

A Simulation-based approach to understanding the dynamics of the transition from product manufacturer into service provider

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Abstract

Despite the demonstrated benefits of an extended service business in driving competitive advantage, most product manufacturers found it extremely difficult to manage the transition from a product manufacturer to a service provider successfully. In this context, we observed different phenomena. One phenomenon we term the “service jungle”. The “service jungle” describes the phenomenon that the transition has often led to declining business because of increasing costs, which could not be recovered with corresponding returns.

Unfortunately, existing theory does not explain sufficiently the challenges inherent in this transition process. Transitioning from a product manufacturer to a services provider involves interactions among service management theories, basic concepts for improvement programs and human decision making processes in the firm while existing frameworks tend to address one at the expense of the other. To resolve the „service jungle“, we develop an integrative framework combining existing service management theories, the basic concepts for improvement programs with established theories on human cognition, learning, and organizational behavior. We then translate that framework into a formal model and analyze it using computer simulation. The analysis suggests a new construct the degree of integration among structural adoption, activity-oriented adoption, behavioral adoption characterizing the dynamics of the transition. The construct provides an internally consistent theory about the dynamics of the transition. It shows how a low degree of integration can create the “service jungle” phenomenon.

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I. Introduction

The following paper offers a theoretical framework for understanding the transition from pure product manufacturers into service providers. According to Chase (1981) and Oliva and Kallenberg (2002), we assume that there is a continuum from pure product manufacturers to service providers. Product manufacturers try to move along that line as they extend their service business. At the first extreme point of the continuum, we envisioned a product manufacturer that produces core products and services are just an Add-on to the product. The profits and revenue are mainly generated through company's core products and the contribution of services in terms of revenue, profit and customer satisfaction is quite low or even negative. At the second extreme point, we envisioned, a service organization for which its products are just an Add-on to the services and represent only a small part of the value proposition (figure 1). The majority of company's value proposition comes from its service offerings.

Considerable research in the field of management has revealed the need for traditional product manufacturers to extend their service business. The need is driven by the numerous opportunities that services can provide: financial opportunities (Mathe and Shapiro, 1993), marketing opportunities and strategic opportunities. The substantial revenue, the higher margins and the fact that services are a more stable source for revenue represent the financial benefit (VDMA, 1998).

An extended service business can generate an increasing revenue and profit, compensating decreasing product margins (figure 1). Marketing opportunities can be understood as "better services for selling more products" (Mathe and Shapiro, 1993 p. 33). Finally, there are strategic arguments like competitive strategy based on services or services as a market entry barrier (Anderson and Narus, 1995; Evardsson, 1990; Oliva and Kallenberg, 2002). Services, by being more labor dependent, are much more difficult to imitate. They are becoming a sustainable source of competitive advantage (Simon, 1993). For example, Lay et al (2002) have found out that compared to several strategic options like fostering innovation / technology, product quality, suitability to customer needs, cost leadership and delivery time, competing through services enables companies to earn the highest margins.

The entry point to our theorizing is provided by our observation that most companies found it extremely difficult to manage the transition successfully. In this context, we observed different phenomena. One phenomenon we term the "service jungle". The "service jungle" describes the phenomenon that the transition has often led to declining business because of increasing costs, which could not be recovered with corresponding returns. Most companies started service programs to move along the transition line (figure 1). Unfortunately, companies have found it difficult to sustain the initiated service programs. The most service programs led to increasing

service offering and higher costs but did not lead to corresponding returns. The contribution of services in term of revenue and profit did not increase in the intended way (figure 1). The companies left the transition line, gave up their service programs and went into that we call the “service jungle”.

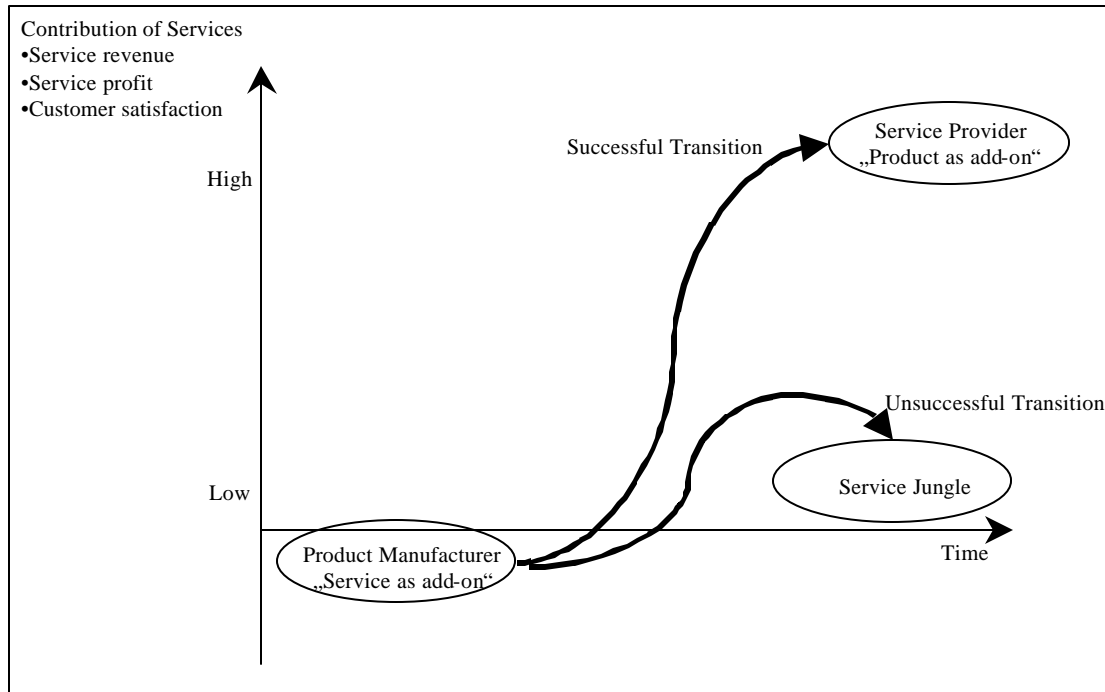


Figure 1: Transition line from product manufacturers into service providers and the „service jungle“ phenomenon.

The reason for their difficulties stems from a lack of theoretical frameworks and management guidance about how the transition should be implemented. Scholars have recently answered the question why product manufacturers should undergo the transition into a service provider. Unfortunately, they are surprisingly sparse on describing how the transition should be done.

II. Existing Theories

The rationale for the transition can be put forth along three lines – financial, marketing and strategic arguments. But up to now, there is no integrative framework explaining how the transition should be implemented. The existing literature is surprisingly sparse on describing the challenges inherent in the transition process (Oliva and Kallenberg 2002). For example, Oliva and Kallenberg (2002), Mathieu (2001b) and Homburg et al (2000) give some recommendations

on how the transition can be done. But, however, there are two significant gaps in the literature on the transition from product manufacturers into service providers.

First, a common thread running through service management frameworks is their focus on modifying organizational structures and firm's activities. For instance, Oliva and Kallenberg (2002) describe how to service the installed based and how to expand the service offerings. Homburg et al (2000) explain also several improvement activities that company have to implement. They explain how to structure the existing service offerings, how to change the communication, how to develop new services and so on. But they do not give any recommendation on how to change the underlying behavior pattern and company's culture.

Overall, the service management frameworks pay less attention to the concomitant behavioral changes required to modify organizational structures and firm's activities. They put the necessary behavioral changes at the implementation level and do not offer some guidance on how the these changes can be managed. Nevertheless, the existing frameworks provide an excellent navigational chart for managers facing challenges during the modification of organizational structures and firm's activities.

In contrast, organizational scholars have focused primarily on the behavioral aspects of change (van de Ven and Pool, 1995, Huber and Glick 1993). However, whereas service management theories largely ignore the behavior of those working within the organization, organizational theories generally do not account for organizational structures and firm's activities. We think there is a clear need for an integrative framework that combines organizational structures and firm's activities with understanding of behavioral challenges to explain the transition from product manufacturers into service providers. Mathieu (2001b) tried to combine the organizational structure and cultural perspective. She describes several types of service maneuvers on the transition line. Each service maneuver requires changes in organizational structure and company's culture. But she does not explain the changes of the organizational structure in detail as well as several change management phenomena like resistance against change and so on. Changing company's culture always lead to such phenomena.

The second significant gap in the literature stems from the inability of existing frameworks to describe the transition as a dynamic process and is not surprising. The transition is by definition a dynamic process. Each theory developed to explain the transition defines, either explicitly or implicitly, a dynamic system of causal loop structures. When developing theories that explain the dynamics of the transition, one has to check its logical consistency. Checking logical consistency requires determining whether or not our integrative framework is capable of generating the behavior that it purports to explain. Establishing whether our integrative frameworks can

generate the dynamics of the transition, we have either to mentally solve the mutual reinforcing links among the different indicated factors or to simulate a system of differential equations. Unfortunately, the reliance of intuition to enforce logical consistency is not in line with well-established theories about limitations of human cognition. Numerous studies on the ability of managers to control a dynamic process or on researchers trying to understand the dynamic consequences of their theories have shown that human ability to reliably infer or mentally simulate the behavior of even low order dynamic systems is limited (Sterman 1989a and 1989b, Sastry 1997). Through translating our integrative framework into a formal model, we try to close that gap.

We use the existing theories and frameworks and try to formulate an integrative framework that combines organizational structures and firm's activities with understanding of behavioral challenges. The purpose of this paper is to develop the beginning of such an integrative framework. Three management profiles build the core of our integrative framework. They illustrate the main success factors for transitioning from product manufacturers into service providers. Furthermore, these management profiles show which factors or dimensions have to be adopted and how the different dimensions have to be configured in the right way. Furthermore, these profiles offer some guidance for managers seeking to design a successful transition.

Because explaining all implications of the transition (starting with the necessary adoption of organizational structures and going further with the changes in firm's activities) goes behind the scope of that paper, we focus mainly on the behavioral side of the transition. Organizational structure and firm's activities are not explained in detail.

The paper is organized as follows. The next section describes our research methodology, data collection and data analysis. In section four, we present an integrative framework that captures the transition process from product manufacturers into service providers. We describe several structural and activity-oriented dimensions and propose a causal loop structure to capture the main characteristics of the behavioral dimensions. In section five, we translate the integrative framework in a formal model, analyze the dynamic behavior of the transition and test the internal consistency. In section six implications for future research and practitioners are discussed.

III. Research method, data collection and data analysis

II.1 Research method and data analysis

Case studies are the main tool for theory development. We focused on European product manufacturers whose products represent an high investment for the customers. The case studies were conducted in several manufacturing industries (like machine manufacturing industries, medical equipment, telecommunication industries etc.). All investigated product manufacturers have been looking for possibilities to enhance their profitability through services because the products were mainly in the maturity stage with decreasing margins and profitability. The results and implications are limited to this area.

Our research method consists of four phases. The first phase is based on bipolar typed case studies (Eisenhardt, 1989). In the second phase, we developed a theory to explain the evolution of the transition. We used causal loop diagrams capturing the rich array of interdependencies and feedback processes in the company and its environment. Additionally, we used structuration literature (Giddens, 1984) to stress mutual, recursive causal links among organizational structure, and the mental models of organizational actors which guide their behavior. We used the system dynamics method (Forrester 1961) to understand the multiple feedback mechanisms that affect the transition.

