteristics of competitors, and group competitors in different categories. This information is a key competitive driver when setting prices and conditions during a bidding process.

Company comment

"Overall, the research gave a new and useful way to handle and analyze spare part markets from our competitors' perspective."

***Tom Wingren**, Wärtsilä*

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KEYWORDS: Competitor analysis, after-sales services, pricing

INDUSTRIES: Solution providers in the manufacturing industry

Service Business Mindset

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Customer understanding – From multiple channels towards service innovations

Short summary

Manufacturing companies do not lack customer understanding per se. Instead, a common problem is that customer information is dispersed among many different actors and departments that are often unaware of each other, and that multiple contact channels are used to reach the customer. These problems imply that a company cannot leverage its knowledge base fully when developing new services and other innovations. To address this challenge, companies should create linkages between different parties collaborating with customers in different channels and arenas in order to boost their service innovation capability. Seven companies (Ruukki Metals, Stalatube, Cembrit, Konecranes, Nokian Tyres, Ahlstrom, and Outotec) in the FutIS program have explored various channels through which they can enhance customer collaboration and identify opportunities for service innovations. The impact of the results is better-leveraged market understanding and improved service innovation activities.

Motivation and aims

Customer understanding and customer-oriented organizational culture are among critical success factors in the servitization of manufacturing firms. Manufacturing companies need customer understanding to develop service innovations that are well received in the market. A central motivation of the research was to create new knowledge for customer understanding and related issues that manufacturing companies face in their servitization and to gain insight on best ways to increase customer orientation, especially when it comes to innovating new services. The research aimed at mapping different customer interaction arenas companies utilize, identifying different parties working with customers and solving emergent problems, recognizing customer information gathering and bottlenecks, and coming up with solutions to tackle the issues.

Results

The result involves a framework that illustrates different sources of customer understanding that companies can use to improve their service innovation efforts. The framework covers a wide repertoire of such sources. At one extreme, the framework illustrates ad-hod types of methods. They are typically one-to-one communication situations such as sales or maintenance events, or joint workshops, where company representatives and customers can discuss whatever issues are at hand. At another extreme, the framework presents large-scale many-to-many virtual interaction platforms such as blogs or service review sites, where customers can express their opinions and give feedback about their service experiences. The framework is presented in Table 1 below, and lists a range of sources that FutIS companies use to gain a better understanding about their customers.

Table 1. Summary of sources of customer understanding in FutIS companies

Source of customer understanding	Examples of communication arenas
Direct contact between delivery and customer service personnel and the customers	• Demonstration of technology functionalities • On-site training • Training at supplier's training site • Maintenance and upgrade activities
Direct contact between sales personnel and the customers	• Sales meetings • Customer research • Focus groups • Customer satisfaction surveys • Expositions and fairs • Blogs, customer portals
Indirect contact through third parties (architects, structural engineers, consultants, logistics providers)	• Design assistance • Product information and demonstrations • Technical support • R&D cooperation
Indirect contact through distribution channel (wholesale intermediaries, independent sales units...)	• R&D cooperation • Service-oriented information, brochures • Training of distributor personnel, joint events • Rewarding the distribution for service sales

Moreover, the framework explains successful use of customer understanding as a function of adequate linkages among different parties that collaborate with customers across different channels, arenas and organizations. Contrary to popular views, the findings show that a lack of sufficient customer interaction and orientation as a key impediment of servitization is actually a myth. The real problem is not the lack of cus-

tomer information. Instead, the problem is that *pockets of customer knowledge are dispersed across different departments within an organization, or within different organizations, and that the pockets do not cross paths.*

The problem is caused by companies not having natural linkages and common arenas for interaction between different parties inside a company. Therefore, the diffusion of customer information in the organization is slowed down or strongly impeded, if not entirely thwarted. For example, in one FutIS company, we noticed that the supplier's maintenance workers and customer machine operators were both doing post-delivery customizations to a machine in order to improve operating and maintenance. The rest of the organization was completely unaware of this, even though the customer understanding resulting from this activity could have greatly benefited R&D, sales, and even marketing.

The problem may also be caused by a lack of natural linkages and common arenas for interaction across different organizations. A key characteristic of servitization is that the entire supply chain is moving towards activities and practices that promote service innovations and efficiency in service operations. Many FutIS companies have faced the fact that customer information may emerge as a part of various third-party activities (such as distributors, designers, logistics providers), but this information never reaches the supplier firm.

This is because customer information is dispersed across different organizations that may or may not be connected with each other contractually. This implies that they are not "officially" obliged to share their customer knowledge. For example, three FutIS firms have experienced designers as a crucial third party, having access to customer information and also influencing contractors' decision making about the use of the suppliers' or their competitors' products. These companies have various ways to influence the decision making of customers, if cooperation between suppliers and designers is active. In two other companies, distributors became an issue when services are sold alongside with products.

Finally, the framework demonstrates three types of problems that inadequate linkages and lack of common arenas for interaction among service providers and their network partners can cause:

- **Efficiency problem.** Different actors within a company gather overlapping customer information unaware of each other.
- **Effectiveness problem.** One actor may possess information that could greatly benefit the development work of another actor, but the information never reaches the party who could take advantage of it.
- **Partnership problem.** The company is linked with a customer not only directly, but also through sales intermediaries, distributors, and third party logistics providers, but does not access to customer information available through these "third parties".

Application and impact

The key impact of the research was increasing the amount of customer related knowledge that is put into use in the innovation activity of FutIS companies. This in turn should lead to more successful innovation processes as customer understanding is a highly crucial issue when developing new offerings or operational improvements. In addition, the findings generated new understanding on the challenges and benefits of cross-functional collaboration in boosting service culture and innovation.

Four types of changes are needed. First, companies need to make changes to official procedures and implement tools in order to support better knowledge sharing and, more importantly, show that this is a company priority that deserves attention. Second, companies should strive to make small adjustments to existing meetings, workshops, and other communication practices in order to get people working with customers to interact naturally with each other. This ensures that the new procedures and tools lead to concrete actions and changes in the organization. Third, companies need to identify the third parties through which they can access critical customer knowledge and even influence their customers. Partnering up for example through R&D collaboration can bring benefits to all parties involved. Fourth, companies need to join forces with others in the delivery chain (e.g., distributors and logistics providers) to build service capabilities into joint offerings. It is not always the product supplier that can offer the services, but third parties may also take that role.

Company comment

"FutIS has helped bring services to the company agenda more strongly than before and helped redefine the focus of activities in different business units at Cembrit. In Ruukki Metals, the findings have helped create an understanding about the importance of sharing customer information internally. We do have the customer information that is needed, but sharing it across functions and units is an important issue. To do so, we need direct cooperation across functions as well as information systems. At Stalatube, the findings have helped us make our sales process more solution oriented."

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KEYWORDS: Customer Understanding, Servitization, Cocreation, Intra-Organizational Collaboration

INDUSTRIES: Manufacturing, Construction, Steel, Minerals Processing

Service Business Mindset

CROSS-PROJECT RESULTS

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New service business through intelligent technologies

Short summary

Many companies are implementing completely new services for their customers based on various intelligent technologies. Intelligent technologies may involve digitalization of manufacturing (Internet of Things, Industrial Internet), or new kinds of materials or components that can carry information on their properties, use and lifecycle, and communicate with each other and with people. The challenge is how manufacturing companies can use intelligent technologies in the creation of new service oriented business.

Both OIS and SBC projects in the FutIS program have included exploration of intelligent technologies and their implications for service business. The results feature a framework of relevant factors in remote service systems, tested in the use of selected FutIS companies and their suppliers. It shows the roles and requirements for key partners in service operations, and practices of service co-creation between the service provider and the customer. The framework summarizes knowledge about the requirements and implications of using intelligent technologies in new service business. The results help other companies consider their own potential, requirements, and practices when using intelligent technologies to activate and grow their service business.

Motivation and aims

Manufacturing companies pursue increased efficiency, growth and profit in their business. One way to achieve these business benefits is to adopt and enhance the use of intelligent technologies in service business. The main question and challenge in this research was: how can intelligent technologies be used effectively for service business. The aim was to develop knowledge on 1) different kinds of concepts and technologies the companies utilize in their service business; 2) different ways to co-create value through these systems in a supplier-customer relationship; and 3) requirements of using the intelligent technologies in the business network. Also, companies were interested in benchmarking each other

during the research project. Several benchmarking meetings and other workshops were arranged both by the companies within the projects and researchers studying the topic. As the adoption and development of intelligent technologies and service business may be slow, companies will benefit from the developed frameworks by learning the alternative uses of intelligent technologies in service business, key practices in co-creating value, and implications on the business network.

Results

Using intelligent technologies effectively in service business requires three main considerations as part of the firm's strategic agenda, after the movement to technology-based services has been justified properly both from the customer and business perspectives. Companies interested in successful technology-based services need to consider these issues in their transformation.

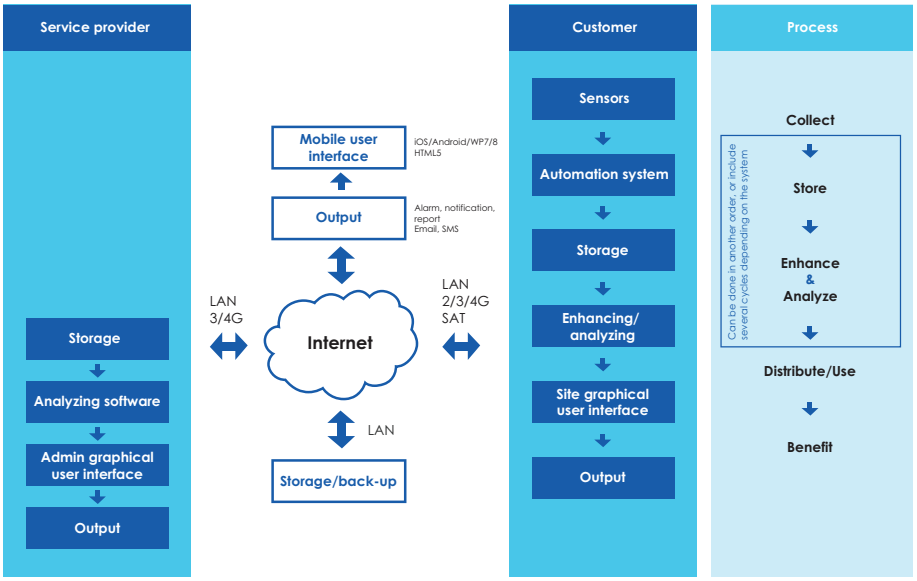

Figure 1. Framework of the remote service system in industrial service business.

The first issue regards the choice and configuration of the intelligent technologies that can be used for enhancing service possibilities.For example, companies consider the use of intelligent materials (materials carrying information about their properties, requirements, use, and wear); ubiquitous computing (technology embedded into products and the environment, supporting collection of contextual data); remote monitoring (following up the status and use of technology from a remote location); and remote diagnostics (performing data collection, diagnosis and serv-

ice activities from a remote location) as potential enablers for new services. Such technologies have been used for offering e-services, remote services, preventive maintenance, and condition-based maintenance. More recently, a variety of intelligent technologies have been bundled into such concepts as the Industrial Internet, the Internet of Things and Industry 4.0. Each company needs to configure its intelligent technologies in service business appropriately for its context and situation. Figure 1 shows a simple model that was created as an example of configuring the remote service system for industrial service business. It maps the roles, interfaces and process steps required in a remote service system among the key actors.

The second issue in the effective use of intelligent technologies in service business is to develop the practices for reaching the expected benefits from technology-enabled services. Suppliers and customer companies co-create value through the systems in business-to-business (B2B) relationships. Companies are benefiting from these joint value creating activities in various ways. Value co-creation describes the concrete values the system is facilitating towards the customer company, and the value co-production side describes the values the system is facilitating towards the service provider company. Figure 2 summarizes key activities in value co-creation and co-production in the above example of a remote service system.

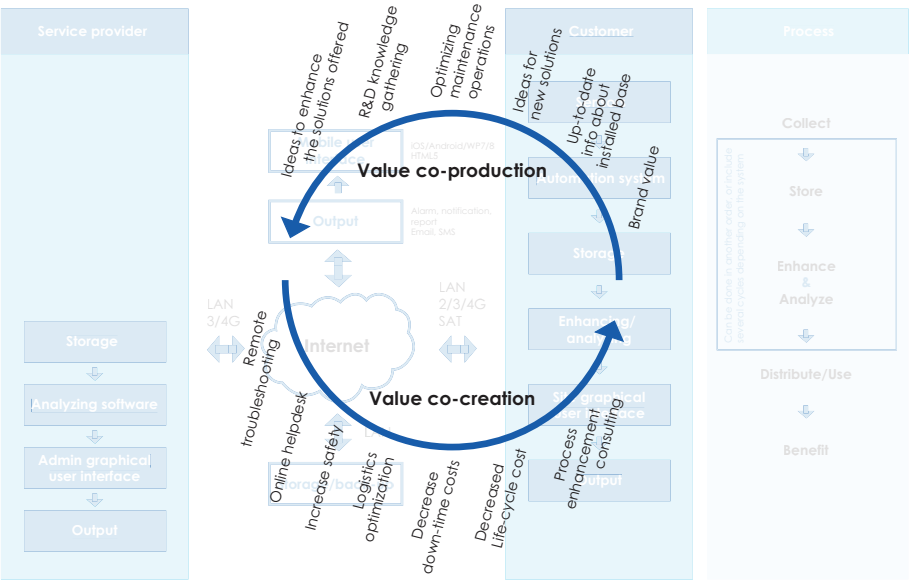

Figure 2. Key activities for service providers and customers in value co-creation and co-production

The third issue in an effective use of intelligent technologies for service business is involvement of the broader network and the possible role changes for stakeholders in the business network. The research revealed how intelligent technologies affect not only the customer-service provider dyads, but they also imply significant requirements toward the broader supply chains and networks (suppliers, distributors, software providers, business consultants, research institutes etc.). In some cases, it is not fully clear who should be considered as customers, and which stakeholder takes the solution integration role and service provider role toward the customers. Therefore, the utilization of intelligent technologies may change the value network and the position of companies in the network. As all stakeholders in the supply chain may have their own unique value drivers for services, it is crucial that companies negotiate actively and openly to identify mutual value priorities when intelligent technologies are taken into use as part of new service business.

