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Balancing between learning and performance in R&D subsidiaries of global technology companies – multiple case study

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Abstract: In global technology companies, the headquarters typically expects the R&D subsidiaries to have high performance in terms of R&D project time and cost, but in the same time high innovation capabilities are expected. On the other hand, the R&D subsidiaries typically have their own interests in maintaining their positions in the company's product development organization, and also competing against other subsidiaries. This causes a learning paradox, in which the R&D organization is expected to have good capabilities for innovation and learning, and in the same time it must have as high performance as possible. This paper presents a qualitative case study that analyses how R&D managers in the subsidiaries can cope with the conflicting tensions between learning and performance.

Keywords: Commercialization, university-industry collaboration, customer involvement; user involvement.

1 Introduction

In the global technology companies, remarkable parts of the R&D are located in the globally distributed R&D subsidiaries. In this manner, the company may utilize the

innovation capabilities and special skills and competences available in the dispersed technology units. As the subsidiaries are typically embedded in various local networks in their own geographic regions, they may develop and maintain unique and idiosyncratic patterns of network linkages. This, in turn, helps the subsidiaries to be exposed to new knowledge, ideas and opportunities provided by their local networks (McEvily and Zaheer, 1999). This differential exposure has been seen as one of the basic competitive advantages of multinational firms, because it increases the breath and variety of network resources (Andersson, Forsgren and Holm, 2002; Ambos, Andersson and Birkinshaw, 2010). Whereas the main motivation of the headquarters to develop and maintain the network of the R&D subsidiaries is to utilize the local resources, knowledge and competences in the most effective manner, the subsidiaries often have their own local interests to develop their activities. The subsidiaries often have to compete with each other in the global network of subsidiaries to maintain or increase their status in the view of the headquarters. Especially R&D subsidiaries located in the developed countries with relatively high cost of engineering work have to maintain and develop their performance to maintain their position in the competition with subsidiaries located in the countries of lower costs of engineering work (Lewin, Massini and Peeters, 2009). For this reason, to be competitive enough, or to even survive, the R&D subsidiaries have to constantly sustain their competitiveness by developing dynamic capabilities (Teece, Pisano and Shuen, 1997; Eisenhardt and Martin, 2000) that enable them to draw on, to extend and redirect their technological capabilities and R&D resources (Marsh and Stock, 2003; Kunttu and Kohtamäki, 2018). In this manner, the globally dispersed R&D units of the global technology companies have to continuously renew and develop new capabilities, skills and competences through learning. These learning efforts may involve building upon, as well as destroying the past to create the future (Smith and Lewis, 2011b). When the global technology companies are increasingly offshoring their knowledge-intensive functions, such as R&D, to the countries of lower cost of engineering work, the units located in the countries of higher cost face increasing challenges to maintain their competitiveness. Thus, whereas innovation performance has recognized as an important competitive advantage for the R&D units located in the high-cost countries, the units have also be competitive enough in meeting their performance targets in terms of project performance (Kunttu and Kohtamäki, 2018). This means that the subsidiaries have to demonstrate project performance by engaging in strategic goals and targets set by the current competitive environment and the views of the headquarters (Ambos, Andersson and Birkinshaw, 2010). This, in turn, means that the managers of R&D subsidiaries are increasingly facing a dilemma of how to encourage the product development staff to explorative innovation, and simultaneously ensure that R&D function meets its performance targets in terms of project time and cost (Lewis *et al.*, 2002). This dilemma is shared by the R&D managers in countries of both high and low cost of engineering work.

In this paper we study a learning paradox, in which the R&D organization is expected to have high innovation performance and learning capabilities, but it must simultaneously demonstrate as high project performance as possible. A learning paradox, as all paradoxes, involves contradictory yet interrelated elements that exist simultaneously and persist over time (Smith and Lewis, 2011b; Jay, 2013). Thus, these kinds of organizational paradoxes can seldom be solved, but instead, the organizational actors may develop practices to navigate through the paradoxes through “both-and” thinking

(Jay, 2013). Scholars in the field of innovation management research have studied organizational learning approach for finding balancing mechanisms between the tensions related to e.g. exploitation-exploration dilemma (Smith and Tushman, 2005; Andriopoulos and Lewis, 2009; Smith and Lewis, 2011b). However, finding balance between learning and project performance in the context of R&D innovation is still a widely neglected topic in previous research. The work of Kunttu and Kohtamäki (2018) presents a framework for this area, but considers the paradox only from the viewpoint of the countries of high cost of engineering work.