We first began to identify the patterns of interest. Then we continued with an iterative development of categories, variables and causal links. The categories into which our observations can be coded are successful and unsuccessful transition processes (“service jungle”). The variables and causal links form the feedback processes that generate the dynamics of the transition. At the end, we integrated our findings in an unified framework explaining both the successful and unsuccessful transition processes. The result is a single set of feedback processes capable to generate patterns of phenomena we observed.

As our causal loop structures emerged, we reviewed each link in the causal maps to assess whether the relationship was supported by existing theory in the third phase. Our framework integrates the characteristics of service management, the structures of improvement programs and the behavioral side. We draw on the basic precepts offered by service management (Simon, 1993, Oliva and Kallenberg, 2002, Mathieu 2001a and 2001b). By investigating the behavioral dimension of the transition, we rely on the latest studies of improvement programs (Sterman, Repenning, Kofman, 1996, Sterman, Repenning, 2002) and on basic concepts of human decision making like judgement under uncertainty (Kahneman, Slovic and Tversky, 1982), bounded rationality (Simon, 1957) and the valance-expectancy-theory (Vroom, 1964).

By combining the single set of feedback processes and the existing theory, we were able to formulate an integrative framework to explain the transition. The transition can be understood as a goal-oriented adoption of company's organizational structure, activities and behavior. The activities describe how a sequence of linked and interdependent working processes transform inputs into the desired outcomes. Behavior is defined as the underlying behavior patterns so deeply embedded and recurrent that they are displayed by the most members of the organization (Garvin 1995). The behavior patterns effect the decision making. It has no independent existence apart from activities and organizational structure in which they appear. They affect profoundly the character of activities and structure by shaping how the activities are carried out and how the organizational structure is going to work.

By combining the single set of feedback processes and the existing theory, we were able to formulate an integrative framework to explain the transition. The integrative framework is textual and diagrammatic. But it is not completely able to describe the transition as a dynamic process. We translated our integrative framework into a formal model during the fourth phase. The formal or simulation model allows us the detailed analysis of the dynamic behavior created by the underlying assumptions of our framework. Our analysis of the formal model highlights and clarifies the interactions between the different elements used in our integrative framework.

II.2 Data collection

As already mentioned, the research design focused more or less on polar types in our first phase. First, we began to identify companies that were highly successful by the transition. Second, we identified companies that struggled to manage the transition successfully. To distinguish between successful and unsuccessful companies, we used indicators like service revenue, number of service offerings, service profit and offsetting of services as well as indicators like customer satisfaction. The primary data collection methods were semi-structured interviews (for the successful practices) and action research among the companies that struggled during the transition. The subjects of the interviews and action research were chosen with the input of the research team.

The interviews with each of the five successful practice companies lasted one day. The interview subjects began by describing their background and history with the organization. They were then asked to give a detailed account of their experience with the transition. Subjects were asked to assess the key success factors and barriers of the transition and to offer hypotheses about their causes. The data analysis started with traditional methods for inductive field work. Our research team read all the interview transcripts. Based on the transcripts, we wrote five detailed case

studies describing the history of each transition. Participants and the research team reviewed the cases, identifying gaps in the narrative and suggesting additional data collection. The reviews often led interviewees to provide more detailed background information. By allowing all the participants to review their transition cases we could offset some of the bias normally associated with retrospective interviews.

Additionally, we tested our findings in action research among companies that struggled during the transition. We conducted several projects and assisted more than 20 companies by doing the transition. By reviewing our first finding in the field, we found additional issues that had not been arisen at first. We were able to test our findings about how the transition is influenced by day-to-day work.

Similar to Oliva and Kallenberg (2002), all case studies were more or less selected according to their perceived position along the continuum between product manufacturer and service provider. The sampled case studies cover the whole transition line as well as the phenomenon of the “service jungle”. The bipolar case studies in combination with interviews and action research helped us to ground our emerging causal loop structure and integrative framework on both retrospective and current data.

Overall, the combination of the four phases helped us to ensure that our emerging framework is grounded in the field data, is consistent with existing principles in service management, management of improvements, organization theory and literature on human decision making and is an internal consistent theory able to generate the behavior it purports to explain.

IV. An integrative framework for the transition

IV.1 Activity-oriented dimensions

During our intensive case studies, we indicated several structural and activity-oriented key factors or dimensions that have a significant impact on the success of the transition. These dimensions emerge also from several causal loop structures. But we will not explain them in detail. We just focus on the description of the dimensions and do not explain how they emerged.

Beginning with activity-oriented dimensions, transitioning from product manufacturers into service providers requires the selling of more and more services. Selling more and more services implies that the customer is willing to buy new services. The customers are willing to buy services as long as customers benefit from these services.

To innovate services addressing origin customer needs, one usually needs an Outside-in perspective of the service innovation process. Unfortunately, most product manufacturers develop services from an Inside-out perspective, because they are mainly technology-driven.

Services need more market pull activities. The transition from product manufacturers into service providers requires a change in the perspective of the service innovation process from an Inside-out to an Outside-in view.

Based on an Outside-in oriented service innovation process, the company is able to innovate market-driven services highly accepted by the customers. The Outside-in service innovation process represents the first necessary adoption on the way to a successful transition process. It leads to an extended service business through more and highly accepted services.

According to Oliva and Kallenberg (2002) and Mathieu (2001b), the expansion of the service offerings changes the focus of the value proposition to the customer. Mathieu describes it as the change from services supporting the product to services supporting the client. As the company moves along the dimension service offerings, the product becomes just a part of the offering and is not opposed to be the center of the value proposition any more (Oliva and Kallenberg 2002). Focusing service offerings on services supporting the client is equivalent to shifting from product manufacturers into “solution providers”. It can be also understood as the development starting with selling products and give away services, followed by several steps like services are sold with hardware, services are sold integrated in the total offering, the total solution is sold and ending up with the total solution is sold as a service (Benchmarking Report 2001). Establishing services supporting the client and changing the focus of the existing service offerings has two important impacts.

At first, it requires an adoption of the existing competitive strategy. Services supporting the product mainly support the differentiation through products. They do not enable a service-based competitive strategy. Services supporting the client (and moving to solution providers based on comprehensive or integrated services) need a service-based competitive strategy, because the product is no longer the core offering (Wise and Baumgartner 1999). It just can be seen as an Add-on to the service offerings. In case of introducing services supporting the client the competitive strategy has to change from a product-oriented to a service-oriented strategy.

At second, an adoption of the marketing is also required. The customer interaction changes from a transaction-based to a relationship-based approach. Establishing a relationship-based customer interaction is mainly based on bundling existing transaction-based services to relationship-based services. For example, separate services around the product like repair, preventive maintenance or inspection are often bundled into maintenance contracts. The move toward a relationship-based customer interaction is mainly driven by the desire to make better use of the existing service capacities. This argument explains how the services provider benefits from relationship-based customer interaction, there is no compelling argument on how customers should benefit

from this kind of interaction. The problem is that relationship-based customer interaction does not add value directly to the customer. The customer benefits only when the relationship-based service offerings are transferred into an higher equipment availability and are priced accordingly, that the customer has the ability to quantify the value of the offerings (Oliva and Kallenberg, 2002).

Another argument comes from the asymmetric information between the firm and its customers. Services have by definition more credence attributes than products (Meffert and Bruhn 2000). That means, the customers have difficulties to judge the service quality and benefit. Uncertainty and risk aversion are a basic feature of human decision making (Einhorn and Hogarth, 1985). Therefore, customers prefer certain to uncertain outcomes. An established relationship-based customer interaction can reduce the uncertainty and can be used as a reputation. In that case, a relationship-based customer interaction can be understood as both the result of excellent service offerings and service quality as well as the necessary requirement for selling services.

By illustrating our four activity-oriented dimensions or key factors for the transition, one gets the following management profile. The management profile (according to the St. Galler Management Model) can be understood in the following way.

All four dimensions influence the success of the transition. If companies want to transition themselves from product manufacturers to service providers, all four activity-oriented dimensions have to change in a consistent way. They have to be configured in such a way that there is a coalescence among them. The coalescence is meant in a way that the configuration is consistent, complementary and mutual reinforcing. If companies want to move from product manufacturers to service providers, the right configuration of the activity-oriented dimensions in terms of a coalescence will be on the outer circle. The consistent configuration for companies that do not want to move from product manufacturers to service provider would be the inner circle. An inconsistent configuration will not lead to a successful transition. It leads directly to the "service jungle".

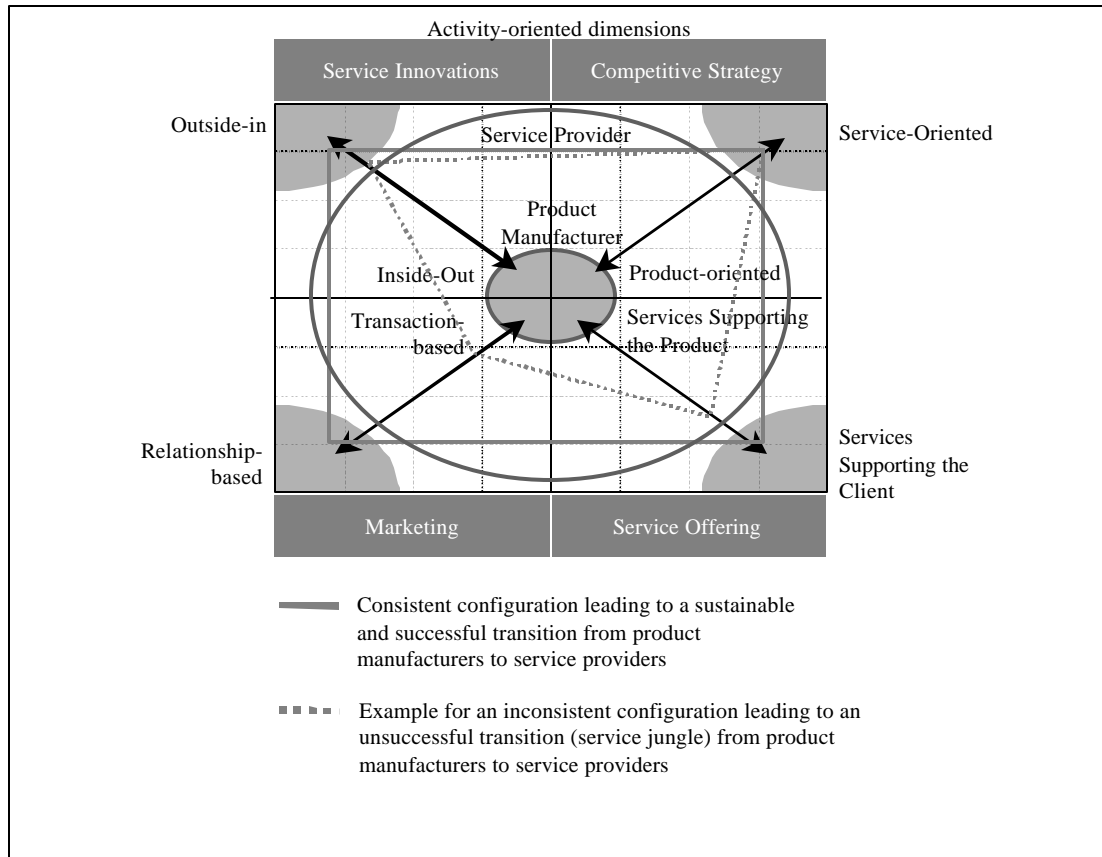


Figure 2: Management profile for the adoption of the activity-oriented dimensions.