Application and impact

It is not sufficient that intelligent technologies are developed technologically, but their business development must be facilitated, to enable their effective use in service business. This study focused on the ways to promote the business benefits of intelligent technologies, particularly in terms of new service business. We reported an example of how some companies are utilizing different kinds of remote and intelligent technologies to support existing and new service business. Many FutIS companies, such as PrimaPower, Wärtsilä, KONE, Konecranes, and Metso, have both configured their technology-based service systems and practices during the project, and benefited from each other through benchmarking and joint learning. The results help also other companies in their business transformation in three ways:

- Proposing a structured, illustrative way to configure the firm's intelligent technology system for service business, by mapping the key technologies, roles, and process steps.
- Drawing attention to the need to identify value drivers and value co-creation practices between the supplier and the customer, because intelligent technologies will have a significant impact on value creation.
- Encouraging the companies to assess and configure their partner network based on the intelligent technologies, toward new kinds of technology-based services.

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KEYWORDS: Intelligent technologies, remote monitoring, digitalization, co-creation

INDUSTRIES: Manufacturing industries

Service Business Mindset

CROSS-PROJECT RESULTS

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FutIS and **UXUS researchers**

SSAB's route toward intelligent service platforms

Intensive and inter-disciplinary collaboration between work packages and Uxus program resulted with new servitization strategies, that originate from the traditional engineering culture. Instead of complicated transformation toward "service organization", the focus is in leveraging technology-oriented firm's native competencies and digital networking tools in building cross-industry service ecosystems.

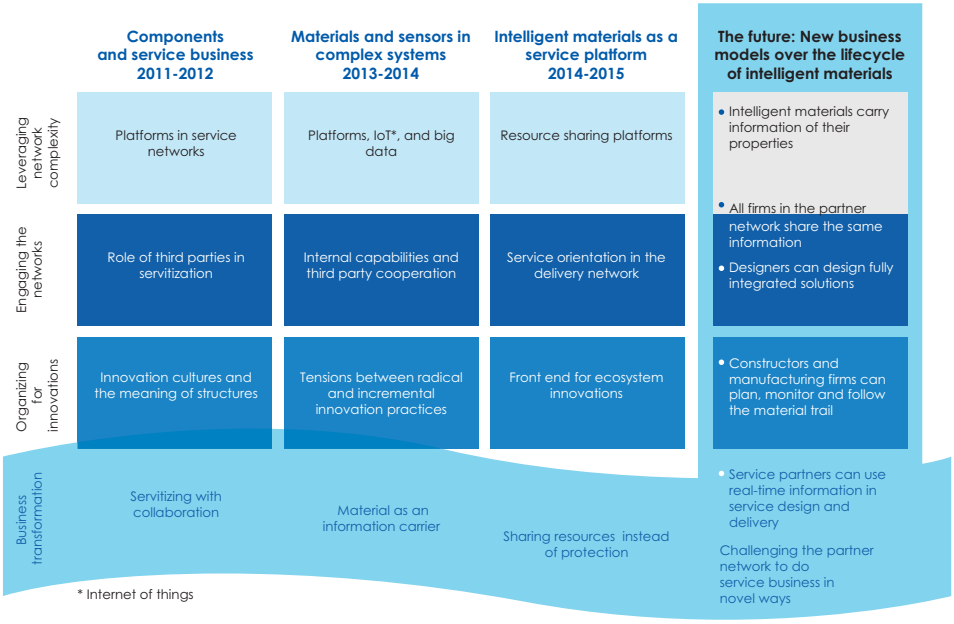

Figure 1. **From transactions to relational collaboration: the role of services**

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KEYWORDS: Intelligent services, service networks, service platforms, business models

INDUSTRIES: Manufacturing industries

Service Business Mindset

CROSS-PROJECT RESULTS

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From transactions to relational collaboration: the role of services

Short summary

Manufacturers are increasingly transforming themselves from product to service providers to gain more stable revenues, profits, and strategic benefits. In order to make this transition successful, manufacturing companies need to let go of the old transaction-based mindset and move into more relational partnerships with their customers, suppliers, and third parties. The results comprise a continuum from transactional to relational collaboration from the viewpoint of services. Particularly, the results provide a set of practices for developing stronger and more in-depth inter-organizational relationships.

Motivation and aims

Manufacturing companies have been mainly product-based companies, but recent market developments have forced them to move towards services. Contrary to product-logic, in service business the demand is unpredictable and a company needs to respond to their customers immediately, making services more complicated to manage than products. Thus, manufacturers must transform their relationships from transactional to relational and utilize capabilities from partner networks that also open up the possibility to develop advanced services and solutions. The purpose of the study was to identify practices to develop stronger relationships, such as partnerships, with customers, suppliers, and third parties.

Results

The central result of this study is a framework that illustrates a continuum of relationships from transactional to relational partnerships. The continuum views services as a practical and actionable means to deepen relationships with customers, suppliers, and third parties. The framework has two main elements. First, companies' interests for relationship development deal with business-driven motives that companies may

have for developing deeper relationships. Second, practices for developing stronger relationships deal with practical means through which companies can deepen their relationships and – ultimately – enhance their own service business motives. The two elements are presented in Figure 1.

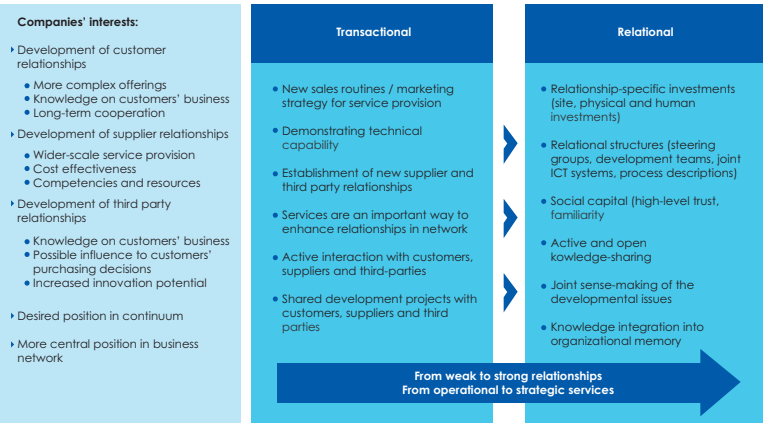

Figure 1. Companies' interests in and practices for relationship development

Companies' interests for relationship development

When pursuing more service-oriented business, manufacturers typically find out that their relationships with different stakeholders need to be developed. Stronger relationships make it possible for manufacturers to gain more in-depth knowledge about customers' business and related service needs, thereby opening up new possibilities to offer more complex services and solutions.

Transitioning towards service business requires understanding service on two levels. On one hand, service as a business becomes possible through deeper and more collaborative customer relationships. On the other hand, services are the practical means through which companies can build their relationships with customers. Additionally, the broader network of partners is affected by service business – new service business requires new kinds of competencies and resources from the manufacturing firm's suppliers as offering services on a wider scale and cost-effectively often requires procurement. Through various third party relationships, a manufacturer can acquire knowledge about an end-customer's business, discover ideas for service innovations, and influence the customers' purchasing decisions. Through stronger relationships with customers, suppliers and third parties, the manufacturers may achieve a more central position in their business network and, thereby, reposition themselves in the product-service continuum.

Practices for transactional relationships

In the transactional end of the relationship continuum, traditional manufacturers' inter-organizational relationships are mainly short-term and weak. This calls for practices that are suitable for strengthening such weak relationships. Some practices can be carried out as internal changes, but others require collaboration with customers, suppliers, and third parties. The framework illustrates a number of examples of such practices.

First, new sales routines and marketing capabilities can be one such practice. This is because increasing customers' readiness to purchase services requires that they be marketed effectively and that their benefits be introduced to customers professionally. Thus, service provision and deeper customer relationships demand new sales routines and development of marketing capabilities.

Second, technical assistance and problem solving can be another such practice. The reason is that demonstrating a manufacturer's technical capability through technical assistance and problem solving helps positively affect trust and commitment in relationships. As a consequence, customers and partner companies are willing to work with manufacturers who want to solve problems with them, and cooperation usually continues after successful problem solving.

Third, building existing or new supplier relationships can be yet another practice that helps develop the competencies needed for service provision. This is because enhanced third-party relationships can be used to provide partial and even complete services.

Practices for relational relationships

In the relational end of the relationship continuum, relationships are deeper and build on commitment, trust and social capital. The framework illustrates practices that help build and foster such relationships. Such practices are important because they enable joint learning among involved actors. In addition, they help secure the attention of top managers in customer and partner companies and, in so doing, help strengthen relationships. The framework illustrates a number of examples of such practices.

First, relationship-specific investments are one example of practices that foster partnerships. The framework identifies three such investments. Site investments denote investments in immobile assets such as factories close to the customer's sites. Physical asset investments include transaction-specific investments such as customized tools and machinery. Human asset investments consist of investments in personnel and processes dedicated to this specific customer, such as engineers operating at the customer site.

Second, relational structures are another example of practices that foster partnerships. Partnerships require structures that facilitate mutual learning. One practice is to establish a steering group (or management group) to set strategic initiatives for the business relationship and to follow up on their progress. This practice is strategic in its nature and enables firms to set common targets and strategic plans for managing the relationship.

Other relational structures are more operational and focus on continuous improvements. This practice involves setting up development teams that consist of personnel from both sides, and that are tasked with co-developing new offerings or processes by the joint-steering group.

Yet another relational structure is to invest in relationship-specific ICT-systems that allow more active and open knowledge-sharing routines. This may include the usage of CRM, PDM, or CAD systems through which sensitive information is shared.

Third, the framework illustrates practices that help nurture social capital, trust, and familiarity between involved partners. Examples of practices that typically build trust include unofficial meetings, open-book management, regular meetings, and memberships in the same organizations such as belonging to the same industry associations.

Application and impact

Building a more advanced and complex service business requires developing stronger relationships with customers, suppliers and third parties. The study developed a framework that demonstrates practical ways for companies to deepen and strengthen their relationships with customers and other parties that are needed to develop advanced and more complex services. Enacting such practices helps companies in the transactional stage to embrace a service mindset and to initiate building more interactive relationships. In addition, such practices help more relational companies build genuinely strategic, open, interdependent and collaborative relationships. Overall, the findings help manufacturers build more interactive and deeper relationships with their customers, suppliers and third parties. Ultimately, this helps them transform into service businesses and access more stable revenues, profits and other strategic benefits typically associated with service business.

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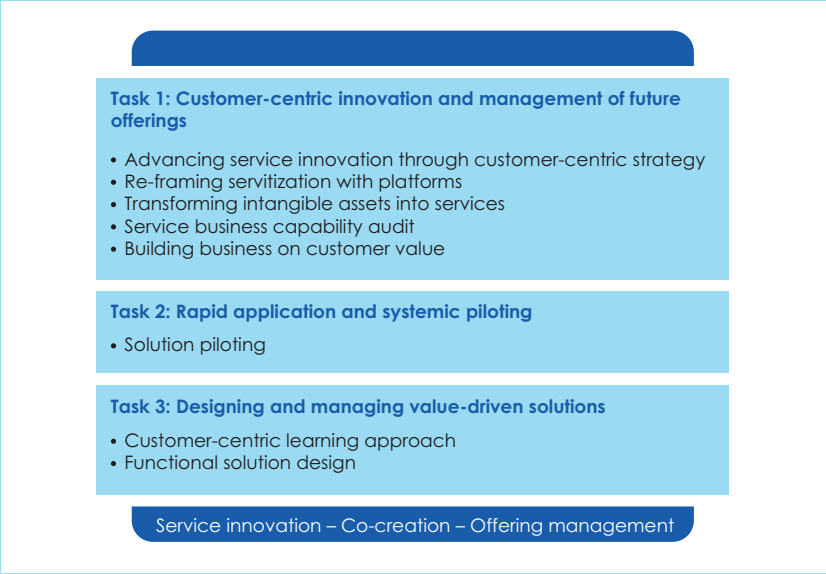
KEYWORDS: Collaboration, relationships, services

INDUSTRIES: Manufacturing industries

INTEGRATED SERVICE DEVELOPMENT

Integrated Service Development aimed to research and develop models and practices for integrating customer oriented service innovation and solution business development into the technology and processes of an industrial company. The interest was to improve the industry's readiness for "agile solutions business". This was to be achieved by incresing customer centricity and competitiveness of service management and organization as well as by using systemic methods of service co-innovation and piloting and efficient service concept management, life cycle process and lean service development. Integrated service development links customer insight and customer processes as well as internal and external technology development to the service innovation process. The research was positioned within service innovation research, with a special focus on connecting service innovations with technologies, and looking at innovation from the offering management and co-creation perspectives.

Integrated Service Development consists of three tasks (figure below) involving a network of 12 firms, three research institutes and a number of international research partners.



Customer centric innovation and management of future service offerings

Summary

The purpose of the task was to improve service business competitiveness and growth by expanding future service offering in the industry through an increased focus on service innovation and efficient market entry. The main content of the task was to explore customer centric innovation and service content creation for future global markets and the integration of service innovation to engineering and customer interface processes. The task involved five focus areas:

1) Market oriented industrial service development,
2) Service Platforms in industrial service setting,
3) Customer value based sales approach,
4) Transforming intangible assets into services, and
5) Capabilities for networked service business models.

