UNIVERSITY OF CAMBRIDGE
Cambridge Service Alliance

EXECUTIVE BRIEFING

WHEN INNOVATION FOLLOWS PROMISE

Why service innovation is different, and why that matters

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- Create and develop industrially applicable tools and techniques that deliver competitive advantage.
- Provide an unparalleled network of academics and industrialists that share experience, knowledge and insight in how better to design and deploy high performance complex service systems.
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Academic members

The Alliance draws on members from across the University of Cambridge, initially from the Institute for Manufacturing and the Judge Business School.

Internationally leading researchers and educators will be invited to join the Cambridge Service Alliance to meet specific research requirements and the needs of industrial members.

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Executive Summary

Research suggests that organisations are often less innovative with service provision than with product design, manufacture and sales. However, service companies account for 75 per cent of economic activity in developed economies, and even product companies incorporate elements of service into their business. So why does service innovation lag behind product innovation?

We looked at the process of service innovation in an attempt to improve the way that service and product–service providers develop new services. Our findings have implications for service provider and customer, both regarding their approach and contribution to the innovation process and service delivery, and the risks and rewards appropriated.

We focused on complex relational services, such as performance-based contracts that guarantee product availability. Relational services accentuate a key difference between products and services – the customer's direct involvement in co-creating the service. They are also becoming more prevalent as companies in a number of sectors shift from transactional business models, towards more relational business models, based on the provision of solutions. In this research we focused on the innovation process and outcomes in four providers of complex relational services.

The research shows that conventional product-oriented thinking about the innovation process does not automatically translate to a services context. The innovation process in relational service provision is very different from that in a more transactional business. The value chain of product companies, for example, is comparatively linear and sequential. Relational services, on the other hand, start with the initial design, but exploration and learning central to the innovation process takes place at the same time as the production and use of the initial service. New service development is, therefore, simultaneous to its production and use, and co-created with the client.

These two characteristics – simultaneity and co-creation – have several implications for service providers regarding effective service innovation. Firms that prepare properly before engaging in relational service provision are more likely to be successful. This is particularly true for companies making the jump from a product-oriented to service-oriented approach. Preparing for service innovation might mean taking on managers with service delivery experience, for example, or investing in a new stand-alone business unit to take on the services element.

Second, it is essential to understand how the service innovation process unfolds. The service is designed, contracted for, and then delivered, with innovation occurring iteratively throughout the service delivery process – as delivery takes place. As both service provider and client co-create the new service, the provider must be able to engage productively with its client. Equally, as lessons from the innovation process take place during delivery of the initial service, the service provider must be able to capture the learning at that point.

Risk & Reward. The nature of risk and reward in service innovation is also different. The service provider may invest in the infrastructure necessary to provide the new service, but in contractually committing to pay regular service fees, the client effectively co-finances the innovation process. There is limited market risk for the service provider – the provider has already contracted for the service. Instead, the service provider must address the risks inherent in delivering a novel service, whether that is higher service costs, contract penalties, loss of profits, or a dented reputation.

There is a significant risk that problems with the initial service delivery will lead the firm to withdraw its services, or disengage from the client at the first opportunity. But these problems are a normal part of the innovation process. If companies don't understand this, they may fail to capture the lessons from this initial innovation, and the financial benefits that accrue over time, through additional services delivered to existing and new clients. Early losses on the initial service delivery should be seen as investment in new service development; and everyone involved, including the finance managers, should understand this.

The potential benefits for the service provider include: first-mover advantage, enabling the firm to leverage its learning by using it to secure further contracts with existing or new clients; cross leveraging innovation infrastructure investments and learning across other service contracts; and using the initial service innovation as a catalyst for other types of innovation –both services and products.

Firms that want to be good at service innovation should have a whole firm perspective of service innovation and related activities. They should organise across the enterprise to capture the benefits. This means an organisation-wide entrepreneurial culture, and knowledge-management systems to capture data and knowledge. It means cross-functional teams, and company-wide incentives to innovate.

It also means acknowledging the importance of adopting a long-term approach. Service innovation is inevitably challenging in the early stages of the first contract. Service providers should not allow modest or non-existent initial returns to deter them from persisting and reaping the rewards likely to materialise further down the road.

Finally, the findings also have implications for the clients in these relationship-based service contracts. To ensure that the client gets what it expects from the service it must have good knowledge of the service provider. The relationship is likely to be a long-lasting one, if the full benefits of service innovation are to be realised. So the client must be able to trust and be prepared to collaborate closely with the service provider, working with the provider to overcome any early problems.■

Introduction

Innovation is an organisational imperative. Without innovation enabling organisations to respond to the changing nature of the market environment, feeding improved performance and growth, and creating value, organisations stagnate and fail. The corporate history books are littered with examples of organisations that have failed to innovate successfully, falling by the wayside as a result.

