Inter-partner learning in global supply chains: lessons from NOVO Nordisk

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Abstract

The interdependent forces of global competition and technological development have fundamentally changed the way in which firms define the boundaries of their own activities and those that are left to subcontractors. Joint skill development and inter-partner learning have become important in the global sourcing policies of firms. The purpose of the present paper is to develop a conceptual model for understanding inter-partner learning processes in international subcontractor relationships. We see this as a process of developing shared skills. Furthermore, we demonstrate how inter-partner diversity impedes this process. Because of a lack of previous research in this area, a reconstructive approach is taken, which involves extending the conceptual framework through a case study. © 2000 Elsevier Science Ltd. All rights reserved.

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1. Introduction

The interdependent forces of global competition and technological development have fundamentally changed the way in which firms define the boundaries of their own activities and those that are left to subcontractors. Joint skill development and inter-partner learning have become important in the marketing and sourcing policies of subcontracted goods.

In the new realities of the economy, outsourcing practices are undergoing substantial changes. Firms realize that they cannot efficiently keep pace with the growing number of relevant technical fields. In order to survive in the race for innovation and technological flexibility, firms choose to concentrate on core competencies and collaborate with external partners in order to develop shared technological capabilities (Imai and Baba, 1989; Nooteboom, 1992). Strategic collaboration in developing new capabilities means pooling of resources. This may lever resource economies of scale and scope which otherwise may be unattainable for the partners, individually.

Also, sourcing activities are becoming increasingly global in scope. In search of competitive advantage vis-à-vis local rivals, contractors increasingly look for excellent subcontractors beyond their domestic markets. Hence, knowledge-intensive international subcontracting has become an important part of the firms’ sourcing activities (Andersen and Christensen, 1998).

Strategic collaboration with subcontractors may be one way of enhancing risk-sharing and providing synergy effects through the combination of contractors and subcontractors’ distinctive skills. The virtues of organizational partnering in the international marketplace have been outlined in the literature (e.g., Kanter, 1994; Burton, 1995). However, processes of inter-organizational learning also entail increase in social complexity (Adler and Graham, 1989). Adding an international dimension only magnifies the differences as more sources of diversity are introduced (e.g., cultural and spatial related). Thus alliances between organizations often fail because of inter-partner diversity (Bleeke and Ernst, 1991; Fedor and Werther, 1996; Parkhe, 1991).

The purpose of the present contribution is to develop a model for understanding the processes influencing inter-partner learning in international subcontractor relationships. Our model, views shared skill development as a crucial factor in understanding the management of this
process. Moreover, we seek to demonstrate how inter-partner diversity impedes this process. We also discuss a number of mechanisms through which the partners may cope with problems of inter-partner diversity in collaborative learning. Because of a lack of previous research in this area, a reconstructive approach is taken toward this issue. Instead of interpretative approaches, we follow a positivistic approach to field research that includes both literature studies and field observations. We use an argumentative interaction between field studies and existing theory to reconstruct theory (Burawoy, 1991). We develop a conceptual framework and subsequently use a pilot case study involving a Danish MNC and a Japanese subcontractor in order to further examine the implications of the model.

2. The co-alignment of skills in international subcontractor relationships

Similar to other industrial markets, the market for subcontracted goods covers a wide range of different exchange situations, which may be described by the aid of a buyer–supplier relationship spectrum (Webster, 1992). At one end of the spectrum, subcontracted goods may be highly standardized, where decisions can be guided almost purely by the aid of price signals. However, as contractors to a large extent depend on the complementary skills of subcontractors, marketing and purchasing becomes inseparable from the exchange of information, services, expertise, etc. involving multi-departmental interaction across the buyer–seller interface and mutual adaptation of technologies, organizational practices, etc. (Ford, 1980). Hence, exchange becomes dependent on previous exchange episodes, and may be described as an exchange relationship following its own momentum rather than guided by market mechanisms (Johanson and Mattson, 1988). This process may be described as the alignment of exchange activities in order to achieve efficient coordination of exchange. In addition, comes the complexity of sharing and developing knowledge between organizations (March 1996). This is the central issue in the Novo Nordisk case: as not all types of knowledge are equally transferrable, there is a need for developing practices for sharing knowledge, while simultaneously controlling the knowledge flow among organizations. It has been described as a complex and evolutionary process of relationship-building, where gradual commitment of resources and the development of mutual trust are steered by norms of reciprocity (Dwyer et al., 1987; Ford, 1980).

When exchange relationships are developed across both organizational and national boundaries, complexity is magnified. Hence, international exchange of subcontracted goods involving multiple business environments complicates communication. Markets for subcontracted goods are particularly vulnerable to increased psychic distance in the buyer–seller relationship (Andersen, 1999).

Ideally, the alignment of exchange activities in international subcontractor relationships can be described as the development of a shared understanding between the partners. This process of mutual co-alignment of contractors and subcontractors has been described as the development of relation-specific skills (Asanuma, 1989). Parallel to the concept of organizational routines, relation-specific skills ascribe habitual patterns of interaction to specific exchange situations which are formed and gradually extended. We describe this process as one of building shared skills. These skills become idiosyncratically related to the specific partnership. As such, they are mutual investments directed at handling collaborative efforts efficiently.