Integrated Service Development

CUSTOMER CENTRIC INNOVATION AND MANAGEMENT OF FUTURE SERVICE OFFERINGS

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Advancing service innovation through customer-centric strategy

Our research investigated how industrial service companies can bring customer-centricity to the fore. As a result, we found guidelines for successful transformation. For some time now, industrial service companies have highlighted their customer orientation and announced that understanding customer value is a part of their core activities. However, implementing and acting on these promises is challenging. Our results indicate that in order to make this transformation successful, companies require restructuring in various routines, including planning, design, marketing, and sales processes.

Result The study provided the following three main deliverables for companies:

1. **Aligned methodology**. Companies need to bring customer-centricity into all actions and levels for successful co-creation of solutions. We have shared this understanding with company representatives and provided them with guidelines on how to align goals throughout the company. As a result, more levels and functions were engaged in customer-oriented service business.
2. **Shared tools**. Our research provided tools for offer structuring and value quantification. They can help different parties (internal and external) to identify shared targets and action plans. Furthermore, structured service concepts and offerings promote more efficient innovation and marketing.
3. **New market analysis**. An analysis methodology can help companies when evaluating potential new market areas. These multiple analytical tools, utilizing various sources of information, proved valuable in new market inquiries and in identifying global growth potential.

Motivation

In addition to these main outcomes, the study identified key actions within organizational responsibilities, decision power, and routines that directly contribute to achieving a customer-value focus.

Application and impact

Customer-centricity is a core value for companies that aim to make a transition toward service business. It must guide corporate strategy as companies set goals toward service transformation. It is important that these goals are implemented in managers'daily actions throughout all the levels of a company. Particularly, promoting efficient service innovation and solution marketing require renewed processes.

Companies need to implement aligned methodologies for transformation of their operations toward solution business. Engaging more levels and functions is the key for truly customer-value-oriented services. These targets can be achieved by using the models, methodologies, and tools generated within our research. Companies can use offer structuring and value quantification to promote new solutions development, marketing, and sales. New market analysis tools can be used to assess potential market areas or segments. The concepts have been tested in use and shared with participating companies.

FutIS in action – Company impact

Learning to leverage the full scope of industrial services helps tap into sizable growth potential

"Industrial services are extremely varied. A good understanding of different service models in one's own and other industries is crucial. This is because one can uncover surprising growth opportunities by analyzing service models not used in one's own company or industry. FutIS program helped us approach service development in a systematic manner. We co-developed a service categorization model and used it successfully to map Valmet's service offering relative to other existing service models. This helped us to better understand how Valmet's services are positioned in relation to direct competition and to other industrial service providers, and furthermore to identify any gaps in Valmet's offering indicating further growth potential".

***Juha Ojala**, Global process owner, Service delivery, Valmet*

Agreement-based business models drive significant growth of industrial services at Valmet

"Agreement-based business models are in high demand because of they have good predictability, generate spin-off sales, help differentiate from competition and allow high-volume business operations such as outsourcing. FutIS program helped us conduct a situational analysis of our agreement business portfolio. The analysis revealed a large number of agreements with little or no coordination on the whole. This lack of overall coordination helped us focus on service agreements. The subsequent development work has resulted in a significant growth of our agreement business".

***Juha Ojala**, Global process owner, Service delivery, Valmet*

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KEYWORDS: Customer-centricity, value co-creation, market analysis, service concepts, offering

INDUSTRIES: Mining, metals, machinery, process, maintenance

Integrated Service Development

CUSTOMER CENTRIC INNOVATION AND MANAGEMENT OF FUTURE SERVICE OFFERINGS

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Reframing servitization with platforms – leveraging the complexity of networks

Platforms bring together service providers, suppliers, and end-users, setting the structure as well as rules that facilitate transactions between parties. Platforms form a foundation upon which companies build complementary products, services, and technologies, thereby increasing the value of the whole platform via both direct and indirect feedback loops. Platforms usually materialize in the form of digital infrastructures and related services.

Managing industrial service offerings is very demanding for firms with a long product-based heritage. In our research, we addressed this challenge through platform-based strategies. The aim was to combine empirical evidence from the service-driven manufacturing context with theoretical platform-related insights from the research fields of strategy, economics, software architecture, and digital service design. The aim of this cross-fertilization was to construct frameworks on how to use platform approaches in innovating and providing industrial services.

Result *Intensive and inter-disciplinary collaboration between companies and many research organizations resulted in detailed knowledge on a novel strategy for servitization – a platform approach*. We focused on leveraging a technology-oriented firm's native competencies and digital networking tools in order to build cross-industry service ecosystems. The fundamental differences to existing strategies may be summarized as follows:

1. **Collaboration.** A platform approach is based on extensive and agile collaboration, enabled by digitalization and connectivity.

Motivation

2. **Pace.** With platforms, rapid testing is preferred over rigid contracting. The organization is not forced to struggle through massive mindset change either, as a platform approach originates from the traditional engineering culture.

Application and impact

Managing industrial service offerings becomes very demanding for firms with a long product-based heritage. Digitalization makes the setting even more complex as the boundaries of the manufacturing industry become fuzzier, and competency requirements are increasing exponentially. In many cases, companies are not able to innovate and deliver services without partners. Therefore, firms must address the challenges of managing and orchestrating complex company networks. Rigid structures don't work efficiently because service provision, especially in a digital environment, requires customization, agility, and rapid scalability. Furthermore, partnering includes the risk of losing the client to the partner network. New models of solution network orchestration are needed, supporting the requirements in terms of flexibility and scalability. In addition, the models must provide control and revenue points to the orchestrator company.

The results were summarized into a framework that conceptualizes the different roles of platforms in servitization. Three logics are identified for platform business, including connecting actors, sharing resources, and integrating systems. Current platform implementations are mostly operating in the integration mode. However, our results indicate that connecting and sharing logics offers new potential for agile leveraging of complex company networks in service ecosystems.

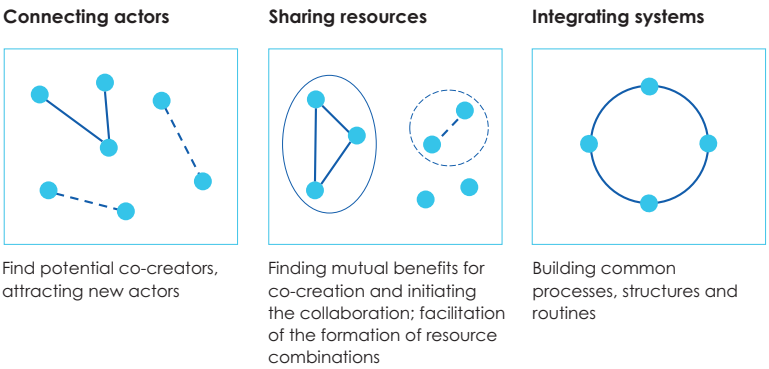

Figure 1. Three logics in service-driven manufacturing platforms

FutIS in action – Company impact

Service platforms help ABB Marine sustain its dominant position in the maritime industry

"There is an increasing interest in 'service platforms' in the area of global maritime operations. In particular, being able to develop co-creative operating models (i.e. service platforms) between customers and provider that help create and sustain a 'lock-in' is viewed as a source of competitive advantage. FutIS program helped us identify viable development directions for service platforms. More specifically, our work focused on the building blocks of successful service platforms, on designing relationship and operations processes using service platforms, as well as on facilitating social and business relationships through service platforms. The findings have been important in sustaining our dominant position in the maritime industry".

***Richard Windischhofer**, Head of business development, ABB Marine*

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KEYWORDS: Service networks, solution networks, platforms, digital infrastructures, socio-technical systems, service systems

INDUSTRIES: OEM

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Transforming intangible assets into services

Rapid technological change and continually evolving business environments demand the ability to quickly transform intangible knowledge into something more concrete in order to convert this knowledge into financial success. As services evolve more to take advantage of knowledge, this capability is critical.

Result We analyzed the ability of organizations in Finland, the USA, and the UK to transform tacit knowledge into something more concrete, and later tested our findings by surveys capturing data from more than 300 organizations. The results can be summarized as follows:

1. **Key capabilities.** By examining how organizations are transforming their intangible assets (IPR, patents, software, etc.) into services, the study was able to underpin the fundamental capabilities needed for this conversion process. Successful organizations are able to make their knowledge more tangible or concrete, which in turn helps them employ their knowledge more effectively (e.g., by using visualizations).
2. **Best practices.** However, our results indicate these tools, techniques, or methods are not so important on their own. The essence is the way in which they are used to affect change (e.g., in more effective teamwork). These techniques help to co-create a working space for discussion, development and, in many cases, entirely new solutions and services.
3. **Lessons learned.** We also found that there is a symbiotic relationship between these tools/techniques and the key knowledge workers who develop and utilize them. There are many cases where the tools/techniques do not work well on their own and which require key knowledge workers to function in unique ways to mitigate the limitations associated with complex knowledge and relationships.

4. **Benchmarking tool.** We developed a benchmarking tool to gauge how well organizations harness and exploit their knowledge. This tool not only allows for comparisons to some of the world's leading companies, but can also pinpoint strengths and weaknesses as a starting point for further development.

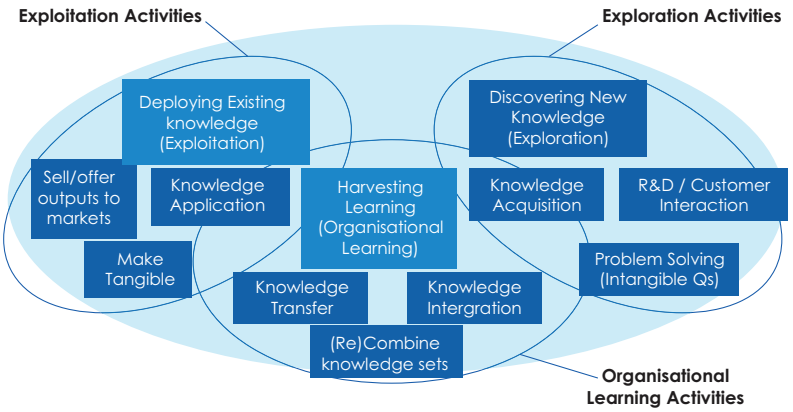

Figure1. Framework for case study interviews – examining key value creation and value capture activities

Motivation

As services evolve to become more knowledge-intensive, the ability to convert tacit knowledge into something more concrete for it to be deployed, packaged, and sold to customers is critical for being able to exploit it for financial success. We identified this problem as critical to Finnish organizations in the future and therefore designed our research to better understand how organizations transform their intangible assets into services.

Application and impact

Our results provide insights for companies looking to capture their intangible knowledge. Since our benchmarking tool has a good relationship to financial performance and we have identified many best practices and lessons learned in terms of how organizations transform their knowledge into services (and products), it can be utilized to further develop companies in Finland. In addition, these tools help create collaborative spaces and mechanisms to generate higher levels of collective understanding, new knowledge, and change.

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INDUSTRIES: Ship building, construction

Integrated Service Development

CUSTOMER CENTRIC INNOVATION AND MANAGEMENT OF FUTURE SERVICE OFFERINGS

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Service business capability audit

The *service business capability audit* (SCA) is a tool developed in collaboration with leading service companies and research organizations to test the state and develop service business in manufacturing organizations. The tool combines questions related to value creation, delivery, and capture, as well as ecosystem understanding and risk aversion in novel business models.

Results

As a primary result from our study, we have formulated an **SCA Tool** for performing *service capability audits* (SCAs) within companies. The origins of the tool date back to 2012 when, together with University of Cambridge, 12 successful service businesses were studied in order to understand the capabilities that underpin their successful service transition journey.

The tool can be used to systematically analyze the service business capabilities in various types of firms. The SCA tool itself is a questionnaire that determines a company's maturity on 12 capability measures, which have been identified to correlate with successful service transformation. As a result, 10 different capability audits and development paths have been established in related organizations, further resulting in totally new service business models for certain product categories and several operational improvements in target organizations.

Motivation

In the early stages of FutIS, it was realized that service and further value-based business require a new set of capabilities and resources from companies. The SCA tool was built in order to better understand these capabilities and to measure which of the identified categories would lay a foundation for successful service business in a broad context and in various industrial domains. This was done in order to resolve the so-called *service paradox*, where companies are increasing the service volume, but which doesn't always correlate with returns.

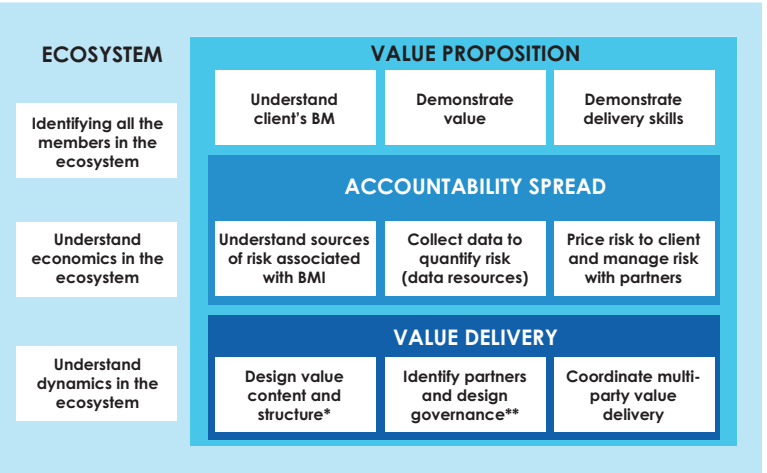

Figure 1. **Service capability audit questionnaire framework**

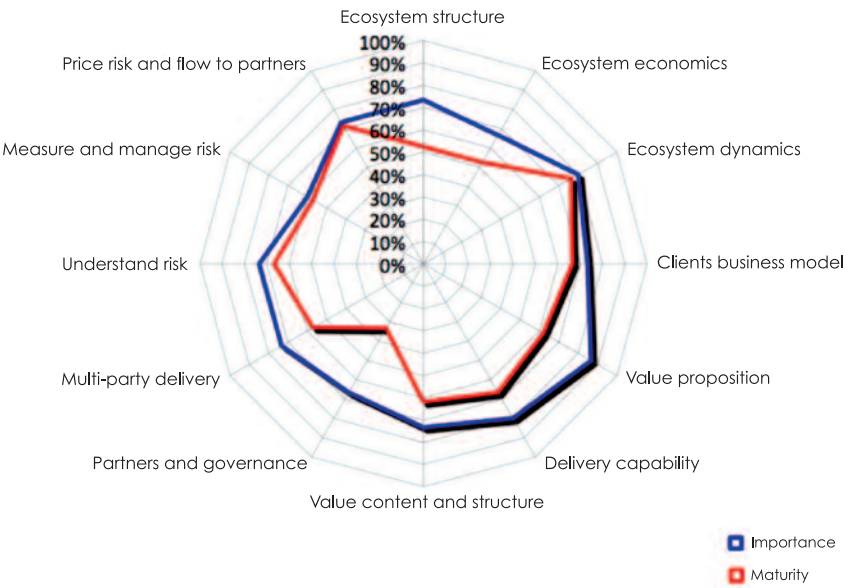

Figure 2. **Capability demonstration based on questionnaire**

Application and impact

Results are in active use within the participating organizations and general results are published in scientific outlets for further stimulating research on the topic.

