Service as the encounter point in an adaptive network: the Siemens-CP case

ABSTRACT

The purpose of this paper is to understand the role of Service as the framework where industrials customer and supplier companies develop over time and place the learning adaptive processes that support the network created; and also to highlight the relevance of knowledge, individual and in organizational structures, in industrial relationships, contributing to the findings of past research. The paper is based in a single case study and has both inductive and deductive characteristics. Most data is collected from semi-structured interviews on managers from CP-Siemens dyad, using both narratives inquiry technique and critical events. It is found that knowledge, as a resource for a mutual process of learning interaction and taking different forms over time between actors, is the main driver to the explanation of different business strategies of adaptive networks over time.

Keywords: Service; Relationships; Value; Adaptive networks

INTRODUCTION

The study focuses on the role of Service as the framework where industrials customer and supplier companies develop over time and place the learning adaptive processes that support the network created. Our purpose is to contribute to fill two gaps in the existing literature. First, the current perspective in service as a new logic is short in considering mutual interaction; and there are insufficient studies addressing adaptability in service relationships.

Service was present during last decades in the construction of a new paradigm and in this construction streams of thought started to emerge such as services marketing (Zeithaml et al., 1985) and industrial marketing and purchasing (Håkansson, 1987). In all these approaches interaction, relationships and value were present. More recently, Vargo and Lush (2004) propose a new logic, the s-d logic. Central to this new paradigm is the concept of value in business relationships. The use of interaction as a basis for value creation has changed the nature of the business environment (Prahalad & Ramaswamy, 2004) and played an important role within value network constellations (Håkansson & Snehota, 1995).

Adaptability and adaptation are interconnected. Lawrence and Lorsch (1967) found that integration and differentiation are opposing organizational forces that need to be balanced as environmental complexity increases. Thompson (1967), in the same path, recognized the need to maintain buffers between flexibility and stability, because organizations are simultaneously closed, rational, locked to uncertainty and opened to it, and suggested a structural decoupling of the organizational functions to deal with uncertainty and flexibility. Loose and tight coupling cannot be dissociated

in a complex organization and are complementary dimensions in the process of organizational adaptation and learning (Lynn, 2005). IMP researchers approached the learning process, particularly the relationship as a context for learning, in business networks (Håkansson and Johanson, 2001) using a decodified form of knowledge, known as tacit knowledge.

The aim of this paper is to discuss how adaptability (and adaptation) occurs over time in a long relationship between manufacturing firms, and the role of knowledge in the change from a rationality of products to a different one based on service. The paper highlights the relevance of organizational structures and human interaction in adaptive processes as a trigger for service. In order to contribute to this discussion, a research case study is presented on how the Portuguese railway industry, modeled as a dyadic relationship between two major actors, Siemens and CP, adapt through time, having as a mentor of the transition the Service. The remainder of the paper is divided into four sections. First, previous research in the relevant areas is discussed. The research design and methodology are then described. Subsequently the case and its discussion are presented. The paper concludes with the study implications as well as with suggestions for further research.

LITERATURE REVIEW

The service-dominant (S-D) logic, as an alternative to goods-dominant (G-D) logic (Vargo and Lusch, 2004), is a conceptual and thinking framework that allows managers and researchers to better understand business reality through a service-based lens. Here, market actors interact, adapt and collaborate for the competences and capabilities of the other party that renders service, and therefore this

logic service is defined as “the application of specialized competencies (skills and knowledge), through deeds, processes, and performances for the benefit of another entity or the entity itself” (Vargo & Lusch, 2004).

In S-D Logic goods, as services, still have a fundamental importance, but are considered in their role as vehicles for service delivery. Value in this notion is within the customers’ context, integrating and interacting with the customer resources as well as applying other resources. (Vargo et al., 2008) specify the primary nature of the customer as an operant resource in value creation process. Operant resources are often core competences or organizational processes and rely on people competences (skills and knowledge).