Several contributions on the collaborative efforts of firms have underlined that inter-organizational coordination of capabilities may be organized more or less successfully and that the outcome of such activities often depends on the initial conditions for these processes (Teece, 1977; Von Hippel, 1994). Firms vary in their ability to utilize supplied skills of partners and in developing incentive structures for learning to collaborate efficiently. In the following section we will develop a model for understanding these differences, based on a systems perspective of organization. This perspective has previously found use when describing relationships between organizations (Astley and Van de Ven, 1983). It views an organization as a social system, which can be understood through its initial exogenous conditions, its organizational structure and processes and their outcomes (Van de Ven, 1976). These dimensions of organization may be discussed in the following order — organization’s initial conditions, the processes of organization; and the outcomes (Ruekert and Walker, 1987). The perspective holds that there are contingent relationships between dimensions. Initial conditions are expected to influence processes as well as outcomes whereas processes may influence particular outcomes. In turn feedback processes may lead to changes in all dimensions of the conceptual framework. There is no optimal ordering of the dimensions. As initial conditions may differ, diverging processes and outcomes are expected. However, the model holds a deterministic view on organization, viewing processes and outcomes as contingent on initial factors.

We have developed our model of subcontractor relationships consistent with the systems view depicted above. The outcome considered here is the development of shared skills. The model considers two basic aspects which may affect this outcome. Inter-partner differences are the basic initial condition which may affect the development of shared skills. Diversity may be understood in terms of several dimensions. We have chosen to focus on organizational, strategic and cultural diversity. The
process aspect involves the subcontractor’s and the contractor’s ability to absorb and communicate knowledge across organizational boundaries. Fig. 1 portrays our basic model.

In the sections to follow, each of the dimensions of this model and the causal relationships between them are further elaborated and discussed. In order to improve the consistency of this presentation, we begin by outlining key aspects of the outcome dimension and then follow it with a discussion on process and situational dimensions.

3. Outcome dimensions: The development of shared skills

Inter-organizational learning processes are situated in an organizational “vacuum”, where the division of responsibilities and the coordination of work is subject to processes of collaboration rather than being directed under principles of hierarchy or market governance. The development of mutual trust has been seen as the governing principle of inter-organizational coordination (Dwyer et al., 1987). However, we will argue that the development of shared skills also calls for an organizational design which supports shared responsibility in solving specific tasks. We will address these issues in the following two sections.

3.1. Trust-building in the shared skill managing process

The development of shared skills depends on the mutual commitment of the actors. According to social exchange theory, commitment relates to the expected gain from participating in developing shared skills, which simply may be expressed in the relationship between expected benefits and expected costs. If the benefits are expected to be greater than the costs (and other comparative investments) firms are willing to commit resources to the development of shared skills. Trust between partners have been identified as an important element in collaborative relationships (Beamish, 1985). Decision makers therefore partly, or completely base their collaborative decisions on their trust of the partner (Ddogdson, 1993). However, it is difficult to know in advance the benefits and costs associated with the development of shared skills. As the trustworthiness of a potential partner is circumscribed in the beginning, firms do not commit large resources at one go, but engage in tit-for-tat games where trust gradually builds up and a growing portion of resources are invested in the relationship, forming a set of ties between the firms. Critical incidents play a pivotal role in this process. Thus, collaborative partners are constantly evaluated according to the firms’ expectations and perceptions of reciprocity and fairness (Dwyer et al., 1987).

3.2. Organizing cross-skill development processes and division of work

The development of shared skills concerns the co-alignment of the skills of the participating firms by transferring knowledge and committing resources into the joined effort. At least two aspects are important to consider. First, some types of knowledge are more “sticky” than other types depending on their type and degree of codification and, therefore are more costly to transfer into the relationship (Andersen, 1999). Secondly, depending on their degree of codification, some types of knowledge are more difficult to imitate by competitors and, therefore, are more important for developing a differential advantage for the firm.

One important distinction concerns the tacit versus codified knowledge continua. Tacit knowledge is partly inaccessible to human consciousness (Polanyi, 1962). What is known of as “giftedness”, “expertise” or the hunches that craftsmen experience through many years in their profession is often based on this type of knowledge. Thus, tacit knowledge is only transferrable between individuals by example or “learning by doing”. Socio-cognitive communities, such as professions, are often characterized by this type of knowledge development practices, as for instance in the Danish wind turbine industry (Karnoe, 1996).

Although all knowledge in principle generates from individual experience, some forms of knowledge can be made accessible by being codified as commutable rules and procedures. Transferring knowledge from a subjective or inter-subjective level to an explicit and generally accessible level has been labelled “externalization” (Nonaka and Takeuchi, 1995). Externalized knowledge gains in utilization as more people easily can gain access on how to do things. However, by gaining utility, knowledge also loses in scarcity and economic significance.
Take as an example the typographic profession. Along with the development of computer software for setting up text and generating pre-press versions of printed material, the skills of typographers have become accessible to a large community. Consequently, the importance of typography as a craft has decreased.

