

Synergetic Effects of Knowledge Based R&D in Multinational Corporations

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Abstract: In this paper we try to explain the importance of knowledge management practices (knowledge sharing, distribution, utilization) in research and development to be effective in multinational corporations (MNCs). In the first part we define research and development (R&D), different types of R&D and their characteristics. The following part is dedicated to the relationship of R&D and knowledge management (KM). Further on we bring the concept of synergic effect from knowledge sharing by subsidiaries and headquarters of MNCs. In the last part we define open questions and future issues to be explored.

Keywords: research and development, knowledge management, knowledge flow, multinational corporations.

Introduction

At the beginning of their operation multinational corporations (MNCs) moved overseas largely to use lower costs for resources and labor for production activities. R&D used to be performed in the home country. Innovations were introduced to subsidiaries abroad. If any R&D was done abroad, it focused on tailoring products to the specific needs of the local market. In this structure, knowledge and innovation moved within the MNC only in one way—from headquarters to foreign subsidiaries.

Today, the globalization of MNCs is concentrated not only on production and marketing. Providing knowledge and innovation developed internationally has become the key issue. In this modern knowledge system, the subsidiaries have often the task to develop or cooperate by the development of essential innovations. In this situation, knowledge has to flow in multiple directions—from home country to subsidiaries, from host country to subsidiary, from subsidiary to home country, and from subsidiary to subsidiary.

Because the external environment of a company tends to be ineffective surroundings for knowledge transfer (tacit form of knowledge, risk of spillover), the MNCs globalize their R&D within own company (Iwata, 2006). This global diffusion of R&D gives MNCs the competitive advantage over a centralized one country R&D. This advantage depends on the effectiveness of the MNCs to share knowledge between headquarters and subsidiaries with R&D. This we call knowledge-based view of MNC. (Iwata, 2006).

Most of the research that has been done in this field focused on decisions to internationalize and not on the integration and management of the dispersed activities in R&D.

1 Changing Role of Subsidiaries

In the recent years many companies and R&D projects concentrated at development of information and knowledge management systems that would increase the productivity in certain departments of companies. There are ambitions to find a system how to put together related R&D outputs to form systems and tools that can be used in management support systems across whole supply chain.

One of the dimensions of this situation is the changing role of subsidiaries around the world. From former user of the knowledge and R&D results the subsidiaries changed to active part of collaboration on MNCs' R&D. One of the tasks is integration of knowledge management systems in the collaboration of these R&D divisions.

The role of subsidiaries in multinational companies' innovation activities is increasing (Mudambi, 2002) and also in their knowledge networks (Cantwell and Mudambi, 2004; Makino and Inkpen, 2003). Some become sources of MNCs strength (e.g., Bartlett and Ghoshal 1989; Birkinshaw 1996), or even "centers of excellence"

(Foss and Pedersen 2002; Moore and Birkinshaw 1998). As nodes in multinational companies' knowledge networks (Makino and Inkpen 2003), these subsidiaries help their parents maintain a knowledge advantage (Cantwell and Mudambi 2004), partly by providing a valuable source of new knowledge through the development of new products and technologies (Pearce 1999; Zander 1999).

In the theory the researchers have moved from evolutionary theory of the firm through resource-based view to knowledge-based view of the firm.

There are five types of knowledge flows – technical knowledge flow, market knowledge flow, subsidiary - headquarters, subsidiary – local market and subsidiary to subsidiary. The strategies of R&D generally determine amount of knowledge flows. The study of Iwata concerning these flows found that flows integrating market and vertical knowledge flows are more important for performance than other forms of knowledge flows. Organizational factors are more important for the performance than strategic ones. (Iwata, 2006).

2 Background Information

2.1 Research and Development

By speaking about research and development we mean those business activities that are designed to make a discovery that can lead to the development of new products or procedures, or to improvement of existing products or procedures.

As defined by the Frascati Manual (OECD, 2002), „Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.”

Further on, Frascati Manual explains that R&D covers three activities: basic research, applied research and experimental development.

“Basic research is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view.

Applied research is also original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective.

Experimental development is systematic work, drawing on existing knowledge gained from research and/or practical experience, which is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed. R&D covers both formal R&D in R&D units and informal or occasional R&D in other units” (Frascati Manual, 2002).

