

Open Innovation in Networks: Specifying Orchestration Capability for SMEs

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Abstract

Open innovation in multifirm networks has been a popular topic for long, and the focal firm with orchestration capability will enhance its innovation performance through networks. However, only recently, researchers started to study SME's open innovation and networks, especially those from the low-tech industry. Besides multifirm networks, some organizational researchers are interested in the internal network organizational design of prospector firms putting innovation on top of the agenda. This paper analyzes how an SME from a traditional industry implements the prospector strategy through purposively built multi-level networks, i.e. an internal network organization and a multifirm innovation network. In order to get more innovation output from external and internal networks, orchestration capability is needed and should be applied in both levels of network organizations.

Introduction

Open innovation, has been widely accepted as a new paradigm for innovation (Chesbrough 2003). It introduces a new organizational innovation which targets at utilizing both internal and external innovation resources to advance firms' technologies and capabilities. Open innovation theory assumes that "knowledge is widely distributed, and that even the most capable R&D organizations must identify, connect to, and leverage external knowledge sources as a core process in innovation" (Chesbrough 2006). Furthermore, another important issue is that open innovation theory emphasizes converting R&D into commercial value (Chesbrough 2006).

Since firms can not rely entirely on their own technology capabilities, they can acquire new technology in many ways, including licensing, strategic alliances, joint ventures, and can develop new markets by technology spin-offs, which refer to a networking way of innovation. Open innovation scholars suggest companies to set up and manage interorganizational networks, knowledge networks, or value constellations not only to tap into external technology sources in the early stages of an innovation project, but also to commercialize new products successfully (Hu & Sørensen 2011a; Vanhaverbeke 2006). Generally speaking, networks can be

classified into interorganizational or multifirm networks, and intraorganizational or internal networks (Hu & Sørensen 2011b). Innovation researchers have noticed multifirm networks for innovation, such as strategic alliance, joint ventures, industrial clusters, value chains (Gereffi 2005), etc. However, organizational researchers move one step further to conceptualize a new organizational design for firm's innovation, i.e. the network organization, which is different from traditional hierarchical organizations (Miles & Snow 1986, 1992; Snow et al. 2011).

Though network organization is recognized as a suitable design for innovation, how to manage a network organization in order to avoid chaos remains uncertain. Based on Dhanaraj & Parkhe (2006), in order to successfully construct and maintain innovation networks, orchestration capability is needed for a "hub" firm. A hub firm has a central position in the network structure, and performs a leadership role in integrating the dispersed innovation resources and capabilities of network members. In order to do so, a hub firm needs "orchestration capability" (Dhanaraj & Parkhe 2006; Ritala et al. 2009). However, the orchestration capability has not been applied to an intra network organization yet.

Besides, when talking about open innovation, it seems that SMEs' innovation potential and their roles in networks have been excluded from mainstream literatures (Boutellier et al. 2008; Lee et al. 2009). Thus, this paper will show that in order to pursue open innovation, SMEs must have orchestration capability to construct and maintain a network organization. The research questions of this paper are:

1. *How can an SME foster open innovation through a network organization?*
2. *How can we make sense of orchestration capability in both multifirm innovation networks and an internal network organization for an SME?*

The paper is organized as follows. First, we will review literatures on multifirm innovation networks, network organization and orchestration capability. Second, the paper will discuss the conceptual framework and methodology of this paper. Third, we will provide a profile of the case company. This will be followed by an analysis of a case: open innovation in networks; network organization; orchestration capability in multifirm networks and a network organization. Based on the analysis, there will be discussions on some findings from analyzing orchestration capability. Finally, implications for innovation management and strategic management will be outlined.

Literature Review

Multifirm Networks and Innovation

From the resource-based view and the knowledge-based view of firm (Barney 1991; Grant 1996; Wernerfelt 1984), resources are heterogeneously distributed across firms, thus critical resources, especially knowledge for innovation may located outside a firm. Business network theorists conceptualize the business environment as a network of connected business relationships evolved from interaction between

actors (Holm et al., 1996). Thus an R&D network aiming at a cooperative strategy that provides the right balance between efficient use of resources and the control of technology is an important form of business networks (Håkansson & Snehota 1989; Håkansson & Laage-Hellman 1984).

Since the 1980s, “networks of innovators” which are characterized by flexibility and mutuality are seen as a proper design for innovation (Freeman, 1991; Powell, 2005). The locus of innovation is found in networks of learning rather than in individual firms (Powell et al., 1996). Strategic alliance and joint R&D have proved their advantages on enhancing product and process innovation performance, as well as both exploitation and exploration (Capaldo 2007; Hagedoorn 2002; Schilling & Phelps 2009). The locus of innovation is not only multifirm, but also global. Transnational corporations globalize their R&D activities and try to find global partners to utilize cross border R&D resources, which is what we call global innovation networks (Cantwell & Piscitello 1999; Millier 1994). TNC’s global R&D will contribute to firms’ innovation capabilities, and then is positively related to product and process innovation, as well as the ability on basic research and engineering (Zander 2002). Recently, some open innovation scholars are shifting their interests from big high-tech multinational corporations to smaller low-tech companies. For example, Wincent et al. (2009) show it has been more and more popular to form small-firm networks to enhance R&D activities, and the effectiveness and performance of these small-firm networks is highly related to a unit that is responsible for coordinating. Similarly, Lee et al. (2010) show that the input of an intermediary in facilitating innovation is crucial to the success of SMEs’ open innovation.