Based on our research, we have provided the following company guidelines for service transition:

1. **Recognizing** the current competitive state is difficult for companies. This is problematic because the state defines strategic fit for different capabilities. The SCA tool helps companies better analyze their situation and to take the right actions in different situations.

2. **Hyper competition** is changing the market structure in many industries. It shortens product life cycles, and therefore forces shorter product design cycles. In a hypercompetitive state, rivalry is so fierce that sustainable competitive advantage is very hard to protect. Instead, companies can seek network opportunities if they do not possess all the needed capabilities and resources for service provision.

3. **Networks** offer channels to increase different elements of a service offering. The capability requirements have shifted toward combining social and technical service systems, making cooperation between actors increasingly important. Networks may increase the complexity of an offering, but this can be managed by strategies that allow flexibility and adaptability.

4. **Platforms** help in creating and managing these collective offerings and in creating flexible organizational structures. Our research indicates that companies can utilize different platform strategies depending on the current situation. We have presented three different strategies, including (i) connecting, (ii) sharing, and (iii) integrating.

Our results indicate that by building value constellations and utilizing inter-firm resource complementarities, companies can overcome the challenges of comprehensive internal change, capability requirements, and the *service paradox*.

FutIS in action – Company impact

Helping Valmet develop solid solution business capabilities

"Transforming successfully from traditional product and service business to fully-fledged solution business requires new capabilities. The Solution Capability Audit gave us a great opportunity to have a third-party view to our solution business capabilities at Valmet. Highlighting strengths and identifying solution capabilities needing further development helped us pursue our solution business strategy more systematically".

***Juha Ojala**, Global process owner, Service delivery, Valmet*

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KEYWORDS: Service business, capabilities, transformation, value based business models

INDUSTRIES: OEM

Integrated Service Development

CUSTOMER CENTRIC INNOVATION AND MANAGEMENT OF FUTURE SERVICE OFFERINGS

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Building business on customer value

Industrial companies are implementing a change toward value-based business strategies. This transformation is driven by a search for new and differentiated sources of competitiveness, revenue, survival, and growth. The transformation is challenging to implement. Hence, industrial companies need to develop significant new capabilities, processes, and tools, and successfully implement the change at multiple levels including people, systems, partner networks, customers, and entire industries.

Results

The research addressed the following two main areas of critical capabilities:

1. **Value frameworks.** The developed end-state value-based business capabilities provided companies with ready-to-implement frameworks for value-based selling, value-based pricing, business opportunity validation, and management. Within these frameworks, specific routines, processes, and tools were developed to support customer value research, value proposition development, and value quantification. Profitability and performance measurement of value-based selling wasalsostudied.

2. **Tools for change.** Change and renewal related capabilities help companies to implement the transformation toward value-based strategies. The research identified barriers and pre-requisites to overcome duringthe different stages of transformation. The results below are described as frameworks of barriers and suggested solutions the companies can readily implement to succeed in the transformation.

Motivation

The transformation toward value-focused business models and customer relationships is motivated by the loss of competitiveness in current offerings, as well as the new opportunities provided by service businesses, deeper partnerships, focus on core competencies, and digitalization of industrial operations.

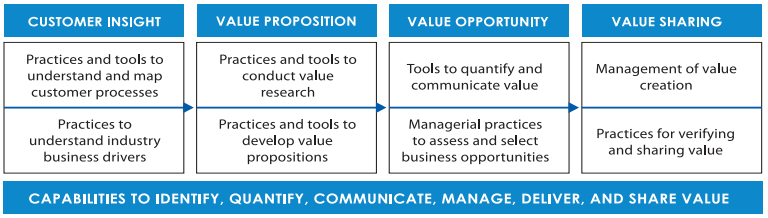

Figure 1. Value-focused business framework

FutIS in action – Company impact

The research has affected the business performance of the companies at the following three levels:

1. Companies gained in-depth knowledge and advice on the required capabilities, resources, and processes to conduct value-based exchanges. Similarly, the companies now know the specific challenges related to successful transformation.
2. Specific processes and templates on how to gain customer insight, develop powerful value propositions, quantify and communicate value, implement value based pricing, and measure value-based selling impact and performance were developed. For example, these have resulted in changes and improvement in current sales processes.
3. A number of tools to support value identification, quantification, and communication were developed.

The case companies have developed the following tools:

1. Tablet applications to access databases of success case examples to illustrate previous successes.
2. Applications to perform customer value quantification, including value-based product comparisons and pay back time of production and processes modernizations.
3. Tools to guide sales people through discovery and solution-generation discussions.
4. E-learning tools to teach sales organizations value-based selling.

FutIS in action – Company impact

Helping KONE embrace value-based selling

"For some years now, KONE has been amidst a transformation process where the aim is to adopt a value-sales approach. FutIS program has helped us greatly in that process. In particular, we have learned to use tools that help sales persons discover customer needs, quantify value with customers and to develop performance metrics that align with value creation".

***Pekka Nevalainen**, Senior manager, Kone*

Developing a systematic value-based pricing approach helps drive profitability at Valmet

"For us, value-based pricing holds a great promise of higher margins. We engaged FutIS program to help us with the pricing approach in one of our business units. We did a thorough analysis of the existing pricing model and nature of business in the business unit, devised a new value-based pricing approach, and finally implemented the approach with good results".

***Juha Ojala**, Global process owner, Service delivery, Valmet*

Using customer value to boost selling reliability services at SKF

"Being able to capture, document and communicate the cash flow effects of our reliability services to customers is key to our business success. With FutIS program, our aim was to make concepts like 'value' and 'value creation' concrete and actionable so that they can be used on the 'shop floor'. This helps us gear our sales efforts towards how our daily operations impact customer's business process".

***Petri Saarinen**, Platform development manager, SKF*

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KEYWORDS: Value-based strategy, Value-based exchange, customer value, value-based selling, value-based pricing, business opportunity validation

INDUSTRIES: Manufacturing, services

Rapid application and systemic piloting

Summary The purpose of the task was to create a framework for systemic new solution business piloting which helps shorten the time from an early solution business concept to marketable and sellable solution. In particular, the task aimed to develop a systematic solution piloting process that involves not only one pilot, but a set of pilots required to proof and refine the solution in collaboration with customer. The work involved studying and defining the goals and roles for different actors in the piloting process, as well as developing management practices for a systematic solution piloting approach.

Markku Mikkola
Heidi Korhonen
Tapio Koivisto
VTT

Speeding up solutions business development through piloting

Solutions business holds great promise to industrial companies. Yet, developing solutions also takes a long time, is costly, and its outcomes are uncertain. What if we could make solutions business development faster, more cost-efficient, and less likely to fail? VTT has developed a novel approach to piloting in the DIMECC FutIS program.

Results

A novel approach to piloting solutions business emphasizes strategic dialogue about future opportunities and co-creative development between the provider and customer. The approach is built on the following two key models:

- a learning model
- a collaborative piloting process model.

The models are to be used in tandem, with the learning model providing the general structure for the analysis of the pilot and the process model laying down the main steps to carry out the collaborative pilot.

The learning model (Figure 1) illustrates the key elements of the solution from both the provider and the customer perspectives. For a solution to be successful, there has to be a fit between the stakeholders regarding the elements. The developed piloting approach supports the collaborative development process between the stakeholders to reach the fit.

Learning from pilots

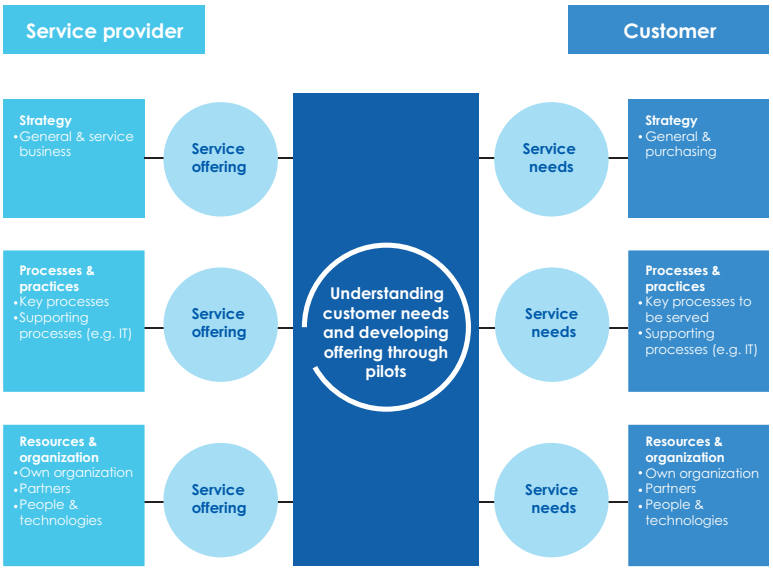

Figure 1. **Learning model**

The piloting process model (Figure 2) depicts the main phases and tasks of the service provider and the customer during the collaborative pilot. From the provider's perspective, piloting is not limited to a single pilot case with a specific customer, but instead extends over several customer cases, thus providing a foundation for benchmarking and comparing the solution's feasibility in different contexts.

	Identification	Planning	Performing	Closure
Provider	Identification of potential piloting customers	Planning provider tasks Setting up resources	Performing the pilot (provider tasks) Continuous follow-up (measures, documentation)	Gathering & analysis of experiences (from all relevant functions)
Joint	Negotiation of pilot opportunity (benefits, efforts, risks)	Planning of the pilot (goals, tasks & responsibilites)	Performing the pilot (joint tasks) Continuous follow-up (measures, documentation)	Close & feedback of the pilot
Customer	Identification of potential improvement opportunities	Planning customer tasks Setting up resources (personnel, facilities)	Performing the pilot (customer tasks) Continuous follow-up (measures, documentation)	Gathering & analysis of experiences (from all relevant functions)

Figure 2. **Piloting process model**

Motivation

A fundamental driver for piloting new offerings is the need to reduce uncertainty, e.g. related to commercial feasibility or implementation. A lack of practical testing during development may cause significant extra costs and delay in breaking even after the commercial launch. Managing the complex context of the solutions business, e.g. multiple organizations and their functions, is essential. This calls for systematic managerial engagement at a strategic level and cross-functional collaboration among stakeholders. Table 1 presents the different characteristics required from solutions piloting compared to traditional piloting.

Table 1. Solutions piloting differs from traditional piloting

	Traditional piloting	Solutions piloting
Focus	Product, technology	Value co-creation opportunities
Working style	Sequential, based on value chain	Synchronistic, simultaneous
Roles of the stakeholders	Separate and distant	Co-creative and overlapping
Approach	Closed and somewhat secretive	Open and trust-based

Application and impact

The solutions piloting approach speeds up solutions development by engaging management in the development process, by employing a cross-functional, synchronistic way of working, and by laying a foundation for simultaneous commercialization and industrialization. Utilization of the solutions piloting approach is most suitable for complex systemic solutions and implementation contexts where high uncertainty about the potential benefits and required efforts by different stakeholders exists. In that type of scenario, looking at the challenges together using jointly agreed upon methods, solution providers and customers can gain invaluable insights to cross the "valley of death" of new business development.

FutIS in action – Company impact

Helping Outotec develop a systematic service piloting process

"At the onset of FutIS work, the Outotec service development organization was in a need of developing a shared service piloting concept and process. Together with FutIS researchers, we analyzed the role of piloting in the new service development process, explored and developed operating models with clear roles and responsibilities and finally implemented the piloting approach with success. A particularly interesting learning was the great extent of communication required within Outotec functions and with pilot customer to define purpose and goals for the pilot as well as to secure key resources to carry out the pilot".

***Risto Valakari**, Service Sales Manager, Outotec*

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KEYWORDS: Piloting, solutions, services, development

INDUSTRIES: Business-to-business industrial companies

Designing and managing value-driven solutions

Summary The purpose of the task was to research and develop a value-driven service processes. Doing so implied developing frameworks that help manage new service development for continuous global service processes. Doing so also implied developing practices for integrating customer relationship management to value-driven service processes. Combined, the findings help metals and manufacturing companies re-position themselves as value-driven full-scope solutions providers.

Maria Ivanova-Gongne
Johan Nordström
Åbo Akademi University

Customer-centric learning approach

Learning holds the keys to future success in developing lifecycle solutions. When developing lifecycle solutions, it is important to begin by learning what makes the customer successful in the long run. A crucial step in that process is to obtain in-depth understanding of the customer's business logic and to implement market-oriented thinking into the organization. Engaging in in-depth learning of customers' business logic, drivers, and long-term targets enables a company to uncover "hidden" customer needs and business opportunities, identify core competences for service development, and reorganize its focus on customer value.

