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FIR at RWTH Aachen University

# Service innovation

## 6 principles for successful data-based service innovation in industrial businesses

Whitepaper

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# Imprint

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# Service Innovation

## 6 principles for successful data-based service innovation in industrial businesses

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# Service innovations

The digital economy radically changes the way businesses are run. Objects, products and machines are equipped with sensors, they are measurable, controllable and constantly connected to the internet. They collect, analyse and share data of many different kinds and, by doing so, make visible what users and operators need.

Today, cost-effective technologies and algorithms can already be used to detect and forecast customer requirements, for example in the field of technical maintenance. Non-branch service providers take on the roles of market supporters and have access to the customer base of investment goods manufacturers (so-called business convergence). All in all, the foundations of classical industrial companies and the previous business models that go with them become more and more vulnerable in a digital economy. This will increase the innovative pressure on new services and business models.

> **“The future power of modern industrial businesses is significantly formed by their service innovation strength.“**
>
> *Prof. Dr. Dr. h. c. mult.*
> *Wolfgang A. Herrmann*
>
> Source: Reichwald 2008, BMBF-Whitepaper

The development of data-based services is becoming increasingly important in the industry, particularly as a result of traditionally manufacturing companies shifting to service providers for complex and digitally enriched solution systems. The differentiation of competitors based on goods and traditional services, such as spare parts or maintenance packages, is no longer promising. The high pressure on innovation in the service business is reflected, among other things, in recent studies by the *KVD* Customer Service Association in Germany. According to the study results, 92 % of companies operating in the industrial services sector expect a change in the business model in the service over the next five years[2].

One aim of the innovation efforts is to improve the ability of customers to increase their own productivity when using products or when selling productivity improvement as a service. The basis for this is usage and process data of products as well as the development of new data-based services.

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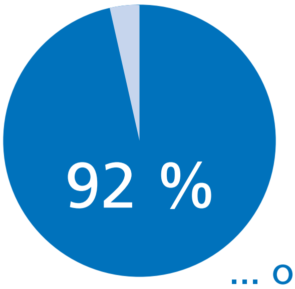
[1] KVD-Service-Studie 2015



... of businesses expect a change in service business models in the next 5 years.

Source: KVD-Studie 2015

According to the *Deutsche Akademie der Technikwissenschaften* (acatech), internet-based and physical services will be linked to each other in the medium term and will be made available to the customer as needed. When doing so, the focus is always on the user of the service. Providers of data-based services should have an in-depth understanding of the user. They must be able to link a great amount of data in a smart way and monetise innovative services and business models.

However, the change from the traditional to the digital service provider is not easy. The digital maturity level of many industrial companies is still too low to successfully place these digital service innovations on the market. One problem of service development is the increasing involvement of information and communication technology in service development and implementation. The additional technology makes the innovation processes for services on the part of manufacturers increasingly complex by involving different internal and external stakeholders (e.g. IT partners, data protection officers or product development departments).

In addition to this, data-driven services also require that manufacturers (e.g. data scientists) develop new competencies in order to use the customer data obtained to increase machine productivity and to offer new business models. Furthermore, industrial companies that want to successfully offer data-driven services must develop new market introduction strategies to create a high degree of acceptance and trust among their customers. This is necessary to get access to relevant data. These and other challenges caused the success rate of companies in regarding the development of new, industrial services to shrink.

To change this, this white paper presents six principles that help industrial enterprises to develop new successful data-driven services.

Before the term service innovation is defined in this text, the following paragraph highlights typical problems and challenges that industrial businesses often have to face in the context of service innovation. The aim is to outline and understand reasons for the failure of new service developments.

The traditional definition of the term service innovation describes the process on the one side and the actual result on the other – including the definition of the customer benefit, the selection of ideas, the realisation and evaluation and improvement of the new service offer. Capital goods manufacturers or industrial service providers stand out on the market with their service innovations offers, such as extensive service contracts. Nowadays, the focus is on digital and therefore data-based service innovations. Data-based services are characterised by the combination of physical as well as digital service components, the fact that they can be added to already existing intelligent products or machines and that they can be offered to customers based on their actual need.

An example: An elevator producer offers not only traditional after-sales-services, such as elevator maintenance, repair and trainings, but also data-based services. By using data from the control logic system of the elevator and installing an additional data box, the producer can offer his customers real-time-data that provides information on the condition of the elevators as well as required maintenance measures. Intelligent monitoring and preventive measures can increase the safety and availability of the elevators by up to 50 % and producers gain a significant competitive advantage in comparison to other market players. Instead of a single purchase of the product/the elevator and paying single bills for reactive services, the customer can proactively pay a yearly fee for the increase of the elevator availability and therefore for the increase of the innovative service offer. By doing so, the customer profits from a high machine/product workload. As a next step, the producer can connect the already available elevator data with real-time information about the usage of the building and public transport, thus increasing the transport capacity by more than 50 %. Other elevator producers who do not have a similar service portfolio and do not support service innovations will not be compatible in the medium-term.

> “The most important criterion of strategic development of data-based solutions is a clearly visible added benefit for the customer for a specific practice case.“
>
> *Thomas Dömer,*
> *Drägerwerk AG & Co. KGaA*

Other latest examples for successful service innovations are heating technology company Viessmann and turbine producer Rolls-Royce. Because of the connection of the heating control system, the thermal installations and the provision of an App for remote-controlling of the heating system, Viessmann can offer its customers a saving in energy usage of up to 30 %. Rolls-Royce increased the life expectancy of its turbines from 700 to 900 hours by offering an output-based business model called “Power-by-the-hour” (payment of individual hours of use of the turbine instead of a purchase of the entire turbine). The model was combined with a condition-based maintenance service for the turbines.

It is undeniable that industrial companies have to cope and deal with the development of new service offerings in order to maintain competitive. However, it is also proven that service innovations follow different innovation patterns than innovation in the production goods industry. Relatively little is known about these innovation patterns. Because of this, most companies face many unsolved challenges in the field of service innovation development. 43 % of all newly implemented industrial services fail within a year after originally being introduced and brought to the market, because the market entry and implementation is unsuccessful.[2] This rate is even higher for services that are based fully or partially on data, their failure rate is as high as 50 % because the development of data-based services is very complex. When investigating the reasons for the failure of many digital service innovations, a couple of different specific **challenges** become apparent:

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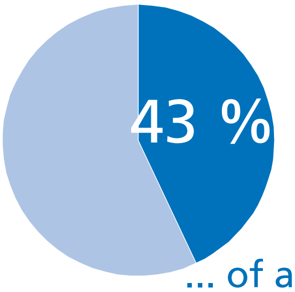
[2] Castellion u. Markham 2013, S. 979.