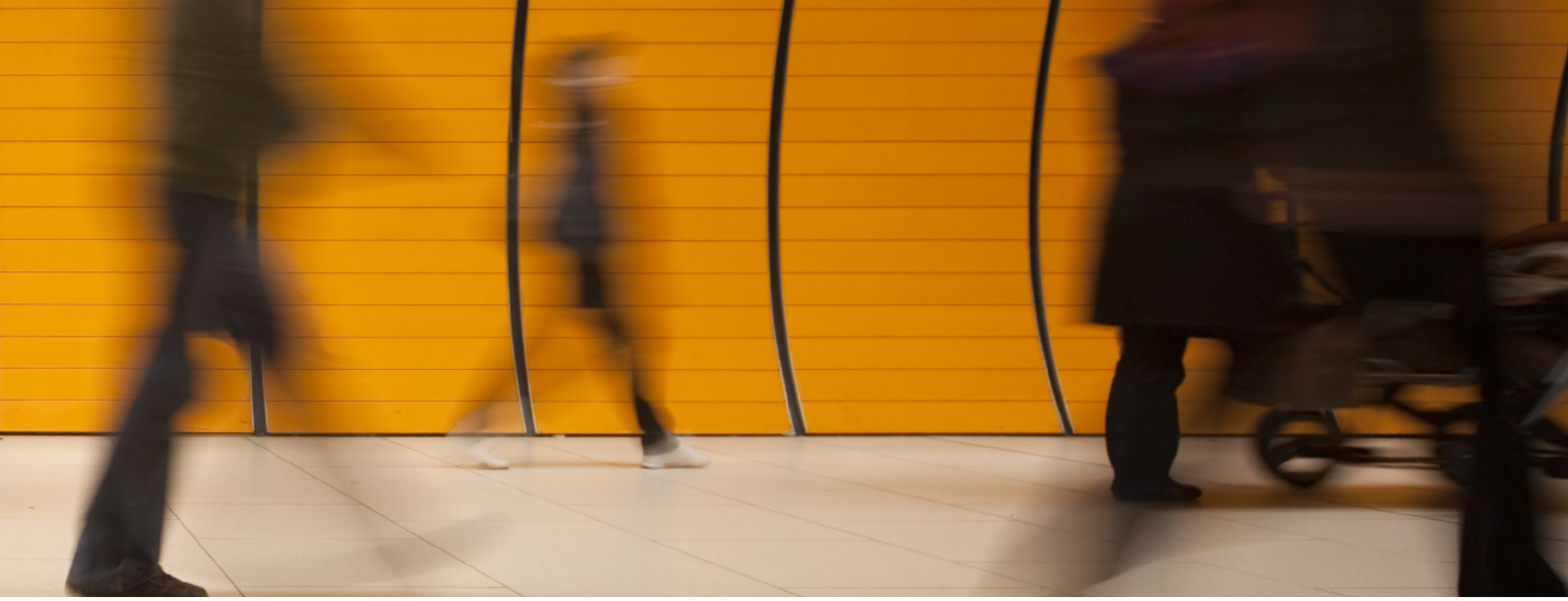
Academics and practitioners have, over time, tried to gain a better understanding of the process of innovation. Traditionally, innovation was mainly associated with products; it was viewed as the outcome of a collision between technological opportunities and unmet user needs. The study of product innovation produced a number of valuable concepts, at product and firm level, including innovation portfolio mapping, innovation roadmaps, the innovation funnel, stage-gate innovation and, more recently, open innovation.

In recent decades researchers have broadened the concept of innovation to include other types of innovation, such as process innovation, design innovation, management innovation and business model innovation. One important development, and the focus of this briefing, has been a move to understand innovation in a service context. This is partly as a result of increasing numbers of organisations adopting a business model that incorporates the delivery of solutions and experiences and, therefore, by extension, delivery of services. Indeed, anecdotal evidence suggests that several highly innovative service firms have succeeded in disrupting competitors by radically innovating their overall business model, and obtained a competitive advantage as a result. Low-cost air-transportation is a good example of such a service.

Overall, however, service innovation appears to lag behind product innovation. Our research set out to discover the reasons for this, and to attempt to build a better understanding of the process of service innovation, both at the level of a single service as well as at the level of the firm. In addition, we investigated the relationship between service innovation and other types of innovation, such as business model innovation, product innovation, and process innovation.

To do this we compared a number of companies that provided durable products with multi-year, relational, service contracts, which were related to specific products. These complex relational services, with contracts often lasting for many years, are extreme examples of the co-creation of services, which distinguishes the provision of service and products. The client is necessarily involved in the co-creation of relational services, such as multi-year leasing and maintenance contracts, which are among the most complex examples of the co-creation process, where services are first sold and then simultaneously produced and used.

By studying a number of product–service providers we were able to identify the characteristics of the service innovation processes, particularly for the relational services, and assess the implications for service providers.■



Methodology

We used case studies to investigate the process of service innovation and its potential relationships with other types of innovation. The idea was to use the case studies to map out the fundamental innovation processes and associated phases for each case, noting the presence of, and interrelationships with, any other types of innovation that took place either before, concurrently or after the focal service innovation. Using this research design, we hoped to capture accurately the characteristics of the innovation process at the level of both the individual service and the firm as a whole.

For the four comparative case studies we chose firms that provided both products and services. This helped us to contrast product and service innovation processes and also to understand the necessary preparations for firms that change from a product and more transactional business model towards a service and more relational business model. In particular, we chose manufacturers and service providers of complex engineered equipment, as these products have a lifespan of ten years or more, and offer a market opportunity for extended relational services.

Relational services represent the most demanding service categories, as they imply uncertainty over long periods of time and often also assume risk-taking on the provider's side. They are also the best examples of the production/consumption or so-called co-creation, between service provider and client, because they require significant client involvement over extended periods of time. It seemed appropriate to contrast the innovation process of these services with the more transactional products that have been frequently used as an exemplar of the innovation processes in previous research.

Eventually, we opted for two firms that were originally engine manufacturers, and two firms that began as train manufacturers. While our primary contact was with the organisations' UK-based management, all four firms operate globally.

The research evolved in several phases, starting from data collection and description to analysis and validation. Data collection and analysis involved both archival data and a minimum of two interviews per case study, targeting mainly top management, who were aware of the innovation procedures and specifics of their organisations.

The interview protocol was built around four high-level questions: Which innovations have been adopted and taken to the market over the past 20 years? How would you describe these innovations (e.g. product, service, business model, process)? What did the process and sequence of these innovations look like, and were there interdependencies? What were the outcomes of each innovation project and the overall innovation process in general?

We asked additional questions to gain further insight where appropriate. Given the focus of our research, we concentrated in particular on service innovations. We also looked at the interviews with company reports, financial data and historical records to gain a deeper understanding of each case. Archival data was particularly helpful in tracking evolutionary aspects of innovation processes.

To validate our findings the results were presented to the company representatives, so that they had the opportunity to correct and provide feedback on some of the specifics that we had possibly misunderstood.

The Four Case Studies: Service Innovation in Practice

What follows is an account of the case studies we looked at, drawing attention to those aspects that relate to service innovation. In the following section we then synthesise these findings into a more coherent framework of understanding for service innovation.

Hitachi Rail Europe

Hitachi Rail Europe provides train solutions – trains, related services and equipment – to rail operators. The company has evolved from the sale of simple products – trains – to the provision of services and solutions, such as a 9-year 'train availability' contract and a 27-year 'train availability contract with retained ownership'.

From product to service business model. Hitachi Rail Europe was an established train manufacturer in Asia and the Americas, but lacked a presence in Europe. When entering the European market, it decided to present itself as a provider of advanced train solutions, offering products and services underpinned by the manufacturers design authority to guarantee legendary Japanese reliability. In order to meet the needs of customers, Hitachi Rail Europe chose experienced rail service personnel hired locally, and reinforced their understanding by delivering training in Japan for both managers and some craftsmen, who would be maintaining the units.