Result

As a result of the current project, a learning approach was developed to generate customer-focused insights that allow the identification of business opportunities and the development of revenue-boosting lifecycle solutions. This approach entails obtaining in-depth knowledge on the following customer business logic dimensions:

1. How are the customer's assets operated and what is the ownership structure of the asset (i.e. does the customer have full ownership of the asset)?
2. How are the operations of the asset planned?
3. How is the performance of the asset managed?
4. How is the asset maintained?
5. How is the asset kept up-to-date?
6. How is the asset disposed of?

These dimensions cover the full lifecycle of the customer's asset, and understanding them will enable high-level knowledge of what drives a customer's financial performance. Figure 1 shows a step-by-step learning process that enables gaining knowledge of the aforementioned

dimensions. Such a learning approach will allow the seller to develop a solution that can be integrated into the existing business process of the customer, as well as provide more value and benefits to all the parties involved in the ownership and operation of the asset.

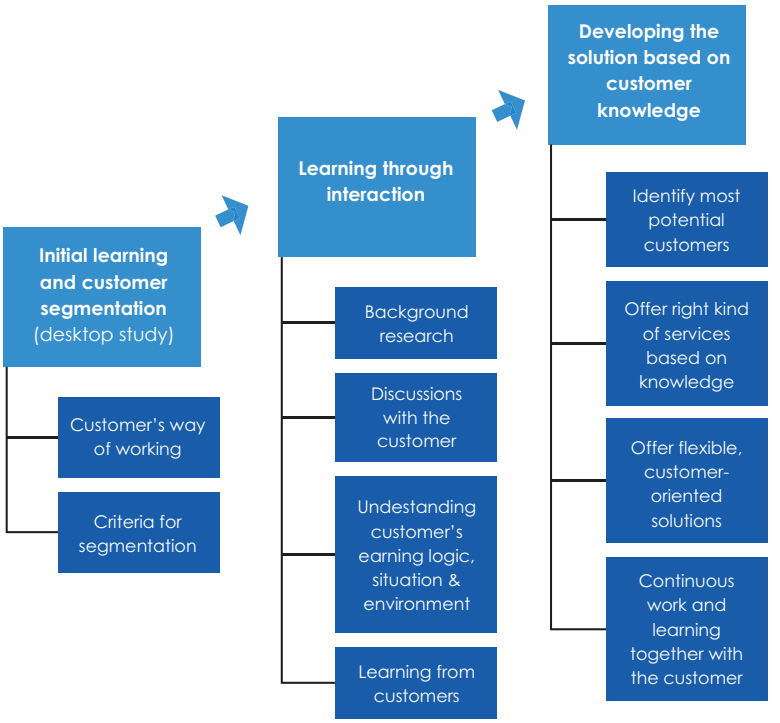

Figure 1. Learning process

Motivation

Engaging in lifecycle solution development is a complex process, requiring the company to shift to a service-oriented mindset and develop in-depth knowledge about the market and customers. However, engaging in a learning process requires identification of focal aspects of customer business logic to which the company should pay enhanced attention. This serves as a core motivation for investigating what should be learned and how the learning process should occur in order to reach enhanced productivity of operations over the entire lifecycle for both the customer and the provider.

Application and impact

The learning approach developed in the scope of this project allows transformation towards a solutions business with increased efficiency, improves customer cooperation by aligning mutual targets, and provides higher mutual financial benefits. In particular, it helps identify "hidden" service needs and tap into new business opportunities, which is the basis for developing and providing novel services. Such a learning approach

also enables improving a customer's value creation by proposing novel business logics for the customer on the basis of the knowledge about the customer's current logics and changing the customer's mindset towards a solutions business.

FutIS in action – Company impact

A systematic learning approach helps SKF transform into solution business

"We engaged FutIS program to develop a systematic approach that allows us to learn about business opportunities together with our key customers and to devise solutions to help tap into those opportunities. We have implemented the approach with success and intend to keep refining it in the future. The real impact of the approach is that it has allowed us to initiate a transformation towards genuine solution business".

***Petri Saarinen**, Platform Development Manager, SKF*

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KEYWORDS: Customer logic; service development; service-orientation; customer value

INDUSTRIES: Paper board; energy; mining; oil

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Functional solution design: Key to customer and provider value creation

Value creation for customers and suppliers rests on designing solutions during the sales process. The *solution design* approach is strategic (focusing on the future benefit of those involved), co-creative (considering input from several ecosystem stakeholders), negotiated (based on stakeholder agendas and interests), and based on the mutual benefit for everyone involved. Applying a *solution design* approach to the sales process allows a company to transform itself into a solutions business, practice value-based sales, consider the impact on stakeholders when designing the solution, and provides increased financial value to its customers.

Result

As a result of the current project, a new approach, *solution design*, was developed to facilitate value creation between the buyer and the seller, as well as to consider the broader context. Compared to traditional solution sales, this new approach entails a more interactive, co-creative, and customer-oriented process. It is an open-ended process of collaboration where both the need and the solution are designed. A solution is therefore not simply a combination of products and services, but rather a supplier's capability to solve customer problem and demonstrate financial value. The *solution design* approach entails a step-wise value co-creation process that increases customer certainty in the proposed solution and enables gradual value creation through enhanced interaction, understanding of customer logic and needs, and integration of business processes. The process consists of the following steps:

1. **Value definition (Pre-sales)**, which represents the process of verifying the value with the customer, understanding the criteria for a good solution from the customer perspective, and increasing customer certainty in the revenue impact of the solution.

2. **Value commitment (Detail sales)**, which involves increasing customer commitment to the proposed solution by reaching the decision makers within the customer organization and presenting the customer with pricing models that clearly outline customer value from the proposed solution. The ultimate outcome of this stage is getting the customer decision to sign the deal.
3. **Reaching certainty (Final sales)**, which entails outlining the final scope and specifications of the solution together with the customer, outlining the final contract model, and signing it. At this stage, the customer is convinced of the added value of the solution, allowing the investment decision to be made.

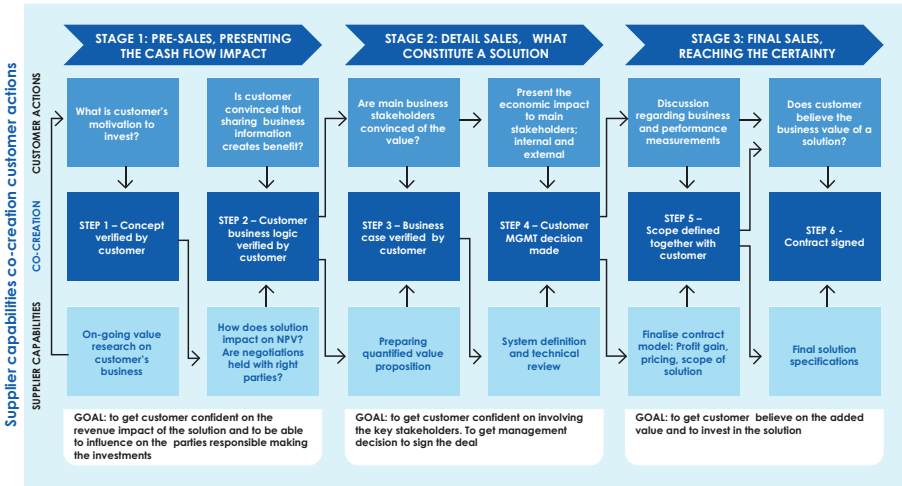

Figure 1. **Solution design process**

Motivation

The complexity of value creation requires a structured supporting process that enables reaching the desired aims in a straightforward and comprehensive manner. In particular, the need is to improve supplier-customer interaction, develop relevant arguments and pricing models, and consider the impact of the whole ecosystem when developing a solution.

Application and impact

Applying the *solution design* approach allows a company to obtain the following results:

- Stimulate gradual transformation into solution business and motivate an organizational change towards a service-oriented mind-set by providing the personnel with a new approach to sales.

- Co-create value with the customer by applying a step-by-step process that enhances customer certainty on the revenue impact of the solution, facilitates the investment decision of relevant parties, and provides convincing evidence of the added value of the solution.
- Design solutions based on in-depth knowledge about the industry and customer business logic.
- Implement and practice a functional *solution design* approach in sales that involves developing value propositions based on solid, verifiable data and meet current and forthcoming industry needs and requirements.

FutIS in action – Company impact

Learning to co-design lifetime solutions at MacGregor

"Increasingly, MacGregor is in the business of helping ship owners and their customers create financial value by optimizing the cargo system. This means that we work jointly with ship owners and other stakeholders to co-design a solution, to verify its performance during the ship's first voyages and to continue to provide services and operations support throughout the ship's lifetime. FutIS program has helped us greatly to develop a solution design approach that allows achieving this. This makes the fruits of FutIS work all-out important to us at MacGregor".

***Henri Paukku**, Operation support manager, MacGregor*

Using solution co-design to revamp an asset optimization solution at Wärtsilä

"Wärtsilä's Optimised Operation helps follow the performance of a customer's asset in real time, and to offer advice that helps improve that performance. We engaged FutIS program to help in re-designing the existing technical expert service into a full-blown commercial solution. We learned how important it is to co-create the solution together with all stakeholders involved in the delivery. Equally importantly, we learned to co-design the solution so that its value-adding benefits live up to the needs of all involved parties. This is what makes up the competitive advantage for our Optimized Operation solution".

***Ari-Pekka Saarikangas**, Director, Wärtsilä*

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KEYWORDS: Solution design, service-orientation, value-based sales, value co-creation

INDUSTRIES: Shipping, mechanical engineering

SERVICE OPERATIONS EFFICIENCY

Service operations efficiency – the third part of Dimecc FutIS program – researched and developed models and management practices in the area of efficient and effective industrial service operations. Service operations efficiency aimed to advance academic and practical understanding of how to design information-enabled service operations that are supported and optimized by information captured from installed base, business environment, and customers.

The findings will help tackle challanges with maintaining profitability of service operations in the face of increasing complexity, evolving service oppeferings, increasing uncertainty and risks as well as global scale. In particular, the findings will benefit the globally operating Finnish machine building industry. Service operations efficiency consisted of four tasks (figure) involved a network of 9 firms, four research institutes and a number international research partners.

Task 1: Information management and support for future service operations

- Service reporting toolbox (incl. the following)
- Method for measuring data value
- Method for assessing data quality
- Ways of motivating field reporting
- Elements for reporting interfaces

Task 2: Information enabled service operations

- The adaptive maintenance concept.

Task 3: Capturing and managing customer and commercial data from service operation

- An information management approach between stakeholders in service delivery

Task 4: Managing complexity in systemic service processes

- Dynamics in service competence management

Service data – Service operations – Complexity

Information management and support for future service operations

Summary The purpose of the task was to study and develop installed-based information management. More specifically, the task focused on pieces of information needed from the installed-base, on storing and organizing installed-base information for optimal processing, as well as on combining information about customers, their operations and service contracts for total optimization of future service business operations.

Katrine Mahlamäki
Jukka Borgman
Andrea Buda
Manik Madhikermi
Jussi Rämänen
Aalto University

Service reporting toolbox

The transfer from a product manufacturer to a product-service system (PSS) provider sets new requirements for communication within service operations. Service design, pricing, and production require adequate feedback from the field. Main sources of feedback include sensor data (condition monitoring) and manually collected data (service and operations reporting). Data quality is a pre-requisite of any data-driven decision-making. Our *Service Reporting Toolbox* provides industrial service providers a tool for improving communication and data quality in their PSS operations. This enables identification of capabilities and defining the service offering accordingly.

Results

The Service Reporting Toolbox improves awareness of the current installed base, services, operations, and customers related to it.

Key steps in designing a new service offering or improving an existing service include the following:

1. Identify the data needed in service design, pricing, and production.
2. Measure the quality of available data.
3. Assess current data collection capabilities to identify improvement opportunities.
4. Evaluate the value of new data collection tools.
5. Define and decide on actions to improve data quality and availability.

After identifying the data needed, the Service Reporting Toolbox provides a tool for analyzing the quality of currently available data. This analysis shows whether current data exists at a level of quality sufficient for decision-making.

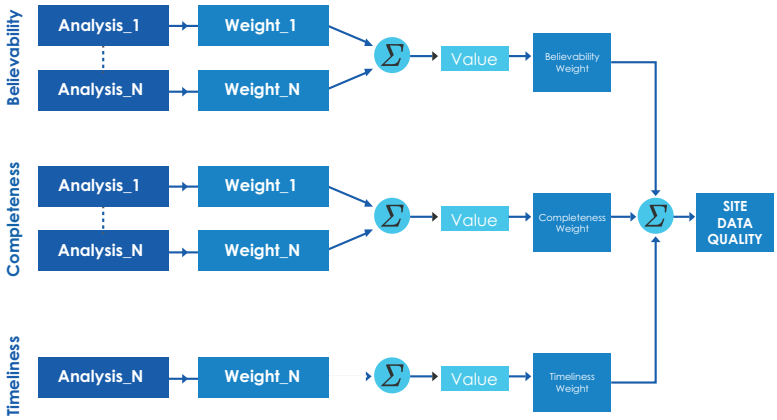

Figure 1. Measuring data quality by analyzing timeliness, completeness, and believability

The method for measuring the quality of service reporting is composed of the following four main steps:

- IDENTIFY quantifiable indicators for each quality dimension.
- CALCULATE quantifiable indicators for identified dimensions.
- AGGERATE results for each dimension (Figure 1).
- COMPUTE ranking of sites based on aggregated values.

Once the indicators have been identified, the calculations can easily be repeated. By doing so, the success of improvement measures can be evaluated by measuring the improvement (or lack of it) in data quality.