... of all newly developed industrial services fail within the first year after their market launch.

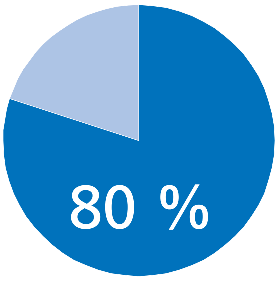
Source: Castellion u. Markhamm, 2013, S. 979

- **Definition of the customer benefit:**

  Although many industrial companies started initiatives to support the development of digital services, these efforts often do not meet customer´s requirements. Because they did not pay enough attention to the actual customer benefit of the service idea, many developed services turn out as unsuitable for the market, causing a waste of resources. Providers often fail to collect or to use already existing data and information to gain detailed insight into the problems of the company´s typical type of customer. Very often, external users and customers are only involved in the innovation process once the market entry is imminent.

- **Use of technology and data access:**

  Another challenge affecting the success of service innovations is the use of technology and the access to data. The technological basis for the collection of product and service data is the starting point of this crucial step. Many companies are currently not able to equip their already installed basis or new products with technologies that can collect relevant product or machine parameters. Apart from the general collection of data it is also often required to prepare the collected figures and transfer them from the customer to the producer which can be another difficult step. In addition to this, many customers, however, are not willing to share the required data in the first place and need to be convinced of the benefit of the new service offering first. Once the producer does receive the required data, the technological basis required to save and process the data (e.g. technologies such as machine learning) needs to be available to generate useable information from the data. All in all, the increasing amount of data that needs to be processed is a great technological and organisational challenge for many companies



… of all surveyed responsible managers of the industrial service business predict a continuous growth rate for industrial service in the future.

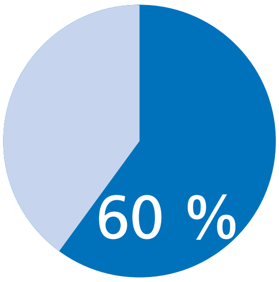
Source: KVD-Studie 2015

- Implementation of new services and integration into customer processes:

  While traditional services such as reactive maintenance or certification can be provided in a standardised way, the implementation of data-driven services requires individual components. Providers of data-based services often have to carry out customer-individual adjustments to make their services scalable. One example for this is the service offering of Siemens Digital Factory, which cannot be provided without scheduling an on-site operation from the Siemens service team that carries out customer specific adjustments. In addition to this, a data-based service innovation requires an in-depth integration into the customer´s processes and IT-structures (e.g. for the permanent provision of data stemming from different systems or the offering of remote-services with a direct participation of the customer) which also adds to the complexity of the implementation process.

- Building of resources and partnership:

  Many companies neither have an established network of strategic partners nor expertise and qualification when it comes to the development of data-based services. Traditional capital goods producers can indeed benefit from broad domain knowledge, however they do not hold expertise when it comes to the collection, preparation, evaluation and marketing of machine data in the service area. The innovation process requires additional capabilities which are necessary for the development of digital services. As such, data safety or technology experts are indispensable. Apart from the building of resources, e.g. data-scientists, the importance of strategic partnerships (e.g. with technology providers) increases and grows in innovation processes.



… of companies have not yet developed a Business strategy for the development of new business models in the Service Department.

Quelle: KVD-Studie 2015

- **Development and commercialisation of sustainable business models:**

  Apart from the technological and process-related hurdles, the development and commercialisation of data-based services and business models is a great challenge for companies. The close connection between customers and partners, the uncertainty of the access and the quality of the required data and the missing expert knowledge regarding the design of the data-based service solution increase the uncertainty of the sustainability of the business model. New sale and pricing models such as performance-based models or rather cost-benefit-sharing demand a high level of knowledge on side of the provider. Additionally, many providers currently do not know, which target group and which negotiation partner they have to address on the side of the customer with their new, data-based service offer.

Although companies have to face these as well as numerous further challenges and more than 60 % of surveyed industrial companies currently have not developed a digital business strategy for the set-up of data-based services, 80 % of them believe in a strong growth potential of the service business for the next year[3]. It appears that the industry is very unsure how to design services that set themselves apart from classical-traditional services because of the inclusion of data. Because of the higher demand regarding the development speed of products and services, traditional service development strategies need to be developed further. So far, many companies follow specific fixed innovation processes that demand a high time and work load as well as a lot of organisation.

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[3] KVD-Studie 2015

> “Innovation is sometimes simply trial & error.“
>
> *Frank Lothar Unger,*
> *Bilfinger Maintenance GmbH*

In the economy of today, which is characterised by a fast pace, it is beneficial to focus less on perfectionism and instead try and test out new ideas and digital solutions quickly on the market – regardless of whether or not they are fully ready. By doing so, the development phase turns into a phase of testing. A faster learning process and an earlier customer feedback are the results. There is a new motto for innovative service solutions: Only those who make mistakes quickly can eliminate them equally fast and establish an innovation as a pioneer on the market.

Together with a consortium consisting of five industrial companies from different industry areas, the FIR at the RWTH Aachen has conducted a consortium benchmarking between 2015 and 2016. It was on the topic of service innovation[4]. Thanks to the survey, five especially successful practice companies in the area of service development were identified and inspected further in order to find cross-sectoral success principles

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[4] cp. www.konsortialbenchmarking.de

Market
Idea
Concept
Implementation

# 6 success priciples

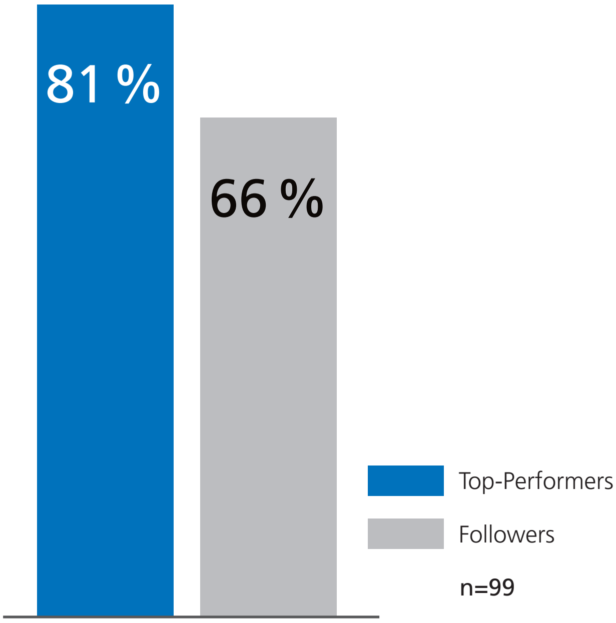
Based on the findings of the benchmarking study, the cooperation with the industrial consortium and the work with the successful practice companies it was possible to extract and define six universally valid principles which support companies in the development of data-based services and therefore strengthen their competitive position. A number of examples of successfully developed data-based services were also defined.

