

Challenges in the Diffusion Process of New Industrial Services in the Network of an OEM

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Abstract

This paper aims to identify the constraints in the diffusion process of new industrial services. The importance of this topic was raised during a research project launched by a global OEM (Original Equipment Manufacturer). The stated strategic choice of the OEM was to expand by developing its after-sales service business. Moreover, the OEM assumes that after-sales business is more profitable than manufacturing. The researchers have been intensively involved in the process. Thus, the conceptual research on both diffusion of service innovations in the business to business context and issues of change management in the multinational companies is supported by empirical observations from the case. Surprisingly, though the strategy of the OEM seems apparent, no appropriate actions have yet been taken by the top management. The constraints in the diffusion process of the new service innovations were somewhat related to the vagueness of the new strategy. The challenges may not be directly derived from any characteristics of those new services, but rather from the history of the OEM as a machinery manufacturer. Therefore, we suggest that the innovations should be analyzed and classified based on the scale of the changes required of the different stakeholders.

Keywords

industrial services, diffusion process, change management

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Introduction

Approaching diffusion of industrial service innovations

Rogers (1998, 5) defines diffusion as a process by which a certain innovation is communicated over time among the members of a social system. As diffusion in general is a very complex phenomenon, it can be tackled from various perspectives, including

anthropology, sociology, communication, marketing and management, and economics (Rogers 1998, 42-43). In the industrial management literature, emphasis has typically been given to measuring and explaining the dimensions affecting the diffusion of innovation in successfully launched new products (Gold 1981). Additionally, there are several studies that aim at identifying the generic success factors of new product development in order to launch similar success stories (i.e., Cooper 1990; Ulrich & Eppinger 1995).

Innovation is typically defined as a new idea, method or device that provides a new opportunity for a business to succeed (Veryzer 1998). The newness of a phenomenon is always context dependent (Suomala 2004, Garcia & Calantone 2002). Compared to measuring mechanistically time-based newness (e.g., less than three years), it is a more challenging task to identify how new an innovation actually is for an industry, business segment, a customer, or a service provider. Thus, innovations can be divided into product, process and organizational innovations, based on the scale of the innovation in the business context (Utterback 1994). As a general requirement, to be adopted and diffused into the markets, the new entity should be perceived by individuals or organizations to be valuable (Suomala 2004; Garcia & Calantone 2002).

Industrial services aim at enabling effective use of machinery during the entire life-cycle (Johansson & Olhager 2004; Mathieu 2001; Martin & Horne 1992). The industrial services can be divided into 1) after-sales services and 2) business advisory services (Kotler 2000). The development of industrial services is more often considered as forming part of the strategic change of an OEM into a solution provider, instead of focusing solely on the sales of machinery (Brax 2005; Oliva & Kallenberg 2003; Martin & Horne 1992; Wise & Baumgartner 1999). Thus, challenges in the diffusion process are more likely to lie at the strategic level. Moreover, rarely do any “new-to-the-world” service innovations turn up; instead, best practice is more commonly applied to new business areas, or organizations.

While diffusion of product innovations has received relatively much attention in the literature, it should be noted that little research has addressed the diffusion of innovation within the industrial service sector. In the literature concerning New Service Development (NSD), a couple of studies have focused on service innovation success factors (de Brentani 1991; 1995; Shostack 1984). These studies have been based on the characteristics drawn from the literature which have been found to differentiate between services and physical goods: 1) intangibility, 2) heterogeneity, 3) inseparability, and 4) perishability (i.e., Zeithaml & Bitner 2003; Grönroos 1998; Jackson et al. 1995; Shostack 1977). Despite its dominance in the literature concerning new service development, the basis of the IHIP typology has been heavily criticized in recent service literature (Edvardsson et al. 2005; Lovelock & Gummesson 2004, Vargo & Lusch 2004). Instead, we have suggested that research needs to focus on the goods and services case by case, beyond those aforementioned distinctive characteristics (Laine et al. 2005).