First service innovation. From offering no services at all, Hitachi Rail Europe bid for, and then signed, a 9-year contract guaranteeing the customer (train operator) the availability of 27 trains on a daily basis over the course of 9 years. 'Availability' implied that the trains would be reliable, ready for use when needed, and clean on the inside as well as the outside. Failure to deliver clean trains free of technical faults could have attracted penalties that would have severely impacted on profitability.

The process of service innovation. Hitachi, as well as its competitors that tendered for the service contract, had to make several assumptions regarding the nature of the service delivery and the risks and contingencies that would determine its ability to deliver the service.

Hitachi's recent arrival in the European market was a relative disadvantage as the team had to make a number of assumptions about the delivery of a new service and its evolution over time. United Kingdom and European standards needed to be understood and complied with. A maintenance regime and the attendant processes had to be created, and it was necessary to recruit and train a significant number of service blue-collar workers, in addition to shaping their job expectations, culture and benefits.

However, having the customer commit for nine years allowed the service provider to make sizeable investments in the service delivery, such as designing a new depot for the train servicing, without facing the market risk of having to try to sell products in the market after the investment.

Hitachi Rail Europe had to learn how to work successfully with the stakeholders in the ecosystem. For example, close coordination and negotiations with the companies that owned the rolling stock, managed the rail tracks, and operated the train services was vital in order to avoid delays in the train testing schedule and delivery of the trains to the client. Hitachi Rail Europe placed great importance on its reputation for on-time delivery, having never delivered a train late. There were unavoidable start-up costs but the contract was profitable and was enhanced following a number of innovations to the process of service delivery.

As one interviewee pointed out: 'We knew we would have to take a punt on profits initially at the signing of the contract – it is the only way to learn.'

Subsequent innovations. In year six, Hitachi Rail Europe signed another, more innovative, contract of 27 years to provide train availability for its client, but with retained ownership (leasing).

In addition to reliability and availability, Hitachi Rail Europe was experimenting with a number of extra performance benefits, such as energy efficiency of its assets and real-time data transfer from in-service trains. The ability to make a bid on the basis of this proposal relied on the enhanced understanding gained from the delivery of the services provided under the earlier contract.

The interviewees also believed that the reputation already established with the client had a positive impact on the bidding position. Hitachi's services were process-critical for the customer; having them delivered to a standard was crucial for reducing the risk to the customer's own reputation – a risk that could not easily be contracted out.

The service innovations also had implications for the understanding of the manufacturing arm of the company, inspiring innovation in the product. Having responsibility for reliability, availability and efficiency of the trains prompted Hitachi Rail Europe to design trains that maximised these sustainability aspects. The designs no longer just rely, in the traditional way, on the scope defined by the end user.

Bombardier Transportation

Grounded in a product-oriented business model. Bombardier Transportation is another global provider of trains and related services and equipment to rail operators. The company has focused its efforts and strategy on the engineering excellence of its products. In the past, services were originally seen as a support function to help sell the products, rather than as a stand-alone business.

First service innovation. Once the customer demand for services became apparent, Bombardier Transportation made considerable efforts in relation to offering new and innovative services. More specifically, in order to win a train sales contract, Bombardier Transportation had to design a service offering that encompassed a total-care package guaranteeing availability of more than seventy trains on a daily basis and packing the whole service using a price per km of train operation. This was considered to be one of the most innovative service contracts at the time.

The client – the rail operator – was involved in the process of designing this new service. The negotiation process was tough and the bidding context with other train solution providers put significant pressure on the price. After winning the bidding contest and securing the contract, the customer retained responsibility for selling tickets, scheduling trains, driving the trains and in-train services. Bombardier Transportation provided all the services relating to the train: a complete solution that consisted of services ranging from cleaning and repairing the interior of the train, to the scheduled maintenance and overhaul of its most complex components.

The process of service innovation. Thus, Bombardier Transportation had entered into a highly innovative service agreement. Inevitably, given the levels of innovation involved, there were some initial challenges in service provision. Due to significant changes to the service approach, it proved difficult to deliver the promised standards of availability and reliability right from the start.

More specifically, the existing operations were based on reactive repairs, where the client brought the train to the depot when it wanted to, and then waited for the train to become available. Clearly this approach was no longer optimal. But Bombardier Transportation was quick to see the need to adapt its service operations approach. Taking on responsibility for availability meant streamlining the process of servicing, scheduling a really diverse set of service jobs, and having a lean service provision. This process was bound to take time, and while implementing its process innovation the firm incurred some penalties on the contract.

However, over the long term, and despite early challenges, the firm's transition proved highly beneficial. A change of management, operational reorganisation and a number of technological innovations, transformed the service unit into one of the most profitable units of the company. The new management introduced a rigorous business process of re-engineering that significantly reduced the time it takes to service a train, and worked very closely to improve the scheduling of maintenance.

The firm also developed a centre that allowed train performance to be monitored in real time. Using sensor technology, Bombardier Transportation could learn more about the performance of its trains in use. For example, if a train faced certain problems, then it would be inspected before more serious problems arose – thereby increasing reliability. In the case of issues with the track, or reckless driving, Bombardier Transportation would consult a track management company or driver, respectively.

Subsequent innovations. As the service unit became one of the most profitable units, following adoption of these process and technological innovations, Bombardier Transportation began to reassess its view of the business model.

The contract aroused the interest of senior management, and special projects were designed to better understand service-based train solution business developments. The new streamlined service led to Bombardier Transportation winning a prize for service excellence three years in a row, and renewing the contract with the same client (bids with other clients for similar contracts are also ongoing).

Furthermore, additional service innovation ideas continued to emerge. Having a good digital grasp of train operations through its technology centre prompted Bombardier Transportation to contemplate a better digital experience for the customers as well. Train televisions, Internet, and other amenities, are all service innovations currently under consideration.

Rolls-Royce

History of a service-oriented business model. Rolls-Royce provides airplane engines for the commercial and defence sector, and started differentiation through services 20 years ago. Rolls-Royce anticipated the opportunity for the service business early on and transformed its business model to meet the gradually evolving customer demand for services. The company realised that, apart from direct product services, it would have the opportunity to broaden the scope of its service portfolio to encompass business services, such as on-wing care and fuel systems, rather than remaining limited to purely engineering solutions.

First service innovation. Following swiftly on from its decision to evolve the business model towards services, Rolls-Royce launched its first service contract encompassing the 'total care package', heavily focused on the availability and, in particular, reliability of the equipment.