Although the development of shared skills presupposes some kind of collaboration, competitive elements may be involved as well, as the partners do not necessarily share long-term interests. Developing shared skills includes to some degree the transfer of the firm’s core skills. Codification of skills which previously had a tacit form means that these skills can be accessed by a wider community. This also means that the mutual dependency of core and supplied skills decreases over time. Firms may communicate these skills to new partners more swiftly or internalize these activities. This has been discussed as the “hollowing-out” effect of firms, in relation to, for instance, international strategic alliances (Hamel, 1991). It is acknowledged that partners differ in their ability to learn from each other and in their ability to exclude strategically important knowledge from each other. Therefore, an important aspect of developing shared skills also relates to the demarcation of the collaborative scope and in controlling the knowledge flows in subcontractor partnerships in order to make sure that no unintended knowledge spillover effects take place.

Activities may be more or less partitioned (Von Hippel, 1990). In some cases the product architecture is highly interconnected in systems, where the single components are not easily separable. For instance, the product architecture of fighter jets or mainframe computers calls for integral designs, where alterations in each individual component must carefully be coordinated with all the other components. In other product architectures, such as bicycles, components follow industrial standards and can be decomposed relatively simply. Contingent with the complexity of product architecture, process tasks may be more or less specified: in some cases the degree of specification is high, suggesting that a high degree of codifiable knowledge is involved. This is the case when subcontracted components are manufactured based on the customers’ specifications. In these cases, the buying firm is relatively independent of the subcontractor firm, as it can relatively easily inform a substitute subcontractor of the terms under which it wishes a specific activity to be performed. This is for instance the case with IKEA in relation to its subcontractors of furniture parts (Kinch, 1984).

In other cases, the contractor is less explicit in specifying the nature of the components. Thus, the contractor only specifies a particular problem whereas the development of a component’s specifications is left to the subcontractor partly or completely. In these cases, subcontractors add to the value generating process not only by supplementing production capacity but also by applying their skills in the development process. The overall level of explicit information is low, which suggests the presence of a high degree of uncoded knowledge. Contractors may have little knowledge concerning the actual procedures carried out by the subcontractor in performing the activity. In these cases contractors depend more strongly on a particular subcontractor, as it is less easy to transfer the resources embedded in specifying the problem to a new subcontractor. Also, the availability of subcontractors with an equal skill profile will tend to be relatively scarce. For instance, Ericsson, has little knowledge concerning data exchange between mainframe computers building on different hardware platforms. Hence, Ericsson uses the Danish firm ICCC as a subcontractor not only for data exchange protocols but also in cases of critical customer service (Andersen, 1995).

Parallel to the resource-dependency approach, boundary management strategies can be seen as ways to increase the bargaining power toward external providers of critical resources (Pfeffer and Salancik, 1978). A high degree of input specification may strengthen the strategic independence of the contractor, decreasing the costs associated with transferring and implementing these specifications to another subcontractor. A low degree of input specification, on the other hand, entails a substantial degree of development costs which are proprietary to the particular contractor. The latter approach may shift the power dependency in favour of the subcontractor.

4. Process and structural dimensions: The skill boundary interface of the single firm

Strongly related to the inter-organizational issues discussed in the previous section are the intra-organizational issues of inter-partner learning. Firms differ in their ability to learn for several reasons. In some cases the rationale for learning is limited, and scholars may even suggest that learning is antithetical to the organization concept as its very rationale is to structure a fairly stable relationship between tasks and responsibilities in order to produce a specific economically feasible output (Weick, 1991). Learning means exchanging old types of behaviour with new ones, which is a costly and resource consuming process. Effective accumulation of knowledge in one period will permit a more efficient accumulation in the next (Cohen and Levinthal, 1990). Moreover, as learning includes the break up of old routines and the introduction of new ones, learning is combined with phases of uncertainty and volatility. Constant learning may be equal to non-stability where any rationalization of economic performance is impossible. Hence, both learning and non-learning may be seen as important for any organization.

Organizing learning processes not only calls for an efficient regime of collaboration between the firms, but
also for efficient procedures for managing the knowledge generation and diffusion of knowledge inside the organization. We contend that this process depends on the firms’ ability to absorb and communicate knowledge. In the following paragraphs, these two aspects of learning will be further elaborated.

One approach to the firms’ ability to learn, concerns its absorptive capacity regarding its ability to recognize the value of new information, assimilating it, and applying it to commercial ends (Cohen and Levinthal, 1990). This ability is believed to be strongly related to the established knowledge of the firm. Cognitive research shows that knowledge develops through categorizations. The breadth of knowledge categories into which knowledge is categorized, the differentiation of these categories, and the linkages across them permit individuals to make sense of and consequently acquire new knowledge (cf. Cohen and Levinthal, 1990).

The principles of individual learning may be related to organizations as well. Organizational memory has been labelled as routines (Nelson and Winter, 1982). Organizations acquire new routines by developing coordinated activity links among individuals, units, and functional departments for performing specific activities. Once acquired, the routine becomes a skill — an activity mastered by the organization for recurrently transforming specific inputs into a desired output. Basically, however, all organizational learning stems from individual experience. The essential questions are, therefore, how organizations organize individual’s information exchange with the internal as well as with the external environment of the firm, and how new knowledge is distributed within the organization. Both questions relate to the structure of the organization, i.e., the dispersion of tasks and responsibilities.