Ford (2011) recognizing that some divergences and convergences exist between IMP approach and S-D logic states that interdependencies and relationships are central to the comprehension of business markets and the units of analysis to be considered in their perspective are not individual actors, but processes that take places between them. Within dyads, at a network scale, reciprocal value creation is always determined by the beneficiary in relation to specific problems. In this sense value to the actors involved is always episodic and relational towards coping with their specific problems. Treading the same path, Ford and Mouzas (2010) developed a conceptualization of interacted service in business networks based on the IMP view of the business landscape that involve reciprocal problem-coping. Service is provided by actors in networking, interacting directly or not, in the relationships under conditions of uncertainty to resolve particular problems. The process of receiving and providing value through interactions is space and time specific within a particular relationship through a continuing cycle of

episodes and is likely to involve adaptation/adaptability aspects of the activities and resources of both actors and to the actors themselves.

Adaptation is embedded in interactions between actors in business markets and they are linked to a relationship (Brennan et al., 2003). There is some consensus in considering adaptation linked to behavioral or organizational modifications that take place in complex and long term cooperation at the individual, group or corporate level for individual partners (Brennan, 1998). Adaptation could be seen as a form of cooperation, where firms work together to pursue common goals following agreed paths or introducing offensive and defensive modifications in its performance to cope with relationships (Hagberg-Andersson, 2007). In most studies individual customers are considered in a closed inter-firm relationship, due to the existence of a small number of connections customers-suppliers vital for the business performance. Buyer-seller adaptations are considered as behavioral modifications made by one firm, at individual, group, or corporate level to cope with the specific needs of others (Turnbull et al., 1996), including themselves in a specific relationship (Brennan and Turnbull, 1995). Dyadic relationships tend to substantiate these interactions and specific organizational changes made in presence of a specific environment (Brennan et al., 2003). This does not mean that there isn't networking among and within these organizations, but only that the interaction between the two is crucial for the changes detected. If there are other relationships structuring the changes to be contemplated new dyads must be added. This is the case of a triadic approach, where there is a need for analyzing each of three dyadic relationships in the context of the other two (Holma, 2008). In the case that more actors are added a network environment must be considered (Hagberg-Andersson & Grønhaug, 2010).

Jahre and Fabbe-Costes (2005) considered adaptation as an integration process to more efficiency and adaptability as synonyms of flexibility, to anticipate and adapt to future changes. In this sense, adaptability is concerned both with the dynamics of the relationship in relation to the future and with how strongly bonded connections can be loosened to support adjustments in its relations (Andersson, 1992). The notion of systems loose coupling (Glassman, 1973), based on the work of Ashby (1956) about systemic diversity, was introduced in organizational studies by Weick (1976) with the concept of loosely coupled systems opposed to the idea of an integrated mechanism. Loose coupling is due to causal indeterminacy and fragmentation of both the external and internal environment. It combines concepts of connection and autonomy recurrent between organizations and their environments in a way that coupling is concerned with stability hindering the interaction with external forces, while looseness produces flexibility for opening these forces outside of it (Orton & Weick, 1990).

This takes us to the concept of organizational learning as a mean to generate value in relationships where suppliers cope with customer's problems and reciprocally. A learning organization, as an organization involved in deliberate efforts to improve learning, is one that is able to creating, acquiring, transferring knowledge and modifying its behavior to reflect new knowledge and insights (Garvin, 1993) and therefore is more flexible, adaptable and proactive. Cyert and March (1963), probably the first to use the concept, view the organizations as adaptive systems, which link their behavior through routines, norms and technologies (Levitt & March, 1988).

Therefore knowledge, in this sense, is always subjective since it is related to human actions in a specific context, but

is also explicit through formal codes in a way that allows communication and sharing. Knowledge could be described as two complementary and interrelated dimensions. Both tacit knowledge and explicit knowledge are interconnected into each other (Nonaka and Takeuchi, 1995) and in synthesis knowledge creation in an organization is concerned with transforming individuals' skills or knowledge into the knowledge embedded in the organization.

Following this rationale, it is the individuals who will acquire and process tacit knowledge and in a strict sense tacit and explicit knowledge are converted only by individuals in a social process to a different type or level of individual, group, organization or environment knowledge from which a new form of knowledge is created. The role of the organization is to provide the context for the social interaction since knowledge is created through interactions between individuals. This concept of interaction is close to the business relationships reference used in industrial networks approach (Håkansson and Snehota, 1995) as a mutual and oriented interaction between two or more actors in a network oriented to a commitment in achieving a common goal.