Soon after the service package characteristics were set and delivery of the service began, Rolls-Royce realised that it didn't know how to deliver the service outcome it had committed to. In particular, the delivery risk involved the willingness of the customer to collaborate, as Rolls-Royce was unable to do anything without the customer's help. Consequently, Rolls-Royce created a joint team with the customers and started to construct value-stream maps to understand what needed to be done.

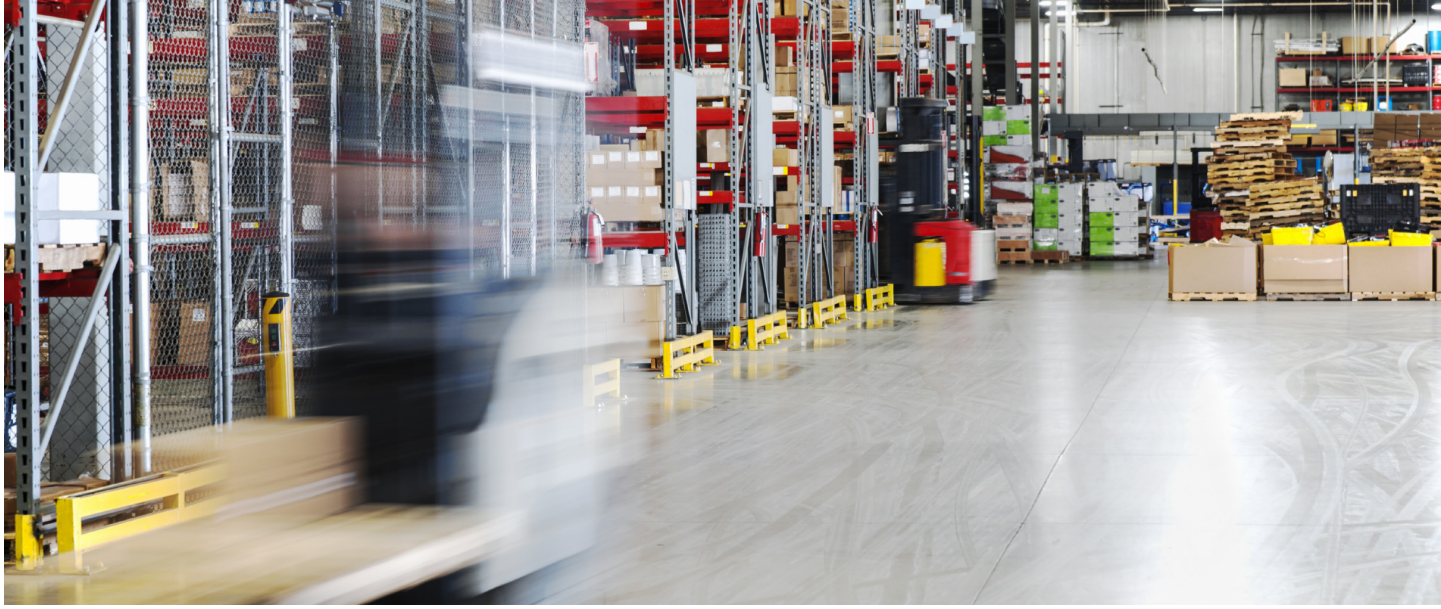
Process of service innovation. Several process innovations emerged from the initial service innovation. For example, the customer used to schedule all equipment overhauls, waiting until stock of available equipment pieces in the inventory was low, then demanding that the provider produce overhaul services within a pressurised situation.

After adopting the new service, a joint provider–customer team assumed responsibility for scheduling. This meant that the provider could see when the customer was going to change an engine, and could optimise operations accordingly (overhauling the easiest piece of equipment to fill up the stock). This also allowed the customer to reduce inventory on its side as the overhauls were performed more efficiently.

Given that the service package was a gain-share agreement, both provider and customer have reaped the benefits. This also meant that the delivery risk was shared. Sharing the risk meant both parties were incentivised to avoid cost or delay, and thereby diminished the overall risk exposure.

Nevertheless, the client still complained of the long-term market risk it faced. Because it was difficult to reverse the service that the client committed to without significant penalties, it was exposed to using a service that could become unnecessary if the business or operational climate changed (e.g. in the case of operations' downsizing). On the other hand, the contract length (between five and ten years) allowed the provider to invest in and concentrate on learning and asset data collection and analysis. Rolls-Royce developed an aero-engine monitoring facility that performs statistical analysis from the engine data that is collected via sensors. In the case of defence customers, because of confidentiality issues, this data is recoded and post-analysis carried out, while for commercial planes the analysis is carried out in real time.

Subsequent innovations. The initial service innovations allowed Rolls-Royce to develop additional services, including real-time monitoring of the commercial aircraft. At the same time, the investments in service capabilities helped to develop new generations of products as well as new service innovations. Today, for example, Rolls-Royce is partnered with two other defence service providers on product platform availability (the availability of multiple interconnected assets manufactured by Rolls-Royce or other defence equipment manufacturers).



Caterpillar Logistics[1]

From product to service business model with a dedicated unit. Caterpillar manufactures off-highway engines as well as construction and mining equipment and other industrial equipment for a varied range of customers. About twenty years ago, Caterpillar took up the challenge to capitalise on its internal logistic and supply-chain skills and offer consulting and execution services in this domain to external customers. Initial investments in developing its new business model encompassed the creation of an experimental service unit that had a mandate to design and provide a first service, Caterpillar Logistics.

First and subsequent service innovations. Beginning with a simple warehousing service, Caterpillar Logistics (Cat Logistics) gradually developed the length and scope of its service portfolio, responding to the demands of its most committed customers, as well as adding to its number of clients.

The firm started with an experimental project to deliver a warehousing service (so-called heads and sheds). It then evolved towards offering a modular suite of 24 interconnected supply-chain (SC) services (e.g. purchasing, product logistics), with a set of operational performance attributes such as service levels (for logistic service) and percentage of defects (for product quality monitoring service). This new, innovative contract was signed for a two- to three-year period allowing sufficient time to recoup the upfront investments in customer operations (e.g. installation of the new ICT system).

Process of innovation. The provision of the first warehousing service was used as a research springboard that allowed the firm to sharpen its service delivery skills to external parties (having internally built supply-chain and logistic capabilities), as well as to develop a comprehensive set of new client services.

Cat Logistics decided to take small steps in service innovations – gradually increasing the scope of services in the contract, the length and investments associated with the contract, and the guaranteed aspects of performance and performance levels. Incremental experimentation meant that the risk associated with every service contract was lower than when taking big innovation leaps, and that any lessons learned were swiftly applied to the next generation of service contracts.