Open innovation researchers have paid much attention to innovation networks and multifirm ties. Simard & West (2006) classified four types of innovation ties which help to construct multifirm innovation networks: deep, wide, formal and informal. Deep (exploitative) ties enable companies to tap into key resources for incremental innovation; wide (explorative) ties lead to new technologies and markets; formal ties are based on contract; and informal ties will lead to more formal arrangements to cooperate. When a firm wants to create value from the early stage of technology development as well as commercialization of products, it is crucial to establish a “value network” with partners and to shape the role that suppliers, customers and other parties play in influencing the value captured from commercialization of an innovation (Chesbrough & Rosenbloom 2002).

Network Organization and Prospector

Global innovation networks usually consist of the focal firm and its partners all over the world. Some scholars however move their focus from outside to inside of the firm. Under complex, rapidly changing, and turbulent environments, hierarchical structure is not suitable for innovation, especially global innovation (von Zedtwitz & Gassmann 2002). Gassmann & von Zedtwitz (1999) classify five evolutionary types of R&D, which are ethnocentric centralized, geocentric centralized, polycentric decentralized, R&D hub, and integrated R&D network, and their em-

empirical multiple case studies show a general trend towards the integrated network model. Medcof (2004) proposes four types of structural cells for internationally dispersed technology, i.e. star, cluster, network and satellite. Among them, the network has strong communication links among both the central and periphery units.

Not only the R&D function of a firm evolves toward a network organization, in order to enhance innovation, all the functions of a firm have to be mobilized. Based on different strategies, there are three types of firms, i.e. prospectors, defenders, and analyzers (Miles & Snow, 1986; Snow et al. 2010). Prospectors are firms that continually develop new products, services, technologies and markets. They achieve success by moving first, either by own efforts on R&D or by building a market through their customer-relating capabilities. Analyzers have a “second-in” strategy, and they imitate and improve the products offered by competitors, i.e. have innovation on the periphery and also efficiency. Defenders are firms focusing on stable product or service lines, thus standardization and efficiency are the main focuses. Based on different strategies, there will be different organizational design. Defenders usually have functional organization, analyzers employ matrix structure, and prospectors usually have more flat and flexible organizations with autonomous work groups, i.e. network organization.

According to Miles & Snow (1992), there are three types of network organizations: *the stable network*, *the internal network*, and *the dynamic network*. The stable network consists of independent organizations along a certain product or service value chain. The internal network is configured as a market inside a firm. The dynamic network involves different firms or units of firms, which are collaborating temporarily on a new product or service. In other words, a network organization enhances flexibility and innovation. Similar definitions on network organization can be found in Borgatti & Foster (2003), Jarvenpaa & Ives, (1994), and Baker (1993).

It should be noted that, Miles & Snow (1986)’s definition and typology of network organization has nothing to do with ownership, thus a network organization can be constructed by a set of firms, i.e. “*multifirm network organization*” (Snow et al. 2010), which means that strategic alliances, joint ventures, virtual organization, and outsourcing can all be regarded as network organizations (Jarillo 1988; Child et al. 2005). However, in order to avoid confusion, we make a difference between a multifirm network organization and an internal network organization when analyzing the case.

Orchestration Capability

In most situations, it is not possible for a firm to control other partners in a network organization since different partners are autonomous organizations and the networking relationships are based on mutuality and interdependence. Dhanaraj & Parkhe (2006) define the management role of networks as orchestration. The network orchestration can be defined as “the set of deliberate purposeful actions undertaken by the hub firm as it seeks to create value (expand the pie) and extract

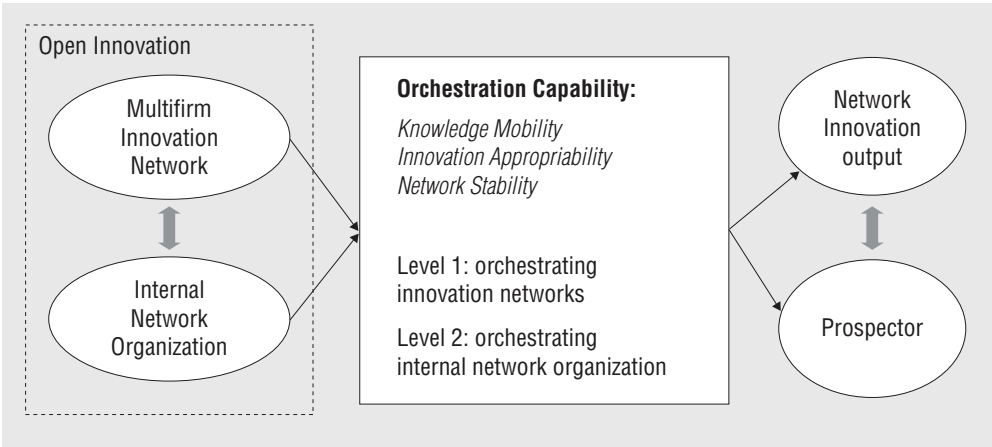
value (gain a larger slice of the pie) from the network” (Dhanaraj & Parkhe 2006). Hub firms are key actors within a network (Jarillo 1988). They possess prominence and power in a network and thus can perform a leadership or orchestrator role in integrating dispersed resources and capabilities of network members (Dhanaraj & Parkhe 2006). According to Ritala et al. (2009), orchestration capability is defined as “the capability to purposefully build and manage multifirm innovation networks”.

