



Organising the interplay between exploitation and exploration: The case of interactive development of an information system

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ABSTRACT

Every company needs to exploit on its current technological solutions while also working on developing new ones, i.e. exploring new or modified solutions. The ways in which a company deals with these issues are closely connected with how it organises the interaction among actors within the firm as well as with external counterparts. In this paper we present a case study of a company that combines the two issues so that product features developed in interaction with specific customers can be systematically taken advantage of in future standard solutions. Owing to various interdependencies within and across products and product versions over time, this is not an easy task and the organising of interaction across projects, functions and firm boundaries can be seen as a key challenge. The paper ends by suggesting that new innovative ways of organising interaction are needed to cope with increasingly complex interdependencies that span organisational boundaries. We also suggest some key aspects of organising that need to be taken into account in such endeavours.

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1. Introduction

The literature emphasises the interaction between technical and organisational factors in product development projects carried out within a firm. However, owing to specialisation resulting in increasing interdependence and technological complexity at the interfaces between firms, firms face increasing challenges in organising their activities not only within but also across their boundaries (Gadde, Håkansson, & Persson, 2010; Håkansson, Ford, Gadde, Snehota, & Waluszewski, 2009). Dubois and Araujo (2006) analyse how interaction cuts across boundaries at the levels of the firm, dyadic relationships and networks of connected relationships. This points out the importance of not limiting the analysis of product development to individual projects or internal activities but of recognising how the development relates to different scopes in time and space within and across project and firm boundaries.

In this paper we address these challenges by focusing on a key theme in innovation literature: exploitation versus exploration. The aim of the paper is to inquire into how a company can organise the interaction among specialised actors within and across its boundaries in order to explore and exploit innovative effects from systematic interaction. We take the perspective of the supplying firm and scrutinise a case in which a company develops an information system in interaction with its customers. We conclude by suggesting that it is

possible, using innovative ways of organising the interaction among a set of actors, to foster productive interplay between exploitation and exploration of technical solutions developed in interaction.

In the next section we present and discuss some key theoretical notions, beginning with the concepts of exploration and exploitation of technical solutions. We then discuss organising internal as well as external. Based on these notions, and before introducing the case, we present a model for the case analysis.

2. Theoretical reviews and reflections

2.1. Exploitation and exploration

While exploitation deals with efficient employment of current assets and capabilities, exploration concerns the development of new assets and capabilities (March, 1991). A long research tradition claims that these two issues are difficult to combine and that exploitation and exploration are therefore competing strategies (Burns & Stalker, 1961; Galbraith, 1982; Kyriakopoulos & Moorman, 2004). Galbraith (1982) argues that, when not separated from exploitation activities, exploration activities may not receive adequate attention. One important reason for this is that the returns from exploration are less certain and more remote in time. In addition, exploitation and exploration strategies are associated with different organisational structures (Burns & Stalker, 1961; Kyriakopoulos & Moorman, 2004). Burns and Stalker argue that exploration flourishes in an organic structure, while exploitation benefits from a mechanistic one.

Despite the difficulties described in combining exploitation and exploration, firms must engage in both (Levinthal & March, 1993;

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March, 1991). According to Auh and Menguc (2005), excessive exploitation at the expense of exploration can be costly, as the tangible outcomes of exploration will only be realised in the distant future and then only with considerable uncertainty. On the other hand, concentration on exploitation with too little focus on exploration discourages the organisation from pursuing learning and development. This can direct firms to focus only on the near future and potentially to miss out on long-term investments and opportunities that could prove valuable. Hence, as claimed by March (1991), “maintaining an appropriate balance between exploration and exploitation is a primary factor for a company's survival and prosperity” (March (1991):71).

Adler, Goldoftas, and Levine (1999) offer some solutions to how exploration and exploitation activities can be combined. Firstly, companies can encourage employees involved in routine tasks to become more creative. Secondly, companies can work to keep their individual culture and structure intact while switching employees back and forth between routine and non-routine tasks. Unfortunately, these two approaches both have some drawbacks. In particular, role ambiguity and role conflict can surface when role specialisation become weak. A third way of combining exploration and exploitation activities is to divide the organisation into two parts, one of which focuses on exploration and the other on exploitation. An important advantage of this kind of structure is the improved accumulation of deep knowledge and expertise. However, it also results in the need for a dual organisational structure. The task partitioning approach may also generate a cultural division—an adhocracy culture related to exploration and a hierarchical culture associated with exploitation. According to Adler, such division and partitioning can be an obstacle to synergistic efforts between the subunits because it impedes horizontal information flows and communication.