Unlike other service providers looking to seal long contracts, and therefore diminish market risk, Cat Logistics was satisfied with contracts that were sufficiently long to recoup the necessary investments, given that this meant its delivery risk was smaller.

Starting small enabled the company to build trust and reduce strategic risk on the client side as well. The customer faces a significant risk when delivering its supply chain – the 'lifeblood of their business', as it described it – into Cat Logistics' hands. Even though contracting on outcomes makes it easier for clients to understand what they are getting, and they hold the provider responsible for the delivery risk, trust is essential because it is not possible to cover the entire risk in the contract.

For example, on the output logistics (spare part logistics), Cat Logistics deals directly with clients of their primary client. Even though Cat Logistics is more effective in providing these services, for the primary client it is still a leap of faith, as any default of the service provider will reflect badly on the primary client.

Subsequent innovations. Over the 20-year period Cat Logistics continued to bring new generations of supply-chain services to the market. Over the same period of time, Cat Logistics evolved from a single customer to a customer base of 54 companies. Soon after the service innovations had been tried out with the first customer, subsequent contracts with other customers followed.

Success with external supply-chain customers recently led to another business model innovation concerning the internal delivery of supply-chain services for Caterpillar Inc. – Cat Logistics' parent. About ten years after the formation of the service unit, the business model changed again, as Caterpillar Logistics was at that point starting to bring the experience gained with external customers back to Caterpillar's internal world..

Finally, the expertise resulting from consecutive service innovations also encouraged Cat Logistics to move into the development of software solutions for the supply-chain management of spare parts. In collaboration with a major software development company, and an automotive manufacturer with complementary supply-chain expertise, Cat Logistics designed and developed a supply-chain suite of software that is now being proposed and rolled out to its customer base.■

[1] Caterpillar Inc. has since sold 65 per cent of its third-party logistics business, Caterpillar Logistics Services, to global M&A&O firm, Platinum Equity. The business is now called Neovia Logistics.

Summary of the case-study insights

Company alias	Hitachi	Bombardier Transportation	Rolls-Royce	Caterpillar Logistics (Cat Logistics)
Core business area	Train solutions	Train solutions	Engine and equipment manufacturer	Engine and equipment manufacturer
Challenges with the service innovation	Some operational challenges resulted in decreased profitability initially.	Operational challenges resulted in decreased profitability initially.	Some challenges in co-creation with the customer resulted in decreased profitability initially.	Negligible challenges, unremarkable on the profitability levels.
Prior to service innovation: business model	Change from product-oriented to service-oriented business model (from selling trains to selling train availability) followed by investment in staff.	Grounded in a product-oriented business model where services used to be seen as a support function.	Anticipated service business opportunity early on and transformed business model from airplane engine producer to aero solution provider.	Investments in a dedicated business unit with a focus on logistics and supply-chain (SC) services for external clients, with an accompanying business model.
Service innovation: process, customer involvement and risks	Large service innovation step (9-year train availability & reliability performance contract for 27 trains). Two years of serious contract negotiations where client was reluctant to share all information. Service delivery estimate based on a number of assumptions (e.g. performance of secondees). Sizeable investments (new depot).	Large service innovation step (multi-year train all-in performance contract priced by km for >70 trains). Customer taking stance of a heavy negotiator and pushing the price down in a bidding contest. Severe operational issues at the beginning, penalties incurred on a daily basis. Maintenance process innovation, investments in train monitoring centre led to impressive turnaround to the best service contract in the UK.	Sizeable service innovation step ('total care package' of a customer's aero-engine fleet). Uncertainty about the exact service delivery process at the time of the (outcome-based) contract design. Delivery hurdles associated with client participation and willingness to collaborate resulted in early issues with decreased profitability. After organisational innovation has been adopted (joint team with customer as well as risk-sharing mechanism) the delivery process started to function and performance picked up.	Incremental service innovation steps; gradually expanded from a warehousing service to a portfolio of 24 SC services with performance levels, embedded in multi-year contracts. Contracts always allow for the time to recoup investments (usually ICT systems). Capabilities and client base (expanded from 1 to >50) gradually expanded from one service to another.
After service innovation: additional service sales and subsequent innovations	Additional service innovation (a 27-year contract on train availability with retained ownership). Additional service innovations contemplated (energy-efficiency performance contract), product design innovations for better endurance and serviceability.	See above for the process innovations and technological innovations. Business model innovation towards service-oriented business model and associated investments in leadership. Further service innovations towards monitoring and in-train service under development.	Organisational innovation (see above) and subsequent process innovations (visibility of the scheduling process). Technological innovation (aero-engine monitoring) and service innovations (real-time monitoring services and data analytics, multi-party platform availability contract).	Service innovations (see above). Business model innovation (internal parent SC logistics performed by the dedicated unit too). Product innovation (multi-party software solution development).

Understanding Service Innovation: characteristics and implications

Using the case-study research findings we isolated some of the common characteristics of the innovation process as well as the inter-relationships with other types of innovation. The characteristics of the service innovation process also have implications for service innovators. We considered these implications, and what kinds of actions the firm might take to ensure they adopt the most effective approach to service innovation.

Business model innovation first; service innovation second

Our research suggests that the way some organisations are currently set up to innovate acts as a significant barrier to innovating their services. This appears to be particularly true for experienced product innovators.

For the manufacturing firms in our case studies, and indeed for firms delivering transactional services, making adequate preparations for business model innovation seemed to be an important precursor to developing the first innovative relational service offering. The more radical the service innovation, the more important it is that it takes place within an appropriate business model.

Hitachi Rail Europe moved towards a service-oriented business model and acquired experienced managers before innovating its new services, and consequently experienced only minor challenges during the innovation process. Similarly, Cat Logistics made a preliminary investment in a separate unit that hosted the new business model, made modest, incremental service innovations, and subsequently reported a comparatively smooth innovation process.

Consequently, our suggestion is that to begin with firms that are contemplating service innovation should consider whether their business model, infrastructure, and operations, are adequate to accommodate that particular service innovation. Product firms looking to develop a service offering, or service firms that offer transactional type services – which are more similar to products than to relational services – should strongly consider making the appropriate preparations to move to a new business model first. IBM, for example, commenced the gradual transition from a product-driven business model in the 1990s towards a service-oriented business model by acquiring PWC in the early 2000s, divesting its laptop hardware business in the mid-2000s.