Generally speaking, orchestration capability is aiming at more network innovation output, including product and process innovation, exploration and exploitation, etc. According to Dhanaraj and Parkhe (2006), and Ritala et al. (2009), there are three key processes in orchestration capability, which are *knowledge mobility*, *innovation appropriability*, and *network stability*. These three key processes are positively related to innovation output. Knowledge mobility means that distributed knowledge resources can be accessible to network members, which refers to sharing, acquiring and deploying knowledge within the network, and it can be enhanced through knowledge absorption, network identification and socialization. Innovation appropriability means the orchestrator has to ensure that the value created is distributed equitably among network members, which is actually ensuring mutuality. If there is no mutuality among network members, the network may end in failure. Network stability refers to the network members’ willingness to continue the collaboration, which is related to dynamism of an innovation network. These three elements are not separated but positively related to each other. For example, knowledge mobility will enhance innovation appropriability and network stability. Furthermore, Ritala et al. (2009) elaborate the organizational and individual level determinants of orchestration capability. On the organizational level, orchestration capability requires organizational capabilities in operational and entrepreneurial issues such as collaboration, visioning, competence leveraging, legitimizing and influencing. On the individual level, orchestration capability requires individual skills such as social skills, entrepreneurial skills, operational skills and balancing skills.

Conceptual Framework and Methodology

Based on the above literature review, Figure 1 shows a conceptual framework for this paper. Unlike most literatures researching on big transnational firms, this paper focuses on a SME’s open innovation, and makes an attempt to specify the orchestration capability in both multifirm network organization and internal network organization. It is almost impossible for an SME to have a dominant position in an industry, but as we shall see, it is possible for it to be a prospector by focusing on a niche area and relating to leading customers. In order to generate more innovation outputs from networks and becoming a prospector, orchestration capability is needed to relate external partners and to utilize internal innovation resources. The three key processes of orchestration capability, i.e. knowledge mobility, innovation appropriability, and network stability, can be orchestrated by different means in a firm’s internal network organization compared to those used in multifirm networks.

Figure 1. Orchestration Capability at Two Levels.



This paper is an explorative single case study on a Danish SME called InnoFlex, which has a branch in China. This study uses both primary data collected from interviewing and discussing with managers and key employees from both Denmark and China, and rich secondary data such as ten years' annual reports and information on its website. Discussions and interviews add up to 11.5 hours. Most interviews are recorded and transcribed, and minutes are made after each discussion. Two of the interviews are taken in Chinese, thus the Chinese transcriptions are then translated to English. Minutes are sent to the interviewees, and comments as well as revisions are made to ensure the validity of data. Secondary materials add up to around 300 pages. Analysis is then made based on triangulation of data. Also, we used Nvivo for coding data and assisting our analysis.

Case Profile

InnoFlex develops, manufactures and sells textile products. It is an SME with a business unit in China, i.e. InnoFlex China. InnoFlex is a well known brand in its niche area and puts innovation at the top of the agenda. InnoFlex has constructed a multifirm network with long-term partners, such as world-leading furniture companies as key customers and OEM companies with specialized abilities as suppliers. Close collaboration with InnoFlex's network of customers, users, suppliers, and advisors ensures the generation of new ideas and new business opportunities. To cope with its outside networks, InnoFlex designed a special internal organization which consists of "strategic business units" (units). A unit is an independent profit center with its own mission statements, visions, targets, strategies, action plans and budgets. Most units are named after different functions, e.g. DesignUnit, LogisticsUnit, MarketingUnit, etc. When cooperating with internal units, each unit is expected to buy and offer services at the most competitive prices and other conditions. In the following section, this paper will firstly show how an SME constructs multifirm innovation networks and internal network organization to foster open innovation, and then analyze the orchestration capability of the case company from both levels.

Findings

Open Innovation in Multifirm Networks

Table 1 offers an overview on InnoFlex's multifirm network for innovation. According to the open innovation theory, there are four kinds of ties, i.e. deep and wide, formal and informal. Through different types of ties, InnoFlex initiates innovation projects and communicates with various outside partners, and proactively engages in activities relying on core competencies such as textile construction, furnishing, upholstery design and technology, etc.

Cell A shows InnoFlex's formal deep ties with long-term partners based on exclusive agreements and long-term contracts. These partners are usually global customers and suppliers. InnoFlex's value creation and innovation rely heavily on collaborating with world leading furniture or design customers that always open new areas in the industry. InnoFlex finds it needs to be there together with these big customers wherever there is a new business area, and it is obliged to proactively interact and offer new ideas to its customers. On the other hand, InnoFlex outsources its textile production to a set of qualified suppliers in Europe and China rather than do the production itself.