IV.2 Structural dimensions for the transition

Beside the activity-oriented dimensions, we also indicated four structural-oriented dimensions. These structural dimensions explain necessary organizational changes on the way to a service provider. They result from the difference between manufacturing and service operations. Compared to manufacturing operations, service operations require usually a process-oriented approach for the value creation, low hierarchy, an high degree of de-centralized responsibility and different multi-dimensional metrics to measure customer satisfaction, employee satisfaction and the success of the service offerings (Meffert and Bruhn 2000, Grönroos 1997, Oliva and Kallenberg 2002). The rationale for such an adoption of the organizational structure is normally put forth along four lines. Service operations require an high empowerment of the employees. Reducing the level of hierarchy helps companies to empower service employees (Bowen and Lawler, 1998). Second, because of the inseparability of service delivery and service outcome, the service quality is mainly determined by the delivery process. A process-oriented approach for the value creation ensures high process quality and guarantees superior service quality. Third, we observed that the most successful firms in transitioning from product manufacturers into service

providers were those that ran de-centralized service organizations with profit-and-loss responsibility. Fourth, these new de-centralized service organizations have to run and get coordinated with a different set of metrics. They have to run like a normal service organization using metrics needed by a service organization to measure customer satisfaction, employee satisfaction and business success. We call these kind of metrics multidimensional, because they consist of different kind of variables compared to metrics used in manufacturing companies. The resulting management profile and the configuration is illustrated in the following figure. The meaning of configuration is similar to the activity-oriented dimensions.

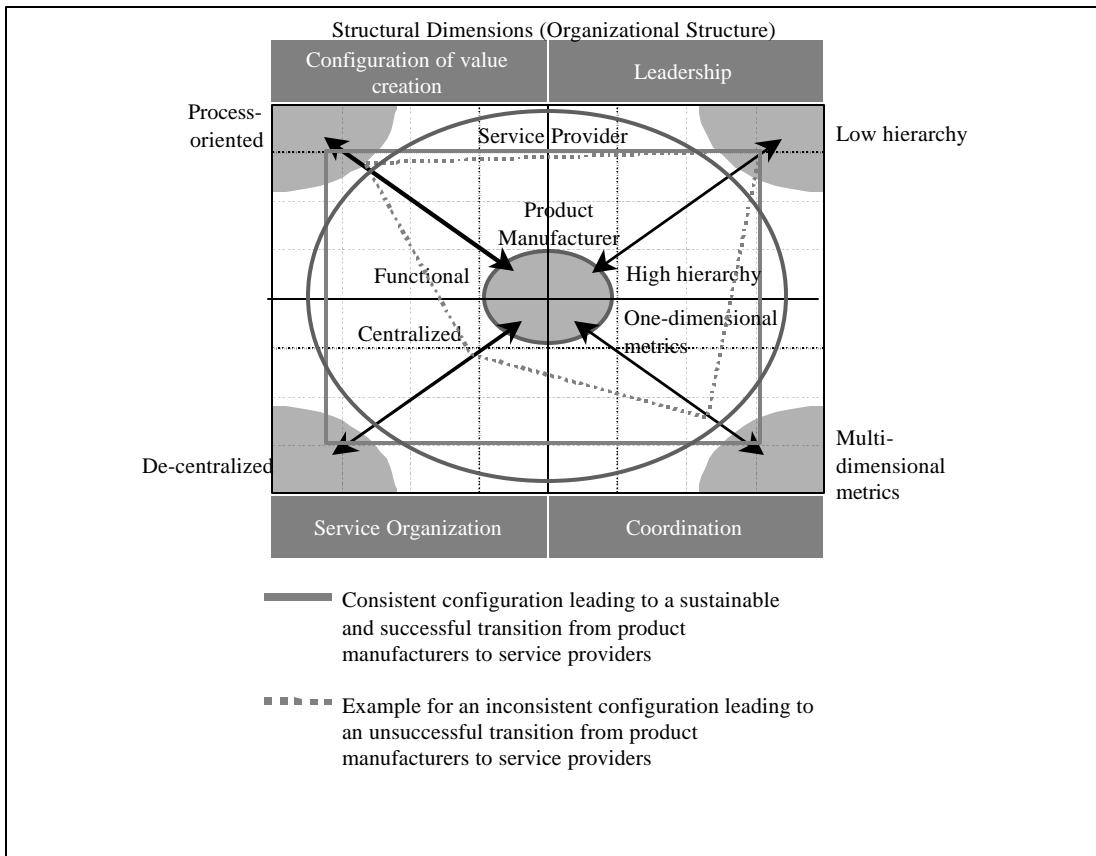


Figure 3: Management profile for the adoption of the structural dimensions (organizational structure).

IV.3 Behavioral dimensions for the transition

IV.3.1 Basic concept for adopting the outlined structural and activity-oriented dimensions

To transition a pure product manufacturer into a service provider, one has to change the outlined structural and activity-oriented dimensions in a consistent way. Most companies initiate improvement programs to adopt these dimensions. But this necessary adoption cannot be

installed easily. A successful adoption needs a sustainable and continuous improvement program and is more like a process that must be grown organically. To do so, the product manufacturers must grapple with several central issues of improvement programs during the transition.

We assume that the service management tries to initiate an improvement program, leading to the adoptions of the structural and activity-oriented dimensions. Resources are necessary for the adoption or improvements. In the next section, adoption and improvements are synonyms. Service workers and service managers have limited time, which must be allocated among the daily business and improvement activities. The improvement activities are linked to the service delivery, because they interrupt the service production.ⁱ Furthermore, to address the issue of inseparability of service delivery and quality (Oliva 2001), service quality has been defined as a function of the allocated time per order – a proxy for the degree of attention and care that service workers are providing. According to the Mill's equation of service quality to service productivity (Mills, 1986), we assume that increased working effort leads to less time per order decreasing the service quality.

By combining the issue of inseparability with interaction arising from firm's finite resources, one gets a short and a long-term effect of adoptions or improvement programs. For example, increasing resources for the improvements cuts off resources for the daily business leading to more working effort and less time per order eroding service quality and reducing the success and sustainability of the transition in short-term. If the improvements overcome the short term effect, in long-term an increasing service quality and an improved service innovation process boost sales, service orders and market potential leading to more resources needed to fulfil the daily business. That makes fewer resources available for improvement programs in long-term. Both effects can slow down improvement programs and do not lead to a successful and sustainable transition process (figure 4).

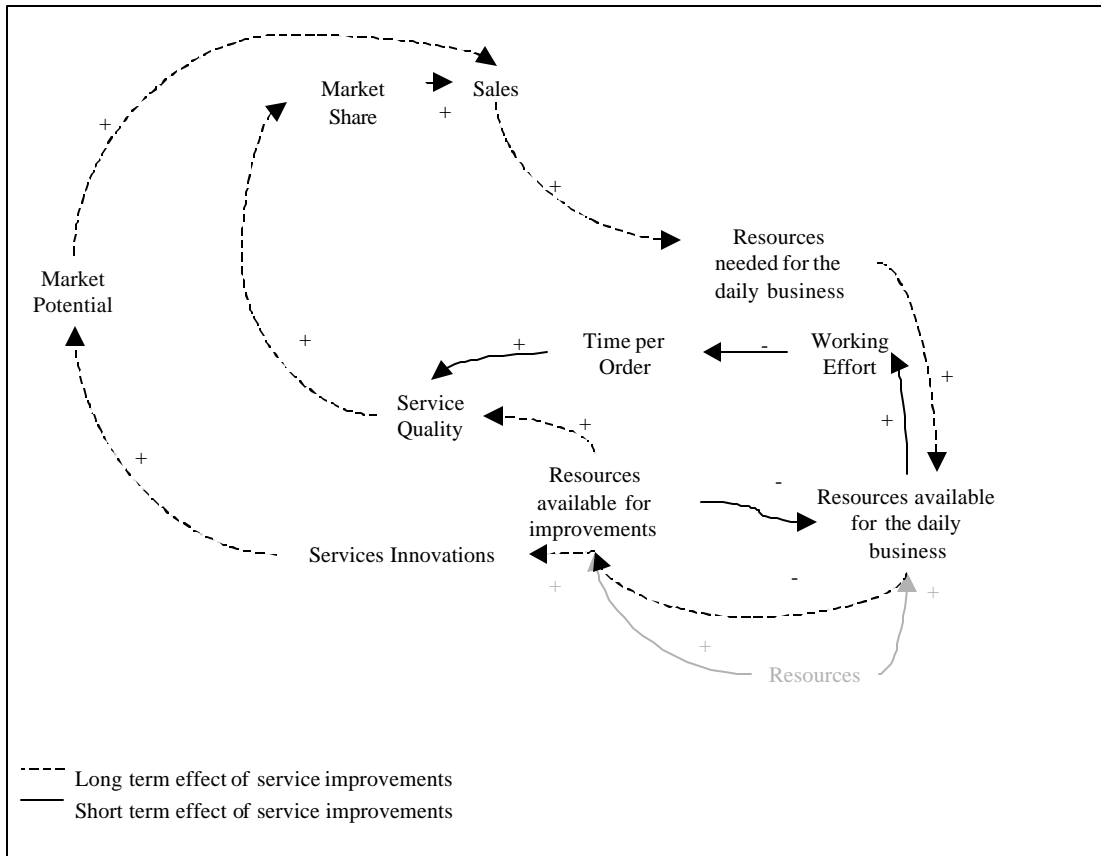


Figure 4: Short and Long term effects.

Referring to the latest research in improvement programs, improvement programs can focus on first or second order improvement. According to the service or quality movement (Deming, 1986, Heskett et al, 1994), the first order improvement is fighting the symptoms. Second order improvements are fighting structural problems leading to less problems or symptoms increasing efficiency and productivity. It is more like working smarter. By concentrating the improvement effort on the second order improvement, one can increase efficiency and productivity leading to more resources available for improvement.

Adequate resources and concentrating on second order improvements lead to sustainable improvement programs, strengthening the transition process. But what determines however the described feedback loop operate? The answer is influence in large measure by the mental models of managers and employees. The following section shows the impact of managerial and employee's mental models.

IV.3.2 Behavioral challenges and cognitive processes

IV.3.2.1 Managerial options

According to the “teleological” theory (van de Ven and Pool, 1995), the management sets goals for an adequate level of improvement programs / adoption of one dimension. Combining that with the aspiration and valance-expectancy theory (Vroom, 1964; Lant, 1992), managers assess the adequacy of the current level by comparing it to the desired level. In case of a gap, managers must try to increase resources for the improvement program by using one or more options.

If one looks at the managerial option to increase resources available for improvements, one gets three different options. Each option initiates a balancing feedback loop (figure 5). First, to increase the improvement resources workers can work harder, increasing the utilization of existing resources or short cutting the resources for the daily business. Unfortunately, effort squeezing would initiate the former mentioned short-term effect overcoming B1. Second, managers can extend the capacity by hiring more workers or purchasing additional external capacity (B2). Expanding capacity involves substantial time delays (training, building capabilities and ...) and has just a long-term effect.