The service innovation process: Service development, research, co-creation

Service innovation is different from product innovation. With product innovation, research and development are sequentially followed by production and use. However, with services the innovation process tends to intertwine and overlap with other steps in the value chain.

From our research the service innovation process appears to progress as follows.

Initial service design: First comes the initial service design – formalised in a contract – with negotiations on what the service will look like based on the service outcomes the client wants. At this point, not having delivered this type of relational service in the past, there is certainly an amount of informed guesswork. The service providers rely on their experience in service delivery, back-of-the envelope calculations of service delivery costs and risks, and the customer's input as a user and service co-creater.

As we saw with Bombardier Transportation, Hitachi, and Rolls-Royce, all three had to sign risky service contracts because of a lack of information-sharing on the client's side. On the other hand, Cat Logistics' partnering relationship with its first client helped substantially with the client supporting the firm in developing the initial service innovations.

Service provision, then research, understanding and innovation: Next comes provision of the initial service; once the design is finalised and formalised in a multi-year contract. Here, the customer will be directly involved in service provision.

With service provision, upfront research and development has limited usefulness; it would be like testing one product, and then producing and selling a product that was similar, but not the same. Given that prototypes and pilots are not possible for relational services, or are at least very costly (reproducing a five-year contract in a prototype phase would take five years), the service provider is only able to learn about service delivery once it starts providing the service.

The 'learning phase', or research and development phase, happens at the same time as production of the first service takes place. Because a service only becomes tangible and real at the time it is used, in many instances the success of that service depends on factors that become apparent only when the service is delivered. Thus, the initial service is the first

significant learning experience.

When the service gets underway, with the customer contributing to its production, the customer begins to learn more about the value of the service, and the service provider begins to understand how the service might be improved, and can start to research and experiment with service provision. For example, Bombardier Transportation radically re-engineered the process of service delivery, while Hitachi Rail Europe had to learn from scratch how to deliver the service it had signed up to.

Consequently, the intellectual input of the client is indispensable both at the stage of development, and also as an active agent in the process of co-creation and R&D. The level of customer involvement and responsiveness, as suggested in the case of Rolls-Royce, plays a crucial role in the success of the service. Firms may need to take action to ensure that they are able to engage with the customer in a productive way. If, for example, companies host highly technology-driven, closed-innovation departments, they may need to consider involving the customer in the process of product innovation before they take the more radical step of conducting R&D on 'live' services.

Risk and service innovation

As well as a different innovation process, and new roles assumed by the parties involved as part of that process, the nature of risk and the dynamics of risk-bearing also differ between products and service delivery.

The service provider will invest in the tools and equipment needed to deliver the service. For example, investments in IT infrastructure were common in our case studies, once the contract was signed. The customer, however, guarantees service revenues, committing to pay for the service for a number of years after signing the contract but before the service is launched and research into improving the service can begin. In doing so the client assumes the role of financier, as well as a co-creater of the new service.

This arrangement fundamentally changes the nature of the risk for the service provider. As a result the service provider faces limited market risk for its service innovation. The provider, in securing a contract spanning a number of years, has secured its customer in advance and avoided the market risk of innovating, developing an expensive service, and then being unable to profit from that innovation because it is unable to sell

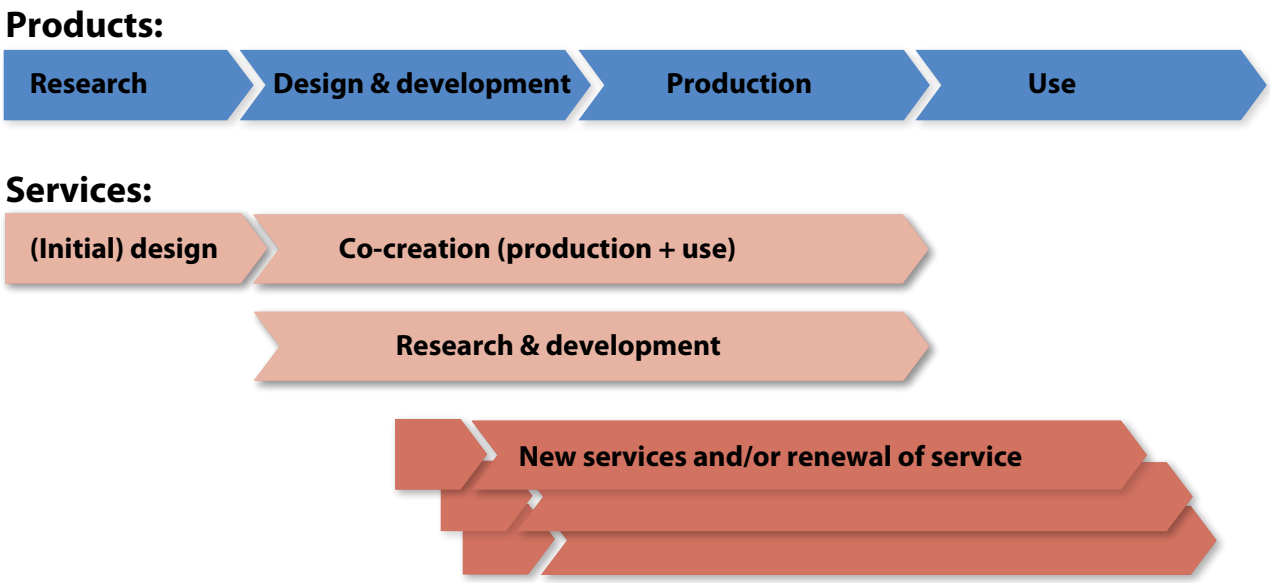


Figure 1. Innovation Process and Related Steps in Value Chain: Products vs Services

its service – as happens with many products. Investments are covered by projected revenues from the customer and are usually financed with preferential loans given the clients' contractual guarantee. This has been assumed in the case of all the relational service cases we examined.

However, although there is limited market risk, the service provider still faces uncertainty regarding the exact nature of the delivery process and associated risks; estimating the performance levels of the service outcomes that it commits to, for example. As the delivery or production of the service is simultaneous with consumption, and subject to contracted performance standards, the service provider is exposed to delivery risk in the form of higher service costs that lead to penalties and losses, or simply reputational losses in the face of a dissatisfied customer. Indeed, Hitachi, Bombardier Transportation and Rolls-Royce reported decreased profitability at the beginning of their services.