Objectives and methodology

In this paper, the objective is to identify the constraints in the diffusion process of new industrial services. As the basis for empirical observations, we define the diffusion process for a generic business-to-business innovation and its main stakeholders. Additionally, we discuss briefly the issues of change management related to the diffusion process in a multinational

company. In the case network, new industrial services are described by asking five simple questions concerning the required change, in order to more thoroughly analyze the diffusion process and gain a deeper understanding of the situation.

The importance of this topic was raised during an action research project launched by a global OEM (Original Equipment Manufacturer). The stated strategic choice of the OEM was to grow by developing after-sales service business, on the assumption that after-sales business would be more profitable than manufacturing. The researchers have been intensively involved in the process. Empirically, this paper is based on semi-structured interviews, participant observations in several meetings, and analyses of the databases of the OEM during the project. From the methodological perspective, the study can be labeled action research (Eskola & Suoranta 2001, Dickens & Watkins 1999). Eskola & Suoranta (2001) regard action research to be a general concept that refers to studies which aim to affect the subject of the study. It is the intervention of research in practice (Eskola & Suoranta 2001, 126). Action research can also be seen as a process of research and learning in the researcher's relationship with a problem (Dickens & Watkins 1999, 128). Overlapping data collection and analysis, as well as an iterative research process, are typical to action research and case studies in general (Eisenhardt 1989). Importantly, the action research process typically involves people who are connected with the problem (stakeholders) and activates them to collaborate with the researcher(s) to jointly solve the problem at hand (Eskola & Suoranta 2001, 127-128). These features are also present in this study.

Describing the diffusion of an innovation

The phases of the diffusion process

Any new issue, despite its potential advantages, won't become a successful innovation. According to Cooper (1994), it is the customer who determines what is superior and what brings value. To broaden the view, the goals and needs of different stakeholders affect the potential success of the innovation. This is in line with observations by Clark and Fujimoto (1990) concerning the essence of product integrity. New products should not only be better than those they replace but should also be consistent with the expectations and values of the potential stakeholders (customers).

In the business-to-business context, there are three main stakeholders making decisions. 1) The innovator is the organization which typically recognizes the new business opportunity. Moreover, the innovator is the first organization that is subject to change. 2) In the distribution network, innovation is typically communicated and delivered to the end customer. 3) The end customer is one of the key stakeholders that should take advantage of the changes resulting from the innovation.

In this paper, *the diffusion process* is defined as a mechanism that turns the innovation into action, among a wide population of companies in a certain business environment. In other words, the diffusion process of an innovation is completed, when the needed changes have taken place successfully in each of the parties involved. The diffusion process is illustrated in Figure 1. The diffusion process begins as 1) the new opportunity is recognized within the innovator organization. This may then lead to 2) the development and 3) the

commercialization of the innovation. Next, 4) the innovation is sold to the customer, and thereafter 5) it, in one way or another, provides support to the customer's business processes. In sum, there are several heterogeneous types of adopters to be taken into account during the process, depending on the business context. As a basis for the diffusion process, the innovation should fit the strategic goals of each of the stakeholders.

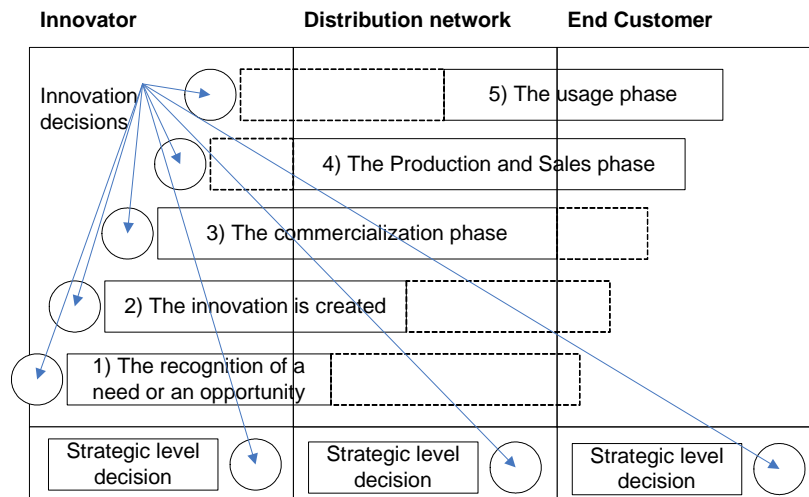


Figure 1. Phases in the diffusion process.