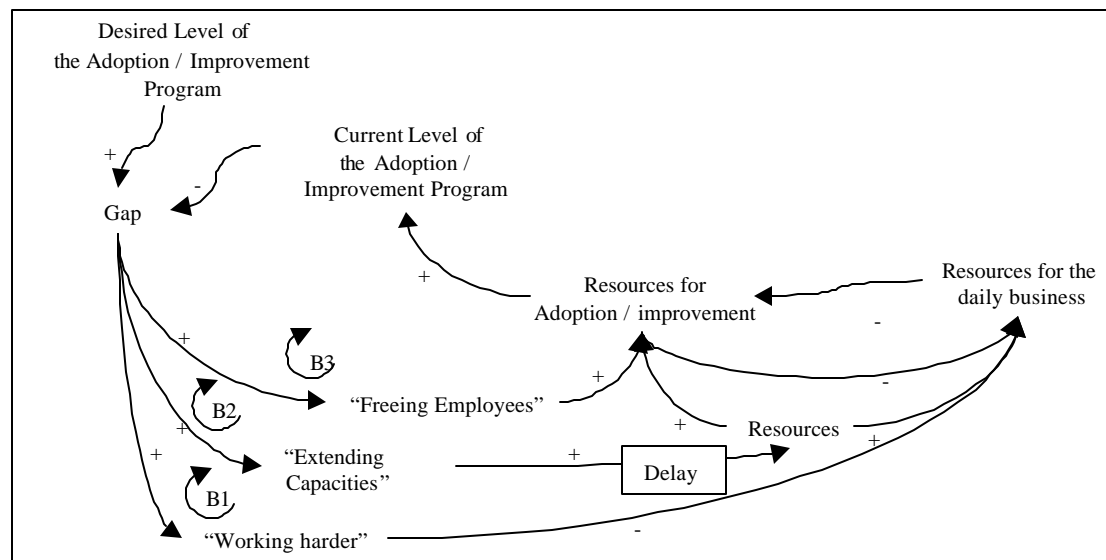


Figure 5: Managerial options for closing the gap between the desired and current level of service improvements (Based on Repenning and Serman (2000)).

Third, the managers can free employees to participate in the improvement program. That would lead to the same side effect of fewer resources available for the daily business like working

harder (B1). The short term effect would overcome the balancing effect of B3. This looks like that it is quite hard to sustain for any improvement, because of the lack of resources.

But nevertheless - according to our former description, one can recommend the following resource strategy for the adoption of the different dimension. First, one has to free employees for the improvement activities. Simultaneously, new service employees have to be acquired, because service employees need time to build the right capabilities. Freeing employees leads to the described effect of eroding service quality. To overcome this effect, the employees have to concentrated on second order improvement, leading to an higher productivity. In mid-term these improvements overcome the quality erosion. This phenomenon is usually called “worse before better” effect (Keating and Oliva, 2000). In long-term the new service employees initiate B2 and compensate the long-term effect.

IV.3.2.2 Managerial bias against improvements and managerial service awareness

This is not the first article to identify the trade-off between improvement activities and daily business and to explain the resource bottleneck. They appear in several studies and have been the subject of rational actor models (Repenning and Sterman 2002). The interesting question for theory is why do many product manufacturers do not push such improvement programs. The answer is determined in large measure by mental models of managers about the right way to allocate resources.

Yet, there are several reasons, rooted mainly in cognitive processes, why improvement programs do not sustain. In choosing whether to pursue improvement or daily business, service managers must make a judgement about the causes of insufficient improvement programs or the lack of adoption to the requirements of a service provider. If a gap between the current and desired level of improvement programs is thought to result from lack of worker effort or discipline, then managers will increase the production pressure (B1). If service managers believe the cause lies in a lack of the adoption, they will focus their efforts on changing the described structural and activity-oriented dimensions. This initiates the balancing feedback loops (B2 and B3) that are able to close the gap between the current and desired level of the adoption.

Unfortunately, attributing the gap to inadequate worker effort is consistent with Ross’ “fundamental attribution error” (Ross 1977). Ross reviewed that people use to attribute undesirable outcomes to people rather than to system structure. The “fundamental attribution error” gives the theoretical foundation of our findings that managers tend to attribute a gap between the current and desired level of the adoption to inadequate working effort and not to structural or activity-oriented problems. While literature (Repenning 2002) and our field data

support that linkages, two questions have to be answered. First, would not manager recognize the existence of the feedback loops and take actions to avoid it? Second, if managers find themselves stuck in the attribution error, wouldn't they learn to escape from it? Unfortunately, several theoretical studies of human decision making and our action research recommend that such learning is very far from reality and does not go automatically (Dörner 1980, Dörner 1983).

According to Senge (Senge 1995), by enacting the different dimension, managers need a reflection about how the adoption is working as well as an awareness that it is necessary. The reflection represents the understanding of the illustrated feedback structures.

Similar to Oliva and Kallenberg (2002), we observed that it is quite difficult for manager who sell a multi-million Euro machine piece of equipment to get excited about a maintenance contract worth €10.000. To initiate the right service awareness, one has to overcome the successive hurdle in making manager aware about the value of services.

If manager think about services as "value added" activities leading to sustainable competitive advantages and not as "non value added" activities, they will be highly motivated to push the necessary adoptions. The "value added" service awareness refers to efforts to promote improvement effort or mandate participation. Promoting service improvements and mandating participation means that manager initiate B2 and B3 instead of B1. It can be understood as the managerial commitment or management push.

IV.3.2.3 Employee pull effect

Freeing employees and adding new service capacities (B2 and B3) can be understood as the management push or normative pressure to initiate improvement programs and to promote changes in the explained structural and activity-oriented dimensions. The management push often creates temporary excitement, but must be replaced by other sources of motivation like employee pull effect.

The employee pull effect leads to a changing service awareness at the employee level. It boosts the "value added" thinking and helps to overcome typical cultural habits of product manufacturers. Usually, services are thought of as add-ons, and initial services (installation, commissioning and so on, etc) are often "given for free" during the negotiations to sell products in manufacturing firms. But whenever you give services for free to customers, the customer will never understand the value of services. Generating a "value added" thinking on the employee level, enforces the cultural transformation. The product manufacturers must learn how to value their services, how to sell the service offerings, how to convince customers, how to deliver superior services and how to bill them.

Employee pull and “value added” service awareness arise when service workers understand the benefits of service improvements and commit themselves to improvement efforts (figure 5). In that case, improvement effort is independent of management attitudes. The employee pull has the same property like a re-investment cycle. It can function as a virtuous or vicious cycle. As illustrated in figure 6, we observed that a variety of factors could interfere with the employee pull feedback raising the odds of a vicious cycle. In the next sections, we will explain several of these factors.

Employee perception of benefit

In making the judgement that service improvement works, workers compare the improvement results they observe to their expectations (Cyert and March, 1992). The expectation is influenced by the objectives set by managers. The “value added” service awareness raises if progress is high relatively to aspirations and falls whenever progress is disappointing. The described links create a reinforcing feedback loop (R1). The loop, illustrated in figure 6, can operate as a vicious or virtuous cycle. The objective managers set to the workers determine its behavior (Keating et al 1999). When objectives are set high, the expectations can outstrip the observed improvement results and the service awareness falls, slowing down the employee pull feedback. It ends in a vicious cycle of goal erosion and cynicism. While aggressive objectives can weaken the employee pull, adequate objectives can boost it. When objectives are set in the right way, the improvement results outperform expectations and service awareness increases, boosting the employee pull effect through R2.

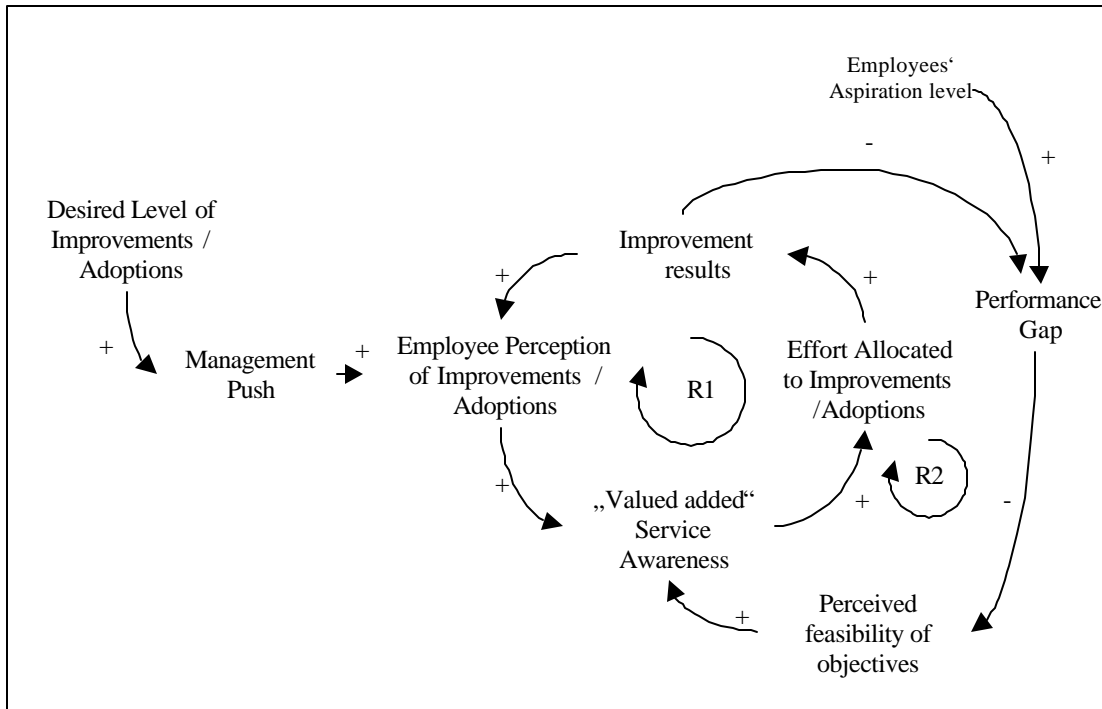


Figure 6: Employee pull effect boosting „value added“ service awareness.

Adequacy of management support

Furthermore, the effectiveness of any improvement or adoption activity depends on the adequacy of the chosen methodology or tool (R3). By focussing on more complex or second order improvements, the adequacy of methodologies and tools decreases dramatically. We assume that less adequacy of tools and methodology requires a higher management support. That means, if the improvement effort is focused on higher improvement half-lives, the management has to support the use of the required tools much more. It changes management's role. At first, the management has to concentrate on motivation and initiating the employee pull. Afterwards, the management has to support the service workers by using the existing methodologies and tools. In case of a lack of support, the employee pull is going to weaken leading to an improvement failure. Adequate support can boost the employ pull effect through B4.