Some inter-organizational forms are seen as more efficient in absorbing and distributing knowledge than others (Kumar and Nti, 1998). The ability to transmit knowledge in any social systems depends on two aspects, (1) whether some mechanism exists for summing up individual learning or expertise and externalizing this in order to make it codifiable and commutable, and (2) whether some mechanisms support the transfer of knowledge between units and assimilate this knowledge within already existing knowledge (Nonaka and Takeuchi, 1995).

5. Situational dimensions: inter-firm diversity

In the previous sections, we have outlined the critical aspects of developing shared skills in subcontractor relationships. As it is obvious from this discussion, the development of shared skills is a socially complex process involving the management of both inter-organizational and intra-organizational boundaries. Adding substantially to this complexity is the fact that both contractors and subcontractors differ in terms of business scope, strategic missions, etc. Thus, subcontractors and contractors may differ sharply along several fundamental dimensions of their organizational profiles. In an increasing number of cases subcontractor relationships cross national borders as well, adding cultural differences to the set of factors that may accentuate inter-firm differences. We expect these differences to affect the management of inter-organizational and also of intra-organizational boundaries.

5.1. Organizational diversity

Subcontractors and contractors may differ along several key organizational dimensions crucial to their cooperative ability. One such dimension is the ideologies and values characterizing a firm. Differences in cultural norms and values are known to cause trouble in strategic alliances (Bleeke and Ernst, 1991). For instance, organizations may stress control measures differently, each seeing the partner as careless with respect to a particular aspect of control (Hofstede, 1981). Also, inter-organizational differences in attitudes toward work and career profiles may severely hamper collaborative efforts. Inter-organizational diversity may also arise from differences in managerial styles (Samli et al., 1996), negotiating and decision-making norms (Weiss, 1987; Pucik, 1988), and planning cycles (Ohmae, 1989). Differences in organizational culture influences both the formation of shared skills as well as the management of skill boundaries. The development of expectation levels and confidence in the partner is often shaped by different cultural norms. Hence, words and deeds intended to signal trust may not be interpreted as such by the receiver of these signals. Also, organizations differ in respect to knowledge receptivity and transparency (Hamel, 1991).

Finally, differences in organizational structure and processes may disable processes of cross-skill development. Organizational structure may play an important role regarding the ability to manage processes of knowledge absorption as well as knowledge distribution. For instance, rigid internal division of responsibilities within the subcontract or contractor’s organization may limit the collaborative processes in the subcontractor relationship by including sales and purchasing divisions only. Knowledge acquired from outside the organization can be used only to the extent that it is distributed and interpreted within the organization (Jelinek, 1995). Therefore, both subcontractors and contractors need some form of transmission mechanism for scattering knowledge from the organizational functions close to the organizational perimeter further into the organization. Also, rigid, closed, and mechanistic organization forms may collide with more organic and open-ended organizational forms, when it comes to trust-building and the division of work.
5.2. Strategic diversity

Differences in strategic directions constitute another source of inter-organizational diversity. Strategic asymmetries in inter-firm collaboration may include temporal differences in strategic horizons (long versus short-term strategic orientation), differences in business scope or strategic importance, etc. (Harrigan, 1988). Divergent strategic missions may manifest themselves in the division of work between subcontractors and contractors. Often contractors may want to protect specific development activities, as the contractor is particularly vulnerable in respect to imitations and competitive out-learning of a particular technology. Also divergence may be apparent when it comes to managing the skill boundary. Differences in strategic agendas of particular business units may limit the willingness to share resources or allow knowledge transfer between contractors and subcontractors.

The strategic importance emphasized by top management also affects shared skill development, both indirectly through affecting the resources devoted to the development of shared skills and directly via signalling trusting or opportunistic behaviour. As MNCs usually are complex organizations, the strategic intent of collaborating with a subcontractor may be perceived differently among various parts of the organization. Planning horizons may differ between HQ and operating units (Pucik, 1988). Also, boundary spanning units, close to the collaborative perimeter may not be well informed concerning top management’s true intentions regarding the collaborative activity, or may view the gains from collaboration differently due to differences in perspective.

If management does not prioritize inter-firm learning as a part of their overall strategy, they may not be able to adapt to changes in collaborative roles and circumstances. Without constant co-alignment and adjustment to new circumstances, the division of work and sharing of responsibilities between contractors and subcontractors are likely to become inefficient and even to fail.

5.3. Cultural diversity

Societies fenced by national boundaries are main providers of the norms and values that permeate all aspects of management behaviour. As the mental models of managers are formed through processes of socialization in a particular national context, they differ from those of other national contexts. Hence, the differences in norms and values are the main source of inter-firm diversity in international subcontractor relationships. Attitudes toward cooperation and conflict, problem definition and problem solution will tend to vary on the premises of cultural differences. Firms may differ substantially concerning what the norms and practices for efficient collaboration between contractors and subcontractors are (Helper and Sako, 1995). Especially when dealing with subcontractors from other national cultures, managers and employees directly involved in the collaborative activities may lack inter-cultural skills, both in terms of language capabilities and in terms of familiarity with the business practices of the subcontractors’ national context (Pucik, 1988). These shortcomings may hurt the development of shared skills both directly and/or indirectly. Directly, the ability to develop mutual expectations and norms of conducting business is disabled by a lack of inter-cultural competence. Also, the extent absorptive and communicative skills of each partner are directly related to the inter-cultural skills of the involved personnel (Hamel, 1991).