## Principle 1:

### Involve customers as early as possible

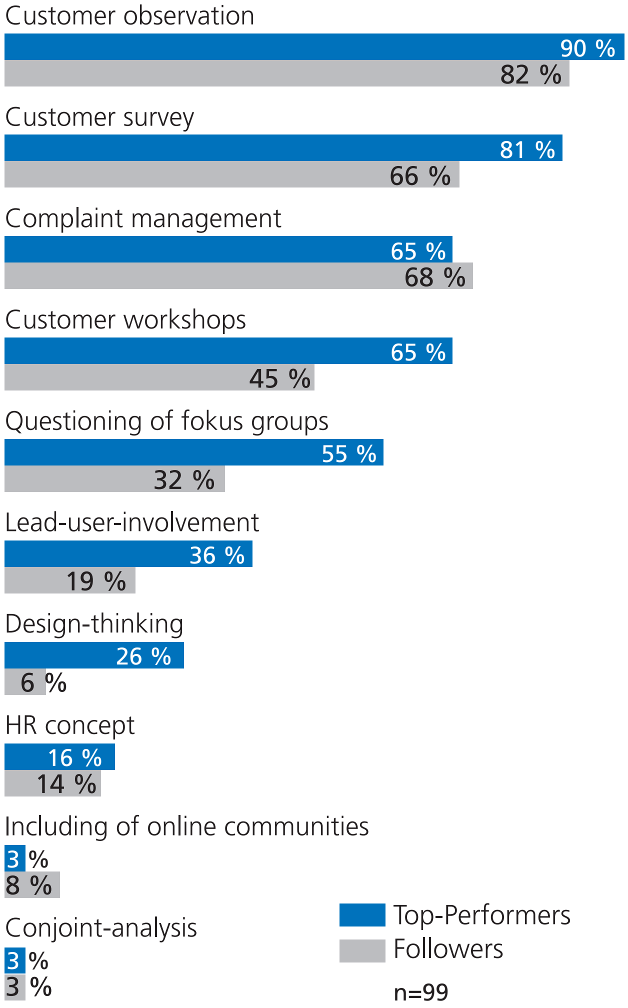
Successful service innovators interact with their customers in various different ways in order to identify their actual demands and needs as early as possible. Because of the early inclusion of the customers, the five identified successful practice companies can detect trends and changing developments quickly. They can align their product and service portfolio continuously with the market requirements and derive possible development measures from the information they receive through this. The early customer feedback helps them to avoid market irrelevant components and functionalities of the service offering. This applies in particular to data-based services – there is only little experience regarding the requirements of customers and the actual added value they receive from the service.

By involving the customer as early as possible in the service development process, current problems and new service ideas can be discussed and adjusted in cooperation with the customer, even if the ideas are not market ready yet. This allows the customer to bring in his requirements and ideas and actively influence the development of the new service. On the one hand, strategic partnerships like these enable a stronger market-oriented and more successful development of data-based services. On the other hand, they also strengthen customer relationships and mutual trust. A high level of trust and acceptance towards the service provider is essential for the successful realisation of service innovations. Data-based services benefit especially from a high level of trust because they require an intensive



Top performers involve their customers significantly more often via surveys than followers.

## What methods do you use to assess the requirements of your customers?



and continuous exchange of process- and machine data, which companies are not always easily willing to share.

When assessing the requirements of their customers, many successful companies focus on observing and questioning the customer, as can be seen from the image on the left. They do so at a very early stage of the innovation process by organising interviews or surveys or setting up workshops with specific customer groups or lead-users. Thus, they include and involve their customers in the development process. The researched company examples show that the successful ones do not only react to what their customers want (e.g. via complaint management), but also proactively reach out to the customers and aim to establish long-term partnerships with them. These relationships can be a crucial factor for the successful realisation of data-based services, because this kind of service requires the involvement of the customer to a much greater detail than other service types.

### Successful Practice

One of the chosen best practice companies sets itself apart by accompanying some of its product and service users in their daily work as part of a global study (ethnographical approach). This enables companies to detect existing or arising problems that customers face in their daily work. They can also identify demands that were invisible before and affect the developing of services - such as the provision of relevant use data for customers and service technicians. The ideas derived from the company visits are developed together with the customer in numerous iterative feedback loops until they are ready to be introduced to the market. In addition to this, the cooperation with and close contact to the customers strengthens the local sales organisation.

# Principle 2:

## Maximum use of external and internal sources

> “Our market intelligence was a real eye-opener for us. We had to reassess a lot of our presumptions and can now understand our clients and their demands much better.“
>
> *Bernhard Steinel,*
> *Heidelberger Druckmaschinen AG*

*Top performers* use significantly more sources, internal and external ones, for the generation of ideas for new digital data-based services than companies that can be identified as followers. In addition to this, they specifically resolve problems that could potentially limit the development of new ideas. One example for this strategy is a mechanical engineering company that relies on market intelligence initiatives (e.g. market surveys) to identify customer demands. Until then, new developments in the field of data-based services were always limited because the product- and service department did not recognise that there was a demand for them. Because of the lack of experience and best practice examples in the industry regarding data-based services, many companies that only consider very limited internal and external sources for new service ideas do not succeed in developing successful innovative ideas and services. In contrast to this, top performers also use external idea sources at an early stage of the idea development as part of a co-creation process. In doing so, not only the customer functions as an accelerator and source for the new service and product but also the co-operation partner, supplier and research partner. Many of the successful industrial business generally consider the first phase of an innovation process, the phase of generating ideas, as more important than other, less successful businesses. Service innovation is only successful for those, who understand the problems of their customers in greater detail. But when it comes to data-based services, many providers simply do not know yet what their customers really demand and how these requirements can be considered when designing and offering a new service solution.

Successful service innovators often rely on a strategy that includes a very broad *innovation funnel* at the beginning of the innovation process, which means that all kinds of internal and external influences and impulses for the service development are considered at this stage. For top performers, the researching and use of technological trends is the second most important task after the observation and questioning of competitors and customers and the analysis of mistakes. As mentioned before, it is proven that successful companies consider the phase of idea generation as more important than less successful companies. The companies also invest significantly more than others in technology and idea development approaches such as open innovation and community solutions. In addition to this, technology scouting, artificial intelligence, mobile communication technology, remote and condition monitoring systems and cloud platforms are considered to be the technological accelerators in this phase of the innovation processes.