The diffusion can be brought to a halt for several reasons in each phase of the diffusion process. The acceptance or rejection in a certain phase of the diffusion process can be illustrated by *the innovation decision process* proposed by Rogers (1998, 161). The innovation decision process, shown in Figure 1, is here interpreted as a prerequisite for each of the phases during the process, quite analogously to the typical stage-gate processes (e.g., Ulrich & Eppinger 1995). Moreover, the strategic decisions, made by each of the stakeholders can be seen as prerequisites for the different process phases. The starting point for decisions at different levels is always 1) awareness of the innovation. 2) Persuasion, thereafter, requires forming an attitude towards the innovation. 3) The decision phase, resulting in either adoption or rejection, is followed by 4) implementation and 5) confirmation. Confirmation of the decision involves comparing the decision with new knowledge acquired concerning the innovation. The decision makers in different phases have their own contexts, i.e., incentives and capabilities of either accepting or rejecting the innovation.

The suggested process model is a simplified example. Real-life processes are always complex by nature. Various process phases can include extensive interaction between the innovator, the distribution network, and the customer (user). Moreover, there are several phases, where the power of the different stakeholder over each other and the trust among them either enables or disables the successful completion of the process. Garcia and Calantone (2002) point out that the processes are typically highly iterative, and that innovation is always improved after the initial introduction. Additionally, in different business environments, the representatives of different stakeholders may take different roles during the process, thus potentially exerting a strong effect on the completion of the diffusion process.

Managing the needed changes during the diffusion process

Introducing something new in a business environment requires change management inside each of the stakeholder organizations. An organization's readiness for change is affected by two forces (Tyson & Jackson 1992, 198). 1) There are forces within the individual him or herself. On the other hand, 2) there are also forces within the system, including the culture and climate of the organization. Individuals naturally defend the status quo if they feel that their status is threatened. According to Kotter and Schlesinger (1979), there are four reasons for resistance to change: 1) self-interests that affect decisions more than business interests, 2) misunderstandings due to communication problems, 3) low tolerance to change, and 4) disagreement concerning the reasons for change. In order to enhance the change process, Kotter (1995) stresses, for instance, anchoring the change to the more general business objectives, developing a clear vision, and thereafter attaining short-term wins that support the change. On the other hand, declaring victory too soon and celebrating the win as a victory in a war may be catastrophic to the needed change (Kotter 1995).

In multinational companies, there are several stakeholders that, to different extents, either support or resist change. According to Doz and Prahalad (1993, 25-27), the multinational companies are essentially different from simpler organizations based on their multidimensionality and heterogeneity. When managing the change in such an organization, there are many types of different stakeholders to be taken into account, the factory itself and its subsidiaries in the distribution network is the clearest division. The characteristics of the multinational companies lead, for instance, to problems in managing knowledge inside the whole entity (see, e.g., Kogut & Zander 1993), as a prerequisite to communicate the needed change throughout the whole organization.

The scale of the needed change due to the new phenomenon is, of course, always context dependent. The changes may be either relatively incremental or radical both inside the customer's and the innovator's organization (Figure 2). As a simplified example, providing new products to totally new markets requires radical changes to the innovator organization. Preparing incremental changes to the products sold to current markets involves much more routine work.

| | | Customer's perspective | |
|-------------------------|-------------|--|--|
| | | Incremental | Radical |
| Innovator's perspective | Radical | Incremental change to the Customer, radical to the Innovator | Radical change to the customer, radical to the Innovator |
| | Incremental | Incremental change to the customer, incremental to the Innovator | Radical change to the customer, incremental to the Innovator |

Figure 2. The changes required due to the innovation from the perspective of the innovator and the customer.