6. The pen and the needle: an application of the proposed model

In the following section, the model will be tested on a case. In the process we will develop the model further through empirical testing. The fact that the empirical part consists of interactions within a single company has drawbacks but also strengths (Eisenhardt, 1989). Multiple cases may enhance theoretical sensitivity, thus providing a more robust theoretical framework. On the other hand, focussing on multiple interactions within a single company enable us to obtain a relatively comprehensive picture of interactions between the involved companies. As our purpose is to extend and refine the theoretically deduced model, the design trades some level of external validity for the necessity of enhancing internal or analytical validity.

The case presented here has been developed from multiple data sources, including case studies, internal reports, interviews and various other sources. Interviews were conducted in the Japanese subsidiary of Novo Nordisk, as well as at Novo Nordisk head quarters in Copenhagen, Denmark. Semi-structured questionnaires were used, and all interviews were transcribed and submitted to the interviewees. Unfortunately, only one of the partners in the subcontractor relationship has actually been interviewed: The contractor, Novo Nordisk. Thus, we will primarily see the subcontractor relationship from the perspective of this firm, both in the case description and later on in the case analysis. However, this does not mean that we downplay the subcontractor’s role in forming and sustaining the shared skill interface.

6.1. Novo Nordisk: company profile and background for launching NovoPen®

Novo Nordisk is a multinational company within the pharmaceutical and biochemical industry. It was established when two leading insulin producers: Nordisk Gen- tolte and Novo Industri, merged. Novo Nordisk is
a leading producer of insulin for diabetics, providing more than 40% of the global production. It is a R&D-intensive firm. More than 3000 employees are involved in R&D activities, which account for 16.3% of the turnover (1998 figures).

In the 1970s, researchers became aware that complications might be reduced by a better control of the blood sugar levels of diabetics through smaller and more frequent doses of insulin. This, however, led to a practical problem. As a consequence of more frequent dosing, the diabetic needed to carry equipment for injecting four to five daily doses. Therefore, if diabetics were to benefit from this new kind of treatment, they were to bring with them a bulky assortment of syringes, needles, and insulin.

Several solutions were launched to overcome the problem of insulin dosage. After some attempts, interest began to emerge around the cartridge concept. Cartridges had been successfully applied in other areas of the pharmaceutical industry, as for example by dentists. Thus, the technology relating to packing, labelling, and filling cartridges was well known. In 1981, Novo Nordisk started a pilot project with the intention of developing an injection system based on the cartridge technology. NovoPen® was launched in 1985. It was an insulin syringe, the size and shape of a ball point pen, which diabetics could keep in their shirt pocket.

The launch of NovoPen® was an international success. The product captured 70% of the market in Japan and a considerable share of the European market, whereas the American market proved somewhat more reluctant to adapt to the new technology.

Prior to the successful product launch, both the technical staff at Novo Nordisk and their external partners had put considerable efforts into developing the pen systems. The use of external partners was a necessity, as the development and production of the injection system called for capabilities that were not available within Novo Nordisk.

6.2. The initiation of the search process

In 1981, while developing the initial sketches of the pen, the product development team focussed on developing a foolproof system for dispensing insulin in correct doses. Initially, when NovoPen® was launched for testing, it was equipped with a pilot version of the needle grinded by a local manufacturer of needles.

Novo Nordisk soon realized that the quality and production capacity of this supplier were not sufficient to meet the demands of Novo Nordisk. In 1983, they initiated a global search for qualified subcontractors who were willing to participate in the development of the needle component. Novo Nordisk technicians believed that if they were to meet the subcontractor’s engineering department, they would be able to explain and clarify their ideas for the needle component, without revealing the product concept they were working on.

6.3. Start-up and development of the relationship with Nissho Medical Industries

As the range of prospective subcontractors gradually shrunk, the Novo Nordisk team eventually met with a group of marketing representatives from Nissho Medical Industries (Nissho). The Nissho Corporation is a company employing more than 5300 persons, with net sales of 130.9 billion Yen (1997) figures. The Nissho representatives were very interested in the product concept.

“Nissho was strictly business-minded. Naturally, they would like to know what the product concept was. At that time I suspected that they were trying to get our idea and use it for themselves. However, we had been very cautious when we developed the drawings and specifications for the pen, so that the total product concept was not revealed from the drawings of one component”

[Jørn Rex, Product Development Manager, Novo Nordisk]

On the one hand, the representatives from Novo Nordisk were unwilling to provide this information, while on the other hand, they wanted to maintain Nissho’s interest. So, they hinted to the Nissho representatives that a production of no less than 50 million items annually was planned. This was clearly overstated, but it helped to increase Nissho’s interest. However, the representatives from Nissho wanted more information on the product if they were to engage in the project, and present the business proposal to the management. Finally the representatives from Novo Nordisk stated that the product concept would be revealed if Nissho would commit itself to collaborate under a secrecy agreement. Novo Nordisk was willing to make the necessary investments in production facilities, while Nissho’s contribution was mainly to provide the necessary expertise and to contribute toward a further refinement of the product.