To find a most appropriate measure of R&D, we can evaluate the inputs – sources of R&D or evaluate the results and their effects, or evaluate the use of R&D. There are different outcomes that can stand as measures for R&D – patent applications, stock of patents, number of researchers or total factor productivity (TFP).

Even though the relationship between R&D and innovation is complex, it can be said that substantial progress in technology can be achieved only when the work is done on systematic basis. However, there are several types of R&D, which can result in different types of innovation.

Business R&D results in new goods and services, higher quality of them or in new production processes. It has high spillover effect – other economic agents can use it. That's why its social return is much higher than just private return. This fact is one of the reasons that can justify the need for government support of R&D.

This support can be oriented on R&D performed in the public sector, which is the second type of research, performed by government or public universities and research institutions. Public R&D has a large impact on the economic growth in the long run.

These two types of R&D are closely related and interconnected. In many cases the technologies developed in business research have been already explored by the public research. For this reason it is very important for

governments to provide support and network for cooperation between private and public research so the knowledge can flow between the two of them.

The third type of R&D – represents the knowledge arisen in other countries that comes to a country from various channels – companies can buy patents, licenses or know-how from abroad, they can hire foreign researchers, observe foreign competition, interact with companies abroad, read foreign scientific literature, etc. The government support is important also by this type of R&D, since enabling free flow of goods, people, and knowledge can help to better absorb the foreign technology and better usage of it. It is also important for the countries to make their own R&D rather than imitate the invented technology since the innovative countries can better use the foreign technology.

How this foreign R&D influences domestic economy depends on countries capacity to absorb this knowledge, its capability to efficiently use it. This is more possible when the country is more technologically developed. We call it the absorptive capacity.

2.2 Knowledge Management and Research and Development

"Knowledge management is a discipline that promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all of an enterprise's information assets. These assets may include databases, documents, policies, procedures, and previously un-captured expertise and experience in individual workers." (Duhon, 1998).

Another way to view and define KM is to describe KM as “the movement to replicate the information environment known to be conducive to successful R&D—rich, deep, and open communication and information access—and deploy it broadly across the firm. The role of the researcher, considered the quintessential information worker, has been studied in depth with a focus on identifying environmental aspects that lead to successful research.” (Koenig, 1990, 1992)

In most of the KM literature, knowledge is usually divided into tacit and explicit. Explicit information or knowledge is set out in tangible form. Tacit information or knowledge is knowledge that's difficult to write down, visualize or transfer from one person to another.

One of the objectives of KM is to support any kind of innovations within the company, to improve company's productivity and its competitive advantage. One of the more complex indicators of R&D is the investment in knowledge. In today's world when the economies are driven by knowledge, companies put more attention to the fact that individual and collective knowledge is a major factor of economic performance. As for the size and orientation of the companies – the large companies (and as such – the MNCs) and companies that are closely connected to technology intensive industries, tend to set up knowledge management policies. Those are motivating the employees and managers to stay in the company, promoting a culture of information and knowledge sharing, creating partnerships and alliances for knowledge acquisition and implementing written KM rules (Kremp, Maraisse, 2004). Knowledge management in those companies strongly contributes to their innovative performance and to their productivity.

The reasons why companies implement KM are various –such as the existence of complex information and communication technologies, that put new requirements on organizational structures but at the same time also provide better access to external knowledge. At the same time, the managers realize that this internal knowledge is usually not enough and that there is a need to cooperate with other economic agents (clients, suppliers, competitors) to acquire new knowledge.

Several studies confirmed that KM is more present in the companies investing in R&D. Not in all innovative companies are the KM practices commonly used, but they are used much more in the innovative companies than in the companies with no R&D. (Kremp, Marraise, 2004).

The findings support the fact that the existence of (potential) effective knowledge spillovers between companies or between different subsidiaries of one MNC provides reasons or motivation for R&D cooperation that can lead to higher investment in R&D. The agents cooperating in R&D focus mostly on marginal innovations that improve their productivity performance. Universities and customers – are important source of

knowledge for companies that pursue radical innovations that facilitates growth in innovative sales if no formal R&D cooperation exists.

Companies realize that their success and profits rely increasingly on individuals and their tacit knowledge special to their company. The company can lose the skills if the personnel are leaving so they try to motivate the employees to remain within the company.