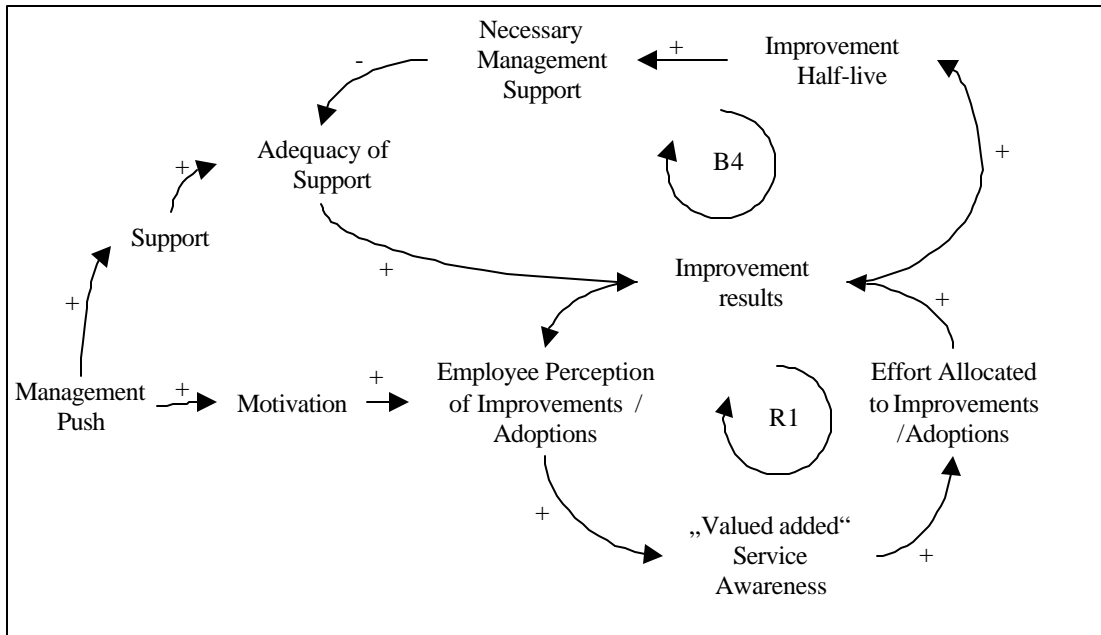


Figure 7: Changing management's role.

Furthermore, the adequacy of management support has another important impact. We assume, the management has to support multiple improvement programs (improvement programs for organizational adoptions, for new service innovation processes and so on). They must provide scarce resources that are critical to the success of the improvement programs. Similar to the employees, the management must also form beliefs as to the efficacy of the improvement program and judge the worth of expending their support in each improvement program.

We assume, that management's decision concerning where to allocate their support. The decision is also influenced by the explained employee pull effect. The feedback structure is illustrated in the next figure. The decision point is in the center of the causal loop diagram, the fraction of management support to improvement program one (in the figure are only two dimensions illustrated). We observed that the management makes this decision based on their beliefs about the relative efficacy of adopting or improving dimension one. If the management believe that dimension one works particularly well, they will increase their fraction of support to that area. As management allocate more resources to area one, all else being equal, service employees respond by increasing their effort. This additional effort increases the results and reinforces management's beliefs about the efficacy of dimension one. These links create a positive feedback loop.

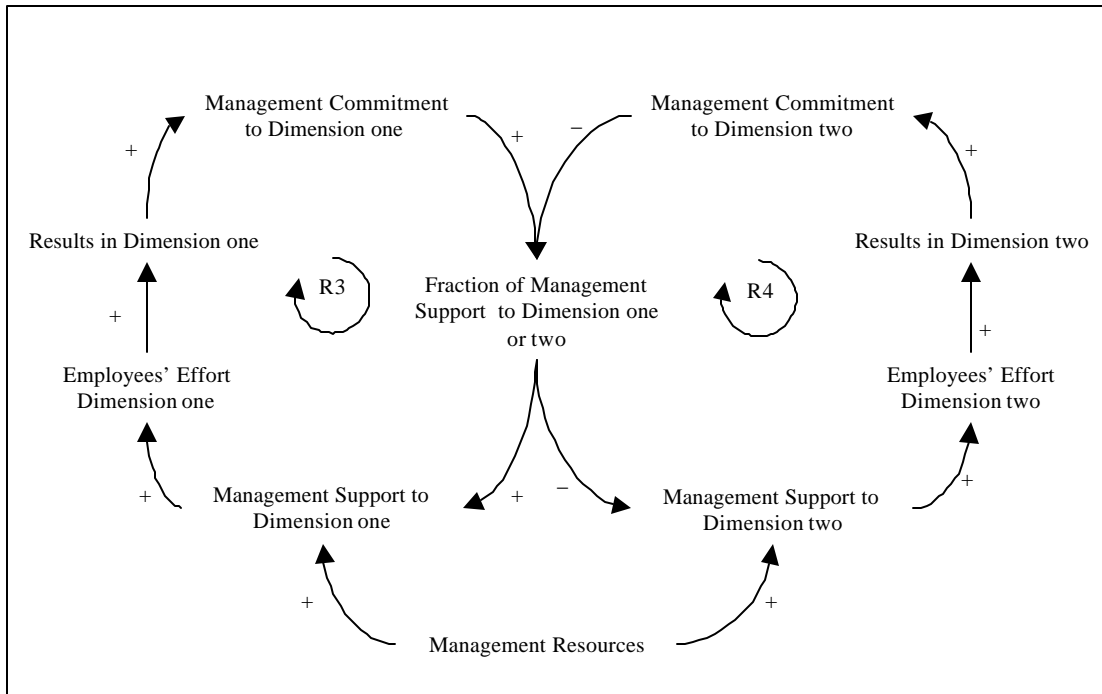


Figure 8: Management Resources.

In case of figure 8, the two loops are potentially coupled. If management resources are sufficient to support both improvement programs in an adequate way, then both loops work in a virtuous direction. If resource are scarce, a decision to allocate resource to improvement program one will be also a decision to allocate resources away from improvement program two (and vice versa). The described link has a strong non-linearity. It shows that resources play an important role in determining the dynamics of multiple improvement programs.

The two links illustrated in figure 6 and the adequacy of management support in figure 7 capture the influence of direct experience on the individual level.

Diffusion

Another feedback occurs from observing other employee's behavior and consequences of it. If service awareness is a group level construct, then there must be an additional linkage between the results and the "value added" service awareness. In the next figure, the influence of results on the service awareness of employees who do not try to adopt the dimensions is captured by adding an additional link between results and service awareness with the intervening variable – observation of service awareness-results linkage by others. The link captures the diffusion of service awareness throughout the group.

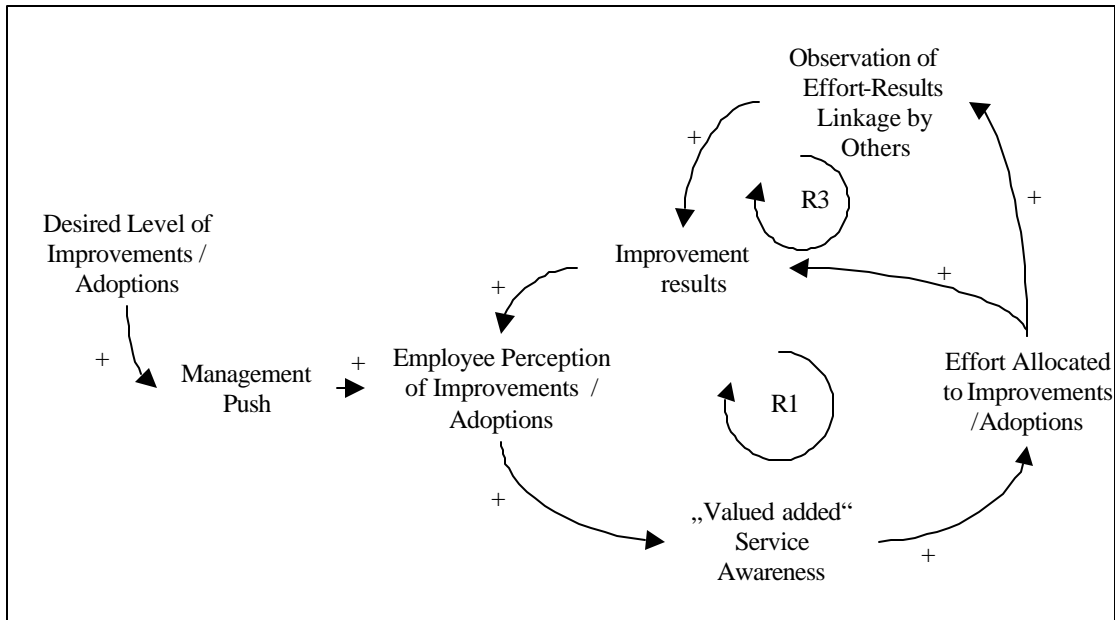


Figure 9: Diffusion process

IV.3.2.4 Employee's bias against second order improvement

The importance of the second order improvement and its impact on the success of the transition was already described in an earlier section. Even most enthusiastic manager can not monitor everyone's improvement activities in a large organization. The management sets goals for the improvement and adoption, but does not monitor how they get done. There is no command-and-control structure after initiating the adoptions and improvement programs. Command-and – control structures are dependent on managerial supervision. They are unlikely to work in settings where employee's participation is difficult to monitor. If the employee pull effect substitutes initial stimulation by management push, the command-and-control structure will be changed to a premise control (Perrow 1986).

In case of premise control, managers do not monitor the improvement activities. The management supports the improvements, but does not necessarily supervise the kind of improvements activities within the adoption of one dimension. The employees decide themselves to enhance first or second order improvement. Similar to management's judgement about resource allocation, four basic cognitive processes limit the second order improvements. The basic cognitive processes refer to the "low hanging fruit" syndrome and over-weighting of salient and tangible features of the environment.

People have repeatedly shown to over-weight salient and tangible features of the environment. First orders improvements are simply more salient and tangible than second order improvements.

(Kahneman, Slovic, Tversky, 1982). For example, an inadequate service concept is adapted to customer needs by redefining it and is visible to all, while the underlying service innovation process is much harder to observe and diagnose.

Second, first order improvements and second order improvements are likely to work at different speeds. Improving the service innovation process and the external communication takes time: identify the current process, indicate root causes, define customer contact points, implement solutions, train participants and so on. The delays between the start of a second order improvement program for the service innovation process or a new external communication strategy ranges from months to years. First order improvements are easier to identify and quickly solved. Therefore, employees under pressure to close a gap between the desired and current level quickly are likely to focus on first order improvements even if they know that doing so does not lead to fundamental improvements. At third, first order improvements have a more certain outcome than second order improvements. Convincing customers is easy and it is usually clear that the customer buys the service. In contrast, changing external communication strategy is more complex and its impact is more ambiguous. It is not clear whether and how a intended change in external communication will in fact lead to more service revenue. Risk aversion is a basic feature of human decision making (Einhorn and Hogarth, 1985). Service employees prefer certain outcomes of first order improvements to the uncertain and delayed outcome of a second order improvement.

Fourth, concentrating improvement efforts on second order improvements, while it prevents future problems, does not eliminate existing problems. Existing services with a lack of suitability to customer needs represent substantial investments in labor and capital. According to the well known sunk costs fallacy, decision makers often continue a project beyond the economical rational point when they already invest substantial resources. Thus, employees will focus on first rather than second order improvements. For example, we often observed that service workers concentrate on the adaptation of existing service concepts to customer needs, because they represent high investments. Unfortunately, the lack of adaptation of existing service concepts stems from ineffective service innovation processes, but companies do not concentrate on the development process. They are just fighting the symptoms and do not concentrate on structural problems. Concluding the last findings, differences in information availability, salience and delays bias employees against second order improvements.

To overcome the bias against second order improvement, one has to initiate a different understanding about improvements. Service employees must understand the effectiveness of second improvements. They have to change their improvement from first order improvements to

second order improvements enhancing fundamental changes leading to better improvement results pushing the adoption of the different dimensions.

