Innovation in a Value Network Perspective[1)]

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A growing number of firms create value by networking their customers. Classic examples include telecommunication operators, logistic services and banks. The primary innovations of such firms increase the connectivity of a network, that is who or what can be reached and the conductivity of a network, that is what can be exchanged. The article discusses exploration and exploitation in networking services. It has implications for how innovations are conceived, managed and measured.

Exploration and Exploitation

An innovation is a significant change in knowledge or practice. Innovating is exploratory activity that results in new skills, practices, technologies, services or products of a firm (Greve & Taylor, 2000, p. 55). Organizations innovate in order to gain competitive advantage from new products, processes and organizational resources. Two important misunderstandings about innovation are, first, that innovations are primarily technical in nature and second, that the primary output of product development is innovations. Innovations are more than just technical devices, and much – if not most – product development does not result in innovations.

Because the word innovation is often interpreted narrowly, the term exploration is used to describe a broader idea of organizational generation of variation. Exploration takes many forms and includes, in addition to the more narrow term innovation, things such as search, variation, risk taking, experimentation, play, flexibility, and discovery (March, 1991). Furthermore, it is well established that the sources of innovation are not found exclusively inside firms. They are commonly found in the space between firms, universities, research laboratories, suppliers and customers (Powell, 1990; Powell, Koput, & Smith-Doerr, 1996). In short, firms innovate when they conduct and participate in exploratory activity inside and outside of their organizational boundaries or absorb novel practices from outside their organizational boundaries (Cohen & Levinthal, 1990). In contrast, exploitation is activities that seek to capture the gains from innovations. Organizations are structured to exploit their competencies (Greve & Taylor, 2000) and exploitation includes refinement, choice, production, efficiency, selection, implementation and execution (March, 1991). The goal of much product development is exploitation through modifying the results of exploration activities to fit a given market or through making incremental improvements in order to beat the competition.

Over time organizations need to engage in both exploration and exploitation because exploration is the seed of competitive advantage, but exploitation is required to translate competitive advantage into commercial success. The form that exploration takes and the balance between exploration and exploitation depend on the type of business the firm is in, on properties of its environment and on timing. In other words where, how and when exploratory activity takes places will vary from organization to organization. This is a challenge with respect to the measurement and evaluation of innovative activity. It is almost trivial to measure classic internally organized research and development activity. However, this accounting category does not correspond well to exploration because it omits exploration done by importing novel practices from elsewhere, it blends exploration (research) with exploitation (development), and it misses exploration in non-technical areas such as development of new business models, and entry into new markets. Hence it accounts for only a portion of organizational innovation, or exploration, particularly since knowledge in rapidly developing fields is both sophisticated and widely dispersed across a number of organizations. In industries in which know-how is critical, companies must be expert at both in-house research and cooperative exploration with universities, customers, competitors and firms that complement their value creation (Powell et al., 1996). However, even more refined accounting measures of exploration would face the conceptual problem that inputs into the innovation process are used as substitutes for the output of innovation.

Exploration in Network Service Industries such as Telecommunication and Inter-related Transaction Services

Telecommunication operators, banks and parcel services are examples of organizations that create value by linking customers who are, or wish to be interdependent (Stabell & Fjeldstad, 1998; Thompson,

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1967). Their activities are modeled by the Value Network configuration consisting of three simultaneous activities: network promotion and contract management; service provisioning and infrastructure operations. Figure 1 depicts the value network configuration for a mobile network operator. Organizations with a Value Network configuration co-produce (Ramirez, 1999) value in a horizontally interconnected and vertically layered value system (Stabell & Fjeldstad, 1998) exemplified in Figure 2. The actors between whom exchange is facilitated, such as end user customers and content creators surround the system as do suppliers of hardware and software to both operators/service providers and end users (see Andersen and Fjeldstad, 2003).