## Successful Practice

One of the identified top performers uses approaches stemming from the open innovation concept for the generation of ideas for service innovations. The company uses an internal collaboration platform to involve and integrate all stakeholders in the process of generating ideas. Individual employees, customers, partners or stakeholder can apply for budgets by submitting their ideas for new services via the platform. Thus, they can actively participate in the innovation process.

By doing so, different people from different areas of expertise get in touch with new service ideas and application possibilities and they can work together on the production of a first prototype. The so-called crowd ideation platform is welcomed very well by almost all employees and can be considered as a successful example.

# Principle 3:

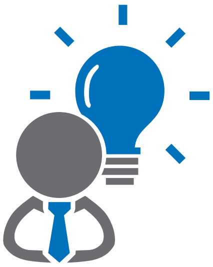
## Risk minimisation through a collective evaluation process

> “Transparent evaluation criteria accompany our ideas through all steps of the systematic innovation process.“
>
> *Andrea Martin,*
> *IBM Deutschland*

The evaluation of ideas and concepts for data-based service offers has shown that successful companies rely on an early, transparent and systematic evaluation by expert committees from different functional areas. The main goal of this approach is to focus the available resources and capacities on promising service concepts as early as possible. This is extra relevant because the development of data-based services is newer and more complex than the development of traditional services. In comparison, noticeably more different functional areas within a company are addressed when developing data-based service solutions – as an example, IT-service providers are required, law advisers and data analysts. Because of this, the involvement of decision-makers from different departments with different point of views and areas of responsibility is extremely important in the phase of assessing and evaluating a service innovation idea. Next to internal stakeholders, external ones are included in the evaluation of service innovations more and more. All in all, successful companies have more than twice as many external experts join the evaluation process than those who have less success. One example for the inclusion of different domain experts is the meeting of a monthly portfolio committee of a successful practice company. Its aim is to quickly evaluate from different point of views how easy or complex it is to realise different concepts.

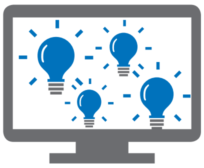
Furthermore, employees tend to embrace and support service innovations even more if they are included in the innovation process by being allowed to express their own ideas and suggestions. The high commitment to the own project influences the implementation success of the service innovation. Top performers also often use structured methods at the stage of the idea phase to evaluate service ideas before they invest in the development of new products or services. They use quantitative evaluation methods, e.g. the arranging of business plans, benefit or scenario analyses to a much greater extent than less successful companies.

### Successful Practice



One of the very successful companies uses an "idea ambassador" who collects internal and external ideas and leads them through the different evaluation steps within the formalised innovation process. The ideas are evaluated and classified in the beginning based on their market potential from different domain experts who are part of an in-house committee. To reach the further steps of the innovation process, a pilot customer must be selected who also accompanies the development and implementation of an idea from the very beginning on. Following decision stages will include external experts who will support the evaluation based on business cases.

### Successful Practice



In a different example, all employees are involved in the evaluation process of a new service idea. The collective evaluation is made with crowdfunding approaches. All of the collected ideas for new services are presented on a web-based community platform. Similar to the idea of a venture-capital-model which stands for partial capital participation, every employee can assign a fictive budget on each service idea. As soon as an idea reaches a previously defined budget limit, the next level of the evaluation process springs into action. By having employees participate in the innovation and evaluation process with own ideas, the number of successful service innovations can be increased and the commitment of employees to the innovation implementation also grows.

# Principle 4:

## Faster market entry with minimum viable services

The time it takes to develop new products and services currently becomes are more and more important factor of success as a result of the increasingly competitive market situation and time pressure. To cater to the increased requirements to the development speed, the principle of minimum viable services offers a promising solution as the experience of successful industrial companies show.

While many companies rely on a process-driven development followed by an evaluation phase and the assembling of a prototype, the principle of minimum viable services opens up a different opportunity: Minimum viable services (MVS)[5] only offer the most important core functions of a new service solution in order to create beneficial value for a customer very quickly. The implementation phase focuses on an early market entry and in return passes on a full-spectrum range of functions. Because of this, the development time is noticeably reduced and (potential) customers in the market can be reached much quicker. Because of the accelerated development, tests and adjustments based on the customers´ demands can be organised much faster in an earlier stage of the process.

The focus is not on the development of a finalised, perfect service. The aim is to gain insight into the planned service offering under real market conditions and to make customers commit to the service early. As part of a first step, the MVS focuses on the core functions of the planned service and develops these until they are ready for the market. After a first serial use in practice, first adjustments and further developments are made based on customer feedback. Thus, usability and efficiency as well as the actual experienced benefit of the service on side of the user are increased. With the help of MVS, a company can learn from the interaction with users and increase their acceptance of a new service idea and, ultimately, also increase the chances of success of its data-based service. The iterative and user-centred development encourages a high acceptance of unknown, digital services e.g. the sharing of process data – if the MVS approach is institutionalised by the company. Because customers are involved in the development of a new service solution from an early stage on, they can influence the added value of the service for their company. In addition to this, they learn about data handling transparency and are committed to the provider early. Apart from an increase of the overall chances of success because of the iterative development based on customer demand, this procedure also has the benefit of reduced time and personnel costs. Because of this, many successful companies increasingly rely on MVS for the development of new services.

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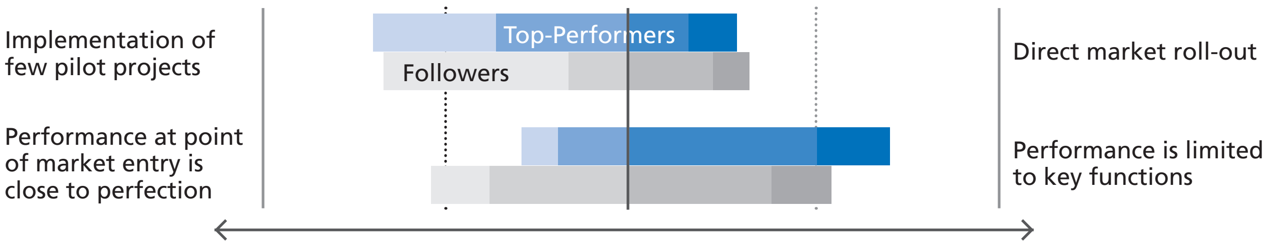
[5] Kampker et al. 2017: Buchbeitrag „Smart-Service.World: Erfolgreich durch IoT-Konzepte und Best Practices“ sowie in Anlehnung an Ries 2011