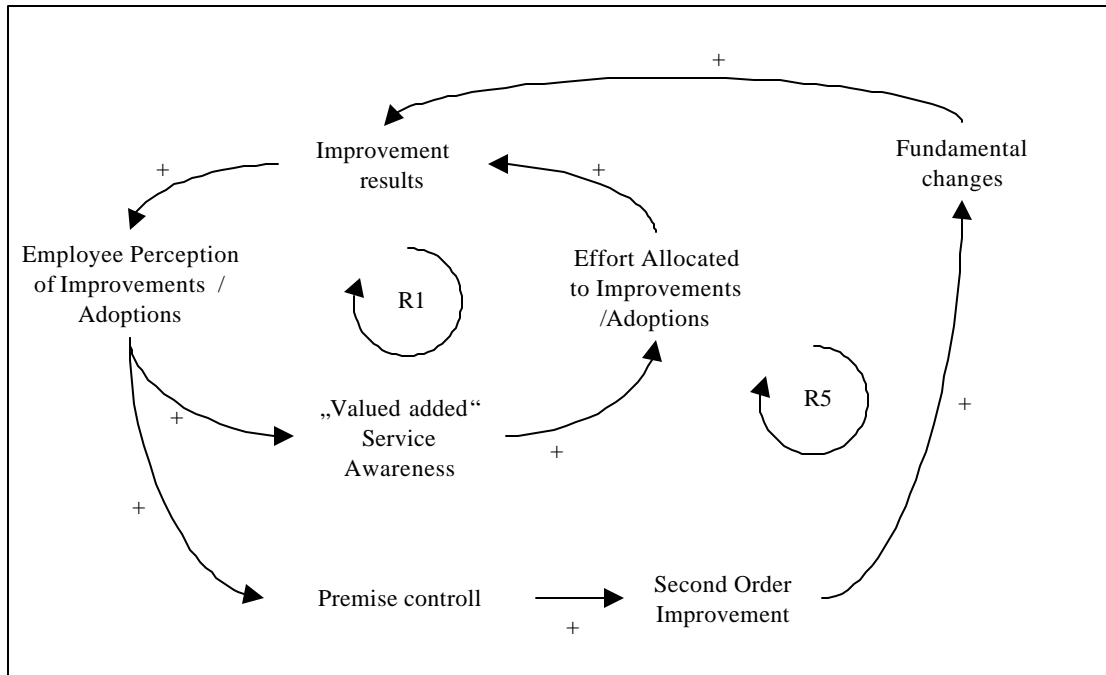


Figure 10: Second order improvements.

IV.3.3 Configuration of the behavioral dimensions

As pointed out in the last sections, transitioning from product manufacturers into service providers has a strong behavioral dimension. The challenges discussed result from an error of attribution made by managers in assessing the causes for a gap between the current and the desired level of service improvements, from a changing managerial role, from employee's bias in choosing the kind of improvement activities and from employees' perception of benefit. All four factors influence the success of the transition from product manufacturers into service providers. They have to be configured in such a way that there is a coalescence among them (figure 9). If companies want to transition themselves from product manufacturers to service providers, all four behavioral dimensions have to change in a consistent way. The coalescence is meant in a way that the configuration is consistent, complementary and mutual reinforcing. If companies want to move from product manufacturers to service providers, the right configuration of the success factors in terms of a coalescence will be also on the outer circle of the following figure. In that case, the described feedback loops operate in the right direction initiating a sustainable transition process. If one or more behavioral dimensions do not change, this feedback loop will work in a vicious way overcoming the positive effects of the other feedback structures leading to

an unsuccessful transition. In case of an inconsistent configuration, the improvements would not sustain and would lead to an unsuccessful transition.

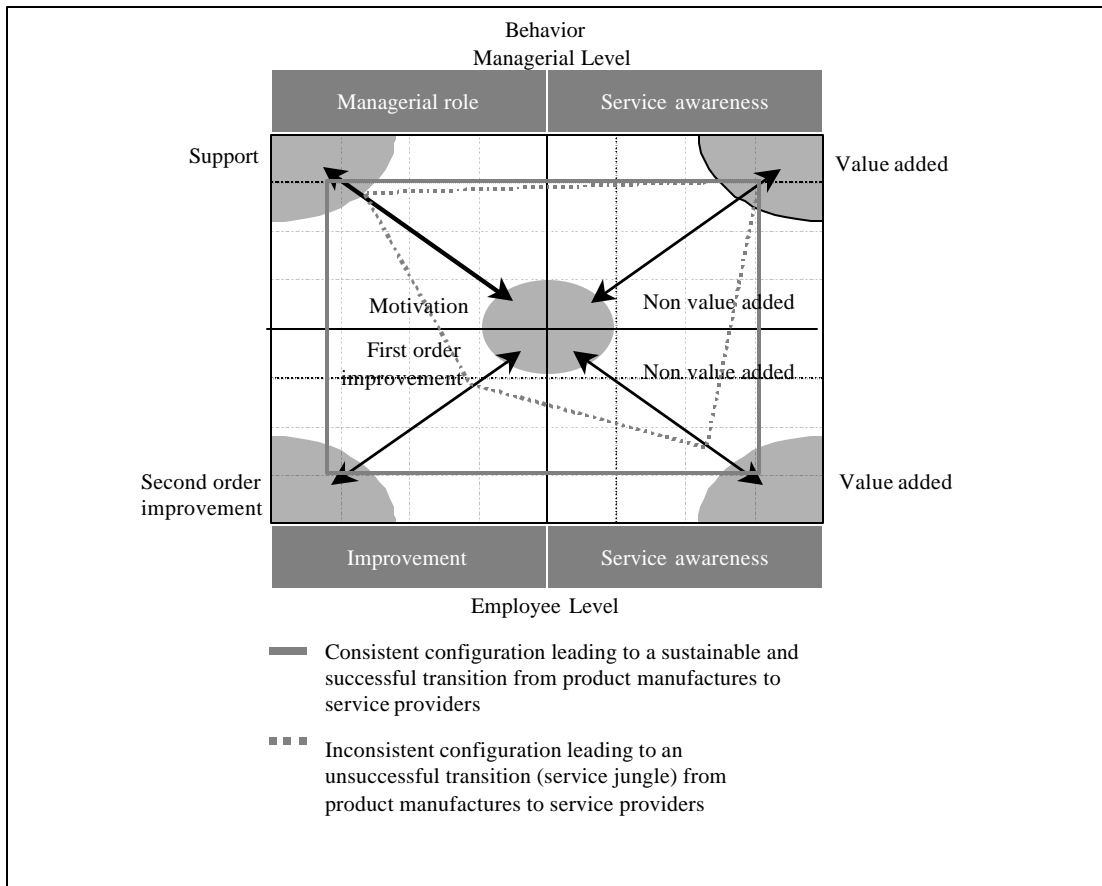


Figure 11: Management profile for the adoption of the behavioral dimensions of the transition.

V. Formal Model

V.1 Specifications

Our integrative framework is textual and diagrammatic. But it is not completely able to describe the transition as a dynamic process. For that reason, we translated our integrative framework into a formal model. Of course, our mathematical model is more precise, but more restrictive, embodiment of a verbal theory. The translation necessarily results in the loss of richness. There is, however, one corresponding benefit. The simulation enforces the internal consistency of our integrative framework, thus ensuring that behavior it purports to explain can in fact be generated by its underlying assumptions. Our integrative framework suggests that the success of the transition mainly depends on the degree of integration among the illustrated management

profiles. The use the mathematical model to answer the following question – Does the degree of integration has an impact on the transition?

In this section, our causal loop model is translated into a mathematical model. To introduce the model formulation, we start with the link between improvement effort and results. To develop a mathematical representation, we are according to Schneiderman's half-live model (Schneiderman 1988). He found out that any defect level, subjected to legitimate improvements decreases at a constant (fractional) rate. We assume that any dimension can be improved in the same way. That means every dimension can be improved through a constant (fractional rate). The improvement is calculated through the following equation.

$$(1) \quad A_n(t) = A_{n0} \exp(-f_n t).$$

A represents the degree of adoption for dimension n . A_{n0} is initial level of the adoption of dimension n . In case of a product manufacturer, the initial level of A_{n0} is 1. Moving towards a service provider means that $A_n(t)$ is converging to zero. If $A_n(t)$ is around zero, dimension n will be completely adopted to the requirements of service providers. The degree of adoption can be interpreted in the following way. It can be thought of as a level of specific capabilities needed to adopt dimension n . The parameter f measures the intrinsic and extrinsic difficulty of improving a particular dimension. Similar to Sterman's et al (1997) interpretation, intrinsic and extrinsic difficulty lead to different improvement half-lives. The mathematical link between the improvement rate and the improvement half-live can be formulated in the following way.

$$(2) \quad t_h = \ln(2) / f .$$

The half-life of one dimension represents the time required for one dimension to adopt by fifty percent. The improvement half-lives vary across the different activity-oriented and structural dimensions. Greater intrinsic and extrinsic difficulty slows down the improvement rate due to difficulties designing, conducting and implementing improvement activities. We found out that improvement half-lives grow with the intrinsic and extrinsic difficulty. Intrinsic difficulty refers to the number and type of people, from different organizational functions, required to carry out the adoption of the dimensions or an effective improvement. Extrinsic difficulty means that the customer can have an impact on the service improvement. Greater extrinsic difficulty slows down the improvement rate due to problems in explaining and convincing the customer to make us of the service improvements. The following figure illustrates the intrinsic and extrinsic difficulty of each structural and activity-oriented dimension.

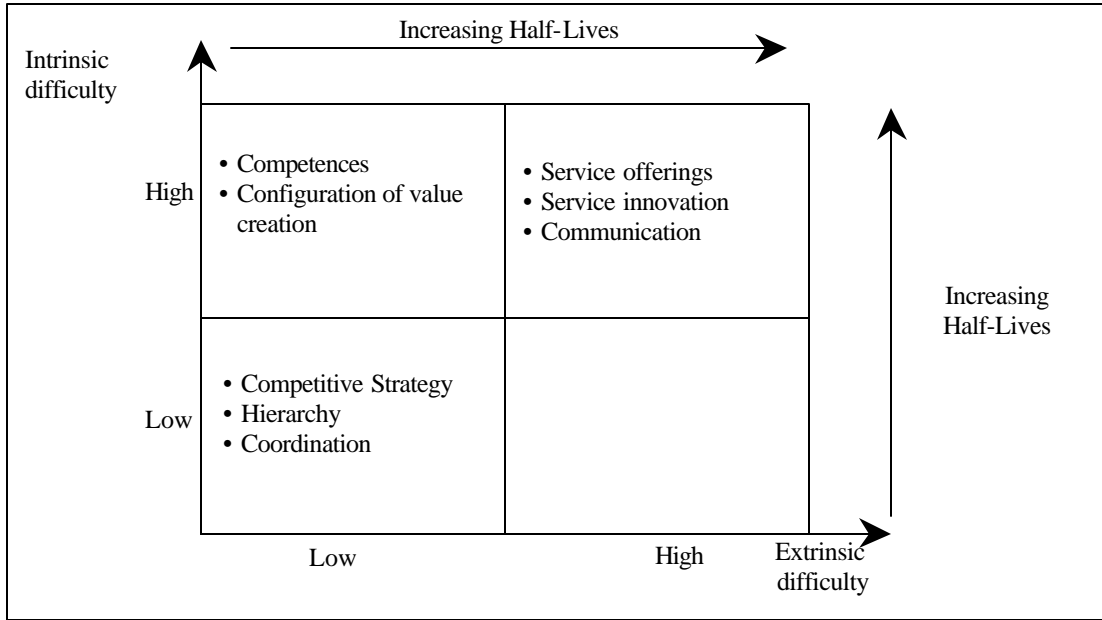


Figure 12: Dependence of improvement half-lives on intrinsic and extrinsic difficulty.