When the first service innovation leads to a reduction in profits, the service provider can view this simply as a loss, or it can see it as an investment in service development that needs to be recouped in the ensuing service business development. Unfortunately, many service organisations take the former view and pull out of the innovative services. The authors believe, however, that a more sensible approach for service players is to expect that innovation entails this type of risk, and prepare to pay the price in the short term, take on board the lessons from its experience and use this knowledge to recoup these 'investments' later on.

Leveraging learning

Given that the research and delivery of the initial service take place at the same time, the challenge for the service provider is to find a way to benefit from the findings of its research in terms of return on the investment. Note that three of the case studies demonstrate how challenges with service innovation may even result in losses generated from the initial service.

However, as we noted in the previous section with this type of 'radical' service innovation, the delivery risk can result in penalties that exceed the initial profit estimations from the contract. This can be very discouraging for first-time service innovators that are used to accurately estimating the costs arising from a contract. Yet, as we have argued, this 'loss' incurred at the level of first-time service delivery can be seen as an investment in new service development – just as R&D is an investment in new product development.

The solution for the service provider, in order to benefit from what it learns during the initial service delivery and thus get a return on its investment, is to focus on signing a subsequent service contract. Securing another contract to provide services, either with the same customer or even another customer, represents a return on investment on the initial service. Cat Logistics is a good example of how firms can leverage their service innovation in this way; it extended its service range from just 1 service to 24, and its client base from a single company to more than 50 clients.

First-mover advantage is very important in service innovation, especially given both the importance of learning from the initial service and the reputational factor. Firms can take the knowledge derived from the innovation of the service during the contract's lifetime and leverage that learning to secure service contracts with other firms, for services that, while not identical, are likely to be similar. This will give them a considerable time advantage once locked into contracts with other firms, given the multiyear nature of these types of contract. They will also be able to use this knowledge to secure further contracts with the existing client. Additionally, some of the investments made in the first period may be cross-leveraged to the second period (IT systems).

Consequently, firms are willing to discount the price of the initial service in order to gain the experience and reputation of the service provision and innovation that the contract affords – using the initial service as a pilot.

As Hitachi's service manager noted, the firm was willing to take 'a hit on a price' in order to secure a business development opportunity. Interestingly, Hitachi, as well as the three other service providers we studied, signed service contract extensions with the same customers, as well as additional service contracts with other customers.

The initial service as an innovation catalyst

The initial service innovation may also act as a catalyst for other types of innovation. Both Hitachi Rail Europe and Bombardier Transportation, for example, reported innovating their processes in a number of ways directly after they had adopted innovative service design.

In the case of Bombardier Transportation, promising a level of train availability, rather than reactively delivering maintenance service at the client's request, meant that the maintenance process had to be streamlined and reconfigured. Both Bombardier Transportation and Cat Logistics also continued to innovate their business models. In the case of Bombardier Transportation, their experience coping with the initial service innovation spurred management on to change from a product-oriented business model to one that was service-oriented. For Cat Logistics, the parent company, Caterpillar Inc., gave the green light to handing over internal supply-chain know-how and services to external clients.

Many other service innovations also emerged as a result of the initial service innovation. Both Bombardier Transportation and Rolls-Royce developed more sophisticated monitoring services based on their investment in the monitoring centres during the initial service innovation. Bombardier Transportation contemplated a move towards in-train service for passengers, while Hitachi Rail Europe was extending its availability contract towards energy-efficiency performance. Cat Logistics made additional service innovations a step-wise process for each of its subsequent services.

In addition, service innovation led to innovations in product offerings. Cat Logistics entered a multi-party alliance and developed supply-chain optimisation software, while Hitachi Rail Europe reported a number of changes in train design as a result of its comprehensive involvement in service delivery.

Putting it all together

One of the most important lessons from the case study work is the need for organisations to understand service innovation and related activities from the perspective of the firm as a whole, and not just from the level of isolated projects. This means understanding the different interactions and interdependencies that take place between different functions and business units during the new service development process – both across projects and over time.

To capture the benefits of innovation across the firm as a whole, companies will need to avoid adopting a silo mentality in the way that they are organised. There are a number of organisation-wide elements that increase the chances of making a success of service innovation. These include, for example, an entrepreneurial culture, company-wide incentives to innovate, and knowledge-management systems that capture related data and knowledge.

Taking a firm-level overview of service innovation ensures that as well as considering all potential opportunities for value creation, all the service-innovation-related investments are properly accounted for. For example, while direct service-innovation investments may well be indirectly borne by the paying customer, there may also be upfront investments in innovating the business model that need

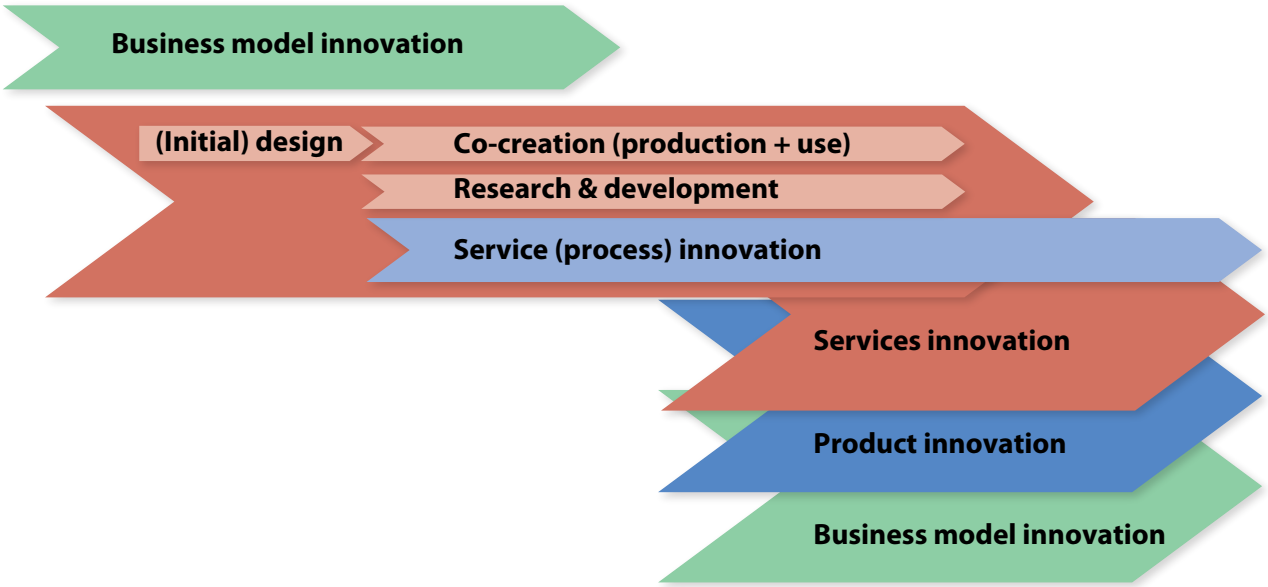


Figure 2. Relationship between Initial Service Innovation and Subsequent Innovations

accounting for, which would otherwise remain hidden at project level.

