

Managerial competencies and organizational capabilities in striving for continuous innovation

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Keywords: capabilities, capacities, learning behaviours, competences

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ABSTRACT

Organisations are being told they need to improve their dynamic capabilities and increase their capacity to grow in an increasingly dynamic environment. Knowledge-based industries are increasingly competing on the basis of their knowledge resources. R&D and new product development activities are dependent on knowledge-based resources. This paper draws together work on learning behaviours, capabilities and capacities and shows how these can be linked to a competitive position for knowledge-based activities. Using empirical data collected for a European-Australian study on continuous innovation in new product development, this research demonstrates how bundles of learning behaviours create organisational capabilities.

INTRODUCTION

Knowledge-based resources are relatively unprotected from imitation, so that competitors can develop similar or even superior knowledge-based resources. Such imitation normally takes time and companies with superior knowledge-based resources can develop their own assets further by engaging in continuous innovation. Hence, companies must be ready to change and re-orient core competencies in order to deal with new environmental challenges, utilising dynamic organisational capabilities (Teece, Pisano and Shuen 1997). This research explains the differences between capacities, capabilities and competencies and is an important empirical demonstration of how they are linked. Based on the notions of organisational capabilities, identified in the CIMA project (Hyland et al. 2001), and of managerial competencies, identified by Boccardelli and Magnusson (2000), this paper explores the links between organisational capabilities and learning behaviours in supporting continuous innovation, utilising data collected from firms in Australia and in Europe.

Continuous Innovation

In order to meet changing market requirements and new competitive situations, learning processes can affect the capability to reconfigure and transform a firm's knowledge-based resources and competences, such as technological assets. Continuous innovation is a fundamental task for a company that exists in unstable business environments and it requires a constant surveillance of markets and

technologies, as well as the capability to quickly accomplish changes (Teece et al., 1997). All reconfigurations and transformations continuously affect operational processes by the accumulation, selection and change of patterns of routines. Another key activity is the recognition and exploitation of technological opportunities (Teece et al., 1997). This is extremely important for companies running science-based businesses, where the strategic and economic performance is often related to R&D competencies and to the capability of identifying and following new technological trajectories. Leading organisations need to find configurations of processes, procedures, people, technologies, and organisational arrangements that allow them to become continuously innovative (Bessant and Boer, 2002). Accordingly, continuous innovation is the ongoing interaction between operations, incremental improvement, learning and radical innovation aimed at effectively combining operational effectiveness and strategic flexibility (Boer, 2002), as it is both operationally effective in exploitation and strategically flexible in exploration. However the search for a continuously innovative organisation depends on the capability to renew managerial competencies and to create radically new competencies in order to achieve congruence with the changing business environment (Teece et al., 1997). The transformation and reconfiguration of resources and capabilities is a key component in continuous innovation. In this article, we contribute to this field by clarifying the relationships between some of the concepts that so far have been proposed, more specifically the concepts of capacities, capabilities and learning behaviours in the specific context of innovation activities.

Capacities, Capabilities and Behaviours

Capabilities are a set of differentiated skills, complimentary assets, and routines, that provide the basis for a firm's competitive capacities. Garud and Nayyar (1994) have for instance written about transformative capacity, which is described by the capability to accomplish three different tasks: choose technologies, maintaining them over time, and to reactivate them when required. Nonaka and Takeuchi, (1995), have worked on the capacity of creating knowledge and on the need to integrate different capabilities in R&D work (Grant, 1996). While Carneiro (2001) argues that an organisation should have the capacity to exploit its knowledge and learning capabilities and it should do this better than its competitors if it decides to assume a competitive strategy, Cullen (1999) argues the

significance of both individual and organisational learning in order to develop organisational capacities. Similarly, Boer et al (2001) argue that organisational capacities enable learning behaviours to develop across the organisation. Orr and Sohal (1999) argue that organisations need to convert their technological capacities into business performance and for this to occur they need to have capabilities and skills in technology planning and forecasting.