Since exploration concerns development of new assets and capabilities, it relates to creativity (Tu, 2010). Creativity is generally associated with the ability to combine separate elements into a meaningful (new) unit (Boden, 1991). Boden argues that this idea undervalues the meaning of the “conceptual space” that allows for certain combinations. In order to be able to arrive at genuinely new ideas, it is necessary to enter into new conceptual spaces. Woerkum, Aarts, and Grip (2007) argue that for organisations it is important to offer members a richness of experience with which they can be creative in many realms. Specialisation in the professional realm is a strong contributor to achieving efficiency. However, this must be “informed” specialisation, with awareness of the context in which one works so that a sense of new trends and new possibilities is fostered. This implies the need of a large number of contacts among a heterogeneous group of people from both inside and outside an organisation.

In contrast to previous suggestions concerning exploitation and exploration as two different categories of activities that need to be assigned to different firm-internal actors, in this paper we inquire further into how a company can organise the interaction among actors within and across its boundaries in order to explore and exploit innovative effects from systematic interaction with its customers. Next, we present and discuss some issues and notions on organising.

2.2. Organising—firm internal and external

Since the 1960s (e.g. Katz & Kahn, 1966; Thompson, 1967), scholars have investigated the impact of a firm's internal organisational design on its innovation capability (cf. Argyres & Silverman, 2004; Eisenhardt & Tabizi, 1995). Many of these authors have emphasised the importance of internal communication and information sharing in relation to the performance of organisations and their development projects (cf. Dalton, Todor, Spendolini, Fielding, & Porter, 1980; Olson, Walker, & Ruekert, 1995; Russo & Harrison, 2005; Tatikonda & Rosenthal, 2000). According to Badir, Buchel, and Tucci (2009), task characteristics such as interdependence, uncertainty, and complexity determine the amount of communication within companies. They argue that more

interdependencies, complexity and uncertainty usually require more communication and a larger number of communication media.

Discussing intra-organisational interaction, Rozemeijer and Wynstra (2005) present different forms of organisational structures, all with different advantages and disadvantages. A functional structure, according to Rozemeijer and Wynstra, provides several advantages over other structures: it gathers all workers of one type and allows them to transfer ideas, knowledge and contacts among one another, and it allows for a greater level of specialisation. In other words, the functional structure facilitates economies of scale and specialisation. Unfortunately, such a structure is not good at coping with great variety in products and markets. In addition, it creates barriers between different functions, slowing down cross-functional processes such as new product development.

In contrast, the “product structure”, where all functions are formed around different product lines, is claimed to compress the product development process. However, it also implies several disadvantages. Firstly, general managers all want autonomy, resulting in each product division reinventing the wheel, duplicating resources and missing various opportunities for sharing. Secondly, there can be a loss of economies of scale (Rozemeijer and Wynstra, 2005).

Finally, a market structure can be applied. This is the most rapidly increasing type of structure, basically because it provides companies with superior knowledge about their customers. The disadvantages are similar to those of product structures: market structures tend to duplicate activities and develop incompatible systems, and they also usually impede sharing of common products and services (Rozemeijer and Wynstra, 2005).

Regardless of what type of structure is chosen, some activities require coordination across departments (Galbraith, 1995). Mintzberg and Quinn (1991) identify six different coordinating mechanisms. The first mechanism is *direct mutual adjustments*, where the people who do the work interact with one another without passing through any management channel. The second mechanism is *direct supervision*, where one person coordinates by giving orders to others, such as a project leader responsible for coordinating the work done by his/her team members. According to Thompson (1967), such coordination is performed at different hierarchical levels where each higher level handles those aspects of coordination which are beyond the scope of the lower levels.

In addition to through direct mutual adjustments and direct supervision, coordination may be achieved through four different forms of standardisation: *of work processes*, *of output of the work*, *of knowledge and skills*, and *of norms*. According to Rozemeijer and Wynstra (2005), a company never relies on only one mechanism, but usually applies a combination of all six.

Complementary to organisational design (e.g. functional structure) and the above mechanisms is the level of centralisation/decentralisation. Recently, increasing attention has been paid to *hybrid structures* that are neither centralised nor decentralised. According to Rozemeijer and Wynstra, these structures allow for opportunities to capture benefits of both centralisation and decentralisation. While standardisation and efficiency push towards greater centralisation, customisation and differentiation push towards greater decentralisation. A key issue is therefore how to combine these two forces.

Research on intra-organisational issues has been a recurring topic over the years, but inter-organisational issues have received increasing attention over the last 30 years, in particular with regard to the role and importance of inter-organisational interaction and its impact on companies' innovation capabilities (cf. Gemunden, Ritter, & Heydebreck, 1996; Gruner & Homburg, 2000; Håkansson & Eriksson, 1993; Nordberg, Campbell, & Verbeke, 2003; Rosenberg, 1982; von Hippel, 1988; Wynstra & Pierick, 2000). Several authors suggest that close interactive business relationships may lead to innovative effects based on the combining of highly specialised resources of the companies (Håkansson & Waluszewski, 2002; Håkansson et al., 2009).

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