To fill this gap, this study aims at answering the following research question: *How managers of R&D subsidiaries can cope with competing demands between learning and project performance?* This study addresses the research question by analysing the coping mechanisms related to the learning-performance paradox and identifying the managerial practices that facilitate simultaneous engagement in project performance targets and, in the same time, maintaining learning and innovation performance. The qualitative case study analyses six R&D subsidiaries in Finland, and one subsidiary in Poland. In this manner, the study seeks to identify differences in the coping mechanisms and related practices in high-cost countries (Finland), and lower-cost countries. This study contributes to the previous work concerning organizational paradox by suggesting practices for coping with the learning paradox in R&D subsidiaries. Second, the study compares the coping practices in high and low cost countries, and third, the study contributes to the existing work on the role of R&D subsidiaries in global technology companies by adding findings on the innovation practices. The findings of the paper can have important managerial implications, given that most multinational technology companies utilize networks of internal R&D subsidiaries, which typically face the challenge of coping with learning and performance demands.

2 Coping with contradictory demands of learning and project performance

The theoretical framework of this study is built on the intersection of the theories of organizational paradox between learning and performance (Smith and Lewis, 2011b) as well as the literature of R&D subsidiary innovation and initiative taking (Ambos, Andersson and Birkinshaw, 2010; Figueiredo, 2011; Reilly and Sharkey Scott, 2014). The view of organizational paradox suggests that sustainability in long-term requires that the organization is able to meet divergent demands (Lewis, 2000). This requires the organizations continuous efforts and ability to develop practices and mechanisms to cope with these demands. The paradox studies thus explore how the organizations may simultaneously attend to several demands that are typically competing and contradictory in nature (Smith and Lewis, 2011a). The theories of organizational ambidexterity aim at identifying mechanisms and practices that facilitate the organizations ability to manage these kinds of tensions (Lubatkin *et al.*, 2006). Ambidexterity scholars have also studied various organizational tensions that have impact on innovation (Andriopoulos and Lewis, 2009), and they have suggested practice-based approach to identify mechanisms to cope with these tensions. As the organizational paradox typically involves elements that are contradictory but interrelated, the paradox research should be able to identify organizational coping mechanisms (Jay, 2013). These coping mechanisms can be identified through the process of organizational sensemaking (Weick, Sutcliffe and

Obstfeld, 2005) that represents an iterative cycle of action and retrospective interpretation to generate stable meaning and organizational action (Jay, 2013).

3 Methodology

The methodology of this paper is based on a qualitative case study approach and it examines six R&D units of global high-technology firms. Five of the R&D units in question are in Finland, and they represent product development capabilities of large high-technology firms operating on various areas of information technology. In addition, one unit is in Poland, and thus it represents the recent trend of technology offshoring—in the sense of relocating in-house R&D activities to low cost countries. Table 1 summarizes the information of each R&D unit referred to in the cases. The empirical data collection for the study involved interviews and discussions with senior corporate executives responsible for R&D and innovation function in each case company. The selected interviewees were key decision makers concerning R&D and innovation, as listed in Table 1. The interviews lasted between 54 and 82 minutes, and all were recorded and transcript. The interview data were analysed when the case interviews were completed.

4 Results

In this section, we present an analysis of the data across all of the cases so as to identify differences and similarities in the data collected from the case-specific interviews. In this section, coping mechanisms related to the learning-performance paradox are analysed in terms of three main categories: strategy-based management, organizational learning, and culture.

Table 1. The description of the cases.