Similarly, it is essential to understand the potential timeframe for returns on innovation investment. A failure to fully comprehend service innovation dynamics can discourage innovation, leading organisations to miss out on the learning potential of the research phase (initial service provision), and resulting in premature abandonment of unprofitable initial service innovations. This is particularly the case with regards to the benefits of less tangible experience-related factors and the customer's role in co-creation.

However, even though direct returns from the initial service innovation may be modest or non-existent, the returns may well materialise during the delivery of subsequent services. Profit may also result from the knock-on effect of other types of innovation.

Besides the role it plays in making adequate estimates of the project-value creation (balancing cost and reward), as well as the value-appropriation regime (the timeframe of the return on investments), understanding the process of service innovation is crucial in decisions concerning the size of the innovation increments, and the risk and length of the innovation process.

Understanding the process of innovation of service firms, and the delivery and market-risk mechanisms, should help firms mitigate that risk through careful consideration of the initial service design. More modest service innovations, such as smaller performance guarantees, or more flexible service design, such as gain-share mechanisms or limitations to certain types of uncertainties, would result in lower risk.

The risk would also depend on the length of the initial service. A longer service contract locks the client in for a longer period of time, offsetting the market risk of innovation. At the same time, the cumulative delivery risk on the project increases as the timeframe increases exponentially. Cumulative risk increases proportionally as the contract (and hence risk) is extended for longer periods of time. Also, the later years carry more risk as the future of the particular service innovation becomes more uncertain.

An optimal length of contract balances the market risk on one side, in particular when the service provider makes bespoke investments in the client's solution, and the delivery risk, which increases as time goes by, on the other side. The number of other customers expected, and the likelihood of contract renewal, should also enter into this calculation: the greater the potential for more customers to follow, the lower the expected market risk and dependence on the initial clients.

From a client's perspective

Of course, as our findings show, to be really effective, service innovation must involve both the service provider and the client in producing and innovating the service over time. Inevitably, therefore, there are also implications for the client as well as the service provider.

So, for example, in agreeing to buy an innovative service, there is a risk that what the customer pays for does not get delivered. So in order to successfully get what it wants from the service provider the customer needs to have a very good understanding of the service provider, so that it has sufficient trust and confidence in the firm.

Second, the customer must be prepared to work closely with the service provider, in a collaborative manner, in order to reap the benefits of the learning effects that occur over time. Additionally, the customer should also be prepared for the fact that, given that learning takes place over time, the service will not be perfect from the start. There will inevitably be some issues at the beginning with the delivery of the service.

Client firms should also be aware of the lock-in effect of service innovation. When long-term relational services are signed in the contract, for a period of five years, for example, the innovation investments are borne within the provision of the initial contact. Given that the client has already made a specific investment, co-financing the service innovation, it may be more likely to contract with the same service provider as a result. The decision about who to contract and work with initially, assumes even greater significance, therefore, as there is less flexibility afterwards.■

Conclusion

Our research into service innovation provides a fresh perspective on the process of service innovation, and, in particular, its firm-level implications.

The case-study research that was conducted provides valuable insights for managers about the innovation process in the provision of services. The most important of these insights relate to: the distinct nature of product and service innovation; the importance of implementing business model innovation prior to service innovation; the challenge of the initial implementation of the service; the fact that service production and service innovation take place at the same time; when the benefits of the initial learning experience accrue; the nature of the risks involved, most notably market and delivery risks; and the effects on other innovations.

In addition to revealing the nature of the different aspects of service innovation, the author's investigations also highlight the implications for the different parties involved in service innovation. We also suggest some actions for organisations to consider in order to take maximum advantage of service innovation; these are highlighted in the box below.

Steps Towards Effective Service Innovation

Preparing for service innovation. Firms contemplating service innovation should consider whether their business model, infrastructure, and operations, are suitable. If not, they will benefit from making the appropriate preparations. These might include hiring managers with service innovation experience, or setting up a separate unit to host the new business model, for example.

Mastering the learning challenge. Service innovation is different to product innovation. The innovation, and thus the learning, takes place at the same time as delivery of the initial service. Organisations need to change the way they think about innovation. They must be ready to capture the knowledge gained during that first service delivery in the field, from the people involved in its co-creation and delivery.

Customer collaboration. Service providers must be ready to engage with the customer in a productive way. The intellectual input of the client is essential in the process of co-creation and R&D. Firms not used to collaborative open innovation should consider involving customers in the product innovation process, before engaging in innovation on 'live' services.

Risk and investment assessment. It is important for everyone to recognise that the investment made in innovating initial service delivery may not produce a return straight away. It may even produce a loss for a while. The benefits materialise when the lessons from that initial service are applied in the same or even subsequent service contracts, or inform other types of innovation. The finance managers, in particular, need to understand this.

Set up to leverage the knowledge gained. The likelihood is that the organisation will not be able to obtain the full benefits of the initial service innovation at the level of the single service. Instead it needs to leverage the knowledge acquired during that first service, not only in later services, but right across the organisation's platform of services. This even includes other types of innovation; service innovation may lead to other product innovation, for example.

Cross-functional decision-making. As service innovation takes place in the field, rather than an R&D laboratory, organisations must rethink decision-making processes accordingly. Decisions about proceeding with innovation, for example, will involve finance managers, innovation managers, service sales managers, service technicians, and many others. New decision-making processes, a realigning of organisational structures to favour cross-functional teams, company-wide incentives to innovate, and knowledge-management systems that capture related data and knowledge, may be required.

Perhaps, however, above all, our research confirms the importance of the relationship between service provider and client in service innovation and the provision of relation-based services, such as multi-year performance and maintenance contracts. Without the effective cooperation and collaboration of both service provider and client, the outcomes from service innovation are likely to be disappointing. Our work also shows how important it is for the organisations involved to look at service innovation at firm level, considering the interdependencies and interactions across various projects, parts of the organisation, and timespans.■

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