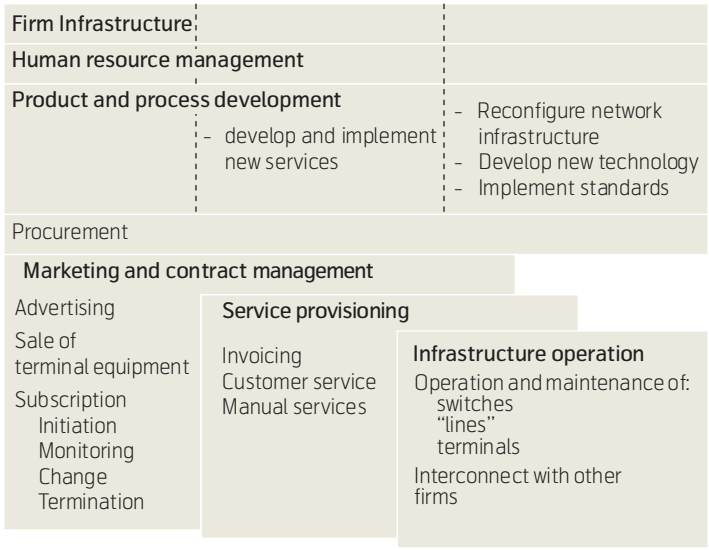

Figure 1 Value Network diagram for POTS provider

The below discussion of innovation references both the value network configuration as it applies to an individual firm and the overall value system.

The value of their offerings is thus strongly influenced by network effects (Katz & Shapiro, 1994) associated with existing and/or potential inter-customer relations for which they can provide service. There is a network effect when the value of a product depends on the size of the network or on its composition, i.e., who the other customers are (Rohlfs, 1974; Stabell & Fjeldstad, 1998). Simplified we can distinguish among innovations that increase the connectivity of a network, that is who can be reached, the conductivity of a network, that is what can be transacted, and other innovations that simply improve on either the willingness to pay for service or on the cost of providing the service, for example a better user interface or a more efficient process.

Network effects are important to the creation and capture of value for a wide range of transaction services (Economides, 1993, 1996; Encaoua, Moreaux, & Perrot, 1996; Rohlfs, 1974), and because of their strong importance, the issues associated with investment in network effects and the ability to earn profits from such investments are analogous to the issues associated with investment in technological development and patenting (Katz & Shapiro, 1985). It follows that exploration of more effective ways of diffusing new networks, that is improved practices for recruitment of customers and the roll-out of physical, human and software infrastructures, or upgrades to existing networks, is at the heart of exploratory activity in telecommunication and other transaction service firms. Such innovations contribute to increasing the connectivity of the network serviced. Firms use a variety of strategies in order to establish critical mass within the targeted user groups. Some of these include "give-aways", and "Trojan Horses", a product whose standalone features get it diffused, but which has a future potential as a network access terminal, and features that make the service diffusible, for example self installation. The diffusion of the PC was independent of its future potential as an Internet terminal, but it greatly aided the diffusion of the Internet (Fjeldstad & Haanæs, 2001).

Network service firms obviously also engage in other forms of exploratory activity. They conduct classic technologically oriented R&D activities. It is common to distinguish between product and process innovations (Wheelwright & Clark, 1992). Product innovations improve the characteristics of the product that the customer buys whereas process technologies improve on processes by which the product is created and delivered. In service industries such as telecommunication, the distinction between product and pro-

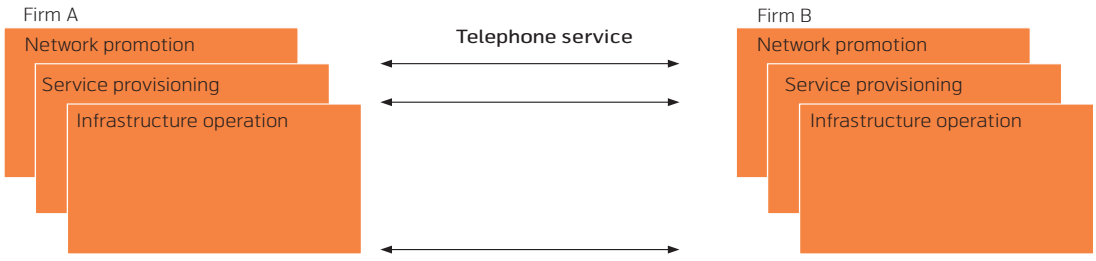

Figure 2 Horizontal co-production with cooperating and competing networks

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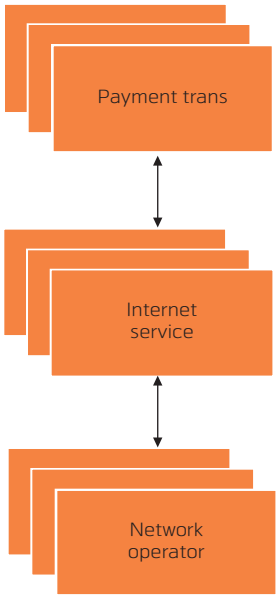

