Stefan Schmid and Philipp Grosche

Developing Foreign Subsidiaries into Centers of Competence: The Case of Audi Hungaria

Abstract
Nowadays many companies are operating across borders. Yet some of them still rely on the traditional center-periphery view and consider headquarters a major source of competitive advantage. These companies, however, do not fully leverage the potential of their foreign subsidiaries. This paper addresses the strategic challenge of gaining competitive advantage through foreign subsidiaries and presents one specific option: the option of upgrading a foreign subsidiary into a center of competence. The process of establishing a center of competence is explained by an in-depth case study of Audi Hungaria, the Hungarian subsidiary of the German car manufacturer Audi AG. The exploratory case study has three major objectives: first to outline how Multinational Corporations can develop subsidiaries into centers of competence over time, second to point out how subsidiaries can be enhanced even after having achieved the status of a center of competence, and third to demonstrate how the whole Multinational Corporation benefits from upgrading a foreign subsidiary into a center of competence. Thus, the paper contributes to closing a research gap in the International Business literature: it not only examines centers of competence in a static way, but focuses on the dynamic development of centers of competence which has been rather unexplored so far. Furthermore, centers of competence are related to the network view of Multinational Corporations.

Key Words
Automotive industry, capabilities, center of competence, competences, Central Europe, foreign subsidiary, Multinational Corporation, network MNC, value activities

Addresses
Stefan Schmid, ESCP Europe, Berlin Campus, Chair of International Management and Strategic Management, Heubnerweg 6, 14059 Berlin, Germany. Phone: ++49-30-32007-136, e-mail: stefan.schmid@escpeurope.de
Philipp Grosche, ESCP Europe, Berlin Campus, Department of International Management and Strategic Management, Heubnerweg 6, 14059 Berlin, Germany. Phone: ++49-30-32007-193, e-mail: philipp.grosche@escpeurope.de

Developing Foreign Subsidiaries into Centers of Competence: The Case of Audi Hungaria

1. Introduction

Foreign subsidiaries play an increasing role for internationalization strategies of Multinational Corporations (MNCs). This is accompanied by changes in relationships between headquarters and subsidiaries. MNCs can no longer assume that all of the company's competitive advantages are generated at headquarters, as many International Business (IB) authors stated in the past (e.g. Kindleberger, 1969; Hymer, 1976). Instead, it must be recognized that the subsidiaries' influence is growing and that both the parent company and the subsidiaries contribute to the company's competitive advantages (Hedlund & Kogut, 1993; Birkinshaw & Hood (eds), 1998; Holm & Pedersen (eds), 2000). Accordingly, MNCs can be considered multi-center firms in which resources, capabilities, or competences are dispersed (Forsgren, 1990; Forsgren, Holm, & Johanson, 1992). Some MNCs accept this modern view and are aware of the fact that subsidiaries fulfill different tasks, possess individual resources, capabilities, or competences, and therefore take on particular roles (e.g. Bartlett & Ghoshal, 1986; Ferdows, 1997). One of the subsidiary roles may, for example, consist of being a center of competence that offers specific capabilities and competences to other parts of the MNC (Chiesa, 1995; Forsgren, Johanson, & Sharma, 2000).

The importance of resources, capabilities, and competences for firms has been stressed frequently by scholars and practitioners alike. The Resource-based view argues that competitive advantage is not only a question of intelligent positioning in the market; competitive advantage is primarily a question of intelligent use of a firm's internal strengths. Proponents of the Resource-based view posit that these internal strengths are resources, capabilities, and competences (Wernerfelt, 1984; Prahalad & Hamel, 1990; Lockett, Thompson, & Morgenstern,

2009). They may lead to competitive advantage for firms, if they fulfill the following criteria: they should be valuable, rare, imperfectly imitable and difficult to substitute (Barney, 1991). In addition, many authors stress that resources, capabilities, and competences are not static; they have to be adapted, changed and developed permanently (Teece, Pisano, & Shuen, 1997).