2.3 Research and Development in Multinational Companies

Little research has been undertaken to show how the various R&D structures adopted by MNCs affect their abilities to generate and deploy innovations globally. The role of the relationship between the coordination structures and innovative capabilities is to be studied.

There are six main channels for international knowledge transmission: imports, exports, inward foreign direct investment, foreign patent flows, geographic proximity and general channels (Ang, Madsen, 2013). Growth rates of domestic and international knowledge stock are potential important determinants of productivity growth.

To the 5 main reasons why a knowledge flow occurs within a multinational company belong economic, technological, organizational, geographic and sociological reasons. Why the sharing of know-how brings potential benefits can be explained by various explanations. From the economic reason, knowledge is shared to bring more efficiency. In the area of R&D this can mean saving cost and/or time. To save cost or time by achieving the R&D task can be a reason why start to search within a group to find already existing know-how. (Ensign, 2009). These studies also imply that organizing the MNC as an integrated network can bring better economic results. Thanks to subsidiaries' specialization on different resources, the company can use this fact to leverage it for more value. The studies also say, that the exchange of knowledge is easier and more efficient within an organization rather than through external market because of various problems and negative externalities of the market (Ensign, 2009).

Technological knowledge sharing between the various R&D subsidiaries of an MNC exist with the goal to achieve synergy through economies of scope. Sharing of complementary intellectual resources generates economic rents. From the resource-based view, (Buckley, Carter, 2009) indicate that integrating knowledge is a business activity with considerable economic benefits. Main motivation for technology sharing is to get specific technological knowledge that can assist in R&D problem solving. Sharing may take place because the technological knowledge is not available within the R&D group but can be accessed from another R&D group (source) within the MNC.

Sharing of resources such as scientific knowledge is main factor for sustainable firm growth and existence (Ensign, 2009). In the case of R&D, where the major focus is on innovation, the need to share scientific know-how takes on even greater significance. The emphasis is on building an organizational context that encourages or even requires cooperation and collaboration between R&D groups (Iwata, Kurokawa, & Fujisue, 2006). Such an environment can enable greater intra-firm sharing.

2.4 Research and Development Synergy in Multinational Companies

To manage the worldwide R&D, support systems for management are used that consist of four broad systems: integrated procurement system, collaborative delivery system, inter-organizational learning system, and synergistic technological system, (Kumaraswamy et al., 2006)

Innovative capability refers to the absorptive capacity of firms as measured by their ability to accumulate and exploit new knowledge (Cohen and Levinthal, 1990), leading to new and improved innovations that enhance their chances for growth and survival (Kogut and Zander, 1992).

Synergistic innovative capability is defined as a higher-order ability to accumulate and deploy new knowledge or to recombine existing knowledge to create new innovations more effectively and efficiently due to collaboration among globally dispersed R&D units.

Innovative capabilities rely on interactions among individuals, groups, organizations, and subsystems (Foray, 1997; Teece, 1996) because such interactions magnify knowledge and learning (Nonaka, 1994). Thus, enhanced innovative capabilities depend on the frequency, density, and quality of interactions both within and outside the MNC group.

R&D collaborations between subsidiaries of one MNC in different countries involve generating and sharing complex and strategically sensitive knowledge across organizational levels and national boundaries without comprising the potential value. In this case, communication strategies that integrate face-to-face and electronic communications (email, Internet, videoconferences, phone calls, and knowledge-management applications) are essential for coordinating such knowledge flows.

3 Through Collaboration on R&D to Better Results

There is a lot of discussion how effective is R&D in multinational corporations. These companies, with their subsidiaries in many countries around the world, have many R&D departments in different regions, dealing with different problems or issues but with the same goal to be productive, to gain competitive advantage by innovations and to produce maximum profits.

In this paper we would like to show that the best way to achieve this is through collaboration on mutual R&D, better knowledge utilization and sharing through implementing knowledge management practices and effective knowledge management support systems.

The importance of cooperation in R&D and its positive impact on companies' productivity and innovation performance has to be explored yet.

Traditionally, the R&D used to be one of the most centralized activities of MNCs, concentrated near to the headquarters. The reasons for it were the risk for escape of technological information, doubled work on innovations, problems with control of dispersed R&D. Only in the last couple of decades the globalization forced the MNCs establish R&D subsidiaries abroad and disperse the knowledge around the MNCs.