Figure 3 Vertical co-production

cess is blurred and one should expect a greater portion of process innovations. These are not typically the domain of traditional R&D activity. In fact a number of process innovations related to IT system development, change of business processes etc., are created with assistance from external consultants.

Some technological innovations directly increase connectivity. These are frequently related to the interconnection of one network to another, for example creating a bridge between e-mail software and mobile phone SMS. Technological innovations that increase conductivity, that is what can be transacted and how it can be transacted, for example speed and security become valuable to customers only by the diffusion to a sufficient number of relevant other customers. The technological innovation process must therefore also closely consider the diffusion process, including to the extent that particular features of the product makes it diffusible. Much of the success of the Internet telephony system Skype is due to its ease of spread; it is easy to download. For each user it suffices that only one additional user with whom he or she is interested in communicating with also uses Skype, and by the SkypeOut interconnection the company has increased the product's connectivity greatly beyond the network of Skype users.

A better service interface and a new type of content are examples of innovations that don't necessarily improve on network connectivity or conductivity. They improve the basic willingness to pay for a service regardless of adaptation by other users. However, exploitation of such innovations can either come directly from the customers' increased willingness to pay for the service or perhaps more important from gains to the effectiveness of the diffusion of a service as described above. Therefore strategic choices about the aim of such developments, as discussed above, and the pricing of the results in the market are very important.

Network services are basic societal infrastructures. They provide virtual spaces for flows in the modern global economy (Castells, 1996). The value is increased each time they can be used to carry another type of transaction. There are therefore two additional important forms of innovations related to network services. First, there are innovations that improve the ability of other network services to use a more basic service, for example mobile data communication, as a medium for their own type of exchange. Examples are innovations that enable banks, real-estate brokers, ticket agencies and others to facilitate their type of transactions via the mobile phone network. Such vertically aimed innovations promote the development of multi-layered network structures (Fjeldstad, 1999) important for the overall value of the service. Second, there are user-located innovations that improve users' ability to use the network to transact. Innovations made in "Tele-medicine" at hospitals and clinics to adapt their equipment and processes to network use are examples of this category. Both forms of innovations take place at the boundary of the organization. They obviously have to be carried out in some form of cooperation with the complementing providers, often competitors, when the aim is to create a sufficiently large combined network and customers.

Telecommunications innovations directly illustrate the features of exploration discussed above. First, innovations take place in the technology, in the business model for pricing the use of the technology, and in the services running on the technology and their business models. Technological exploration is sometimes integrated with exploration in the market domain, but the two domains can also be explored independently. Second, many innovations in the market domain are done once, somewhere in the world, and then imported and adapted elsewhere. This is possible because services that increase the general user's ability to pay cannot be protected as readily as technological innovations, and it can be profitable for all firms taking part in the exploration because innovations targeting willingness-to-pay are progress for both the firm and the customer even when they spread to all competitors, and thus do not alter the competitive balance. Third, some innovations in the market domain are developed jointly with specific users. The costs of developing these innovations are shared across participating organizations, but they still represent significant exploration from the viewpoint of the telecommunications provider. Multi-lay-

ered network structures are examples of such innovations.

In summary, exploratory activity is business type dependent, it takes many forms beyond classic R&D activity and it takes place in the space between a large number of different forms of actors. In network services, innovations are in particular related to technologies, processes, practices and competencies that increase network connectivity and network conductivity. Such innovations are at the heart of exploration in telecommunication service. They are exploited by willingness to pay for network membership and through transaction volumes and transaction prices. In the case of Telenor, Telenor's substantial competence in how to roll-out networks and diffuse services that lead to high network use is globally explored and globally exploited.

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