	Case A	Case B	Case C	Case D	Case E	Case F
Location	Finland	Finland	Finland	Finland	Finland	Poland
Number of employees in R&D unit	70	70	40	50	150	330
Main products/services	Hardware and embedded software	Electrical and electronic devices and systems	Devices and systems for logistics	Software development for mobile communications	Power electronics products	Electrical and electronic devices and systems
Location of the headquarters	United States	Europe	Europe	United States	Europe	Europe

Participants in the case interview	Engineering Manager (R&D)	Technology Center Manager	Global program manager	Project Manager (R&D)	Vice President (R&D)	R&D Site leader
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Development of strategy-based management

The learning-performance paradox caused by the contradictory demands of performing and learning yields often to competing strategies and goals in the organization (Kunttu and Kohtamäki, 2018). The interview data clearly indicated how important it is for the local R&D managers to understand the need of innovativeness and constant learning as necessary requirements for the subsidiary's competitiveness and even survival within the global network of R&D units. All the interviewees confirmed this, and many of them also highlighted the role of the competition between the geographically dispersed subsidiaries of the company. As the subsidiaries have to compete against each other in terms of performance, but in the same time demonstrate innovativeness and ability to learn. All the interviewees recognized this challenge, and described how the organizations were coping with this tension:

Project performance is certainly our top priority, but everyone knows that this is not enough – we also have to provide something new that is useful for the company. (Case A)

We just have to respond the performance needs, and in the same time find time and resources for developing new ideas. This is not always simple, but over the years we have found ways to do that. (Case B)

Even though the interview data indicated that the managers clearly recognized the tensions related to the learning-performance paradox, only a minority of them could directly see it as a strategic challenge for their local R&D unit. As indicated by (Smith and Lewis, 2011), organizational paradoxes are often latent in nature – they remain dormant, unperceived, or ignored until environmental factors or cognitive efforts make them salient. This requires a process in which the contradictory tensions become experienced among the organizational actors (Smith and Lewis, 2011, p. 390) through managerial sensemaking. This kind of sensemaking can be seen as a process through which change initiatives, interventions and plans are interpreted by organizational members and they are being translated into action (Weick, Sutcliffe and Obstfeld, 2005; Lüscher *et al.*, 2008). As Table 2 reveals, the interviews revealed several managerial practices that were resulting from sensemaking on the local level.

Our local organization is well aware of the fact that we have to be productive both in terms of performance and innovation. We have to decide internally how to do this. (Case D)

As a part of local R&D strategy, many of the interviewed managers referred to the local initiative taking (Ambos, Andersson and Birkinshaw, 2010; Figueiredo, 2011), in which the R&D unit makes its own development work, and demonstrates the results to the parent unit:

Our local R&D is actively seeking new areas of technology that could be useful to our company. We often start minor development projects around these topics to create a prototype or a “proof of concept” that we can demonstrate the headquarters. (Case A)

We try to be active in proposing new technological solutions and tools that could provide added value for our product development globally (Case C)

Thus, the local R&D units may use their own expertise and specific capabilities to make the development work on their competence areas. It is typical that this kind of development is carried out as internal processes without involvement or even explicit approval of the parent unit (Ambos, Andersson and Birkinshaw, 2010; Figueiredo, 2011; Reilly, Scott and Mangematin, 2012). If the internal project is successful, the idea can be “sold” to the parent:

Very few of our current development areas would ever be initiated, if we had asked a formal approval for starting them from the parent unit. (Case B)

However, especially the R&D unit located in Poland (Case F) emphasized that the offshore units without own product manager responsibilities rarely can “sell” their initiatives to the product management that is typically located in the parent unit. The interview data shows that the local R&D management sees that close collaboration with the end customers enables them to make their initiatives to the parent unit more successful, because of the customer’s support and recommendations:

We have minimal access to the end customers, we are relying on the product management. (Case F)

We are establishing direct communications to customers. (Case F)

Thus, the interview data shows that the that a subsidiary may use the direct contacts to the customer in the same manner as the local market opportunities to improve the subsidiary’s capability to innovate and thus strengthen its competitive position (Andersson, Forsgren and Pedersen, 2001; Figueiredo, 2011; Yamin and Andersson, 2011; Bäck and Kohtamäki, 2016). In case F, however, the connections to the end-customer were emphasized, even though all of them were not local customers.