In the process of knowledge creation through inter-firm interaction Corno, Reinmoeller and Nonaka (1999) suggested a framework where different ways of sharing knowledge take place, if we take into account the different types of inter-firm relationships. These interactions could be analyzed looking to the way on how knowledge is shared between firms in a network. In this sense the authors suggested three different types of relationships: initiation; encounter; and intimacy. At the first level relationships require explicit knowledge since the interaction is circumscribed to occasional and unstable process of

exchange. In the encounter level, collaboration and dialog are needed to understand tacit knowledge and transform it into explicit knowledge. The last level is concerned with trust and commitment as a result of common experiences and tacit knowledge must be shared.

Using this framework we can suggest that after an initial phase where relationships are not stable and continuous with a frequent switch of partners, interactions can reach the encounter level when the actors try to understand the common tacit knowledge and to make this knowledge explicit for future reciprocal use. At this stage adaptability processes could happen more frequently due to the need to open the internal systems to the exterior influences strengthening trust, dialog and collaboration in a specific relationship in order to internalize new and external knowledge. On the other hand, intimacy stage represents a deeper level of interaction where a more cognitive partnership is established. In order to achieve stability and continuity in the relationship adaptation process are needed.

Ford (2011) recognizing that some divergences and convergences exist between IMP approach and S-D logic, states that interdependencies and relationships are central to the comprehension of business markets. In his perspective the units of analysis to be considered are not individual actors, but processes that take place between them, within dyads at a network scale in reciprocal value creation, which is always determined by the beneficiary in relation to specific problems. In this sense value to the actors involved is always episodic and relational towards coping with their specific problems

Treading the same path Ford and Mouzas (2010) developed a conceptualization of interacted service in business networks based on the IMP view of the business landscape

that involve reciprocal problem-coping. Service is provided by actors in networking, interacting directly or not, in the relationships under conditions of uncertainty to solve particular problems. The process of receiving and providing value through interactions is space and time specific within a particular relationship through a continuing cycle of episodes and is likely to involve adaptation/adaptability.

RESEARCH DESIGN AND METHODOLOGY

The research is based in a single case study. The study has both inductive and deductive characteristics; a combination of theoretical and empirical insights is justified to make sense of the empirical realities, since the researchers had no control over the narratives considered and the study reveals complex configurations of events and structures embedded in temporal contexts (Dubois and Araujo, 2007).

Fundamental interdependencies in Portuguese railway industry are contextualized in Siemens-CP dyad. The analysis of the dyad interaction requires the distinction between the temporal contexts that have occurred over time in the relationship. For each time interval the context is addressed through a particular episode of interaction and the sequence is guaranteed by the connection between past and future episodes. The research adapted an adjusted interaction model developed by Jahre et al. (2006), grounded on past IMP studies (figure 1).

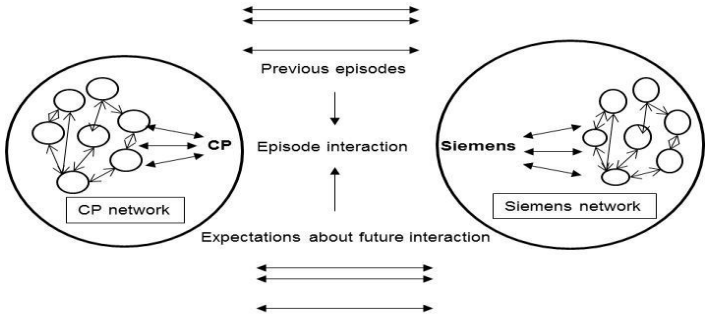

Figure1 - interaction model

The paper appeals to this model, considering each episode as a supply order/contract for rolling stock. A contract for supply railway rolling stock is a 3-4 years' time framed complex event. The data was collected on the three contracts (Table 1) involving the customer and the supplier networks from the 1990's to the present.

Table 1 – Events

Episode 1 (EI)	Episode 2 (EII)	Episode 3 (EIII)
CP5600 Elec. Locom. Siemens-Kauss Maffei, Ger.-Port. 1991/3	UME3400 - Bombardier Electric Multiple. Unit, Portugal, 2001/2	CP4700 - Electric Locomotive Siemens, Ger.-Portugal, 2006/9

Understandingg strategic action in the railway manufacturing industry is of major importance due to politic and economic impacts. Local industries network are defied by global players with a growing pressure on decision makers, consultants and researchers to better define the grounded rules that support feasible economic approaches shaping the industry structure.