Informal ties are needed to maintain deep ties (Cell B). InnoFlex regards key account management as one of the core processes, which means that it needs to ensure long-term relationships. Also, InnoFlex should be able to bring benefits for both customers and suppliers based on continuous innovation. Wide ties keep a firm from locking-in existing networks and encourage more innovation potential from. As shown in Cell C and Cell D, InnoFlex never stops looking for new opportunities for innovation and cooperation, either through formal contract-based cooperation with new partners, or communicate informally with potential partners from various areas.

Network Organization

The previous section has made sense of an SME's open innovation under the multifirm context. In this section, the focus will be moved from outside of the firm to its internal organization. InnoFlex's organizational design is an application of network organization to an SME. The main characteristics of InnoFlex's organization are: autonomy, flexibility, market mechanism, and interdependency.

First, as mentioned in the case description, a unit is an independent profit center with its own mission statements, targets, strategies, action plans and budgets. That is to say, each unit has high degree of *autonomy* which can reduce dependency on the top management, and at the same time, each employee is empowered to take the initiatives to bring about innovation and "speak things into existence".

Second, *flexibility* is in line with autonomy. To elaborate more, here "flexible" means: first, each unit is easier to change and take actions faster; second, each unit and employee is obliged to seek business and innovation opportunities proactively rather than waiting for jobs; third, employees are encouraged to define

Table 1. Multifirm Ties Enabling Open Innovation.		
	Formal	Informal
Deep Ties (exploitation)	<p>A. Exclusive agreements or contracts with selected key account customers and qualified suppliers, aiming at continuous innovation on products and processes.</p> <p><i>E.g. 1. "InnoFlex targets its product development at around 50 selected key account customers accounting for around 55% of the total revenue" (Annual report 2009/10, pp: 10).</i></p> <p><i>2. "InnoFlex needs to input a lot of money when cultivating a supplier. For example, we need time to let them be familiar with InnoFlex's quality system. Their engineers may have different experiences and levels of skills, so we have to train them to be qualified for InnoFlex's working pace, e.g. lead-time, production, and plan, and all steps should be synchronized and coordinated. All these need time."</i></p> <p><i>3. InnoFlex and Pera (a leading innovation advisor), have jointly developed projects targeted at improving InnoFlex's business performance and innovation potential (Annual report 2006/07, pp: 15; Annual report 2007/08, pp: 14).</i></p>	<p>B. Recognizing key account management as a core process. Socialization and dialoguing with long-term partners besides formal projects, such as visiting key accounts regularly, ensuring each key account and supplier's benefits; developing potential for future cooperation.</p> <p><i>E.g. 1. "We need to visit or contact our partners now and then."</i></p> <p><i>2. "Not only the owner of the supplier, but also the employees such as engineers, workers, salesmen. You know, sometimes engineers or workers may not care about your order, so the personal relationships may determine whose order has the prioritization."</i></p> <p><i>3. "I will bring some invisible gifts. For example, the dialogue between the engineer from our supplier and me can be regarded as an informal training experience....What I say (to the design companies in China) may bring some new ideas and concepts on design or their products or even broaden their horizons."</i></p> <p><i>4. "InnoFlex must have market insight into and be in close contact with the entire value chain to produce solutions adding value for customers and users (Annual report 2005/06, pp: 43)."</i></p>
Wide Ties (exploration)	<p>C. Seeking new competent partners, and cooperating on identifying new business opportunities and possibilities on innovation.</p> <p><i>E.g. 1. "We pre-discuss with our engineer and team from Denmark from here. We inspected the facility, and looked and evaluated the machines, and say what is good and what is not good and what can be used and what cannot be used. Then we will tell them basically where we would like to have our products to be made."</i></p> <p><i>3. One designer got inspiration from the car industry, and introduced the Electro Welding technology in the car industry to a new project with two clients (Annual report, 2006/07, pp: 12).</i></p>	<p>D. Engaging in various communication opportunities and searching knowledge from various resources, such as forums, exhibitions, research collaboration with universities, etc.</p> <p><i>E.g. 1. "We go to exhibitions and searching online."</i></p> <p><i>2. "InnoFlex's designers are constantly on the lookout for new materials, new technology and, not least, new methods of promoting the interplay between furniture and upholstery fabrics" (Annual report 2006/07, pp: 12).</i></p>

Source: Adapted from Vanhaverbeke, 2006.

their job roles rather than waiting for arrangements from top managers; fourth, whenever there is a project, suitable units and external partners will be invited to form a network to carry out the project, rather than fixed units, which also shows the main features of a "dynamic network". Since the whole organization is quite flexible, and the job roles are not always specific and standardized, employees will start thinking what can be done, which will possibly generate innovative ideas.

Third, there are *market* transactions between different units. Thus, InnoFlex is able to track the value creation clearly and optimize resource allocation. For example, if one unit needs supports from another unit, it should pay a commission to compensate for the efforts of the collaborating units. However, when mentioning market mechanism, normally competition will be included. In this case, each unit has its own expertise, but they are complementary and *interdependent* to each other in nature which creates a basis for supporting each other. Thus, though there is an internal market, units are not competing with each other on the same part of the value chain or striving for customers with each other. The only competition between different units may be the ability to create values.