Supporting learning on organizational level

As described earlier, the managers have to develop coping mechanisms to respond to the contradictory demands of learning and performance through managerial sensemaking. The coping mechanisms often relate to the processes of organizational learning, in which the organizations develop their own skills, capabilities and competences. In most of the interviews, the managers mentioned challenges related to the resource allocation for the internal work contributing to the initiative generation and innovation, especially in those cases where the senior management has not given approval for these activities. However, the interviews also revealed practices that were developed over time to answer to this challenge:

We [as local R&D management] are usually able to arrange some flexible time for further development of promising ideas in parallel with our daily project-based work. Senior management seems to accept this as far as it does not risk the project work schedules. (Case E)

According to the interview data, the agile working methods widely adopted in high technology R&D often facilitate the innovation development in teams:

Agile working methods let the teams effect on their working priorities, and also decide their internal schedules and workshare. This gives them some freedom to allocate time also for innovation development work. (Case C)

Even though most of the interviewed managers emphasized the meaning of the flexible time for innovation, there were differences between the cases in a way how this flexible time is allocated. For example, in cases A, B, and D, the flexible time was provided to all the members of R&D teams in an equal manner. On the other hand, in case company C the local R&D management allocates the flexible time for those developers who are known to be innovative and self-steering:

We have to be careful when we make decisions how we use the limited flexible time – usually it goes such a way that we give this time for those developers who we know to be capable of really developing something new (Case C)

In case F, the local R&D teams had developed a new approach to use the flexible time for innovative problem solving in a shared manner. In this approach, a team of two developers jointly made efforts to solve a software coding challenge, and the rest of the team follows the work in real-time. The goal of this kind of shared problem solving is to jointly find new solutions to the problems, and also train the whole team to solve similar kinds of problems.

...it's a known computer science problem that you have algorithms for. They solve that. The concept is that they do the pair programming, and this programming is on the projector on the big screen, and other people in the room can see how they code, what tools they use, and how they use their ideas, what shortcuts they're using, things like that (Case F).

Many of the interviewed managers also acknowledged the meaning of the recruitments in gaining new competences in the organization:

It's about people who are seeking some new solutions, who are eager to learn. That's one of the things we check and we look to during the interviews (Case F)

Innovative culture and structures

The attempts to find a balance between learning and performance have a clear impact on the organizational culture in the R&D units. The practical need to develop coping mechanisms to answer the contradictory organizational pressures, tensions and paradoxes can be seen as organizational change processes that were originally intended to be rational and top-down oriented (Balogun and Johnson, 2005). However, these processes may often turn into an emergent and unpredictable organizational phenomenon based on individual sensemaking on local level. According to (Balogun and Johnson, 2005), the change can be underpinned by a wide range of social interactions in two different kinds of processes: vertical ones between recipients and senior managers, and lateral ones between middle managers on local level:

Our local organization is well aware of the fact that we have to be productive both in terms of performance and innovation. We have to decide internally how to do this (Case !).

An interesting finding that is related to the vertical interactions comes from case F. The manager expresses his appreciation towards software developers by calling them detail managers:

I usually call developers as detail managers, because they make lots of decisions during their work. Almost every time they write the code, they can do it in different ways. The better understanding they have of the final goal, the better those decisions are (Case F).

In both vertical and lateral processes, managerial sensemaking (Weick, Sutcliffe and Obstfeld, 2005; Lüscher *et al.*, 2008) is taking place and it forms the organizational identity and actions by which the organizational transformations and changes happen (Balogun and Johnson, 2005). An example of this kind of transformation can be seen in our interview data:

This is not only managerial issue. Also all the developers know that we have to be both productive and innovative at the same time to survive in global competition. I think that this is widely accepted fact in our organization, even if it is not widely discussed in our daily work. (Case E)

In our unit, the people have learned to work as entrepreneurs. Everyone knows the expectations, and this has clearly affected to our way of working. (Case A)

Thus, as the local organizational members have to use managerial sensemaking in coping with the attempts for learning and performance targets, they have also developed their organizational identity in the direction that supports flexibility and entrepreneurial mind set among R&D teams.

Table 2. Description of the case companies and the participants in each case interviews.