It is argued here that organisational capacities can be either internal or external to the organisations. Capacities can be viewed as the potential to activate or acquire a set of capabilities that the organisation needs. Capabilities on the other hand are the abilities and skills possessed by groups within the organisation and these are usually internal to the organisation but may be acquired through using contract labour with highly specific skills that are only required for a short term project. According to Gieskes and Langenberg (2000), capabilities are integrated resources that the organisation draws together deliberately. These resources include tangible and intangible assets ranging from behaviours and skills to information systems. Turning this type of capabilities in the resource-based language, they can be viewed as one of the main component of the strategic (or core) competence of an organisation, being at the core of the accumulation of relevant intangible resources, like technological knowledge and human capital.

Behaviours are described by Karnoe (1995: 430) as a “repertoire of experiences, skills, and beliefs” and by Drejer (2000: 206) as “a system of technology, human beings, organisational (formal) and cultural (informal) elements and the interactions of these elements”. While capabilities may be latent in that they can be dormant or even suppressed by managers in the organisation, behaviours are only evident when they are demonstrated by individuals or groups within the organisation. Capabilities require a bundle of behaviours and the strength of a capability will vary. This also reflects what Boccardelli and Magnusson (2000) term a dynamic capabilities approach. In the dynamic capabilities approach, core competencies stem from the dynamic interaction of tangible and intangible resources and organisational know-how, within and between organisations, which allow organisations to move from one bundle of competencies to a new one. This dynamic reconfiguration of competencies is mainly led by organisational knowledge creation processes and other learning processes.

This frame leads us to draw a fundamental relation between capacities, capabilities and behaviours: capacities are those abilities resident at an organisational level, which work to enable behaviours within and between companies to develop, accumulate or use capabilities for the marketplace. Within this frame the evolution from a bundle of core behaviours to a new bundle or a single new behaviour can be due to internal and external sources of development and/or by combining existing behaviours in new ways.

In that sense the relationship between behaviours and capabilities suggests that people acting with and within organisations apply existing knowledge resident at different levels (Nonaka, 1994) and while interacting and solving emerging problems they not only learn new knowledge but they also learn and accumulate new ways of learning and behaving. In other words, the dynamic interaction between organisational actors, which in business language is usually labelled as organisational and managerial processes, allows the organisation to accomplish and accumulate new patterns of behaviours. The ability to drive the evolutionary paths of these behaviours can be considered at the core of the dynamic capabilities of a firm. Eisenhardt and Martin (2000), suggest that the organisational and managerial processes that constitute a key component of dynamic capabilities are processes that integrate, reconfigure, gain and release resources. In other words, the capacity to lead individual as well as organisational behaviours towards successful company capabilities is a sort of meta-competence running at different managerial level, which in turn manifests itself as a bundle of firm-specific processes, procedures and organisational know-how.

Translating these concepts to innovation activities implies that capacities, usually seen as managerial processes, can be considered as a set of organisational competencies resident at the managerial level that drives company behaviours to the development and exploitation of strategic capabilities. They can be grouped in four classes: combinative or integrative, creative, transformative and absorptive capacities. Combinative or integrative capacities aim at integrating complex, systemic, and often tacit knowledge. This is a decisive factor in turning a project into a single step of a longer sequence of technological knowledge development (Bartezzaghi et al., 1998). Therefore, they not only work within a single project, but also in a longitudinal sequence and in simultaneous projects (Nonaka and Cusumano, 1997). The capacities of transformation are aimed at grasping the residual potential of an