If data quality analysis reveals challenges with current data quality, the Service Reporting Toolbox provides an assessment tool for manual data gathering capabilities. The results of this assessment show where quality improvement measures should be focused.

Figure 2. Assessment of service reporting capabilities in two sites

The assessment of service reporting capabilities considers the following five aspects affecting the quality of manually reported maintenance data: 1) organizational culture, 2) maintenance processes, 3) competencies, 4) motivation of the technicians or engineers responsible for reporting, and 5) the tools provided for reporting purposes.

Organizational culture analyses reveal the support from the organization along such dimensions as trust, managerial support, and so on. Processes are assessed from the viewpoint of time pressure and work descriptions, among others. Competencies include verbal skills, computer skills, and self-efficacy. Motivational factors include social influence, work identity, data user awareness, and benefits for the data collector. Tools are analyzed from a usability point of view.

The result of the assessment shows where there is the biggest room for improvement. The example in Figure 2 compares two sites within one organization. It shows that the biggest differences between the sites are in the motivation of the data collectors. However, the biggest room for improvement for both sites is in the tool they use for data collection.

After evaluating current data collection capabilities, organizations should evaluate the value of investments in new data collection tools. The Service Reporting Toolbox includes a method for measuring the value of condition monitoring. This method can be used when deciding about investments in data collection.

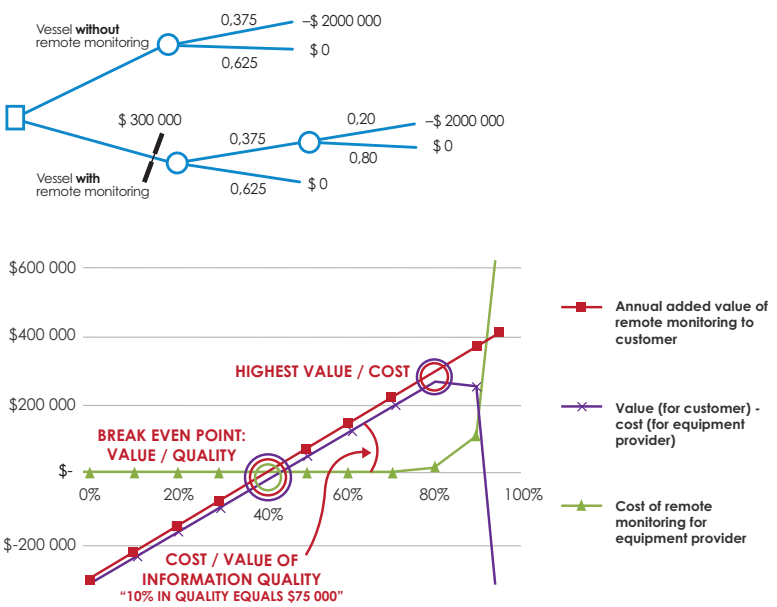

Figure 3. Measuring the value of condition monitoring with decision analysis method

The value of condition monitoring is calculated with a decision analysis method based on statistical and probabilistic mathematics. A decision tree shows the possible monetary outcomes of incidents with or without condition monitoring. The cost of condition monitoring can be compared with the added value it provides for determining a break-even point and the highest value/cost that can be achieved. Another way of interpreting the results is to see them as a way to measure the cost of insufficient data quality.

In addition to condition monitoring, there is always service and operations data that cannot be collected automatically. The Service Reporting Toolbox includes elements for user interfaces that enhance the motivation to collect high-quality data. This necessarily entails the following:

- Ease of use.
- Communication between people.
- Importance of collecting data by justification through its usage.
- Benefits for data collectors.
- Improved awareness of installed base information.

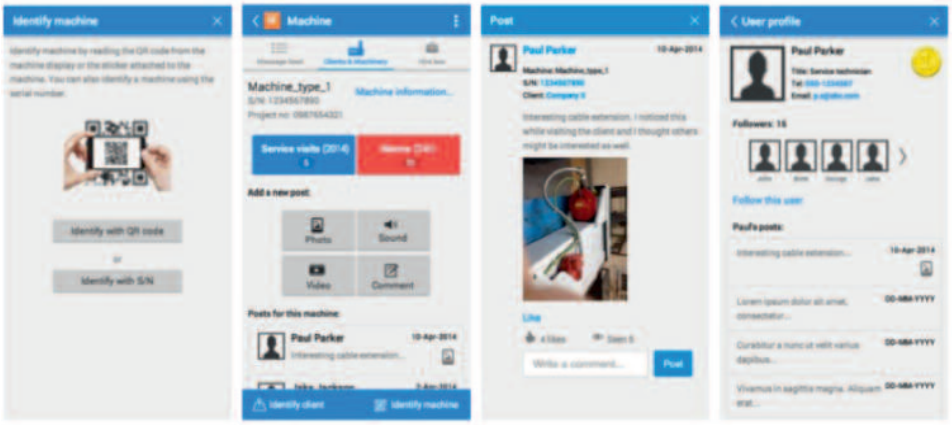

Figure 4. **User interface prototype for a mobile service reporting tool**

A user interface prototype for a mobile service reporting tool illustrates how reporting motivation can be improved by showing users the benefits of their own and their colleagues' reports in the form of equipment history. It provides an easy tool for recording observations on site using text, video, photos, or audio. Equipment items can be identified with QR codes. It is possible to follow leading technicians in order to get their posts in a personalized feed and communicate with them. This also gives recognition to these experts and motivates them to share their knowledge.

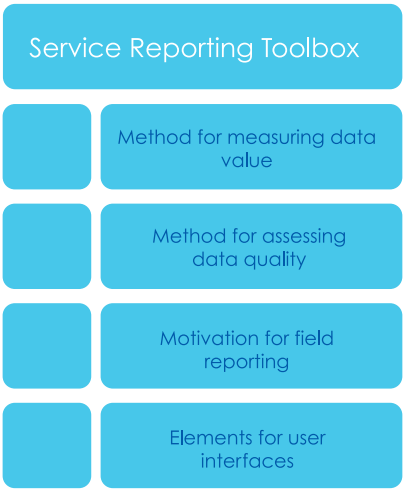

Figure 5. Service Reporting Toolbox

The toolbox consists of a method for calculating the value achieved with condition monitoring. There is also a method for evaluating the quality of current manually reported service data. It also includes a framework of factors affecting the quality of manually reported data and examples of user interface elements that support reporting motivation. With these tools, data quality can be measured and improved.

Motivation

The current quality of service reporting is often not sufficient when developing a new PSS, such as extended warranty or "power by the hour" contracts. PSS is typically a long-term contract and, therefore, setting a correct prize is crucial for the service provider. Without good quality data about previous operations with similar equipment and conditions, this is not possible. The challenges with data come from manual reporting, such as time spent on repairs, timestamps of finalizing jobs, spares used, and so on (see Figure 6). Improving the quality of this data is a pre-requisite of data-driven decision making.

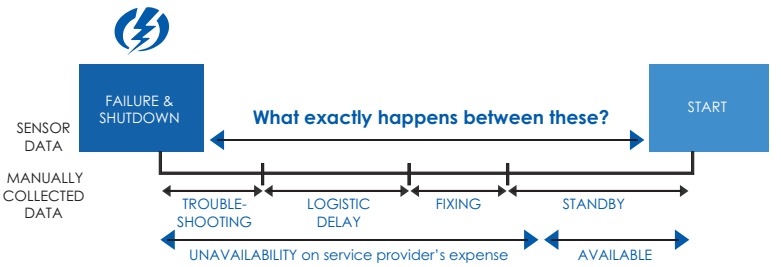

Figure 6. The need for the Service Reporting Toolbox

Application and impact

Using the Service Reporting Toolbox enables good quality reporting by revealing the biggest area for improvement, whether that be in the organizational culture, processes, competencies, motivation, or tools. The user interface prototype of a mobile reporting tool gives an example of improving reporting motivation through tool development. Measuring the value of condition monitoring data can be used to justify investments and for demonstrating the benefits of condition monitoring to customers. Measuring data quality can reveal target sites for learning from the best performers and targeting improvement actions to under performers. Measuring quality can also be used to validate the effectiveness of corrective measures (e.g., providing additional training).

An example assessment of 51 sites in a case company showed data quality scores ranging from 35 to over 90 on a scale of 0–100. The biggest differences in service reporting capabilities between the best and worst performing sites were in the motivational factors. The best performers needed the reports in their own work and were thus benefiting from doing the reporting well. The biggest room for improvement, however, was in the tool they were using for data collection as all sites had their lowest scores in the tool-related factors.

FutIS in action – Company impact

Mobile data collection tools help PrimaPower access important installed base information

"Mobile tools with easy-to-use interfaces help field technicians collect and report valuable data from customer sites beyond formal service reports. We wanted to provide our field technicians tools that help them report short comments, photos, video or audio on customer machines and operations. Concretely, this involved developing user interfaces for two mobile tools – Mini service reports and The Reporter. Co-operation with Aalto University taught us that if a company needs innovations they should collaborate with universities. Internal R&D is good at implementation, but might be locked in the current situation. For collaboration to be successful, there should be real challenges, over-ambitious goals and risk taking, time and access to data and freedom and trust for researchers to work. This way you get good and fresh results".

***Esko Petäjä**, R&D Manager, PrimaPower*

Mobile solutions help Finnair streamline its daily aircraft maintenance

"Finnair faces a very challenging environment for its daily aircraft maintenance due to very high aircraft utilization rate. To streamline the turnaround process, we've made the decision to make aircraft maintenance operations paperless and to arm our employees with mobile solutions instead. As this is a big change, we wanted to work from the bottom up, and to involve technicians in the design process. We engaged FutIS program to explore important background information on employee attitudes towards mobility solutions. The survey of employee attitudes towards digitalization is something we haven't done before internally, and the results have given us valuable information of the adoption readiness of new solutions. The findigs help us make a significant improvement in situational awareness at hectic turnaround times at the airport and thus reduce technical delays ".

***Juha Karstunen**, Head of compliance control and development, Finnair*

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KEYWORDS: Installed base information, service reporting, data quality, Multi-Criteria Decision Making, Analytic Hierarchy Process, Decision Support Systems

INDUSTRIES: Industrial service providers

Information enabled service operations

Summary The purpose of the task was to study and develop effective and efficient processes with a focus on how information is used in service operations. In particular, the task focused on processes, capabilities and organizational structures for efficient and effective service delivery. This implied asking questions such as 'What information are operational decisions based on?' and 'Where are these decisions made and how could they be improved by further utilizing service base information?'. The findings help industrial service providers to significantly improve their service process productivity.

Service operations efficiency

INFORMATION ENABLED SERVICE OPERATIONS

Mikael Öhman
Aalto University

The Adaptive Preventive Maintenance concept (APM)

Condition monitoring solutions offer industrial service providers the opportunity to optimize their service timing so that maintenance interventions are done exactly when needed. However, condition monitoring is only applicable to a limited range of components, and is typically feasible only for the most critical parts of engineering assets. *The Adaptive Preventive Maintenance* (APM) concept offers cost-effective optimization of service timing based on service history and other static equipment information, making it a low cost (complementary) alternative in delivering more effective maintenance services.

Results

The concept includes a measurement method for service outcomes that supports service timing decisions, as well asa description of the continuous learning process through which timing is optimized. Essentially, the concept combines *statistical process control* (SPC) with a continuous process of act-measure-react. By applying the concept, the service provider is able to systematically reduce under-maintenance (intervening too late) and over-maintenance (intervening too early), the latter of which until now has not been possible based on static information.

Technology is the main determinant for the reliability characteristics of a given system, while usage and operational environment constitute the main drivers for system deterioration. Subsequently, deteriorating systems are restored through (corrective and preventive) maintenance actions. These basic tenets define the data requirements for using the APM approach.

The procedure for constructing the measure is outlined in the steps below, and Figure 1 offers a conceptual illustration of the resulting control chart:

1. Extract maintenance intervals from maintenance service data, delimited by maintenance events.
2. Exclude intervals between service visits if the visits are not for maintenance purposes as no reduction in relative equipment age took place.
3. Group data based on similar technology/usage/environment, creating a pool of similar equipment.
4. Plot data relative to the maintenance action as the starting point through aggregating the grouped intervals so that the control chart displays the number of failure events (the y-axis) and time since the previous preventive maintenance (PM) event (the x-axis). The number of PM events can also be plotted (as is done in the measure samples presented in this paper) as they convey the accuracy of service timing.
5. Scale the absolute number of failures to correspond to the failure rate by multiplying the absolute number by a correction factor, accounting for the intervals that have already ended (either by equipment failure or by the next PM visit).
6. Plot the mean value (C), upper control limit (UCL), lower control limit (LCL), upper warning limit (UWL), and lower warning limit (LWL), scaling the limits by the correction factor. The warning and control limits can be derived from variations in the number of failure events at any given time and could be expected to be normally distributed, implying a warning limit at two standard deviations and a control limit at three standard deviations.

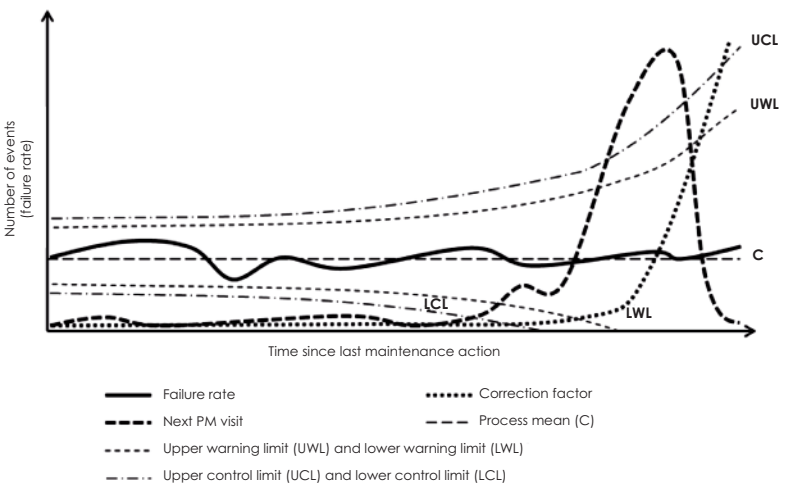

Figure 1. Conceptual illustration of the measure

Because we are aggregating the maintenance intervals of similar equipment, the measure conveys the failure behaviour of the pool of equipment being aggregated rather than the failure behaviour of any single piece of equipment. Consequently, any optimization of service timing based on the control chart will not be done for a single piece of equipment, but rather for the entire pool of equipment, and hence on a fleet level. This means that while the PM timing for individual pieces of equipment will theoretically be sub-optimal, on an aggregate level the timing will be optimized.