## The implementation of new services is based on the priciple of:



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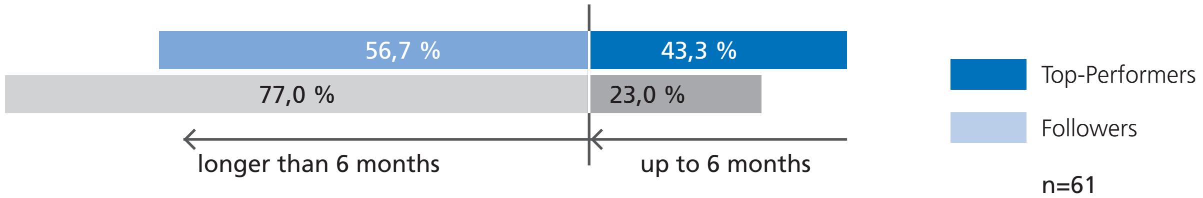
## Average duration of the development process of a service innovation:



n=61

## Successful Practice

A successful practice company develops products and services in the maintenance sector based on an institutionalised process in cooperation with customers and partners. By customer demand, the so far offered maintenance service was expanded with the development of a mobile tool container that provides tools for rent on-site. The producer did not offer this service before but developed it in cooperation with his customers as a new service until it was market-ready. As a first step, a mobile standard cargo container was equipped with basic tools and analogue rental lists and delivered to construction sites. After the first practice experience, the service was adjusted according to the customer requirements. New services were added based on demand step-by-step, such as the automatic billing of equipment/tool use based on the exact hour of the handing out of the tool via RFID tags. After the successful development, the service of a mobile, fully automatic tool station is also offered to other clients since.

# Principle 5:

## Learn from data

> “Every single one of our machines provides us with up to 23 billion data sets per week – but collecting data is easy, the difficulty lies in using it.“
>
> *Bernhard Steinel,*
> *SVP, Head of BA Systemservice,*
> *Heidelberger Druckmaschinen AG*

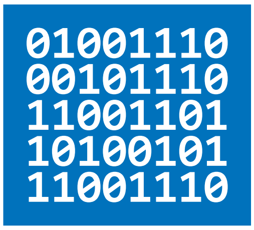
What is special about data-based services is the fact that they involve an always increasing amount of information and data, such as machine data (e.g. log-files) or operative service data (e.g. maintenance protocols). Many successful companies collect this data, which, until now, had no influence at all on the development of service ideas. The companies also implement systematic procedures and tools to analyse the gathered data and learn from it. By now, a cultural change in the area of decision-making can be observed: Gut-feeling or instinct is less and less important, instead, fundamental, data-backed decisions are made. Many companies already have the information required for decisions like these but do not use them systematically for the development of services. Many companies have trouble interpreting the data they have and drawing the appropriate conclusions. The results of the benchmarking show, however, that successful service innovators more often and more continuously learn from data as well as from mistakes and adjust their service portfolio and single functions on basis of market experience. Top performers succeed much better at collecting, analysing and interpreting relevant data and use it for the development of service portfolios.

In order to transfer the gained information into the field of practice, successful companies use a systematic and regular release management for their services. In contrast to less well performing followers, top performers work more structured when it comes to adapting existing service offerings. While followers address changes ad hoc, top performers categorise the identified need for changes and adjustments, often in form of release-roadmaps for service adjustments, and implement them in the framework of clearly defined innovation cycles.

Apart from learning from collected data, top performers also implement a learning-friendly culture in their company more often than others. Next to purely technological matters, a work culture that tolerates mistakes is another success factor for the implementation of service innovations. Successful companies also systematically document improvement potential more consequently than others.

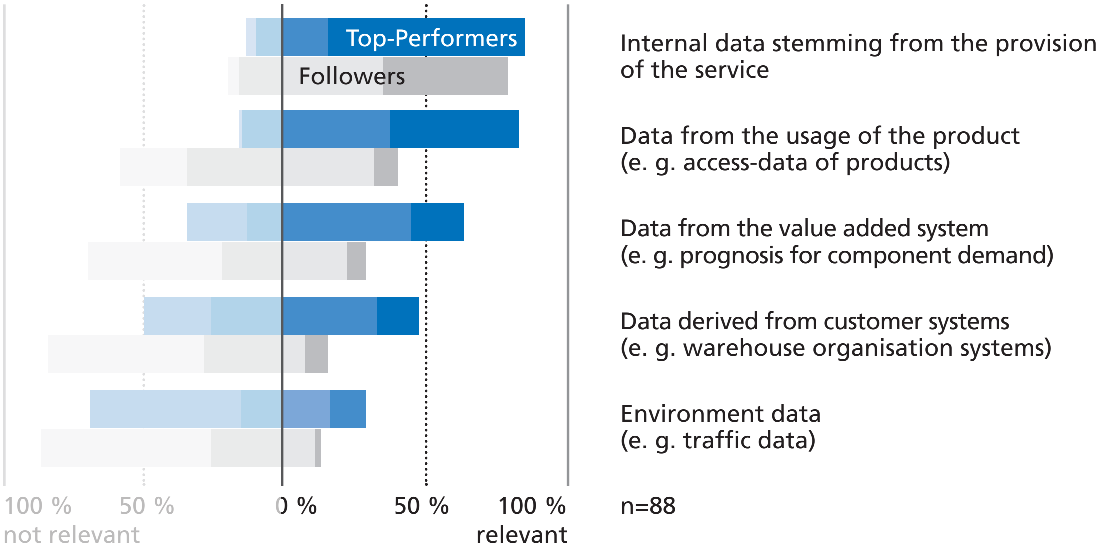
To do this, top performers use user data of products and services as well as the continuous improvement process (CIP) as an instrument of a learning organisation on all company levels. As a result, the gained experience on the market influences new service innovations at successful companies more often than at less successful companies.

### Successful Practice



As another example for a top performer, one company is to be pointed out here that uses automatically sent data of its machines in use at the customer´s site for the development of its product and service portfolio. When a machine is restarted, pre-defined data packets are automatically sent to the top performer. The incoming user and service data are taken into account when developing new machines and services. Both the technical department and the product and service development work with these data. Learning from data is the focus of this successful company and is constantly being expanded so that higher learning effects can be generated at all times. The customer also benefits from this process, e.g. in form of new features such as peer-group comparisons. Only of the customer does not receive added value is he willing to release and share his data.