existing knowledge base. They are used to perform the necessary incremental development to obtain and launch numerous applications from the same technological basis. An important factor to allow for transformative learning is therefore the capability to consolidate earlier acquired knowledge and experience, and make it available to other organizational members. Furthermore, since all learning patterns are not equally important for firm performance, the capability to align learning with company goals and strategies is key. The purpose of creative capacities is to assist in bringing about radically new products, processes and procedures. Often this implies finding ways of breaking with established ideas to create room for the application of new perspectives, which can be facilitated by the use of strong metaphors that do not fit with existing frames of interpretation (Nonaka, 1994; Nonaka and Takeuchi, 1995), or by exposure to individuals or communities holding different perspectives (Boland and Tenkasi, 1995). Another important issue is that inter-project learning and the sharing of information across organisational boundaries (Hansen, 1999), are carried out quickly and sometimes within changing guidelines. The capability to do so provides organizations with absorptive capacity (Cohen and Levinthal, 1990), i.e. the capacity to acquire information from external sources in an efficient manner.

METHODOLOGY

The starting point for this investigation has been the joint Euro-Australian CIMA project (Continuous Improvement of global Innovation Management). More specifically, the basis of the inquiry is the CIMA methodology (Boer et al., 2001), which has been designed to provide insights to firms which they can use to foster and sustain the process of continuous improvement in product innovation. The CIMA process is a structured, step-wise approach to capturing continuous innovation performance and improvement potential. The model underpinning the CIMA methodology describes the improvement and learning within product innovation (see Boer et al 2001). All the variables in the model have been operationalised in a questionnaire, which has been used to collect data on the situation regarding continuous product innovation in the participating organisations. The data was collected using a self-administered questionnaire. The data was collected in Australia and Europe and the current dataset has a sample of 60 companies with NPD functions. The sample was a purposive sample as this was an exploratory study and required firms with an NPD function. In some cases the data was collected on a

one to one basis, in other cases the data was collected from groups of respondents who were part of a workshop on improving learning in new product development. In both instances, a researcher facilitated the completion of the questionnaire.

Results and analysis

Each respondent was asked to score the frequency and diffusion of learning behaviours on a five point scale and for the purpose of this paper the mean of each behaviour has been calculated. It can be seen from tables 1 and 2 that the most frequently exhibited behaviour and the most widely dispersed behaviour is B2 "Individuals and groups use innovation processes as opportunities to develop knowledge" with a mean frequency of 3.4 and mean dispersion of 3.29. The weakest behaviour is B5 "Individuals transfer knowledge from experience and generalise it for application on new processes" with a mean frequency of 2.34 and mean dispersion of 2.37. To rate the relative importance of each capability a mean of means is calculated. Using this value, the capability to integrate knowledge within the PI process has the highest mean of 3.14 for frequency and a mean of 3.10 for diffusion. The capability to transfer and diffuse knowledge among PI processes scores the lowest mean of 2.42 for both frequency and diffusion.

In examining the frequency of behaviours it is surprising to note that the least frequently reported behaviour was B5, "Individuals transfer knowledge from experience and generalise it for application on new processes". It may be the case that this happens implicitly and it is difficult to determine when it is occurring. When comparing the frequency and dispersion of behaviours, one behaviour stands out, B8 "People try to assimilate and internalise knowledge from external sources". This behaviour B8 has a relatively high frequency of 3.22 but a mean diffusion of 2.90; this indicates that the behaviour occurs frequently within a relatively narrow group of employees.

As can be seen from tables 1 and 2 there are some differences in the frequency and diffusion of behaviours and using a mean of means as an indicator there is a spread of frequency and diffusion of knowledge and learning capabilities in the companies in this study. As can be seen in both tables 1 and 2 behaviours are not equally used in terms of frequency and diffusion. This means that some

behaviours are more frequently demonstrated than others and some behaviours are less widespread than others. These differences in diffusion and frequency result in differences in the capabilities within the organisations in this study. Using the mean of means as an indicator it is evident that all capabilities are present in the organisations in this study but some capabilities are more widespread and more frequently used.