After the negotiation team had returned to Denmark, Novo Nordisk was contacted by Nissho, which wanted a new meeting with Novo Nordisk based on the information concerning the production volume. This time the representatives from Novo Nordisk visited Nissho’s production plant, where they had discussions with several production engineers concerning how to produce the component. The initial reaction from the Nissho engineers was that the product could not be manufactured by Nissho. Although this seemed like a blank rejection, the negotiation team from Novo Nordisk had learned from their first visit that such absolute stances were negotiable. Moreover, at that point in time, the Japanese partners were not experienced in doing business with foreign customers and, therefore, had limited skills in communicating...
In English. The negotiation team from Novo Nordisk explained to the Nissho engineers that Novo Nordisk were here on their invitation, and that Nissho had already seen the drawings of the needle. If the engineers from Nissho were able to flatly reject the idea, then why did they invite Novo Nordisk in the first place? During the discussion, Jørn Rex, who was responsible for the development of the Novo Nordisk Cartridge, showed a needle component to the Nissho engineers, which he had picked up during a round trip in the factory. While doing so he pointed out that Nissho was already producing a component which was similar to that of the Novo Nordisk concept in many respects. This point increased Nissho’s interest, and the meeting ended with an agreement to pursue the production.

In September 1983, only two months after the meeting at the Nissho factory, Novo Nordisk received the first trial batch. Following this initial contact period, production staff from Novo Nordisk and Nissho visited each other 2–3 times a year for six years, parallel to the clinical testing activities of the device on Danish diabetics, which took place at Hvidovre Hospital in Denmark. During this period the NovoPen®, including the needle component, was modified several times in order to increase its user friendliness.

Novo Nordisk had designed a short, thin needle, with a connecting device to the pen, and they gradually improved the functionalism of this needle in collaboration with Nissho. The producer possessed excellent skills concerning product modification while maintaining low costs as well as product quality even in mass production. Novo Nordisk and Nissho constantly pressed for improving the lubrication and the sharpening of the needle. For Nissho, in particular, this resulted in spillover effects to other business areas, inducing Nissho to commit more resources into the partnership. Gradually, the needle became thinner, better lubricated, and better sharpened. Both companies contributed to the improvement of the original Novo Nordisk design, which not only included the actual design of the needle but also the attachment of the needle to the rest of the syringe, making the needle disposable. Novo Nordisk later perceived these collaborative efforts as critical when designing the new versions of the pen. Thus, a lot of joint effort and participation from the construction and production departments of both Nissho and Novo Nordisk finally produced the results.

6.4. The emergence of distrust: a critical incident

In the midterm stage of the subcontractor relationship with Nissho, Novo Nordisk invested in a production line for needles to the pen. The line was staffed with Nissho’s employees. Through these mutual investments Nissho and Novo Nordisk both demonstrated a shared commitment to the relationship, very much in line with the Japanese tradition of subcontractor relationships.

Because of the merger of NOVO and Nordisk Gentofte, the new Novo Nordisk took over a needle fabrication plant in Hjørring, Denmark. Partly based on semi-manufactured needle tubes from Nissho, this plant manufactured needles for the pen launched by Nordisk Gentofte in 1986. After the merger Novo Nordisk equipped the plant to produce needles for NovoPen® and the NovoLet®.

The unexpected knowledge that Novo Nordisk had set up its own production of needles in Denmark caused some confusion and disappointment in Nissho. They feared that Novo Nordisk would phase out their production line at Nissho and in the end transfer the knowledge of grinding thin needles to their in-house plant. The result was that Nissho became less committed towards participating in development activities. In the words of a Novo Nordisk manager:

“They saw the Danish facilities as a direct competitor and did not want to give anything before Novo Nordisk gave something to them.”

[Subsidiary Manager, Novo Nordisk Japan]

First, Nissho suggested that its new plant in Taiwan could function as a secondary source of supply. However, Novo Nordisk needed to ensure that delivery would continue, even if Nissho went bankrupt.

The relationship climate gradually worsened. In 1990, Novo Nordisk found out that Beckton & Dickinson (B&D), a world leading manufacturer of needles and injectors, had started developing a cartridge model, conceptually similar to the NovoPen, and using Nissho as a needle supplier. Although Novo Nordisk never approved of it, Novo Nordisk did not prohibit it. One reason for this was, that Novo Nordisk and B&D considered forming a partnership at the time. The potential risk of transferring strategically important assets in terms of knowledge to a possible rival was not acknowledged. It was the belief among managers responsible for the production that the B&D operations had been cleared “somewhere” in the organization. Moreover, the importance of protecting strategically important knowledge from rival competitors was not equally acknowledged by the marketing and top management decision makers. The possibilities of a coordinated response were therefore blocked by a lack of communication and exchange of knowledge between these divisions.

The R&D Division at Novo Nordisk had not paid much attention to the importance of this component in its development efforts with the pen. As Novo Nordisk had no previous knowledge concerning the production of needles, it had no idea concerning the availability of suppliers who could meet its specific requirements. Thus, neither the selection of suppliers was carefully planned,
nor the strategic importance of the supplier relations was acknowledged.