To conclude, this organization prioritizes innovation and has proved its advantages so far in these aspects. First, this organization can fully mobilize every employee’s enthusiasm. Second, the value creation can be seen clearly between different units. Third, since employees in different units are working proactively, innovation will be generated from interaction and cooperation among different units and with outside partners. One employee appraises the advantage of the organization as,

“I would say that probably, if we had not changed at that time, we would have been dead now.”

Orchestration Capability in Multifirm Networks

In the following two sections, the paper elaborates the orchestration capability at two levels, i.e. multifirm innovation networks and internal network organization, and from three core processes: knowledge mobility, innovation appropriability, and network stability (See Table 2). Illustrative data are shown in Appendix 1 and 2.

Table 2. Orchestration Capability at Two Levels.		
Orchestration Capability \ Levels	Multifirm Innovation Networks	Internal Network Organization
Knowledge Mobility	1. Matching: complementary knowledge and in step with each other. 2. Understanding: Effectiveness and Efficiency.	1. Knowledge sharing and idea generation. 2. Employee-driven innovation.
Innovation Appropriability	1. Mutuality: bringing mutual benefits and visions. 2. Negotiating skills: bargaining and balancing. 3. External brokering skills	1. Tracking value creation. 2. Facilitating. 2. Internal brokering skills.
Network Stability	1. Long-term contracts and agreements 2. Risk sharing and problem solving. 3. Building trust externally: Social relationships, expertise and reputation.	1. Creating overall vision and strategy. 2. Innovation culture. 3. Building trust internally.

The first level is multifirm innovation networks. According to Table 2, enhancing *knowledge mobility* firstly requires a basis that comprises heterogeneous and complementary knowledge sources. However, one thing interesting is that the potential partner can't be too strong to cooperate with. As mentioned by an employee from InnoFlex China, some Chinese suppliers are strong enough to develop advanced products and have got a lot of orders, so they don't need InnoFlex's technology and orders. Indeed, abilities of firms should *match* each other. Here "match" means not only complementary knowledge is needed, but also the extent of profundity and richness of knowledge should be in step. As a result, in this case, InnoFlex should keep its pace with its world leading customers in order to match the customers' requirements and capabilities. Since InnoFlex is supplying the world leading design companies or furniture companies, it should be able to design and produce the world leading product to be integrated into the customers' products. Enhancing knowledge mobility is also about "*understanding*", which requires both effectiveness and efficiency in understanding. Effectiveness means grasping the essence of what others mean, while efficiency means understanding quickly. In this case, InnoFlex needs to sense the industry trend together with its customers, select useful external information to develop new business opportunities, and cultivate its suppliers in order to improve the overall performance of its networks rather than only improving its own ability.

The second key process is *innovation appropriability*, which can be achieved through ensuring mutual benefits, negotiating skills and brokering skills. First, as an orchestrator, InnoFlex needs to identify customers' and suppliers' needs, and then provide them with visions that they will get something new and especially real benefits from the innovation cooperation with InnoFlex. Second, within an innovation network, there are tensions or even conflicts between different partners since there are different goals and working styles. Thus, the firm needs to have some *negotiation skills*, i.e. bargaining power and balancing skills with other partners in order to reduce opportunistic behaviors that will harm the cooperation as well as balancing interests of divergent actors. The most important issue in innovation appropriability is the brokering skills, i.e. *external brokering skills* in this situation. Brokering skills here means the orchestrator has to identify highly distributed useful resources and information in a network, and try to assemble and integrate them in order to solve problems and generate innovation. InnoFlex's innovation network consists of external independent customers, suppliers and other partners, there has neither a central office, nor organizational chart or vertical integration, thus the whole network can be regarded as a quasi-virtual enterprise, where InnoFlex works and sees itself as a broker. According to the social network theory, structural holes are the source of value added, and actors across structural holes will generate advantages (Burt 2000). As a result, InnoFlex's external innovation networks with customers and suppliers, provide it with a advantageous position (structural holes) alongside the whole value chain, and a richer information and knowledge pool than other separated firms, which suggests that a company like InnoFlex can enhance innovation appropriability by working as a

broker bringing resources together and later transfer results to the larger operating system.

The third process is *network stability*, which will be achieved through: long-term contracts or exclusive agreements (deep ties in Cell A, Table 1); risk sharing and problem solving; and trust building. InnoFlex need to invest a lot to develop a new qualified supplier, and also to maintain the collaborations with world leading customers, thus the contracts or agreements are usually long-term and in detail in order to ensure the a stable relationships with each other. Wherever there is co-operation, there will be risks or problems. It is not only important for the orchestrator to share benefits with partners, but also important to share risks and solve problems proactively. It is quite important to take the responsibility voluntarily rather than blaming others. Actually, *risk sharing* and *problem solving* are all related to *trust building*. Generally speaking, trust means positive expectations on ones integrity, fairness and good faith, and it can be derived from: social relationships, reputation and expertise in one area. InnoFlex's professional knowledge in its niche creates trust for both customers and suppliers. Customers need InnoFlex's help on improving existing products and new product development, while suppliers want to improve their own knowledge through cooperating with InnoFlex. Reputation is related to InnoFlex's behavior, which are proactively cooperation as well as timely payment and deliver. Besides, according to one manager's experiences, contracts are useless sometimes, while trustful relationships provide more powerful guarantee.