The focal dyad selected represents more than ninety percent of the product development effort for the Portuguese railway freight business. The relationship is long-term and project-oriented and focused in tree projects that provide the empirical boundaries in the study. These contextual elements provided a distinctive boundaries frame in which the theoretical interests are studied.

The empirical data was collected during 2009 (second semester) through workshops, interviews (17 semi-structured interviews), observation and participation in business meetings. A specific workshop was held with industry experts to confirm the study boundaries and scope and define the critical events that shaped relationship development within the industry. The respondents, from both sides of the dyad, were selected based on the role they had in relation to the critical events. An interview guide was developed and tested before starting the interviews process by listening to industry experts. The emphasis was placed on narrative inquiry and critical incident techniques in order to generate the empirical material.

The respondents were introduced to the themes preferably near their working environment. The answers were coded to allow some confidentiality and later aggregated in resuming tables that represent different dimensions of dyadic relationship. The research was also presented in national industry seminars and workshops with railway experts to validate by triangulation the research and to reassess or expand specific issues.

THE CASE AND ITS DISCUSSION

The railway manufacturing industry has undergone, during the last decades, a globalization process of concentration with a clear trend for train standardization on family

products. This process of concentration generated less than five European players (OEM), specialized on the integration of systems and subsystems to their own rolling stock. Industry evolution in the last two decades centred on developing new relationships and meeting performance and organizational requirements to serve its customers. Those changes were driven by European Directives for railway. In the early nineties these directives were focused on stimulating market opening and prompted the railways to concentrate more on competitiveness, allowing new players to enter the railway market. Railway legislation was issued several "packages", first reinforcing the early legislation to improve service reliability, followed by interoperability and security concerns norms, and by 2007 regulated human resource competence certification and service quality indicators were introduced.

The story behaves three episodes, each of them conditioned by a specific railway rolling stock (locomotive) contract supply in a time span of almost twenty years, between 1991 and 2010. These events are lifetime contracts, including not only the purchase of the equipment but also maintenance, repair and refurbishing agreements between the supplier and customer networks over a very long period. Until the 90's the Portuguese rolling stock industry developed product technology based on trade agreements for technology and structural engineering process transfer. In the early 90s most of the effort within the relationship between Siemens and CP was focused on delivering competences developing a technical infrastructure oriented to the design and construction of the product in a local Portuguese facility. Engineering teams from both sides were assigned to the project in an attempt to adopt a new technology in an interacted learning process, working together in mixed teams either in Portugal or in Germany.

All most parts and systems are made in house to the Portuguese market which was protected from concurrence.

By 1994, following the ongoing industry concentration process, the Portuguese local manufacturing company was bought by the Swedish ABB that later, by 1996, joined Daimler Benz constituting the Adtranz group. The group strategic goal was to use the Portuguese manufacturing facility to establish a regional specific unit to a specialized product family to compete in the European market. Once again, the need to adapt the CP-Siemens relationship to these new challenges was considered, and an ambitious development program put in practice, based on the vision that all the strategic units would have an opportunity to upgrade their competences and become self-sufficient or, in alternative, face closure. This program included the admission of tens of engineers from different specialties and the transference of outside expertise (specialists from other units) to the project and in particular to Portuguese facility. A great effort has been made in rationalizing facilities and train-products, but also in other systems. This was not followed by the creation of a firm culture and consistent management for the entire project. By 2001 a global partner was needed and new changes emerged. Bombardier bought the Adtranz group.

Bombardier's involvement in the contract for the locomotive UME3400 (second episode), before a concurrent of the CP-Siemens network, was intended to respond to local needs, but also to generate a simple and modular product-platform adaptable to compete in European and global markets. After 2000 most of the effort within the relationship between Siemens and CP was focused on developing a technical infrastructure supported in competences, individual and organizational, to allow them to deliver services (train assembly / maintenance /

repairing and rehabilitation) to serve final customer and UE reliability concerns, moving from a product centered relationship to a more valued services centered posture. At that time it became clear in the relationship, that the business generated by the services attached to the train lifetime was much more interesting than the train construction (initial contract) and should be explored in the market. The new competitive environment established by EU directives strengthened this bet and the UME 3400 Siemens/Bombardier syndicate was an example of this effort. However the rolling stock tenders became extremely competitive and in 2004 the Bombardier Portuguese assembly unit was closed.