“Roughly speaking, the R and D Division during the development of the pen at one time said: Well don’t we also need a needle for this pen to work?”
[Production engineer, Novo Nordisk]

The importance of the needle component for the functionality of the pen was, however only acknowledged by Novo Nordisk much later, when the alliance was not realized. In the “romance aftermath” Novo Nordisk came to realize the importance of this particular component for B and D in its efforts to imitate the NovoPen.

“We made a serious mistake, not to take a patent out on the needle, as we did with the pen”
[Subsidiary Manager, Novo Nordisk]

Finally the top management of Novo Nordisk announced that they would discontinue doing business with Nissho unless its relation to B&D was terminated. It took serious time and effort before Novo Nordisk could convince Nissho management, that the Danish subsidiary mainly worked as a secondary supplier to ensure delivery, rather than being a threat to Nissho. The fact that the Danish plant only had a fraction of the production capacity needed and that it had insufficient development capabilities helped to convince the Nissho managers. All development activities were still to be conducted with Nissho. Finally, Novo Nordisk is now using long-term delivery contracts in which the purchased amount is settled up to five years ahead.

6.5. The relationship today

The collaboration between Nissho and Novo Nordisk has regained its strength and has become more extensive during the course of the successful launch of NovoPen®. The latest result of the collaboration between the two companies is the NovoFine®: The thinnest and shortest needle available for insulin injection worldwide. Frequent visits and exchange of staff members have continued over the years, and today all of Novo Nordisk’s product improvement activities regarding the needle involve Nissho. This collaboration has worked for 16 years now.

Both Nissho and Novo Nordisk have improved their ability to collaborate over large cultural as well as physical distances. At the present time, four staff members from Novo Nordisk are working together with Nissho on a regular basis, to improve the needle. Novo Nordisk has developed a “culture sensitivity” seminar for employees who are to encounter their Japanese partners for the first time. Moreover, employees who need to be introduced to the Japanese for the first time, are always accompanied by a person, who has already developed personal relations with his/her Japanese colleagues. On the other hand, Nissho has also developed its collaborative skills. To begin with, Nissho employees who are involved directly with Novo Nordisk have improved their English speaking capabilities considerably. And what is more, the Japanese partner has gradually become more aware of the business culture of Novo Nordisk. Thus, discussions between Danish and Japanese engineers have become more open ended and informal than before, signalling a higher level of confidence between the partners.

Over the years of collaboration an entangled web of personal relationships has emerged. Although both companies encourage close personal relationships, such relationships can also be an obstacle for the development of the relationship between the companies. Individual staff members could make deals and agreements which would not be in agreement with the overall mission of the respective firms, or decisions may not be communicated to all persons involved. For this reason, Novo Nordisk has developed a procedure where all formalized agreements must be cleared. At Novo Nordisk, two persons are responsible for this procedure: One takes care of the technical aspects, including alterations of designs, development projects, etc. while the other is in charge of the commercial aspects of a relationship. Besides these arrangements, a yearly meeting is held at both top and middle management levels in order to ensure the smooth functioning of the relationship.

7. Case analysis

The presented case may be analysed by using the model developed earlier. First, we will discuss the nature of the Novo Nordisk–Nissho relationship, and especially focus on its implications for the development of shared skills. Secondly, we will focus on the influence of skill boundary management and partner diversity on this process.

7.1. Shared skill development in the relationship

In many respects the task of developing a disposable cartridge, provides an ideal setting for the development of shared skills. The product architecture of the NovoPen is one of interdependency between the components and few possibilities for partitioning the development task into separate tasks which may be handled independently by the firms involved. Hence, it demands intensive collaboration between the contractor and the subcontractor in order to develop the particular component, including frequent interaction and presumably the exchange of both tacit and of codified knowledge. Personnel from both buyers and sellers were involved in the process, forming a team across organizational boundaries.

Both partners were also willing to signal trust and mutual commitment through joint commitment of
resources to the production facilities. Whereas Novo Nordisk invested in an on-site production line for disposable needles, Nissho agreed to facilitate and staff this line, including the training of production personnel. Therefore, from the onset of their relationship the initiation of a shared development project was relevant, and the basic and necessary conditions for the development of shared skills were present. This may be portrayed schematically, as shown in Fig. 2 and Table 1.

7.2. Skill boundary management by Novo Nordisk and Nissho in the relationship

What seems especially remarkable in this case, is the failing ability on behalf of Novo Nordisk to communicate its intentions concerning the Danish needle producing plant to its partner in Japan. This underlines the importance of understanding the partner’s expectations and norms of reciprocity when handling critical episodes in the partnerships if these are not to destroy resource demanding and time consuming processes of trust-building.

As the communicative abilities of Novo Nordisk fail, the trust of Nissho toward its partner is destroyed. Consequently, Nissho reverted to strict control concerning the communication of knowledge to Novo Nordisk. Closely related to this is the malfunctioning of Novo Nordisk’s absorptive capacity in transferring information from the skill boundary and connecting it with relevant organizational knowledge. Hence, in the case of B&D, the internal connection of relevant decision-making bodies fails.

The departmentalization of tasks and the sharing of information between business units clearly was not able to work effectively here. Hence, the importance of the Nissho relationship, including Novo Nordisk’s dependence on the superior needle-grinding skills of Nissho and the importance of the disposable needle to the NovoPen never seemed to enter the mental frames of the departments responsible for the development of the internal subcontractor of needles nor the top management. One reason for this lapse might be the bottom-up or evolutionary nature of the collaborative process between Nissho and Novo Nordisk, which does not evoke the same awareness and attention as internally monitored development projects whose progresses is carefully evaluated and monitored on a frequent basis.