Translating equation (1) to a first-order differential equation, the time path of adoption can be described through the following equation.

$$(3) \quad dA_n / dt = -f_n A_n$$

Schneiderman's model is a typical specification of improvement in the operations literature. It is also used in latest studies of improvement programs (Sterman and Repenning 2002). It is a useful starting point but has to be modified in two ways.

At first, because sustainable changes of the structural and activity-oriented dimensions require a clear strategy, the dimensions also decay to the initial level A_{n0} at the fractional rate d . The fractional decay rate d is likely to be low for structural changes and higher for activity oriented dimensions. The impact of d is influenced by the competitive strategy $A_c(t)$. If $A_c(t)$ is equal to 1 (product-oriented competitive strategy), the adoption of dimension n will decay to the initial level A_{n0} at the fractional rate d . If the $A_c(t)$ is equal to zero (service-oriented strategy), the adoption of dimension n will not decay to the initial level anymore.

Second, the half-live model does not integrate the behavioral dynamics of the transition or adoption. It treats it as an autonomous process that is solely a function of time. The following modification relaxes these restrictions.

$$(4) \quad \frac{dA_n}{dt} = -f_n A_n B_n + d A_c A_n.$$

The current behavior, B , is defined as the fraction of the workforce currently showing a high level of service awareness and role understanding (“value-added” service awareness and role understanding in terms of business manager and second order improvement). Equation (4) links behavior and results to each other. The level of adoption is now an explicit function of the current commitment to the service improvement. As mentioned in the former chapter, the right behavior stems from a quite complex interaction between intrinsic and extrinsic motivation. The mathematical representation for the evolution of behavior captures both sources. We rely on established mathematical representation used in latest studies of improvement programs (Serman et al 1997).

$$(5) \quad \frac{dB_n}{dt} = \frac{B_n^* - B_n}{t_B} + w_n B_n (1 - B_n).$$

V.1.1 Managerial level

The first term on the left-hand side of equation (5) represents management’s effort to create necessary behavior. B^* is management’s goal for the behavior in terms of service awareness and role understanding. It depends on how much service awareness and role understanding management devotes to promote service improvement programs. Management’s goal, B^* , is endogenous. It is influenced by the company’s success. Company’s success is a construct defined over the zero to 1 interval, that measures management’s willingness to promote the adoptions and improvements of each dimension. The effect of companies success on management’s goal is operationalized as a decreasing function with a second derivative that is initially positive and becomes negative at approximately the mid-point. Small levels of company’s success have little effect on management’s goal, but as company’s success decreases, management becomes increasingly unwilling to promote and push the transition. This phenomenon was identified through interviews with several managers during our case studies. The indicated level of company’s success is a function of two measurements: market share and contribution of services. The parameter $1/t_B$ controls the speed at which employees’ behavior adjusts to management’s goals. That means, employees’ behavior approaches ceteris paribus management’s target with an average delay of t_B . According to Repenning (Repenning 2002), this delay aggregates three important components. First, senior manager need time to develop and implement actions targeted at creating normative pressure. Second, time is also required for participants to react to the management push. Third, participants need time to acquire the appropriate skills and to

modify the behavior. These elements capture both the teleological actions of managers and the different delays inherent in participants' reaction.

V.1.2 Employee Pull

The first term on the left-hand side aggregates the employee pull effect. It represents the "pull" effect generated by successful results and adequate management support. The more people are involved in the in service improvements, the more they will communicate their enthusiasm to others through word-of-mouth. w represents the word-of-mouth. It connects the diffusion with and the reinforcement process. w is not fixed parameter. It is a variable that represents the current belief among those who actively try to improve the dimensions concerning their efficiency.

The word-of-mouth can have a positive or negative impact on the behavior. We model the sign and strength of the word-of-mouth effect as depending on the perceived service improvements and the adequacy of management support. Thus,

$$(6) \quad w_n = \mathbf{v}_n (f_r \{r\} + f_a \{a\}),$$

where $f_r \{\cdot\}$ is the impact of results, r , on the word-of-mouth and $f_a \{\cdot\}$ is the impact of adequacy of management support, a (Sterman et al 1997). w is linked to the perceived service improvements through the following three equations:

$$(7) \quad P_n = \frac{dA_n}{dt} \frac{1}{A_n} = - \frac{\mathbf{f}_n A_n B_n + \mathbf{d}A_c A_n}{A_n}$$

$$(8) \quad P_n^* = \frac{dA_n}{dt} \frac{1}{A_n} = - \frac{\mathbf{f}_n A_n}{A_n} = -\mathbf{f}_n$$

$$(9) \quad p_n = \frac{P_n}{P_n^*}.$$

First, the improvement rate is first divided by the current level of improvements to calculate the fractional rate of improvement. The calculation of the improvement rate on a fractional basis provides a convenient normalization and is consistent with the perception theory (Repenning 2002). The perception theory suggests that people evaluate rates of changes on a proportional level rather than absolute basis (Plous 1993). The improvement rate, P_n , is then evaluated relative to management's goal. In the simulation model, P_n^* is predicted by the theoretical improvement half-life. It does not include the behavior and the decay towards the initial level. P_n and P_n^* , both are used to calculate the improvement rate as a fraction of the objective. This formulation is consistent with the aspiration concept of Cyert and March (1992), whereby

performance is evaluated relative to an explicit goal or aspiration. The formulation is also used in the latest studies of improvement programs (Repenning 2002; Sterman, Repenning and Kofman 1997). Finally, p_n is linked to w via the function $f_r\{\cdot\}$.

w is linked to the adequacy of support through the following equations. Again using the aspiration formulation (Cyert and March 1992), a_n , is calculated by dividing the amount of resources currently allocated to service improvement n , r_n is the amount of resource currently required by that area, r_n^* .

$$(10) \quad a_n = r_n (r_n^*)^{-1}$$

$$(11) \quad r_n^* = L_n \mathbf{r}_n C_n$$

The total resource requirements in area n , r_n^* is simply the product of the number of people in the area, L_n , the improvement resource requirement per person assuming full participation, r_n , and the current believe in service improvement. Finally, p_n and a_n are linked to w_n via the functions $f_r\{\cdot\}$ and $f_a\{\cdot\}$ and the parameter w . w is a constant that represents the frequency with which users interact. The function $f_r\{\cdot\}$ captures how people update their behavior to the service improvement based on the results they observe. Similar, the function $f_a\{\cdot\}$ captures how service workers update their behavior based on the support they get. We just want to discuss their qualitative meanings. A more formal derivation is not in the scope of this paper. For a formal derivation, we accord to Repenning (2002).

There are three major qualitative assumptions embodied in the relationship. First, all theories suggest $f_r\{\cdot\}$ and $f_a\{\cdot\}$ slopes upward – more results and more support lead to an increased service awareness and better role understanding. Second, the left-hand limit is negative, implying that the word-of-mouth is negative when service improvements show no results or when there is a lack of management support. These act as a drain on employee's behavior. A negative left-hand $f_r\{\cdot\}$ implies that the actions of management are not sufficient to create 100 percent behavior on the employee level in absence of results. A negative left-hand for $f_a\{\cdot\}$ implies that results are not sufficient to generate 100 percent behavior in absence of management support. Third, the s-shape represents the assumption that near the left and right limits, small changes in results and adequacy of management support do not necessarily have an impact on the behavior. That means, if there are no results and no support, small changes do not change the beliefs. Similarly, if there are excellent results and adequate support, small changes have also little impact. When

results and adequacy of support are somewhere in middle relative to its goals, then changes have a bigger impact on behavior.

The resource allocation decision of the service management is represented by the parameter x_n , the fraction of managements' support devoted to area n . The amount of resources allocated to dimension n , r_n , is equal to the product of the total number of resources available, R , and the allocation fraction. We observed in our intensive case studies that the management uses two pieces of information in forming their beliefs about the relative expectancies of success in the competing adoptions of different dimensions – the current improvement rate by each service improvement and the current resource requirement, q_n . The rationale for using productivity improvement is obvious: management wants to spend their time in service improvements in which they think the changes they introduce will be successful. Using resource requirements as an input for management's decision rule captures the observed phenomenon that service managers look to service workers how well things are going. Resource requests represent a simply proxy for the service improvement's assessment of its own effort. q_n is calculated through the following equation.

$$(12) \quad r_n = x_n R$$

$$(13) \quad q_n = r_n^* \left(\sum_{n=1}^N r_n^* \right)^{-1}$$

$$(14) \quad x_n = P_n^a q_n^b \left(\sum_{n=1}^N P_n^a q_n^b \right)^{-1}$$

To specify the decision rule, we use an US/(US+THEM) formulation (Kalish and Lilien 1986). This formulation is widely used in the latest studies of improvement programs. The “attractiveness” of each dimension is determined by weighting both the fractional resource requirement and the rate of improvement by exponents, denoted by \mathbf{a} and \mathbf{b} . The resource allocation to service improvement n , x_n , is the determined by equation (14). The equation calculates the attractiveness of dimension n as a fraction of the total attractiveness. If $\mathbf{a} = 0$ and $\mathbf{b} = 1$, then resources are allocated strictly according to need. If $\mathbf{a} > 0$, then the allocation will be biased towards the dimension showing more rapid improvements. The converse is true if $\mathbf{a} < 0$. Consistent with our reinforcement argument above as well as with the commonly voiced “successful change begins with results” policy, \mathbf{a} and \mathbf{b} , are chosen to represent a policy allocating more support to dimensions showing better results ($\mathbf{a}, \mathbf{b} > 0$). The commonly voiced

“successful change begins with results” policy is often found in the practitioner literature (Kotter 1995, Schaffer and Thompson 1992).

V.2.3 Market and competitor

We assume that our simulated company faces a single aggregate competitor. The competitor supplies products and offers services that compete directly with the simulated company. The market share depends on customer assessments of product attractiveness and perceived service quality compared to the competitor. The perceived service quality is the maximum level of service quality and communication. The service quality is determined by company’s structural adoptions. Similar to perceived service quality, service quality is defined as the maximum among the adoptions of the four structural dimensions. The market shares is determined using standard attractiveness or US/US+THEM formulation. This formulation implies that the total market is always split between the simulated company and its competitors. The attractiveness is determined by summing product attractiveness and service quality.

The size of the potential market is determined by number of service offerings. The number of service offerings is increased by new service introductions. The rate of new service introductions depends on the adoption of the service innovation process.