McDermott and O'Connor (2002) argue that firms may require different rules and practices for managing incremental and radical innovations. Especially, in large, mature companies, it may be difficult to gain support for radical innovations (Dougherty and Hardy 1996). For instance, process improvements cannot take place before a certain maturity of the product innovation, let alone fundamental organizational changes (Utterback 1994). In the business-to-business environment, decisions may require long processes, involving many participants. Day and Herbig (1990) suggest that industrial goods diffuse more slowly than consumer goods. However, the diffusion process may have more permanent consequences in the industrial sector.

Little information is available concerning changes to the characteristics of services or the focus of the needed change. According to de Brentani (1995), intangibility primarily presents challenges for the diffusion of new services. The service business is said to require close relationships with customers in order to make services more tangible to the customers (John & Storey 1998). Laroche et al. (2003) discuss the effects of intangibility on the risks perceived by potential customers. The crucial challenge is to make the value of the new products or services more concrete to the customers, though this may not necessarily correspond to the presence of any materials.

To conclude, in order to manage the needed changes, a deep understanding should be gained on the nature of the potential changes in a specific business environment. We have identified five questions to be asked concerning the potential changes: 1) Who wants the change? (Why?) 2) How clear is the need for a change? 3) What is the actual change? 4) Who will be affected by the change? (How much?) 5) What are the resources available for the change? By answering those questions from the perspectives of different stakeholders, the diffusion process could be described and analyzed more thoroughly. We apply the questions in the following section to analyse the new industrial services in the OEM's business environment.

Empirical observations

Description of the case environment

The stated strategic choice of the OEM was to grow by developing after-sales service business, on the assumption that after-sales business would be more profitable than manufacturing. Currently, industrial services provided by the OEM are either 1) "traditional maintenance services" (spare parts, maintenance), or more sophisticated 2) "new performance contracts" that, not only enable, but guarantee the productivity of the machinery. At the moment, the diffusion process is in an early stage in this business environment. Becoming a solution provider, instead of being a pure machinery seller, means increasingly managing the customer's business processes as a whole. Systematic data collection from the machinery is one way to support this strategy. The new information system behind the concept would enable the collection of both production and maintenance data from the machines, thus basing the new service contracts on objective information. Moreover, the OEM is willing to use the information as an input in its own NPD. The vision is that every piece of the machinery will be connected to the global system in the future.

Becoming a service provider may produce a radical change throughout the whole organization. In addition to its factories, the distribution network of the OEM comprises over one hundred subsidiaries or distributors in its ten regions worldwide, each of which has its own business goals. It should also be noted that one part of the distributors is owned by the OEM, while the other part has several principals to serve. Not only should the new strategy be implemented within the factories of the OEM but the chain as a whole and each of its participants should also be turned into service providers. The long change process will require patience as well as a clear vision of the future. The technology behind the services, with its own restrictions, is only an enabler for the change. The need for a deep understanding of the entity consisting of the multinational company and its business environment is not fulfilled by any new technologies. The organization as a whole will need to gain experience in this new area, i.e., service business. The absence of routine procedures for the new services can clearly be seen in the diffusion process in the network (Figure 3).