## Which data do you collect and interpret systematically in order to increase your services?



# Principle 6:

## Formalised iterative innovation process

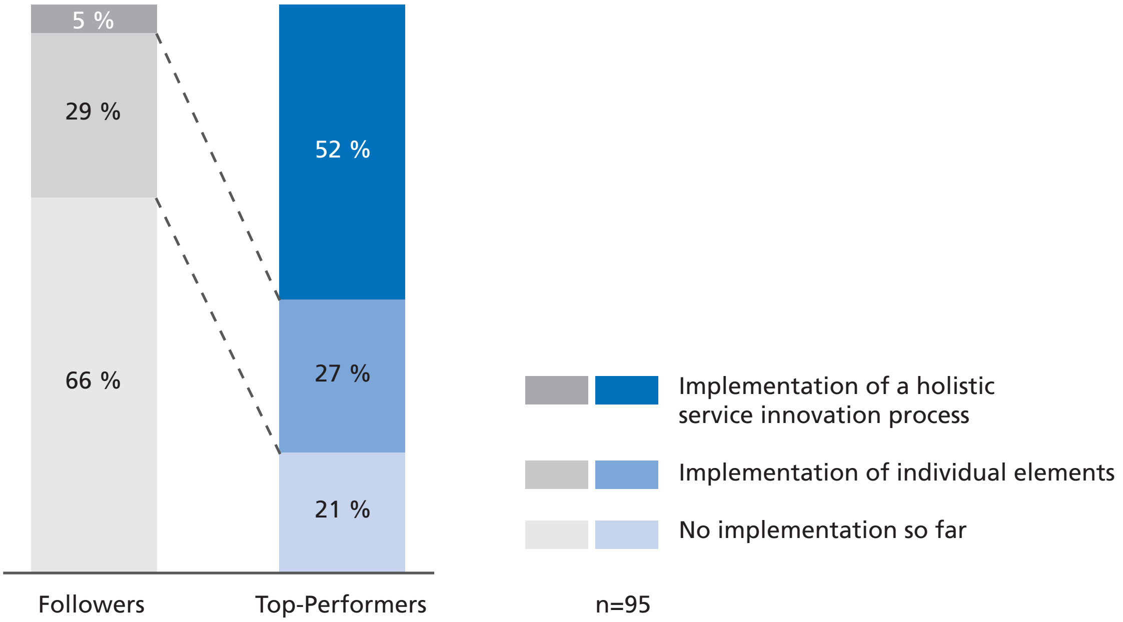
> „Being systematic about innovation is the best way to secure opportunities that will address client and society needs and meet innovation expectations.“
>
> *Andrea Martin,*
> *IBM Deutschland*

Successful service innovations need a structured process. It becomes clear that top performers use formalised service innovation processes when developing new ideas and that successful service innovations are not accidental achievements.

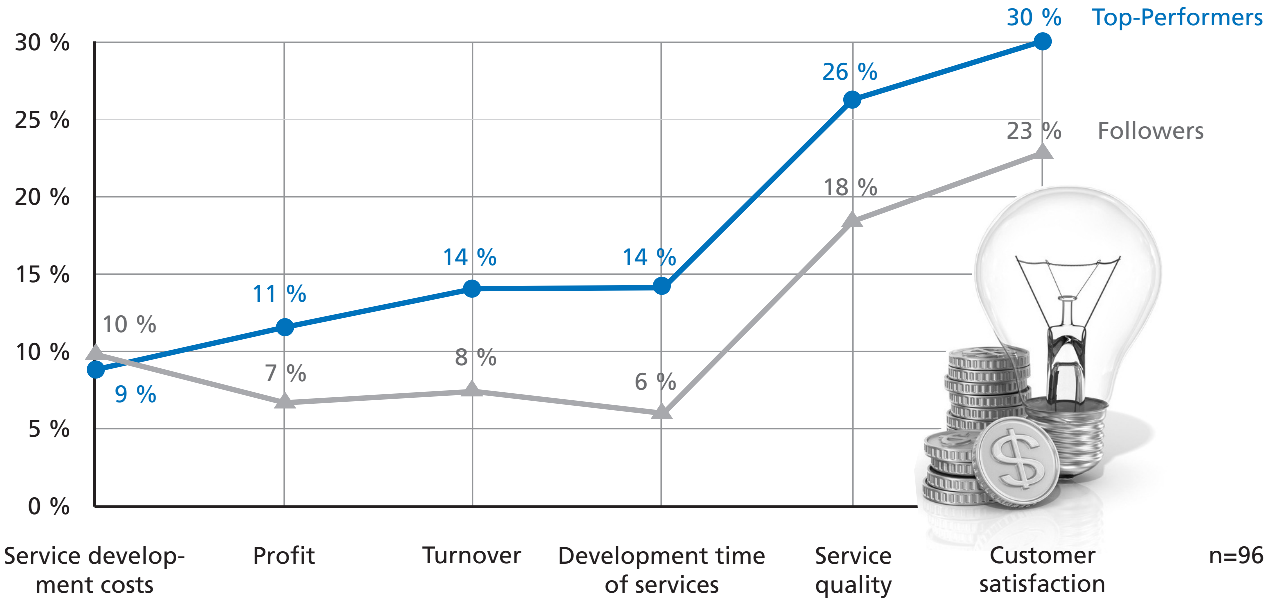
The study shows significant differences between top performers and followers when it comes to establishing a written-down service innovation process. More than 2/3 of the followers have not yet implemented an innovation process for services. In contrast to this, more than half of the successful companies has established a formalised service innovation process, another quarter uses single elements of one. Based on this result, a formalised innovation process forms the basis for a management of entrepreneurially innovation initiatives. In addition to this, it shows that the establishment of universally valid and transparent evaluation criteria within the company is beneficial for the rating of the success potential of a new idea. By doing so, unsuitable ideas and concepts can be rejected at an early stage and limited resources can be saved.

Classically, most innovation processes consist of four phases: the idea generation, concept development, implementation and market entry: Although the classical stage-gate-process is the go-to innovation approach in many companies, agile development options such as the SCRUM method gain more and more importance. At the same time, they are not being used in many areas yet. They are, however, a suitable approach for the development of data-based services because a lack of development experience for this special kind of service exists. In contrast to stage-gate approaches, agile methods make it possible to develop services similar to the idea of minimum viable services – the service can be adjusted if needed and a suitable service solution is developed step-by-step. Data-based services are characterised by dynamically changing requirements which cannot be described in a typical innovation process in advance. The early involvement of customers in the process and the fact that data is used to learn also shows that agile development processes are a strong powerful instrument in the development of data-based services.

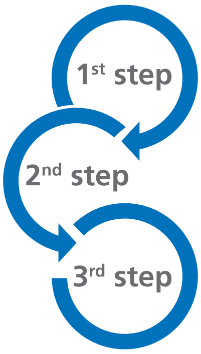
## Is a formalised service innovation process established?