Capabilities	Learning Behaviours								Mean of Means
	B1	B2	B3	B4	B5	B6	B7	B8	
	Individuals and groups use the organisation's strategic goals and objectives to focus and prioritise their improvement and learning activities	Individuals and groups use innovation processes as opportunities to develop knowledge	Individuals use part of available times/resources to experiment new solutions	Individuals integrate knowledge among all different phases of product innovation	Individuals transfer knowledge from experience and generalise it for application on new processes	Individuals abstract knowledge from experience and generalise it for application on new processes	Individuals embed knowledge into vehicles	People try to assimilate and internalise knowledge from external sources	
Knowledge generation capability		3.34	2.78			2.49		3.22	2.99
Learning alignment capability	3.07	3.34	2.78			2.49			2.95
Knowledge consolidation capability					2.34	2.49	3.19		2.74
Knowledge integration within PI process capability		3.34		3.40		2.49			3.14
Knowledge transferring and diffusion among PI processes capability					2.34	2.49			2.42

Table 1 Mean Frequency of Capabilities and Learning Behaviours in Product Innovation

Discussion

Results of this study have shown that companies engaged in innovation activities apply several learning behaviours in order to gain successful combination of capabilities and competences. Accordingly, it would be expected, for example, that organisations involved in internal product innovation will have an extensive capacity for creativity. In the sample studied here the creative

capability would be hindered by the relatively poor knowledge transferring and diffusion among product innovation processes capability and it would be difficult for an organisation to source this externally. Once an organisation has decided to locate its product R&D internally then it needs to build some capabilities internally, particularly those that are difficult to source from outside a firm and those providing firm-specific advantages (Dierickx and Cool, 1989).

Capabilities	Learning Behaviours								Mean of Means
	B1	B2	B3	B4	B5	B6	B7	B8	
	Individuals and groups use the organisation's strategic goals and objectives to focus and prioritise their improvement and learning activities	Individuals and groups use innovation processes as opportunities to develop knowledge	Individuals use part of available times/resources to experiment new solutions	Individuals integrate knowledge among all different phases of product innovation	Individuals transfer knowledge from experience and generalise it for application on new processes	Individuals abstract knowledge from experience and generalise it for application on new processes	Individuals embed knowledge into vehicles	People try to assimilate and internalise knowledge from external sources	
Knowledge generation capability		3.29	2.69			2.47		2.90	2.87
Learning alignment capability	3.12	3.29	2.69			2.47			2.93
Knowledge consolidation capability					2.37	2.47	3.28		2.78
Knowledge integration within PI process capability		3.29		3.35		2.47			3.10
Knowledge transferring and diffusion among PI processes capability					2.37	2.47			2.42

Table 2 Mean Diffusion of Capabilities and Learning Behaviours in Product Innovation

However, in building capacities and capabilities, managers need to be aware that they stem from bundles of behaviours or competences and that these competences are embedded in individuals and groups of employees. Not all competences will exist to the same extent and most can be acquired by training existing employees or recruiting employees who have the competences needed to build a specific capability.

In the paper we proposed that four classes of innovative capacities drive the accumulation of capabilities; combinative or integrative, creative, transformative and absorptive capacities. We also propose that each of these capacities require that the organisation must be able to access all the capabilities identified in our study. As can be seen from the results in this research, behaviours vary significantly both in terms of their frequency and how widespread they are in an organisation. Capacities in this framework play a crucial role, as they work as meta-compences running at the organisational level, which drive evolutionary paths of learning behaviours and through them the ability of the company to reach capabilities enabling superior competitive positions. As a matter of fact, capabilities exist through the bundling of behaviours and therefore they also vary in organisations. The main challenge is thus to understand which type of capacity must be fostered, and consequently which type of learning behaviours, in order to improve the accumulation of capabilities and the competitive position. However this analysis can be addressed only with the consideration of performance variables that can shape capacities and capabilities outperforming from those underperforming. Further research needs to be conducted to determine if other capacities are also needed and if all capacities are situational. This type of investigation remains an interesting challenge for the future as it is central to a better understanding of the management of innovation that managers can identify the capacities and capabilities that they need and determine how they will acquire or grow these capacities and capabilities.

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