	Identified practices	Descriptions of the practices
STRATEGY: <i>Development of strategy-based management</i>	Making the contradictory tensions of performance and learning salient in the organization	<p>Creating (hidden) local R&D strategy supporting innovation development</p> <p>Taking managerial actions to improve innovativeness on local level</p> <p>Keeping the quality high and resisting the request to release software too early. Reputation of the unit kept as key for future.</p> <p><i>Adaptation as coping mechanism with HQ</i></p>
	Initiative-taking	<p>Initiating internal development projects (often without formal permission and/or involvement of the parent unit)</p> <p>Providing additional resources for (internal) strategic innovation development</p>
	Creating prototypes/demos of promising technological solutions to be presented to the parent unit	<p>Local prototyping projects proofing the usefulness of new developed solutions</p> <p>Proof-of-concepts of new and promising technological solutions</p>
	New ways of organizing R&D work	<p>Agile working methods for software development</p> <p>Arranging flexible time for R&D teams for innovation development</p> <p>DevOps releases and all in all developing leading edge way of working to promote productivity and quality in R&D work.</p>
	Utilizing local opportunities	<p>Using local markets as a primary environment of innovation development and testing</p> <p>Utilizing local networks and partnerships Involving local key customers / pilot customers in the development of new technological solutions</p> <p>Customer value creation and understanding of it in focus. Business knowledge highlighted as key for R&D success. Close collaboration with product management and preferably to have product management responsibility within the site.</p>
LEARNING: <i>Supporting learning in organizational level</i>	Identifying new technologies	<p>Exploring potential technological solutions to improve existing products (incremental innovation)</p> <p>Exploring potential technological solutions to create new innovations (radical innovation)</p>
	Supporting competence development	<p>Encouraging the R&D staff to extend their know-how on new relevant areas</p> <p>Recruiting new people with unique and rare competences on interesting new areas of technology</p> <p>Facilitating opportunities of formal and informal learning on interesting topics</p>

	Learning partnerships	Identifying and utilizing partnerships with innovative (local) companies with unique competences and skills
	Innovation mindset	<p>Innovation days dedicated to innovation development in the teams</p> <p>Allowing the development teams to allocate time and resources to develop new innovative solutions and technologies</p> <p>Accepting failures in innovation projects as learning events</p> <p>Adding small value creating add-on things to original product requirements to show innovation and customer value creation.</p>
<i>CULTURE: Supporting innovative culture and structures</i>	Encouraging entrepreneurial mindset	<p>Making the local strategy of “survival through innovativeness” salient locally</p> <p>Encouraging individuals and teams to take positions of entrepreneurs ...</p> <p>Networking, communities of expertise (internal and external) is promoted.</p> <p>Developer seen as “manager of details”, add what R&D do shall have customer value and that as mindset facilitated when working with details.</p>

5 Discussion

The analysis of the six cases reveals clearly that there exist a tension between the targets related to the project performance and demands related to the learning and innovativeness in the daily work in the R&D subsidiaries. As indicated in (Kunttu & Kohtamäki, 2018), this tension can be found on two levels. In the general level, the tension exists in the knowledge-intensive R&D work, in which the performance targets related to time schedules and project cost represent the “tough targets” that must be met by R&D organization. In addition to these formal requirements, the senior management expects the R&D units to be innovative in their daily work and demonstrate capabilities for learning. In this manner, the R&D units have to be innovative and initiative-taking. However, these expectations related to innovation and learning are more salient in nature and they are not communicated by senior management as clearly as performance targets. The analysis presented in this paper reveals several organizational practices that help the R&D managers to balance between the learning attempts and performance targets set by upper management. The identified practices are divided into three main categories, strategy, learning, and culture. The main findings in these areas were the following. In terms of strategy, the subsidiaries develop their own informal strategies to cope with the contradictory tensions, but which are salient in nature. In these strategies, the key coping practices include initiative-taking, utilization of local opportunities, and customer involvement. Based on these, the subsidiaries aim at improving and maintaining their

strategic positions in the R&D network of the company. Regarding learning, the coping mechanisms were related to allocating flexible time for innovating and learning in the R&D teams. In addition, the organizations were developing practices related to joint learning within the organization and with external partners. The coping practices related to the organizational culture involved with the development of entrepreneurial mindset among the R&D team members as well as the creation of organizational identity that supports the local strategy aiming at competitiveness and survival in the R&D subsidiary network.

6 Conclusions

Considering the tensions between learning and performance in R&D subsidiaries, this study builds on the intersection of the theory of organizational paradoxes and the literature concerned with the role of R&D subsidiaries within the global technology company. This study particularly improves understanding how the subsidiaries aim at improving their own standing within the internal R&D partner network of the company in terms of coping practices related to the balancing between performance and innovation. Through our qualitative analysis related to six R&D subsidiaries of global technology firms located in Finland and in Poland, we were able to identify a number of managerial practices that aim at balancing between explorative innovation and the pressures related to the R&D project performance.

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