While stability through Cell A in Table 1 is important, dynamics is equally important. The dynamics of the network can be visualized and demonstrated by looking at Table 1 as a portfolio of partners with different affiliations to InnoFlex. While stability is primarily derived for Cell A, dynamics stems from Cell D with gradual movements through Cell C and D to become the future stability partnership. Thus, it is crucial for InnoFlex to have a balance between the four kinds of ties.

Orchestration Capability in a Network Organization

The second level is internal network organization. In a network organization, there is few hierarchy or command from the top management, thus how to make autonomous units work together towards a common goal requires orchestration capability inside the firm. This paper will then apply theories on orchestration capability to a network organization.

Promoting *knowledge mobility* in a firm will create a rich knowledge basis for different units, thus bring in innovation potentials. The key issues are: *knowledge sharing*, *idea generation*, and *employee-driven innovation*. Since the whole organization is quite flexible, thus there will be multiple information flows rather than top down. Through social communications, project cooperation, IT systems, meetings and workshops, etc., knowledge is shared among Danish and Chinese employees. Through knowledge sharing, new ideas are generated and then discussed either with colleagues or put up in an open IT system. Promoting knowledge shar-

ing is also related to competent employees. If every employee feels it is obliged or empowered to share and express his/her ideas, knowledge will be better mobilized inside a firm, which is recognized by InnoFlex as employee-driven innovation.

In this case, different units are highly independent, thus the *innovation appropriability* means that each of the units should be able to benefit from cooperating with other units. Market transactions between different units create basis for *tacking the value creation* from an innovation project. Within a network organization, the role of management has to change from directing or commanding to *facilitating*. In this case, the top managers of InnoFlex and the InnovationUnit usually act as a facilitator to help different units to cooperate with each other on innovation, or support them to figure out the direction in which they are going. Similar to external brokering skills, *internal brokering skills* are needed, which means the capability to find suitable units or people with the resources needed. In the InnoFlex case, one thing interesting is the ProjectUnit is a virtual business unit, and whenever there is a project initiated, a project manager need to invite suitable inside units and then these units will “meet” at the ProjectUnit to cooperate with each other. After the project is finished, documents and records are kept in the ProjectUnit.

Network stability is needed to maintain the flexibility and innovativeness of the network organization. In this case, different units can make their decisions independently, thus how to unite them is a main issue. Network stability can be enhanced through creating *overall vision and strategy*, promoting *innovation culture* and *building trust internally*. Different units’ own strategies and specific missions should in line with the overall strategy of InnoFlex. Besides, a strong corporate culture will also act as an invisible hand that unites different units, which means that units are guided to work together under a common identity, i.e. InnoFlex. In order to keep innovative, InnoFlex is promoting a corporate culture aiming at innovation, which not only unites different units, but also exploits each employee’s full potential in innovation. One principle for a network organization is market transactions between different units. In this case, a unit can choose to cooperate with external partners or even competitors. Thus internal trust, which means internal confidence on each other’s ability, is essential to unite different units. Internal trust is built on long-term cooperation experiences as well as expertise.

Discussion and Reflection

Does Boundary Matter?

This paper analyzes two levels of networks, one is multiform innovation networks, and the other is an internal network organization. If we take a look at the new trend in organization theories, we can see that a firm’s boundary is blurred (Child et al. 2005; Miles and Snow, 1986; Snow et al., 2010). According to resource-based view (Barney, 1991; Wernerfelt, 1984) and resource dependency theory (Pfeffer and Salancik, 1978), critical resources, especially knowledge for innovation may be located outside a firm, thus there are resource dependency relationships between

firms and then networks are formed. Following this logic, one unit of a firm (in this case, a “unit”) may have deeper and more resource dependency relationships with external partners than internal units, and at the same time, the unit may engage in different innovation networks. Thus from this point of view, it is no need to mention the boundary of a firm. However, this paper divides between multifirm networks and internal network organization. The boundary is divided by firm’s ownership, which creates a common identity and value for internal units, i.e. “InnoFlex” in this case. This common identity also brings a common goal and mind-set for internal units, which can be quite different from other firms within the network even though they are interdependent and pursuing mutual benefits.

Internal, Stable and Dynamic Networks

This paper discusses an SME’s orchestration capability in two levels of innovation networks. The internal network organization corresponds in the characteristics of an internal network as defined by Miles & Snow (1992). In terms of the multifirm network, InnoFlex has both stable and dynamic partners. The stable network is constructed by InnoFlex and its long-term contracted customers and suppliers, and the dynamic network brings various communications and opportunities. Also, the internal network organization can be regarded as both stable and dynamic, since all the units are working under a common and stable identity, while at the same time temporarily gathered for innovation projects. As a result, the three types of networks are overlapping with each other. Moreover, when relate the open innovation theory with Miles & Snow’s typology, we can see that formal and wide ties create stable network, while informal and wide ties may create dynamic ties.