The process for managing PM outcomes based on the developed measure consists of the following three phases:

1. **Learn** – In this initial phase, failure information is gathered and accumulated over time, and for similar equipment. Collecting more information leads to reduced relative variance in the failure rate. Once enough information has been gathered (what is enough should be evaluated on a case-by-case basis), aggregating it and constructing the designed measure will confirm whether the aggregated pool of equipment is being under-maintained or over-maintained.
2. **Adapt** – If the pool of equipment is over-maintained, then the PM intervals should be gradually lengthened (increasing the maintenance frequency) while keeping a close eye on the evolving failure rate distribution. Once the maintenance intervals have been sufficiently lengthened, the UWL and UCL will be breached repeatedly, indicating the first (statistically significant) signs of wear-out failures. At this point, we have passed the optimal interval, and based on the revealed failure rate distribution we can tell what the optimal interval is and subsequently revert to it. If the pool of equipment is under-maintained to begin with, then the maintenance interval should be shortened. However, in this case gradual adjustment is not necessary as the optimal interval should be visible, based on the initial failure rate.
3. **Control** – Once the pool of equipment is being maintained at the optimal interval, the failure rate is monitored for changes in reliability. In cases where reliability growth can be expected in the pool of equipment (in a way which cannot be controlled through technology-related information), it may be beneficial to periodically revert to the adapt phase.

In contrast to previous SPC applications where output is measured for the purpose of controlling the input or transformation, the developed measurement method measures outcomes for the purpose of controlling output. This essentially means that the measure developed here does not utilize SPC of the service supplier process, but rather SPC of the customer process. Furthermore, from a service quality control perspective, this application of SPC is not only (or even primarily) intended

to limit the costs incurred by special causes, but rather to limit the costs incurred by their absence, thus providing a concrete, holistic measurement of the cost of quality and the identification of over-service or over-maintenance.

The developed SPC-based measure and control process together form the basis for APM, which essentially complements currently available options of Design-based Preventive Maintenance[1] (DPM) and Condition-based Maintenance[2] (CBM) (Figure 2). While CBM will provide the basis for the most optimal PM timing, APM provides better results than DPM over time, due to the control process that serves as a learning mechanism for reducing both over-maintenance and under-maintenance. However, in contrast to APM, CBM cannot be implemented for all maintainable technologies, and while CBM and APM share the need for an IT back-end implementation, CBM also requires sensors to be installed at the equipment and data communication infrastructure for connectivity. While this is hardly a problem for new equipment, it may bea daunting task when retrofitting larger, aging service bases.

Implementation effort	None, a part of the equipment design process	Low, intervention restricted to IT backend (operative systems)	Low (new equipment) – High (retrofit), requires sensors, communication infrastructure and analytics
Required data typically owned by	OEM	Service provider	Customer or OEM
Service timing determined for	Equipment design	Pools of similar equipment operating in a similar environment	Individual equipment
Service timing principle	Avoid under-maintenance	Eliminate both over- and under-maintenance	Eliminate both over- and under-maintenance
Learning mechanism	None	Adjust and observe	Real-time observation and adaptation

Figure 2. APM in relation to other PM approaches

Motivation

With the emphasis of service contracts gradually shifting towards outcomes (what is delivered), instead of behaviour (how the service is delivered), there is a growing importance for understanding the provided service'seffect. APM is expected to facilitate the transition towards outcome-based contracts by complementing condition-based maintenance. One of the key benefits of the approach developed is that it provides a cost-

1 Where the manufacturer of the equipment estimates the proper service timing based on reliability estimates, calculations, and simulations.

2 Where service timing is based on condition monitoring.

effective way of revealing service overproduction. Based on our analysis, we conclude that there are significant productivity gains in making sure you meet required standards for service output without exceeding them. In other words, when profitability is driven not only by efficiency but also by effectiveness, the developed concept is key in securing profitable service operations.

Application and impact

Through optimizing maintenance and inspection intervals, the developed concept offers significant improvements in cost efficiency. Implementation of the concept leads to improved service quality (improved equipment availability) and reduced operative costs (reduced need for maintenance resources). Depending on the context, the concept can be expected to reveal reduction potential of direct costs in excess of 10%. The concept can be utilized by any industrial service provider with a substantial service base consisting of similar equipment. Currently, the concept has been proved and limited pilots are in progress.

FutIS in action – Company impact

Turnaround maintenance process improvement at Finnair

"Turnaround maintenance poses a significant challenge for airlines with high fleet utilization. High fleet utilization creates an environment where limited resources need to perform needed maintenance activities under a strict time-constraint. To improve departure reliability, we engaged FutIS program to investigate our turnaround-process, and to use a combination of different process development approaches, including lean and theory of constraints with a specific focus on decision-making in the turnaround-process. The resulting approach was later formalized in the "lean for smart services"-approach. Through the approach, we were able to identify process pain points in terms of information flow, providing insight needed in reorganizing the turnaround process. The pit-stop project provided valuable insight in process problems at the time, and served as a basis for reorganizing the turnaround process in order to improve departure reliability".

***Juha Karstunen**, Head of compliance control and development, Finnair*

Improving aircraft maintenance scheduling at Finnair

"In aviation, the scheduling of aircraft maintenance presents several challenges that arise from complex operating environment. To improve aircraft maintenance scheduling, we developed a long-term forecasting tool for identifying distinct workload peaks. Through early identification of workload build-ups, the tool helps schedule maintenance so that workload variation is reduced, creating the preconditions for high resource utilization and high maintenance quality. Further, we devised a method of creating scheduling heuristics where near-optimal solutions, with respect to workload variation, were obtainable. The forecasting tool has improved our visibility to future maintenance needs, and is therefore able to provide valuable input in the maintenance scheduling process. Further, the scheduling heuristics provided new insight into the trade-off between over-maintenance and workload variation".

***Juha Karstunen**, Head of compliance control and development, Finnair*

Adaptive Preventive Maintenance (APM) approach helps optimize condition-based maintenance at KONE

"In order to move towards more extensive condition-based maintenance (CBM) at KONE, we needed to understand the effect of preventive maintenance for components and systems where condition monitoring solutions are not applicable. Yet, the effect of preventive maintenance is notoriously challenging to measure. We developed an Adaptive Preventive Maintenance (APM) approach for this purpose. The novelty of the approach lies in its ability to uncover not only situations where equipment are under-maintained, but also situations where equipment are over-maintained.

The approach helps optimize preventive maintenance intervals (be they defined by time or usage) which in turn reduces unexpected breakdowns in situations where the service base is being under-maintained. Further, the approach helps reduce operating costs in cases where the service base is being over-maintained, as longer intervals require less maintenance resources. We used the approach in early phases of building our CBM capabilities, and it helped create a novel insight into the effect of our preventive maintenance services".

***Riitta Partanen-Jokela**, Director, Service development, KONE*

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KEYWORDS: Preventive maintenance, Service operations, Optimization

INDUSTRIES: Engineering asset maintenance

Capturing and managing customer and commercial data from service operations

Summary The overall purpose of the task was to study and develop integration models that help capture, combine and use customer and commercial data for the purpose of maximing customer value from service operations. Such models require a deep understanding about customers' business logic and markets in which they operate. The findings help understand and develop information-based service models that can be used to support asset performance optimization through an open development between customers and all other relevant stakeholders.

Service operations efficiency

CAPTURING AND MANAGING CUSTOMER AND COMMERCIAL DATA FROM SERVICE OPERATIONS

Johanna Liinamaa
Johan Nordström
Åbo Akademi University

An approach to information management between stakeholders in service delivery

To reach new business opportunities, technology-based businesses need tofurther expand their service portfolios. For the supplier, the key toenhancing service value is to improve service performance and operations reliability via customer data and information management. Improving service performance and operations thus involves steering and developmentof advanced service offerings via customer service operations and business information acquisition, sharing, and management processes in collaboration with the other suppliers in the customer's value chain. Service providers should focus on capturing and managing customer data from service operations by increasing customer-centricity.

Results

The findings introduce an approach to capturing and managing customer installed-base and commercial data from service operations. Particular emphasis is placed on principles for sharing and utilizing insights of customer operations and business processes in order to improve performance and process reliability in collaboration with other suppliers. The findings propose a four-step model for steering service operations and developing services based on information acquired about the customer's current business situation.

The four key steps present how to acquire, manage, integrate, share, and utilize the customer's operational commercial data and information as joint activities with other suppliers and stakeholders in order to secure and improve the quality of service operations. The model also highlights a strong orientation towards solving present and future customer problems:

1. Identify the critical factors affecting the performance of the asset (Figure 1).
2. Map significant actors in the customer's business environment (Figure 2).

3. Develop an understanding about how the actors in the customer's value chain (Figure 3) operate and function by collecting and analyzing the business models and key-performance indicators of the stakeholders.
4. In terms of contextual adaptation and development of new methods and processes, develop the service and future service potential based on integrated information management from various sources and between stakeholders in the value chain of the customer's asset.

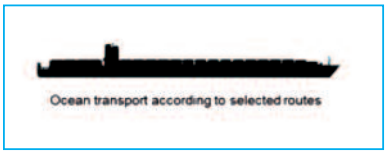

Figure 1. **Example of customer's asset**

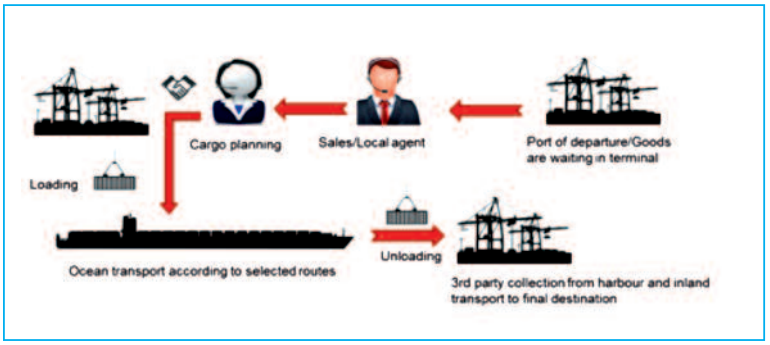

Figure 2. **Example of the business environment in which the customer operates the asset**

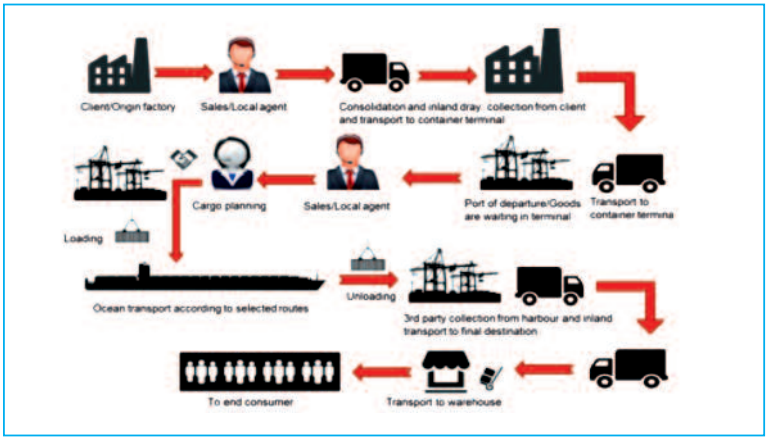

Figure 3. **Example of the customer's value chain on a high level**

Motivation

Creating new service business opportunities by design and execution of profitable service operations, which often face a high level of uncertainty, calls for developing and implementing structured but flexible information management processes. Key-performance indicators for all critical stakeholders, starting with the customer,are crucial in order to strengthen internal processes, strategies, and business development of the parties.

This may be reached by engaging in the following:

- Increasing understanding about customer's earning logic: capture and manage customer data from operations.
- Identifying and verifying the operative and commercial data and processes of the actors in the value chain.
- Embedding contextual information that enhances the customer's performance and revenues.

Application and impact

The approach developed in this task initiates the potential to change industry logic through several suppliers' joint service concept development and offering that result in new models of working in the industry, as well as altering the present "industry recipe" or collective mind-set of the industry. This can be established through integrated information management and communication processes for service operations, which would increase both customers' and suppliers' value respectively. Increased quality of customer knowledge can be reached by collecting, analysing, and utilizing different sources of data and information, service potential, and future business prospects via better understanding of customers' business environment. This includes the customer's business targets, the current installed-base, the growth of the installed-base, and estimated additional sales via new services. This calls for managing, integrating and utilizing the information to increase both customers' and suppliers' value, in collaboration and through sharing data with other parties.

FutIS in action – Company impact

An information management approach helps MacGregor design new value adding solutions

"Understanding our customers' business is paramount to us at MacGregor. This calls for access to information on how customers run their businesses at the moment and what performance challenges they are facing. To make this work systematic at MacGregor, we needed structured but flexible information management processes. FutIS program has significantly helped us reach that aim. More specifically, FutIS has helped us understand what we call customer's business logic. Knowing how to enhance the most important value-adding components in our customer's business network puts in in a position to develop novel business solutions".