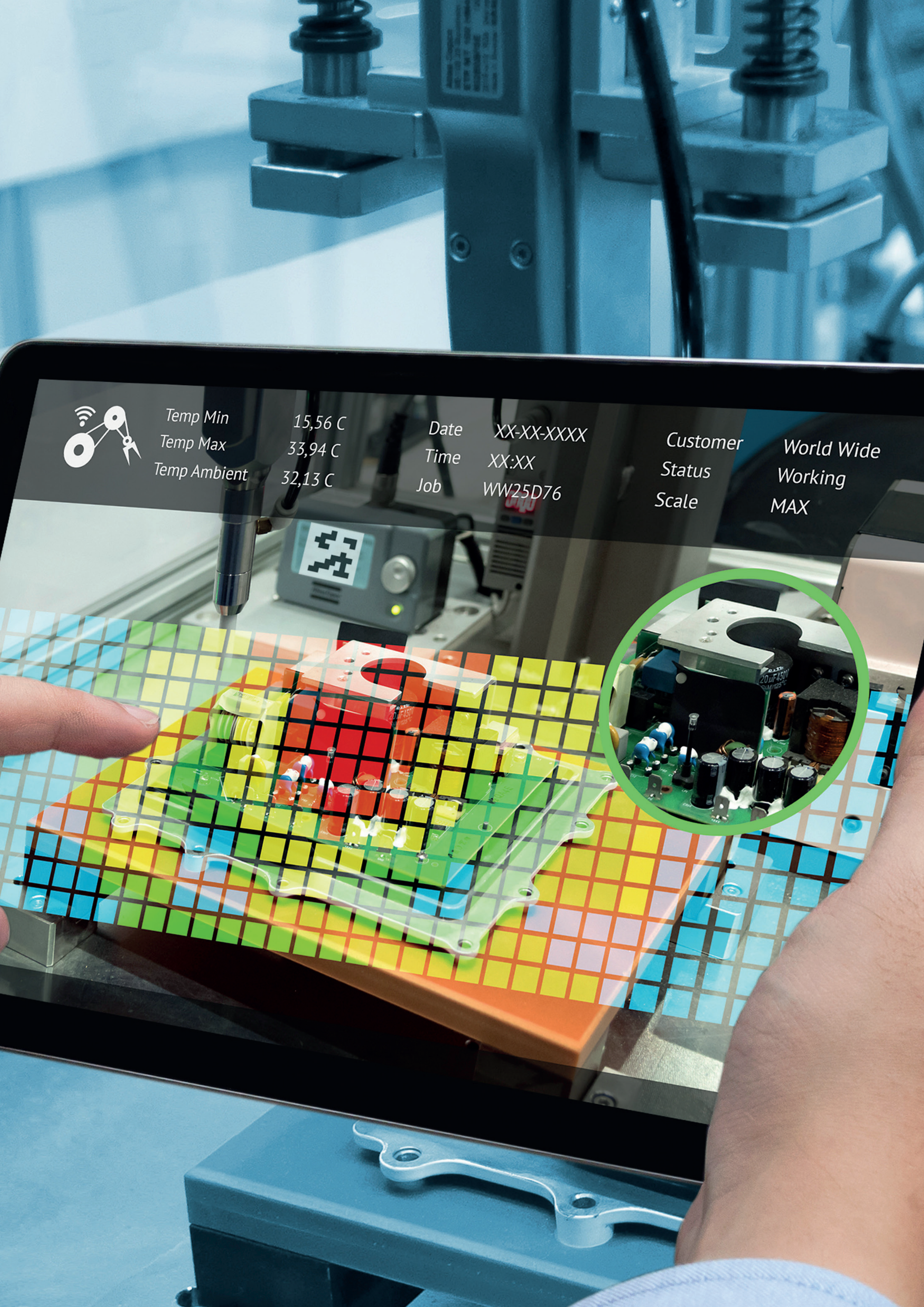
## Improvements that can be achieved because of a systematic service innovation management:



## Successful Practice



The five conducted case studies show that all companies use a complete innovation process for their services. Start-ups as well as long-term established companies trust in formalised service innovation processes. While most of them are based on classic stage-gate processes, agile approaches such as the scrum-method are put to use in some phases of the innovation process (e.g. during the development of IT-specifications). One example for this is a start-up specialising in service platforms: The company uses an innovation process that is supported by all employees. Every month, the entire company meets to discuss the ideas that were handed in via an idea box and evaluates their benefit potential, feasibility and degree of innovation. Once an idea pitch has successfully passed this evaluation step, a first concept is created within a month and introduced to the CEOs. If a positive feedback is received, resources for the implementation are provided. Employees can contribute directly to the realisation of the idea if they wish to do so. Because of this, numerous possibilities for the development of the platform solution are created.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# Implement principles successfully

The *Benchmarking Service innovation* showed that many companies have difficulties to develop new data-based services. By looking at particularly successful companies from different industry areas, six success principles could be extracted in cooperation with an industry consortium. These principles characterise the companies' development of innovative, industrial and data-based services. By implementing and following these six principles, small and medium-sized companies receive support in the development of their own service portfolio.

> "The implementation of innovative solutions requires internal and external marketing to show the existing demand and offer the resources needed for the set-up."
>
> *Dr. Steffen Simon,*
> *Bilfinger Maintenance GmbH*

In order to achieve a real added value for customers with a new service solution, the customer needs to be included in the service development process as early as possible. For the development of the required service ideas, it is beneficial to use as many internal and external sources as possible. The risk for the service innovation to fail is limited by evaluating the idea in the framework of a collective evaluation process, which benefits from different point of views and roles of expertise and the use of different methods. A frank and constructive attitude towards mistakes that might be made and the ability to learn from errors is also part of a successful company culture focused on learning continuously. Improvement possibilities are identified through systematic learning that is based on available data and market experience. These possibilities are structured and can then influence the implementation as well as the adjustment and improvement of products and services is recognised. Continuous learning is, ideally, achieved through minimum viable services, which means to bring core services to the market early and adjusting and developing them further together with the customers. In addition to this, the innovation process itself only becomes transparent and controllable thanks to the use of a formalised and iterative process.

Apart from the six defined success principles for service innovations, experts from industry and research developed a model of procedure that aims to help companies in developing new services – it is called the FIR Service innovation cycle.

The companies involved in the benchmarking study all count on the implementation of the six success principles described in this paper. With the help of the described implementation examples and the consideration of further in-depth study results these success principles can be implemented and put to use in any industrial company.