Interplays

This paper applies orchestration capability in two levels. The three processes that have to be orchestrated in an innovation network, i.e. knowledge mobility, innovation appropriability, and network stability, are also positively related to each other (Dhanaraj and Parkhe, 2006). Within the same level, the three processes reinforce each other. However, the interplay between the two levels’ orchestration capability remains unclear. Generally speaking, successful internal orchestration will help a firm to be a prospector, thus will enhance its role as an orchestrator within a multifirm innovation network. That is to say, internal orchestration capability may positively impact external orchestration capability. However, the cross-level interplay between each element is even more complex. Here we propose that internal network stability and external network stability may positively impact each other, because a stable firm may concentrate better on innovation, and a stable external environment will create basis for more innovation and value creation for each firm inside and thus reduce the possibilities that make a firm unstable internally. Similarly, if there is only internal knowledge mobility, the firm will be isolated in a network and lose its external orchestration capability, and gradually it may lose its internal orchestration capability due to less innovation appropriability from outside. There is space for future research.

Who is the Orchestrator?

This paper shows an SME's orchestration capability in two levels. However, who are the orchestrators? Within a multifirm network, the orchestrator is always regarded as a hub firm, focal firm, flagship firm or lead firm (Ritala et al., 2009). In InnoFlex's case, since it has a network organization, every internal unit, i.e. unit can be an orchestrator since it is empowered to do so whenever they are cooperating with external partners. While, internally, the orchestrator can be InnoFlex' top manager who guides each unit inside to work towards a common goal and facilitates them to be more innovative. Moreover, whenever there are conflicts through cooperation, it is each project members' obligation to solve the conflicts. As a result, within a network organization, each competent employee of InnoFlex can be an orchestrator in both internal and external networks.

However, one thing interesting is that the CEO of InnoFlex is not located in any specific units. To some extent, the CEO is still high up there. Why not include the CEO in a unit with the function of orchestration or facilitation, maybe called StrategyUnit or OrchestrationUnit?

Limitations of Orchestration Capability

The definition of orchestration capability actually has two parts: one is innovation generation and finding innovation partners, the other is maintaining innovation networks and extracting more values. However, among the three elements, it seems only knowledge mobility is partly related to innovation generation. Also, orchestration capability has a presumption that a firm has already owned some resources, but has nothing to do with how to generate innovation resources. Thus, the framework of orchestration capability has limitations, and if a firm wants to become a successful orchestrator, we shall integrate more theories in future research.

Conclusion

This paper discovers the open innovation reality of an SME, and shows how an SME from traditional industry aiming at being a prospector constructs an internal network organization and a multifirm network to utilize resources in and out of the firm, which can be seen as a contribution on integrating open innovation theory and organization theory. In order to ensure innovation output, an SME needs to apply orchestration capability both internally and externally, which is another contribution of this paper. Based on the analysis of this paper, we can get a more specific understanding on orchestration capability, especially the experiences that can be used by an SME.

Appendix 1. Orchestration Capability in Innovation Networks: Illustrative Quotes.**Knowledge mobility**

1. Matching: complementary knowledge and in step with each other.
2. Understanding: Effectiveness and Efficiency.

1. Matching: complementary knowledge and in step with each other

"You should say that they (the suppliers) all get their own specialties and expertise."

"They (the suppliers) are willing to listen to InnoFlex or tractable."

"The supplier's production capacity matches InnoFlex's requirements and needs exactly. You know, some of the suppliers are really strong in technology and devices, but they don't need your order or design ideas because they are strong enough to do everything themselves. Some of them may have shortcomings, but when they marry InnoFlex, there will be a perfect supply chain."

2. Understanding: Efficiency and Effectivity

"Well, it is about communication and speed."

"If you can't communicate quite quickly and disable to include all the records with all the engineers or quickly understand and see what they want, then the project will probably land here."

"Value-adding key account management depends on the quality of the regular identification of customer needs (Annual report 2005/06, pp: 43)."

"(In terms of business development, InnoFlex) should first understand their products then suggest which fabric and products of ours may look good in their products."

Innovation Appropriability

1. Mutuality: bringing mutual benefits and visioning.
2. Negotiating skills: bargaining and balancing.
3. External brokering skills: finding the suitable problem solver.

1. Mutuality

"In one word, InnoFlex is Niche Company which focuses on fabrics for office furniture. As an employee from a European professional company, I need to bring something new to our customers otherwise they may not choose InnoFlex."

"Value-adding key account management depends on the quality of the regular identification of customer needs (Annual report 2005/06, pp: 43)."

"Customer satisfaction among selected key account customers is regularly surveyed (Annual report 2005/06, pp: 43)."

2. Negotiating skills

"That's all about bargaining power."

"It is about carrot and stick."

"If that (copying) happened you are risk at losing all your products for export ... I would take them away from you if you start copying us."

"It's again about balancing out."

"I have to admit that our supplier may become our competitor in the future... Our whole supplier group may be competitive enough to be our competitor, but single one of them is not strong enough now."