4 Support evidence

Synergistic innovation is an important topic in R&D collaboration research, the main concern is on the various ways in which learning and sharing is improved and spread among participating members. For instance, when partners combine their experiences, new ideas, expertise, and tacit and explicit knowledge are generated and shared (Ciborra, 1991) and learning is achieved (Kogut, 1988).

The unit's autonomy is the degree to which an R&D unit is able to make or influence strategic and operational decisions affecting it in various value-adding activities, including production, marketing, human resources, budgets, and R&D (Asakawa, 1996; Brooke, 1984; Mintzberg, 1979; Young and Tavares, 2004). R&D units with greater autonomy have more authority when making decisions on their own behalf compared to those with less autonomy. Autonomy requires resources of several types, including managerial, technological, financial, and informational (Edwards, Ahmad, and Moss, 2002; Young and Tavares, 2004).

In the literature we can find support for the idea that the external networks that subsidiaries create around themselves and act within affects its willingness to transfer knowledge to its sister subsidiaries (Andersson et al., 2001, 2002, Forsgren, 2005). One of the reasons for this is that the business connections to external companies provide important channels for the transfer of knowledge. Another reason is that the subsidiary with already established business relationships with external partners proves its capability to cooperate (Forsgren, 2005).

To increase ROI and shorten payback cycle the MNCs have to adopt a new way of thinking about R&D which encompasses several new approaches: think first about the market; do not look for complexity, prefer simplification; turn the constraints to challenges and concentrate on short-term rather than long-term (Williamson, 2013). The small innovations from the subsidiaries can also help to succeed on the global level. Most of the times, the knowledge transfer is different in the MNCs with headquarters in western countries and

subsidiaries in emerging markets. The centralized control, undervaluation of the innovation possibilities, and absence of two-way knowledge flow slows down the development of MNC. On the other hand, companies from emerging markets can better manage the global knowledge flows (Khanna&Palepu, 2006, Baskaran&Muchie, 2011).

It has been argued that subsidiaries with greater R&D capabilities may be less technologically dependent on the headquarters (HQ) and hence may display higher levels of autonomy (Pearce, 1999; Taggart and Hood, 1999; Young and Tavares, 2004). However, the counterargument is that the strategic sensitivity of the knowledge-related activities of the subsidiary may be grounds for tighter HQ control (Bartlett and Ghoshal, 1989; Martinez and Jarillo, 1991). The finding that a high degree of bureaucratic control inhibits creativity and innovation is complicating the situation (Aiken and Hage, 1971; Thompson, 1967).

Moreover, the incentive to collaborate is greater when R&D units have complementary skills, knowledge, or resources and when the costs or risks associated with certain R&D activities are beyond the capability of any single unit.

Collaborative know how can represent a special type of advantage that can serve as an explanation why some multinationals succeed and some fail (Simonin, 2002, Esterby – Smith, M., Marjorie, A. Lyles, 2011). This capability of alliances is present in many researches.

Theoretical and empirical research on global R&D collaborations underscores the importance of trust as the foundation of collaborative relationships (Barney and Hansen, 1994; Gulati, 1995, 1998; Lorenzoni and Lipparini, 1999). The more R&D staff trust each other, the greater the likelihood that they will share knowledge, information, and other assets of strategic value with their colleagues in other locations. Moreover, several studies, such as Stock, Greis, and Dibner (1996) and De Meyer (1993) observed that R&D staff from different cultures tends to interpret, process, and share information differently.

A subunit's connection to the knowledge system of its host country, often referred to as its "local embeddedness," is critical to acquiring locally developed knowledge (Andersson and Forsgren 1996). Similarly, a subunit's embeddedness within the MNC's knowledge network is an important factor in its knowledge creation and innovativeness. The internal vs. external distinction examines the extent to which a particular subunit activity builds on knowledge developed within the MNC.

With intensified competition, firms increasingly compete on the basis of a sophisticated research and development cooperation network (Roijsackers and Hagedoorn 2006), applying dispersed knowledge from around the world (Chesbrough 2003). In this regard, multinational companies gain an advantage through their globally distributed innovation networks and their ability to assimilate, generate, and integrate knowledge worldwide (e.g., Bartlett and Ghoshal 1989). The ability to harness and leverage knowledge from their dispersed subsidiaries enables firms to develop new products.