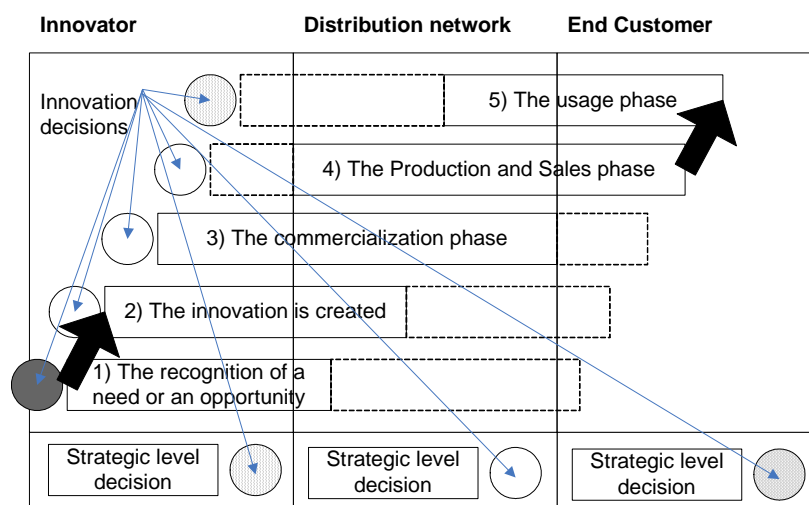


Figure 3. The diffusion process of service innovations.

Although both the OEM and its customers are familiar with different maintenance concepts, few of these customers are accustomed to having different kinds of information systems in their different pieces of production equipment. Therefore, new information-based service concepts are considered to be relatively new to the parties involved. Partly based on the relative newness, the development work for the new services is performed at the customer end by the personnel representing the distribution network (Figure 3). This kind of development is typically based on the urgent needs of individual customers, not necessarily on the strategic goals of the parties involved. In addition, there are some change agents inside the innovator company supporting the new strategy by developing new service concepts. However, these concepts have not yet entered the commercialization phase of the process.

Challenges identified in the diffusion process

In this section, we take a closer look at the needed changes inside the case environment. We bear in mind the defined questions concerning the changes at hand, in order to identify the constraints of the diffusion process.

Different stakeholders have different opinions concerning the change. From the OEM's perspective, there are some external forces that support the change. There are only a few competitors in the markets, which all develop their service offerings similarly based on a technology push. However, there have not yet been any remarkable success stories. Moreover, if manufacturing is sooner or later moved to low-cost countries, the industrial service business will become even more essential way to compete in the industry. The customers are confused about the potential effects of the industrial services on the business. Some customers have made make-or-buy decisions at their strategic level and are already willing to share certain risks and responsibilities with the OEM. Meanwhile, the majority of the customers are passionately waiting for extra information before making any choices. In sum, the situation may be described to be confused but hopeful, quite similarly to several other manufacturing industries.

Internally, the strategy seems rather apparent (Figure 3). Although the services are specified in the strategy of the OEM as an opportunity to grow, the management appears uncertain about the actions required to achieve this growth. Besides the growth, the services might enable the OEM to learn in a close cooperation with its customers, which would have a positive impact both on the machinery manufacturing business and the service business. The profitability of the OEM is at a satisfactory level, and no crisis has motivated the new strategy. On the contrary, the manufacturing units of the OEM have recently broken their production records. Moreover, insufficient resources have been allocated to New Service Development to promote the services as a strategically important issue. This uncertainty is reflected in the low company sales of the new services. In fact, few new commercialized services would be ready for wider adoption.

One key issue to be taken into account is the technology push as an initiative for the new service development. As the technology enables new business opportunities, there has been little interest in examining the underlying customer needs in a detailed manner. The information system has been developed as an off-shoot of other development work, taking more or less for granted the customer's willingness to pay for such services. Some customers have already required those new information-based service concepts. For instance, new performance contracts and extended warranties have been requested by some of the customers considering opportunities to enhance their productivity and share risk. The majority of the customers simply ask for pieces of machinery at a reasonable price.

The case network lacks knowledge concerning the real value of the new service concepts. This problem is partly due to the highly limited resources of the NSD. Unawareness of the potential value to the parties involved has led the case firm to pilot the services for free with a couple of customers. So far, the information system has been piloted in one market area on 15 machines operated by selected customers. Although pilots clearly constitute an important part of normal development work, these free pilots have met with suspicion inside the organization that impatiently awaits for the customer to begin paying for the new services.