3. Brokering

"Generally speaking, InnoFlex now is a logistics company."

"Basically, InnoFlex can do everything for the customer whenever there is a need. InnoFlex will try to find the solution for the customer either by doing it inside InnoFlex or outsourcing it to a proper problem solver as long as it fits with InnoFlex's overall strategic mission, vision and strategy."

"FurnUnit is intended as a One Stop Shop for furniture production in abroad. When customers choose to outsource to us, we can take care of the entire process from start to finish. (Annual report 2010/11, pp:20)"

Network Stability

1. Long-term contracts and agreements
2. Risk sharing and problem solving.
3. Building trust: Social relationships, expertise and reputation.

1. Long-term contracts and agreements

"KAM-Unit's core competencies involve the co-ordination and optimization of the co-operation between the individual key account's organization and InnoFlex's business units for the purpose of fostering the highest long-term value for each key account and KAM-Unit (Annual report 2006/07, pp: 20)."

See also Cell A in Table 1

2. Sharing risks and problem solving

"Whenever there is a problem, InnoFlex will sit together with the supplier and try to solve the problem together."

"Maybe share the loss, or InnoFlex undertake all the loss. InnoFlex will never pass the buck to our supplier, and at this point, InnoFlex is quite generous."

"Not much should be left for our surprises".

3. Building trust: social relationships, expertise and reputation

"If you like a person, that's chemistry, and you can feel that they respect you, and over time, you respect them also. That's very important, you can feel that we have the same, common goal; otherwise you wouldn't have chosen that person at the first place to be a supplier."

"We should make the potential suppliers trust us and believe that we are a very competitive company which can bring them opportunities and substantial profits".

"To be an excellent customer, the first rule is to ensure the timely payment. InnoFlex has a good reputation on timely payment." See also Cell B in Table 1.

Appendix 2. Orchestration Capability inside a Network Organization: Illustrative Quotes.	
Knowledge Mobility 1. Knowledge sharing and idea generation 2. Employee-driven innovation	<p>1. Knowledge sharing and idea generation “We have meetings every week from where we share knowledge. I do a lot of initiative to promote the knowledge share, but knowledge share is also a challenge in China.” “We share knowledge and information, and of course communication is needed, which means that you may communicate within a project, your group, or Danish colleagues from other groups.” “InnoFlex intends to attract and retain well-qualified employees to foster innovation and growth in their international endeavors. For this purpose, knowledge sharing is an important parameter (Annual report 2010/11, pp: 9).” “There is a software system called ‘InnoFlex 360’, aiming at collecting ideas from employees and idea generalization. One part of this software is called ‘idea-spinning’ in which employees can put their thinking and ideas inside.”</p> <p>2. Employee-driven innovation “The current organization can fully mobilize every employee’s enthusiasms.” “Now every employee is obliged to be innovative.” “It is always you to take the initiatives rather than sit and waiting for other people give you instructions, and also every employee should take the initiative to find a customer proactively.” “You are responsible and you are empowered to do this.”</p>
Innovation Appropriability 1. Tracking value creation 2. Facilitating 3. Internal brokering skills	<p>1. Tracking value creation “You can see the value creation clearly between different units.” “FinanceUnit participates actively in the visibility of value creation in the entire group and handles the company’s financial management and risk management (Annual report 2010/11, pp: 8).”</p> <p>2. Facilitating “This organization needs some units working as a facilitator.” ““Of course, they can come to me, but I am not the problem solver. I can tell them, I want them to call the persons in headquarter directly in charge.” “The overall role is facilitator or supporter...he will set up some screens alongside an employees’ track in the right direction.”</p> <p>3. Internal brokering skills “...a project manager will try to encourage and invite different units to join a project.” “There is nobody in the ProjectUnit now ...all the important emails and meetings based on projects or tasks are recorded there.”</p>
Network Stability 1. Creating overall vision and strategy 2. Innovation culture 3. Building trust	<p>1. Creating common goals: overall vision and strategy “The mission, vision and strategy are very general, so it is depending on each unit to make their own strategies and specify their activities under the overall umbrella. Each unit’s strategy must be in line with the overall internal strategy of InnoFlex, and also be able to attract and offer their services to external customers.”</p> <p>2. Innovation culture “The glue between units is InnoFlex’s culture.” “An innovative culture should be able to: exploit the full potential of our employees’ competences, and then ‘speak things into existence’.” “(We) have created a language consist of a set of words to illustrate innovative culture, for example: inception, stakeholder management, workshop, facilitation, change management, process leadership as opposed to project innovation, employee-driven innovation, leadership as opposed to management, etc.”</p> <p>3. Building trust ““That takes time. You need personal relations, and when the trust started, people start to share.” “They had not been that loyal to us lately, we need to change this. We need to improve our service and our speed market, and this is what we are looking for.” “The units can find outside partners, but it takes time and cost to build a relationship with an outside partner, to make sure they are suitable and qualified, and to check whether they can work proactively together with InnoFlex. As a result, since every unit already knows that internal units have the professional knowledge and there are trustful relationships between them, the internal units are still the first choice.” “If you really follow the business model, I should be able to sell it even to the competitor ... but I haven’t tried.”</p>

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