The important role of subsidiaries in multinational companies' innovation and knowledge network has long been recognized (e.g., Bartlett and Ghoshal 1989; Cantwell and Mudambi 2004; Kotabe et al. 2007), but only limited research has explored knowledge assimilation and innovation activities in subsidiaries (Phene and Almeida 2008). Researchers have studied mostly technological innovation by focusing on patents (Phene and Almeida 2008). This means that subsidiary new product development has largely been unobserved, even though an important feature of subsidiary R&D is its substantial influence in new product development (Forsgren and Pedersen 1998). Moreover, although recent studies have demonstrated empirically that a subsidiary's success in technological innovation relies on its assimilation of knowledge from different sources and its ability to integrate and use such knowledge (Almeida and Phene 2004; Phene and Almeida 2008), only the direct impact of knowledge assimilation has been examined.

The role of subsidiary in knowledge utilization is under-researched. Most of empirical studies of knowledge utilization and innovation have been conducted in developed countries, though there is evidence that multinational companies expand their R&D activities to their overseas subsidiaries, including those in emerging markets, to improve their competitive advantages globally (Zhang et al. 2007).

Even though the existing literature about international R&D and knowledge flows within a company studied the factors and effects of overseas R&D (Belderbos 2001; 2003; Frost 2001; Florida 1997; Shimizutani and Todo 2008; Griffith et al. 2006); there is no sign of studying the simultaneous effect of domestic and foreign R&D

investment. (Belberbos, Fukao, Iwasa, 2009). The finding show that foreign R&D activities have become an important source of knowledge flows by accessing the local expertise and using it abroad for development of new technologies and innovations. (Belderbos, Fukao, Iwasa, 2009). Some studies confirm the effectiveness of knowledge flows within the network of dispersed R&D subsidiaries (Cantwell, Kosmopoulos, 2003). Empirical studies have found that overseas R&D oriented on technology can have help to better parent operation and productivity (Griffith et al., 2006).

One of the ways have to evaluate the impact of domestic and foreign R&D on the MNC productivity is to extend a model of Cohen and Klepper (1996) in which dispersed R&D investment is evaluated by its effect on global profits of the firm. In the model we distinguish between the two main reasons of foreign R&D, home base exploiting (development activities) and home base augmenting (research activities) to show the differences in the influencing factors. (Belderbos, Fukao, Iwasa, 2009).

One of the explanations why disperse the R&D among different subsidiaries can be the Ricardian argument, to specialize on those R&D activities where the country's subsidiary has a comparative advantage, so to move the R&D there where there are highly skilled R&D worker. We can call it a pull factor - to pull MNC investment in R&D in this location. On the other hand, there is a push factor – established on international product life cycle theory, to push investment into the large and important markets. (Ambos, Ambos, 2009).

5 Course of action

The question that remains is whether the usage and implementation of KM practices has a significant impact on labor productivity. Moreover, if the collaboration between various R&D units of one MNC with the implementation of KM practices brings more effective R&D and more productivity to the company.

Globally dispersed R&D operations provide MNCs with competitive advantages not available in single-country centralized R&D operations (Dunning 1995). However, this competitive advantage depends on how effectively subunits can leverage external knowledge available through their local networks as well as how successfully MNCs can share knowledge across dispersed locations (Gupta and Govindarajan 2000).

As further steps we suggest to review how MNCs manage their global R&D network, find out about the channels through which the knowledge is spread among the subsidiaries. The task is to track the global knowledge networks of various MNCs, to find out how to create effective international R&D infrastructures.

5.1 Open questions

How interactions – communication, sharing knowledge, within the MNC group amplify innovative capabilities through synergy?

What are the appropriate structures and tactics for coordinating knowledge and technology flows between headquarters, regional headquarters, and subunits?

How MNCs can successfully connect global subunits to create an international, open, innovative knowledge network?

Which factors determine knowledge flows in R&D within MNCs and how should MNCs manage these flows to achieve higher performance?

How to organize global R&D activities efficiently?