***Henri Paukku**, Operation Support Manager, MacGregor Finland Oy*

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KEYWORDS: Joint service delivery; Service operations; Earning logic; Big data; Information management; Service potential

INDUSTRIES: Marine cargo, cargo handling equipment, ship building, ICT industry

Managing the complexity in systemic service processes

The purpose of the task was to develop tools for evaluating competence development policies as well as for planning recruiting or workforce retention activities. By studying service process dynamics and modelling of key systemic components, the task aimed to integrate systemic principles into competence development in global service operations. When applied, the findings help managers create service operations that are resilient, flexible, cost-effective and scalable.

Joona Tuovinen
Åbo VTT

Dynamics in service competence management

Building a global service competence base is not just about optimizing resources. It is also about resilience and transparency – ability to adapt just right to adversity, and to see, share and build the right competences. To gain the understanding of how to adapt and build the right competences, we have created dynamic models on how the service capabilities interconnect and develop over time. These models include and explain for example how service centres ask and receive support based on workloads and skills. With our dynamic models one can discover and harness dynamic opportunities in service competence management.

Result Models that show the dynamics in competence management. The approach moves away from a traditional snapshot to a dynamics view of how service capabilities interconnect and develop with global service operations over time.

Key Steps:

1. Competence mapping	Define and map specific service engineer skills.
2. Business analysis	Analyse competence charts, resource utilization, and customer needs and drivers.
3. Dynamic modelling	Depict how skills interrelate with business and how changes in one area will affect whole operations over time.
4. Policy design	Simulate different scenarios to plan and test manning and development strategies. Learn through simulated experience.

Figure 1 shows and example of the approach by illustrating how service centres request support from others – a highly relevant factor in a global service competence base. Centres are prone to holding on to service cases where they are highly skilled even in high utilization rates. Centres are also prone to holding on to service cases when their utilization rates are low even when they are not as skilled for the cases. These are unformal decision made at the service centre level to cope with the situation but might not be best in terms of the global operations.

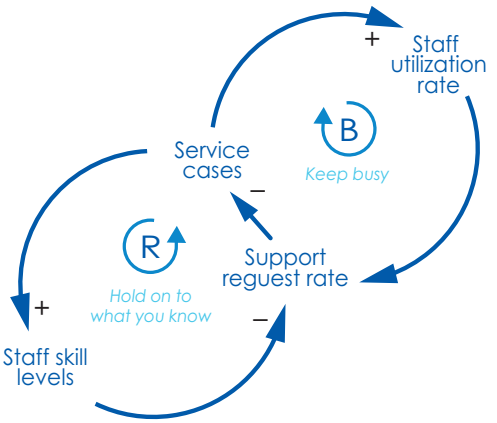


Figure 1. How service centres request support from others

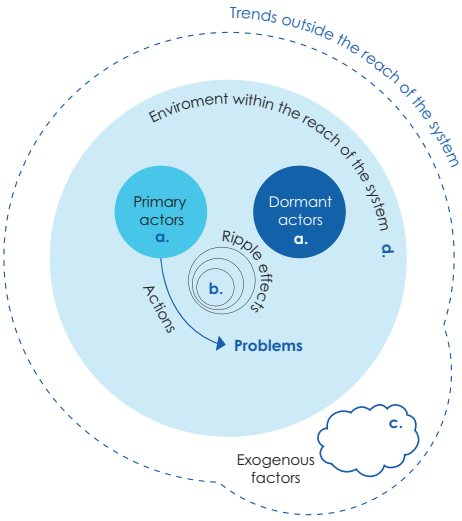
Motivation

To better create an operational model which serves customers' needs efficiently and sustainably. How to have the right skills in the right place at the right time? Solving the challenge is critical as it will be difficult – if not impossible – to grow internationally without a scalable, sustainable and dynamic service competence base.

Application and impact

Competence mapping, modelling and simulation give the ability to compare activities, capabilities, and service engineer mobility on a global scale. If supported with a range of other managerial and IT related factors, it supports the better planning of competence development and manning policies. The approach provides a management flight simulator to test the effect of different scenarios – to try out what if – without the risk of wrong decisions. Meaning, we get "*a better view of our business, the mobility of service engineers, where service centres can ask for help, and a lot of information on what was previously unknown*"

Through our studies we have also discovered patterns and elucidating principles that recur as blind spots in management – reasons why things go wrong. These patterns (shown in figure 2) can be discerned from, and applied to, all types of management contexts.



Too easily:

a. values that drive the behavior of actors remain hidden

b. Little focus is given to the search of ripple effects

c. factors are seen to lie outside our influence

d. the wider enviroment is left unconsidered

Figure 2. Systems map – recurring blind spots in management

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KEYWORDS: Competence management dynamics, human resources, skills, maintenance, services

INDUSTRIES: Industrial maintenance services

CROSS-TASK RESULT:

Service Business Management Environment (SBME)

– The missing link of data-driven industrial service business

Service Business Management Environment (SBME)

CROSS-TASK RESULT

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The missing link of data-driven industrial service business

Opportunity. Data-driven industrial services hold a great promise for manufacturing companies. Yet, past experiences show that turning plans for data-driven industrial services into actionable and lucrative business has remained difficult.

Challenge. We argue that the difficulty stems from the way companies typically approach their installed base and customer data. First, companies often have a lot of data available, but it is scattered across many systems. This leads to making decisions and managing based on a gut feeling. Second, companies often fail to align their functional efforts (business strategy, service operations, service and installed base data, advanced analytics) into data-driven industrial services under a unifying theme. As a consequence, efforts and investments into building a data-driven industrial service business become dispersed across the organization and lose their momentum.

Solution. Future Industrial Services *Service Operations Efficiency* has developed an approach that helps build and manage data-driven industrial services with confidence. We call the approach Service Business Management Environment (henceforth SBME). SBME is a comprehensive decision-making and management environment (concept, processes, tools) for manufacturing companies to build and manage service business based on installed base and service data. SBME centres around 'control rooms'. Control rooms are operations centres which serve as a central space for monitoring, controlling and managing physically dispersed industrial service operations.

A SBME functions in two key ways. First, SBME facilitates decision-making by collecting installed base and customer data into a single point of access; i.e. a control room. Second, a SBME functions by establishing a cross-functional working process for developing and managing service business based on installed base and service data. That working process takes place in and through control rooms.

Impact. Through cross-functional alignment, SBME provides manufacturing companies with the 'missing link' of data-driven industrial services. By enacting the SBME, manufacturing companies are able to develop and manage their service operations in a unified and coherent manner across functional, organizational and geographical borders. This helps make current service operations more cost efficient while simultaneously helping create new value through novel services and service operations.

Result

What is SBME?

Service Business Management Environment (SBME) is a comprehensive decision-making and management environment (framework, working process, tools) for manufacturing companies to build and manage service business based on installed base and service data.

Control room – and beyond

SBME centres around a control room; i.e. an operations centre which serves as a central space for monitoring, controlling and managing physically dispersed industrial service operations. A control room is a venue for SBME in two important ways.

First, a control room is the space into which SBME collects installed base and customer information into a single point of access. Through a control room, managers are able to access data on their whole installed base, service operations, as well as relevant customer information. By aggregating installed base and customer information, control rooms are able to provide a 'fleet view' to their industrial service operations.

The second important feature of SBME is that it expands the traditional control room concept into the cross-functional development and management of data-driven industrial services. SBME involves a cross-functional working process that brings together and aligns the work of four key functions behind data-driven industrial services: business strategy, service business data, service operations and advanced analytics. As a consequence, SBME takes the management and development of data-driven industrial services beyond traditional control room operations.

SBME framework

SBME builds on a framework that 1) brings together four functions that are necessary for the development of data-driven industrial services, 2) aligns the functions, as well as work carried out within them, under a unified purpose of developing and managing data-driven industrial services, and 3) locates such work to be carried out in and through a control room. The framework is illustrated in Figure 1.

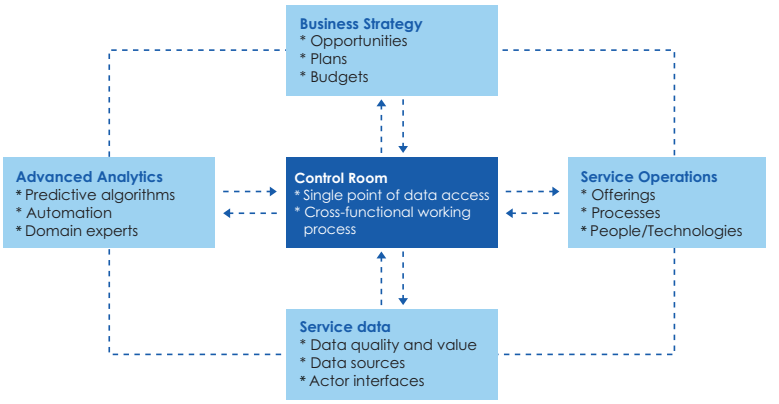

Figure 1. SBME Framework

The SBME framework has five characteristics that are key to decision-making and management of service business based on installed base and service operations data.

- First, the framework identifies functions that are crucial for developing digital services. The functions are 1) business strategy, 2) service operations, 3) advanced analytics and 4) service data management.
- Second, the framework aligns the four functions around a structured working process that takes place in and through a control room.
- Third, the framework is ubiquitous in that it demonstrates that developing and managing industrial services based on service data can start anywhere within the four functions. Therefore, it identifies four possible avenues for business functions to take a lead in developing data-driven industrial services.
- Four, the framework makes SBME hierarchically scalable. As a consequence, the framework can be aggregated hierarchically across individual services, service operations, units, regions and corporations.
- Finally, the framework spans – if necessary – across the entire service ecosystem, involving not only the focal company but also its suppliers, channel members, and customers.

The four SBME 'functions'

The SBME brings together and aligns four previously disconnected business functions for developing and managing data-driven industrial services.

Business strategy. Business strategy drives data-intensive industrial service business. It gives the business a sense of mission, defines how the business is to be developed, gives its targets, and specifies what resources and budgets are to be used.

Service operations. Service operations help provide and operate data-intensive industrial services. Their work involves developing processes, methods and tools that make service provisioning possible. In addition, work force planning and management, skills development, and compensation are key aspects of service operations.

Advanced analytics. Advanced analytics is used to help drive changes and improvements in the actual running of a data-intensive service business. They involve predicting, simulating, optimizing and communicating business outcomes that flow from changes in customer behaviour, service offering and service operations.

Service data. Service data is what a SBME runs on. It involves data on installed base, service operations, customer business as well as other ecosystem members such as providers and partners. SBME provides a single point of access to data through the control room. In addition, a SBME brings together the four functions around service data.

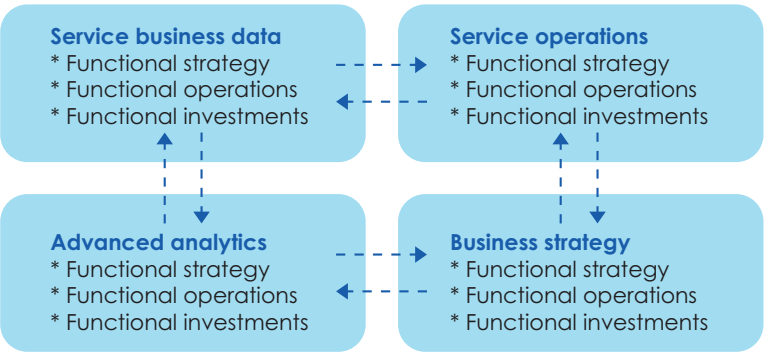

Figure 2. The four SBME functions

SBME working process

SBME involves a working process that is specific for developing and managing data-driven industrial services. Through the working process, company managers enact the SBME framework. The process is illustrated in Figure 3.

Figure 3. The SBME working process

The SBME working process takes place in and through a control room. It brings together managers from the different functions to plan, carry out and follow up on work regarding data-intensive industrial services. The process has six main steps:

Step 1. Opportunity identification.

The step brings functional managers together to identify business opportunities from the points of view of all the four functions involved in SBME. This helps managers and their functions align around a set of commonly agreed opportunities.

Step 2. Selecting industrial service development initiatives.

The step helps align managers and their functions focus on jointly-agreed on initiatives to develop and run data-intensive industrial services.

Step 3. Allocating and securing resources.

The step helps align budgets and resource plans for the four functions around commonly agreed-on opportunities and development initiatives.

Step 4. Planning execution.
The step helps managers from different functions to align their functional work plans around agreed-on targets and schedules.

Step 5. Implementing initiatives.
The step helps align the work that aims to implement agreed-on service business initiatives across the four functions.

Step 6. Following up and learning from initiatives.
The step brings managers together to align insights and learnings from past development initiatives.

Motivation

Industrial companies need a unified and coherent working process to succeed in developing data-intensive industrial services. SBME provides this – it is the missing link that enables building such a business with a confidence.

Application and impact

There are three main benefits from enacting a SBME.

From gut feeling-based decision-making to informed decision making. The first and immediate benefit is that SBME collects, manages and maintains installed base and customer data at a single point of access; i.e. a control room. This helps managers move from gut feeling-based decision-making to informed decision making.

From unaligned to aligned investments, budgets and plans. The second benefit is that SBME establishes a cross-functional working process that helps managers analyze, plan, execute and follow up on industrial services across the four involved business functions (business strategy, service operations, service data and advanced analytics), as well as under a unified service development theme. This helps managers avoid their investment decisions, budgets and work plans becoming scattered across the company, and thus losing their momentum.

Improved likelihood of success for overall company strategy. Through the working process, SBME provides manufacturing companies with the 'missing link' of data-driven industrial services. Through SBME, they are able to develop and manage their service operations in a unified and coherent manner across functional, organizational and geographical borders. This helps greatly improve the likelihood of success for manufacturing companies that seek to branch out into data-intensive industrial services.

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KEYWORDS: Industrial Internet, digital services, service operations, industrial services

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