V.2 Analysis

With the specification complete, the formal model can be used to understand to dynamics of the transition process. We are able to show the implications of the integrative framework outlined above. The transition is started by introduce a step increase in B^* . All the other parameter are in the technical appendix. Figures 13 and 14 show the evolution of the degree of integration and contribution of services. The degree of integration is operationalized through the standard variation among the outlined structural, activity-oriented and behavioral dimensions. A standard variation of zero means the integration is on high level. At the beginning, the degree integration is quite high, because each dimension is equal to 1. Initially the degree of integration decreases sharply and leads to a decreasing contribution of services. After passing the minimum the increasing degree of integration causes an increasing contribution of services. There is a strong “worse before better effect” in the base case. After the “worse before better” effect, the configuration between the different dimensions gets more and more consistent and mutual reinforcing leading to a successful transition.

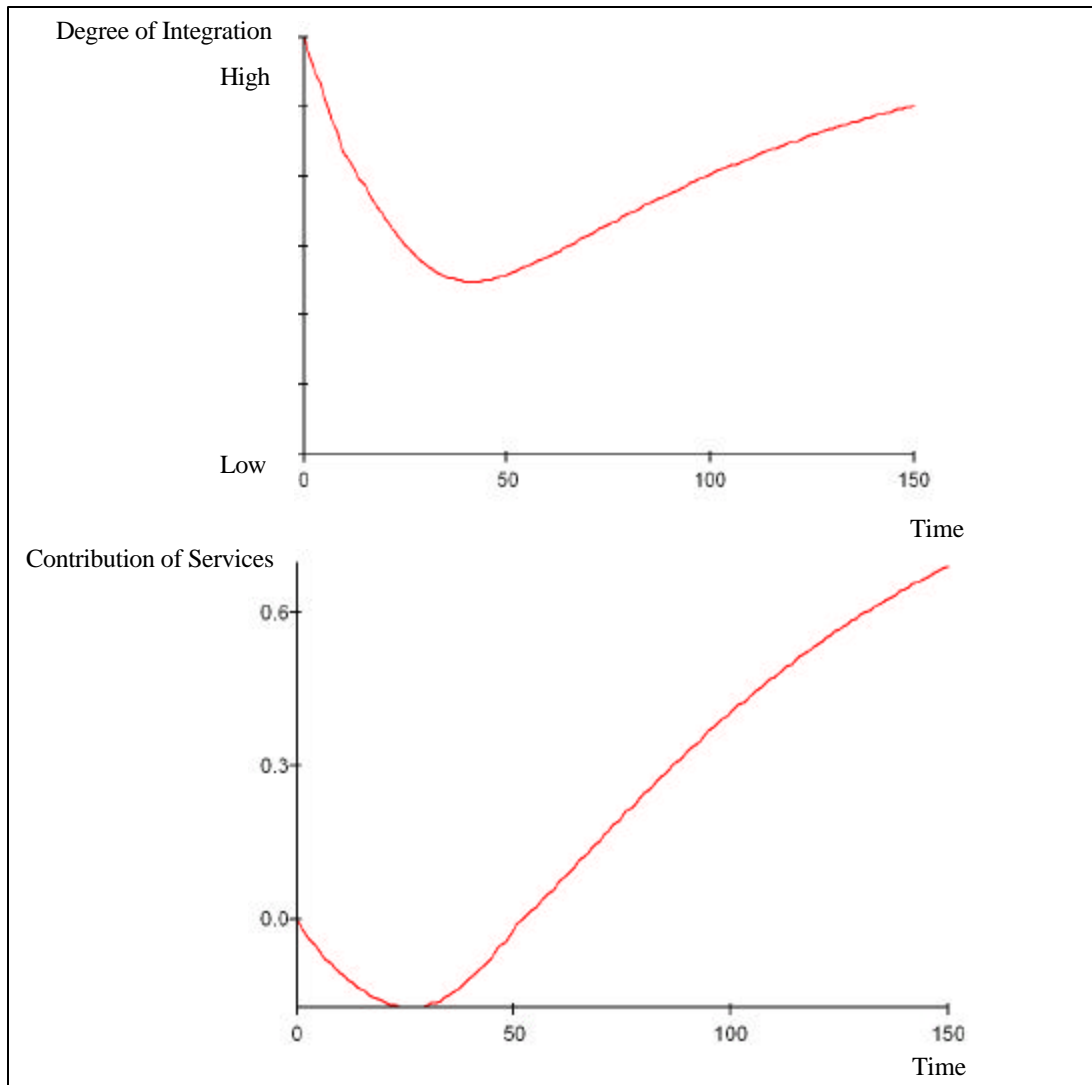


Figure 13 and 14: Degree of integration and contribution of services.ⁱⁱ

This base case shows one possible behavior mode generated by our integrative framework and formal model. The base case constitutes only one simulation run with a specific parameter set.

To show that the degree of integration among organizational structure, company's activities and behavior plays a key role in determining the success of the transition, one has to run a set of simulations.

Figure 15 shows a set of simulation results in which the degree of integration among structure, activities and behavior is different. This experiment can be interpreted as varying the degree of integration by using different parameters for the simulation. The results are presented in the form of three dimensional response surfaces. The vertical axis represents the outcome variable of interest (contribution of services). The horizontal axis represents time and the third axis that extends "into" the page captures the input variable being directly manipulated through different

degrees of integration. Reading from front to back along the input variable axis, any given line shows how the value of the output variable – contribution of services, at one specific time, changes in response to changes in the input variable. Viewing the resulting surface presents a dynamic view of how the evolution of the contribution of services is influenced by changes in the input variable (degree of integration). Figure 1 shows that the success of the transition depends critically on the degree of integration among structural, activity-oriented and behavioral adoptions. An higher degree of integration reduces the “worse before better” effect and increases the contribution of services. An high degree of integration helps to sustain the transition and leads to a successful transition process from product manufacturers into service providers. Our analysis provides some insights into the dynamics of the transition. First, it yields a more precise statement of the nature of the interaction among organizational structure, activities and behavior. Second, the analysis suggests that a principal failure mode in transitioning from product manufacturers into service providers, one that is not mentioned explicitly in existing theories, is the inability to engender an high degree of integration. If the dynamics described here are central to understanding the transition, then the question of “why do most transitions fail?” can be re-stated as “why do most transition processes fail to achieve an high degree of integration among organizational structure, activities and behavior?”.

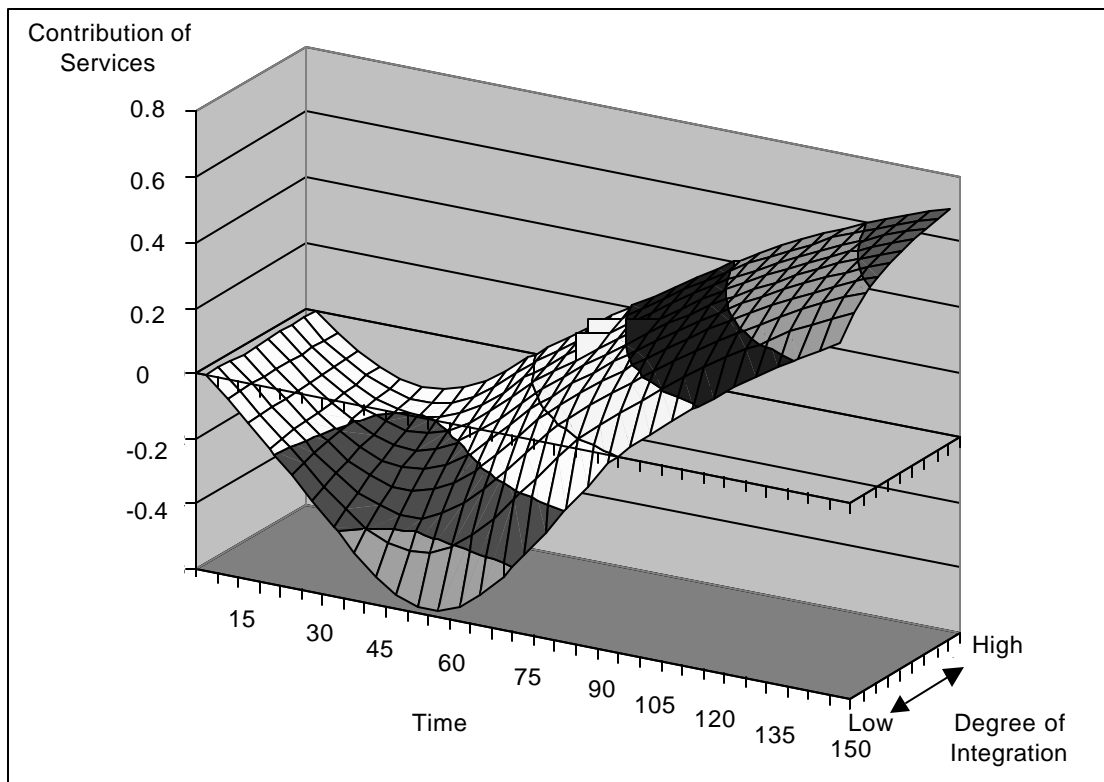


Figure 15: Response to changes in the degree of integration.

VI. Implications for researcher and practitioners

Our sample of case studies was small, but covering several industries. The case studies cover the whole transition line as well as the “service jungle”. We believe that our findings provide useful guidance for managers seeking to design a successful transition process. Our analysis and conclusion have an essential implication for both researcher and managers. For service management theorists, our integrative framework suggests that the designing and implementing the transition from product manufacturers to service providers is strongly influenced by the structural, activity-oriented and behavioral dimension. A complete theory of the transition requires an interdisciplinary theory that integrates service management and human decision making. Our analysis suggests that future studies and research has to explicitly consider these factors which influence the transition. Of course, our ideas presented here offer a complementary perspective to many of the existing ideas advocated by many practitioners.

Companies can push the transition by actively managing the feedback mechanism that limit the success. They must carefully plan and roll-out service improvements. In short, managers must become adept in understanding their organization as a dynamic system and in understanding the transition from product manufactures to service providers as a dynamic process.

The integrative framework from which our insight arises has limitations, of course. Most significant, the framework we propose represents an abstraction from the detail of real service and change management. We aggregate several factors into single structural, activity-oriented and behavioral dimensions. The myriad activities required to change the structural and activity-oriented dimensions are considered simply “improvements”. Nevertheless, while the model is exceedingly simple and captures only a small portion of the complexity of any real transition process, our findings capture an important set of dynamics that play a critical role in determining the success of the transition.

The most intriguing finding, however, was to realize that the success of the transition is mainly influenced by the degree of integration within each management profile as well as between the three management profiles. A successful transition process are characterized through the consistent configurations in each management profile. The consistent configuration is always on the outer circle. In case of inconsistent configurations, the transition process leads to the “service jungle”. Companies that do not want to move along the transition line should try to be on the inner circle. Overall, our management profiles provide a better navigational chart for managers facing the different challenges inherent in the transition process.

To help managers, the matrix in figure 2, 3 and 6 can be used as a decision support system. The decision support system helps to find the right configuration of the several dimensions in terms

of a coalescence. The coalescence guarantees sustainable improvement programs, leading to successful and sustainable transition processes. It supports companies to leave the trap of the “service jungle” and strengthens company’s competitive position through extended service offerings.

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ⁱ The most theorists assert that employees doing a job are the best-informed experts and should be responsible for identifying new service ideas or improvement opportunities for enhancing the service quality. This strategy leads to two advantages. On the one hand, employees already understand their processes. That reduces the time for data collection and implementation. On the other hand, employees have a strong interest in implementing improvement or new services they developed themselves (Deming, 1986).

ⁱⁱ The simulation is a shorter version of our formal model. The complete simulation model will be introduced, if the paper is accepted.