7.3. Dimensions of contractor–subcontractor diversity

In conjunction with the previous observations, differences in both managerial practices and cultural backgrounds have influenced the development of shared skills. Differences in cultural backgrounds have influenced the process directly. The Danish and Japanese business practices for establishing collaborative efforts between contractors and subcontractors seem to be similar in many respects. Long-lasting relationships between contractors and subcontractors, including mutual investments in activities and resources are well-established.

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Table 1
A schematic presentation of the model

<table>
<thead>
<tr>
<th>Link between process factors and outcome factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failing communication internally in Novo Nordisk leads to unintended signals toward Nissho, thus reduces inter-partner confidence</td>
</tr>
<tr>
<td>Frequent visits, exchange of personnel and of prototypes enhances shared division of labour in the subcontractor relationship</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Link between situational factors and process factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultural diversities breeds language problems and different approaches to problem-solving communication and absorption of knowledge</td>
</tr>
<tr>
<td>Technological diversity complicates initial perceptions of the complexity</td>
</tr>
<tr>
<td>Shared strategic interests motivate firms in their willingness to absorb and communicate information</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Link between situational factors and outcome factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing strategic intentions promotes failing confidence and reduced collaborative efforts</td>
</tr>
<tr>
<td>Evolved shared understanding of technology has smoothed coordination efforts</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Feed-back loops from outcome factors to process factors and situational factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaborative experience have improved mutual understanding and reduced communication barriers</td>
</tr>
<tr>
<td>Positive results from collaborative efforts have strengthened shared strategic interests</td>
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</tbody>
</table>
business practices in Japan as well as in Denmark. Hence, these similarities may initially have supported the development of the joint project. However, expectations towards the collaboration may also have differed in certain central respects. Whereas it is a common practice in Japanese subcontractor arrangements to maintain single sourcing arrangements, the practices of the industry to which Novo Nordisk belong tend to differ from this principle. In the health care business it is customary to have at least two subcontractors in order to ensure constant delivery. In some countries, for instance in the US, it is even a legal claim that pharmaceutical firms must operate with a double system of supplies in all vital areas in order to assure delivery ability. This practice may not have been clear to Nissho. Moreover, as Novo Nordisk never bothered providing Nissho with this type of explanation, it was natural that suspicion and distrust towards Novo Nordisk emerged.

Finally, in terms of strategic scope, the partners have complementary and competing interests. The incentive for Nissho to stick to Novo Nordisk seems to be the first mover advantage gained by Novo Nordisk in the field and Novo Nordisk’s strong access to the global market. The potential in the US-market is considerable since only 1% of the diabetics use the pen. In Denmark and in Japan more than 90% of all diabetics use the cartridge solution. Novo Nordisk also seems to be the strongest in the innovation of new types of pens — and thus demanding new types of needles — as well as forcing the technology into new areas of business, i.e., the growth hormone.

However, there is no doubt that Nissho will benefit, if the cartridge concept evolves into a new general standard for diabetes injection devices. A number of events indicate, that the NovoPen may become exactly that. For instance Novo Nordisks major competitor, Eli Lilly and several other competitors have launched cartridges fitting into the NovoPen and some are developing cartridges similar to the NovoPen.

The incentive for Novo Nordisk to stick to Nissho is simply that no other needle manufacturer has the same skills. And it would be costly and risky to try to install such skills in the factory in Denmark. So for Novo Nordisk, exit costs are high. Hence, despite, the current attempts to reestablish the collaborative atmosphere in the relationship, strategic diversity pertains among the partners. In the longer time perspective, this may cause new troubles in the partnership.

8. Conclusion and implications for further research

As apparent from this analysis, it is possible from the model to identify a set of critical factors for understanding the chain of events in a case of subcontractor relationships between diverse partners. The virtue of the model is, that the complexity of studying such relationships in vivo may be reduced, as the forces may be isolated and studied in detail through an analytical lens, hence reducing the analytical complexity of the case.

In the model, we propose the view that inter-organizational learning processes must be seen as a task of both managing shared skill development and skill boundary management. The importance of managing skill boundaries in the inter-partner learning process, including absorptive and communicative capacities, is confirmed by the case study presented. The conversion mechanisms through which learning at the personal level are commuted and adopted at the organizational level are a central issue for learning in supply chains. When these processes are not carefully managed, long-standing and cumulative efforts of trust-building are much too easily destroyed. As these efforts are resource consuming, they represent considerable value for both firms, and need to be protected from errors caused by a lack of internal communication.

Further research is needed in order to develop the model. First of all, additional case studies which involve both contractors and subcontractors may lead to development and refinement of the theoretical lens presented in this contribution. For instance, detailed studies of such contractor–subcontractor dyads may help to identify some of the interactive and dynamic effects of skill boundary management and inter-firm diversity on processes of shared skill development. Also, such case studies may hold promise for more normative oriented theorizing as they can reveal some of the techniques used by firms in order to submerge such divergencies and continue collaborative efforts.

References