At the moment, it is too early to describe the actual change in detail. The possible scenarios differ dramatically from each other. One possibility is that the earning logic (the elements of profitability) of the business units involved may change due to the new services. The new performance contracts, for instance, would shift profitability namely from spare parts to the new services. From the perspective of the spare parts unit, this would mean a role change

from “the money maker” of the organization to one of the less profitable business units. A similar change is also likely for the machinery units, if they are considered narrowly as a means for opening the more profitable life-time business by machinery sales. Even if the change and its consequences were more clearly identified in the OEM, it is nearly impossible to gain support from the units that would lose due to the strategic change.

The history of the OEM as a manufacturing company is an additional reason for the challenges encountered on the road to becoming a solution provider company. Among some of the managers in the OEM, manufacturing will always be the most crucial success factor of the company. Those managers give no value to knowledge-based consultation, especially when vying against pure machinery manufacturing. It would be exceedingly difficult to obtain a wider commitment to the new strategy within the organization of the OEM, not to mention changing the attitudes among the other stakeholders, which, as mentioned, tend to vary very widely. Table 1 analyzes the potential changes in the business environment of the OEM based on the questions identified previously in this paper.

Table 1. Required changes inside the case environment

| Perspective to the change | Potential changes identified |
|--|--|
| Who wants the change? (Why?) | Some managers (aim at growth), some change agents (an opportunity), some customers (a make or buy decision). |
| How clear is the need for a change? | Not clear at all. External pressure for the change (competitors, some customers). Internally, no urgent need for the change. |
| What is the actual change? | Too early to define. It is supposed that the invoicing method and the division of tasks between the parties involved would change. |
| Who will be affected by the change? (How much?) | Depends on the actual change. It may have a remarkable influence on all the stakeholders in the network. |
| What are the resources available for the change? | There are some change agents, no wide commitment inside the OEM. This results in uncertainty among the customers as well. |

In sum, the changes required to become a solution provider company represent a great challenge for the OEM and its business environment. This study has described the constraints of the new strategy and identified six key challenges: 1) The management has not shown clear support for the new strategy; 2) there is no urgent need for the strategic change either in the OEM or among the customers; 3) the effects of the new strategy on the profitability of the parties involved still remains unclear; 4) the driving force behind the new strategy is not a customer need, but rather a technology push; 5) there is lack of resources allocated to NSD in the OEM; and 6) the strategic change as a whole represents changes in the underlying assumptions in the organization, i.e., radical changes in the power structures between the business units and radical changes in the well-established culture of being a machinery manufacturer. Interestingly, there seems to be only one challenge that is related to the literature based distinctive characteristics of services. The new services are interpreted as intangible by the parties involved, and this leads to significant change resistance among the stakeholders, due to the manufacturing-oriented culture in the network.

Conclusions and managerial implications

Currently, there are plenty of OEMs that seem to be eager to add innovative new services to their offerings. In this case study, though the strategy seems to be of apparent, no appropriate actions have yet been taken by the top management. Moreover, several constraints have been identified in the diffusion process of the new service innovations, the majority of which are related to the vagueness of the new strategy. The scale or nature of the required change can not, however, be derived from the special characteristics of goods and services, but rather more readily from the history of the company as well as the current phase of the diffusion process for the new services. The challenges facing the case company can partly be explained by the well-established culture of machinery manufacturing within the organization. Because the required change seems overwhelming to some employees, not to mention the rethinking of power structures inside the OEM's business environment, the observed resistance to change is not surprising.

Conceptually, innovations are turned into action through a diffusion process. We suggest that the innovations be analyzed and classified based on the scale of the changes required from the different stakeholders. The questions to be asked are the same for all innovations intended for diffusion in the markets. For some organizations, the change requires a radical transformation. This is often the case of OEM companies aiming at a solution provider status.

This research setting includes, however, several limitations that need to be taken into consideration. The OEM is taking its first steps with these new types of services. In terms of research method, action research, though versatile, has been carried out in only one environment. Additionally, only a part of the activities in the diffusion process have so far been analyzed. In the future, it would be useful to analyze the diffusion process in the same environment at a more detailed level, activity by activity.

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