We, the FIR at the RWTH Aachen use the gained information for future projects in practice-oriented research and consultancy in the area of industrial service management. Future work will focus on the specific detailing of data-based services and will aim to answer the question, what kind of services are realisable based on what kind of data and analysis procedures.

Feel free to contact us any time if you have any questions of would like to provide feedback!

### Contact

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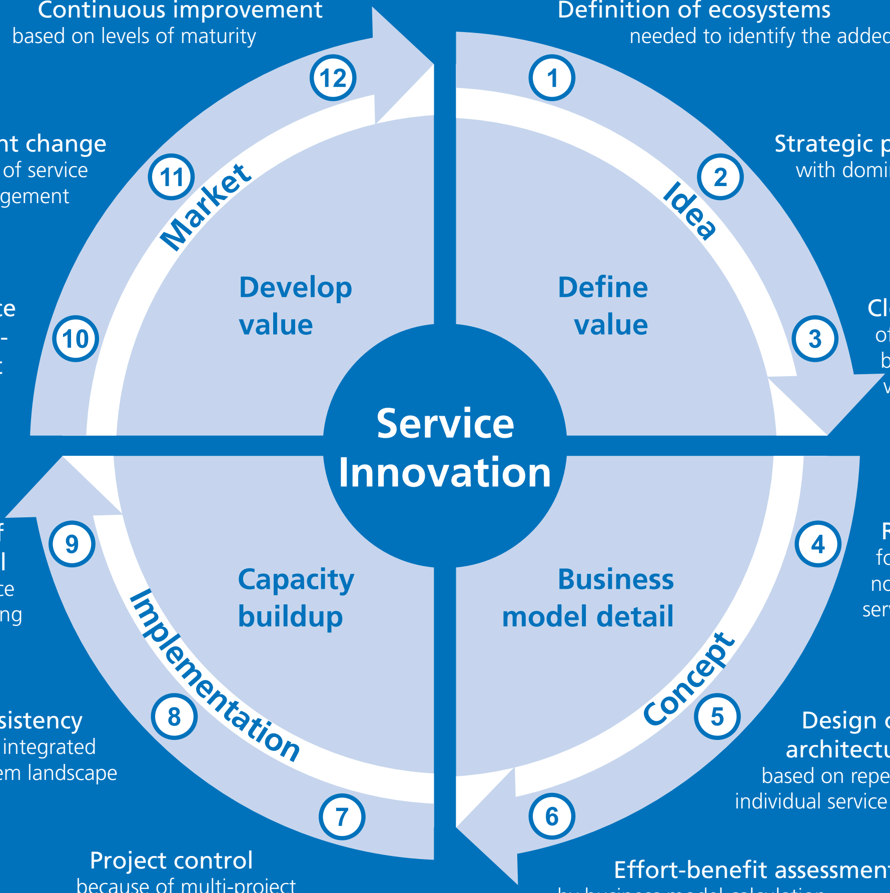
# FIR Service-Innovation-Cycle



**Definition of ecosystems**
needed to identify the added value

**Strategic positioning**
with dominant skills

**Clear hierarchy**
of added value options based on customer value

**Road mapping**
for integrated technology, product and service development

**Design of service architecture**
based on repeatable and individual service modules

**Effort-benefit assessment**
by business model calculation

**Project control**
because of multi-project management and clocking

**SLM / data consistency**
Based on an integrated system landscape

**Strengthening of potential**
with the help of resource and capacity building

**Service performance-Management**
by cost and benefit transparency

**Consistent change**
because of service release management

**Continuous improvement**
based on levels of maturity

The FIR service innovation cycle makes it possible to proceed very systematically in order to develop service innovations. The cycle begins with the very first idea and finishes with the market entry. It takes into account the six defined success principles for the successful development of industrial services. The iterative cycle explains the required essential steps of the service development and separates the innovation process into four different phases: 1) The generation of the idea and the idea selection (develop added value), 2) the development of the concept and the business model (detailing of the business model), 3) the practical realisation and implementation (building performance ability) and 4) market launch and evaluation (develop added value). Based on already existing processes of service engineering and service innovation, the service innovation cycle takes into account the special features of the development of data-based services.

# FIR – Competent partner in practice

The Institute for Industrial Management FIR is a non-profit, intersectoral research and educational institution at RWTH Aachen University concerned with business organization and corporate IT with the aim to establish the organizational basis for the digitally integrated company of the future. Through the development and transfer of innovative solutions, FIR contributes to enhancing the competitiveness of companies. This is undertaken within an infrastructure that is ideally suited for experimental organizational research – methodologically sound, scientifically rigorous, and conducted in close collaboration with experts from business and industry.

The activities focus on the application of research to industry verticals. Currently these include Future Logistics, Smart Services/Maintenance, Smart Buildings, and Smart Mobility. The institute provides research, qualification programs and lectures in the fields of service management, information management, production management and business transformation.

Since 2010, Professor Volker Stich, the managing director of FIR, has also been heading the Smart Logistics Cluster on RWTH Aachen Campus. Within the Smart Logistics Cluster, FIR offers a unique form of collaboration between representatives from research and industry. As a research institution of the Johannes Rau foundation, FIR supports the research strategy of the Federal State of NRW and participates in research clusters to strengthen NRW as a hub of research and innovation.

Techniker Krankenkasse

# List of literature

Castellion, G.; Markham, S. K.: Perspective. New Product Failure Rates: Influence of Argumentum ad Populum and Self-Interest. In: Journal of Production Innovation Management 30(2013)5, S. 976 – 979.

Husmann, M.; Jussen, P.: KVD-Service-Studie 2015: Neue Geschäftsmodelle für den Service. Hrsg.: G. Schuh; G. Gudergan, M. Schröder; V. Stich. FIR e. V. an der RWTH Aachen, 2016.

Kampker, A.; Husmann, M.; Harland, T.; Jussen, P.: Von den Besten lernen: Sechs Prinzipien für die erfolgreiche Gestaltung datenbasierter Dienstleistungen für die Industrie. In: Smart Services und Internet der Dinge: Geschäftsmodelle, Umsetzung und Best Practices. Hrsg.: A. Borgmeier; A. Grohmann; S. F. Gross. Hanser, München [u. a.] 2017.

Reichwald, R.; Möslein, K. M.; Kölling, M.; Neyer, A.-K.: Service-Innovation. CLIC Executive Briefing, Nr. 001. Hrsg.: Bundesministerium für Bildung und Forschung BMBF. 2008. clicresearch.org/downloads/01_de_service_innovation.pdf (letzter Zugriff: 02.05.2017)

Ries, E.: The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses. Crown Business, New York 2011.

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