In the second half of the previous decade the partners of the dyad guided their relationship for the provision of services for its products, and products from other manufacturing companies, embracing the broader market of assemblage, maintenance, repair, rehabilitation and certification. The third event analyzed was dominated by providing a larger service package where the product (LE 4700) contracted in 2006 was just one component. The partners became experts on a range of services, seeking to embrace design skills with services solutions, integrating also resources from new partners dedicated to the standardization and certification in different rail infrastructures. From the CP side some of the engineering competences developed in the past are now outsourced, as in Siemens group, in several small consultant companies forming a diverse network of suppliers.

After 2000 the enlargement of the services portfolio was also concerned with the costs optimization in the industry. The dyad performed a number of minor projects, parallel to the contracts analyzed in the events, concerning the extension of the vehicles life, the renovation of their

interiors, the increase of their performance and ensuring the product reliability through more sophisticated repair and maintenance activities. These practices, using resources from both sides of the dyad become, in the late 90s, a very significant source of income and a way to expand the customer existing equipment life while avoiding the need for the train operators to purchase new vehicles. The collaborative knowledge-based and skills established enabled Siemens to lengthen the relationship based on existing products avoiding competition in new tenders, also making possible the development of competence centers near the customer. This reciprocity, with the partners changing roles, alternating their position as customers or suppliers, was important not only for the existing contracts but also to new business adventure, particularly relevant contracts for the provision of services in different European countries (e.g. Switzerland and England). This ability to capture more and different actors and resources on the value networks of both partners to different situations is a demonstration of agility to face different environments and problems.

The case presented here emerges from a long relationship between the two dyad constitutive firms that add around themselves several other organizations in business networks. Adaptability was supported by knowledge and learning processes generated in interaction by engineering teams from the two companies. Different competences are created, changing in space and time, through the relationship in order to guarantee the due flexibility to cope whit diverse supplier and customer problems. Knowledge was used to guarantee trust and commitment as structural elements that maintain relationship integrity under external competing pressure. Actors positioning turned significantly more flexible between EI and EIII events impacting organizational structure since the partners accepted to

exchange roles in service provision with sensible benefits. The supplier got involved in maintenance services, accepting reliability based contracts in behalf of customer performance; and the customer assumed short term product assembly activities, allowing supplier access to shared industrial resources in a more flexible organizational structure where systems can be considered progressively less coupled.

Clark (1983), state that the loosely coupled systems are an inevitable consequence of knowledge. Therefore, we can state that knowledge, as a resource for a mutual process of learning interaction, could reflect the processes of adaptability (and adaptation) in a relationship over time. But knowledge, as competences and skills, could be considered an operant resource used in interactions to provide value. A service-centered view identifies operant resources as the key to obtaining competitive advantage, and according to this view the employee competences are operant resources, since they are service providers in the value creation process for the beneficiary (Vargo & Lusch, 2004). But the service performed by each part became a resource for the other in their interactions and was dependent of the way of the actor's perception in each episode cope with its specific problems. The entrances and outs of other actors during the three events suggest that the service should be seen as an interacted service and as the encounter point in this adaptive network.

CONCLUSION AND FUTURE RESEARCH

This paper contributes to the research on business relationships using the concept of service as the encounter point in an adaptive network in two different ways. Firstly, by suggesting that service concept, as we used it, is embedded in competence (individual knowledge) and

organization (firm aggregated knowledge) issues that evolve within interrelated processes of continuous adaptation and adaptability. Secondly, by proposing that such processes are tools to shape service through particular relationships.

The use of narratives to form the story (case) was found to be most useful in understanding the complex phenomenon in study. The research presents a number of limitations mainly due to the fact that data were collected from only one dyad (two companies) and not through networks embedding these relationships. As such, more in-depth studies in a variety of companies in different industries are required. It would be interesting to check whether similar assumptions would be possible using social groups as information sources, that evolve within the relationships considered.

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