What factors determine the utilization and accumulation of dispersed knowledge by R&D project subsidiaries? And does this utilization and accumulation influence the performance of the R&D project?

6 Conclusion

The fourth generation of research and development is knowledge management based research and development. The different types of R&D bring with them different magnitude of knowledge spillover which on the other hand motivates to more investment in R&D. Lately, the importance of productivity and effectiveness of R&D is becoming more and more important which arises question about measuring the impact of R&D on productivity and implementation of KM into R&D activities. What seems to be the biggest problem is the transformation of knowledge into productivity.

This requires that global R&D managers view their roles differently by changing their perception of being merely managers of people, processes, and budgets to becoming initiators and facilitators of purposeful learning and innovations across the global R&D organization. Such intentional learning could result in more effective coordination and utilization of costly R&D assets, which over time could further improve coordination processes, reduce costs, and improve innovative interactions among globally dispersed units (Archibugi and Iammarino, 1999; Reger, 1999).

Today's multinational companies expand into international locations for more than access to new markets. They recognize that creating breakthrough innovations requires accessing and using the full range of knowledge available internationally. One of the best ways to tap into this knowledge is with local R&D facilities in international centers of technical excellence. However, leveraging regional knowledge and incorporating it into existing knowledge networks is exceptionally difficult.

One of the assumptions is that the global spreading of R&D activities does not have to bring improvements in innovative capabilities. To be so it has to be supported by effective cross-border coordination and integration. Effective cross-border coordination is necessary while it shows how R&D units are able to create and manage collaborative relationships. As a result is higher level of knowledge generation and sharing that again can produce significant innovative capabilities.

There have been just a few studies in this field. One of the reasons is that it is very difficult to access the real knowledge flows within MNCs. The studies so far have come to the conclusions that the effectiveness knowledge flows varies depending on types of R&D subsidiaries (Birkinshaw, 1998), that a successful global product development depends on the ability of MNCs to transfer and elaborate knowledge (Subramaniam, 2001), other studies stress the importance of intra-MNCs integration (Hakanson, 2001), others stress the knowledge observability and knowledge embeddedness as important factors for knowledge transfers (Birkinshaw, 2002). Cumming and Teng consider similar knowledge base, location of knowledge and communication between subsidiaries as success factors for better knowledge transfer (Cummings, Teng, 2003). Only two from these studies (Hakanson, Birkinshaw) concentrate on R&D subsidiaries.

Another view brings the research of Iwata arguing that knowledge flows involve cost and that's why it is important to find an optimal level of knowledge flows (Iwata, 2006). Through this he questions the fact that the higher level of knowledge transfer brings a higher level of performance. He argues that we should consider not knowledge flows but knowledge accumulation as a factor that contributes the higher performance of MNCs.

It is difficult to measure the R&D of a subsidiary by economic or financial measures such as ROI (tacit knowledge, long-term effect, and various strategic priorities. That's why most of the empirical studies of KBV of MNCs use knowledge flows to measure the performance and assume that the higher the level of knowledge flows the higher the performance of R&D subsidiaries. So we suggest that it is more knowledge that is accumulated rather than knowledge flow that leads to a higher performance.

The decision where to locate the R&D within MNC or whether to outsource depends on several factors. To the most important ones belong the economy of this decision and the risks connected with outsourcing some of companies activities. The importance of transaction and production cost is high. Beside the cost, the knowledge specificity is another critical factor. (Contractor, 2011).

We think that the high level of subsidiaries' autonomy brings higher knowledge flows and performance. And since the higher level of knowledge flows implies better knowledge accumulation and company's performance, the MNCs should encourage the knowledge flows between HQ and R&D subsidiaries in any direction.

The existence of several R&D subsidiaries within one MNC can help to divide the resource and concentrate on the individual strengths of each of the subunit. Not to duplicate the tasks, efforts and work can be achieved through usage of knowledge based research and development. To enable the knowledge flows from HQ to subsidiaries, the other way – reverse knowledge flow – from subsidiaries to headquarters and between the subsidiaries can enable to make use of potential knowledge spillovers – and bring the synergy from economies of scale.

At the end it is important to say that accumulation, transfer and sharing of knowledge does not bring better performance of the company by itself. Crucial is how the R&D subsidiaries and the whole MNC absorbs and uses this knowledge in its activities.

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