In this regard, an MNC can not only be interpreted as a bundle of resources, capabilities, and competences; one fundamental source of competitive advantage then also consists of the capability to leverage the resources, capabilities, and competences that are offered by the various units of an MNC, especially by foreign subsidiaries. However, not all managers have fully recognized the importance of foreign subsidiaries for MNCs; some MNCs still do not properly take advantage of them. Therefore, one specific option of how to use foreign subsidiaries' resources, capabilities, and competences will be discussed in this contribution and explored via an in-depth case study: the option of upgrading a foreign subsidiary into a center of competence.

Centers of competence have already been discussed in the IB literature, sometimes under the heading of the term "centers of excellence" (e.g. Holm & Pedersen (eds), 2000). Yet, most of the existing studies on centers of competence are mainly quantitative and cross-sectional; they only capture certain points in time (see, for instance, publications from the "Centers of Excellence" research project, such as Forsgren & Pedersen, 1998; Benito, 2000). While there are several contributions on the development of subsidiaries in general (e.g. Birkinshaw & Hood, 1997; Dörrenbächer & Geppert, 2005; Pedersen, 2006), the process of becoming a center of

competence has not been researched extensively (for rare exceptions see Andersson & Holmström, 2000; Pahlberg, 2000; Schmid, 2003).[1]

For that reason, this paper reports findings from an in-depth case study about the development of Audi Hungaria, the Hungarian subsidiary of the German car manufacturer Audi AG. The objective of the exploratory case study is to contribute to a thorough understanding of the evolution of centers of competence, rather than to test any theoretically derived hypotheses. It will not only be analyzed how the subsidiary became a center of competence, but also how the subsidiary evolved afterwards. Furthermore, we will show how the entire corporation Audi AG benefited from Audi Hungaria's specific competences. These aspects will be addressed from a managerial perspective to bridge the gap between business research and practice that is mostly inherent in the relevant literature field.

We will first explain the basic characteristics of a center of competence (section 2). Then, we will present the results of the in-depth case study on the development of Audi Hungaria (section 3). Subsequently, we will discuss the implications of the case study for researchers and managers (section 4). We will close our contribution by summarizing the changes an MNC has to undertake when establishing centers of competence (section 5).

2. Foreign subsidiaries as centers of competence

In this chapter, we will first give a general definition of the term "center of competence" (section 2.1), before clarifying the different elements of this definition: namely capabilities and

[1] Ensign, Birkinshaw, and Frost (2000) also report qualitative findings on the development of centers of competence. However, their results consist of rather brief illustrative examples than of comprehensive case studies. The publication was therefore not mentioned here.

competences (section 2.2), geographical responsibilities (section 2.3) and integration (section 2.4).

2.1. Definition of a center of competence

In accordance with earlier publications (Schmid, Bäurle, & Kutschker, 1999; Schmid, 1999, 2000, 2003), we use the term "center of competence" to describe a subsidiary which

- has specific capabilities or competences for one or several areas (e.g. functions or products),
- is responsible for the markets in several countries with regard to this area/these areas and
- is highly integrated into the MNC.

Clearly, a subsidiary has to fulfill all three conditions to be a center of competence.

In contrast to some earlier contributions (e.g. Forsgren & Pedersen, 1998; Moore, 2000; Frost, Birkinshaw, & Ensign, 2002), the definition of a "center of competence" used in this paper places more emphasis on the particular competences offered and the concrete responsibilities taken over by the subsidiary.[2] By specifying what a center of competence "really does", our definition captures the understanding of managers in practical business who stress that a center of competence cannot rely on an abstract notion of competences (Holm & Pedersen, 2000, p. 2). This is also the reason why we use the term "center of competence" instead of "center

[2] For a comparison of selected definitions of "center of excellence/competence" see Kutschker, Schurig, and Schmid (2002b, p. 226). Most of the definitions are rather vague, for instance because they focus on general resources that are controlled by a center of excellence/competence (e.g. Benito, 2000; Holm & Pedersen, 2000). With regard to the specific competencies and capabilities offered by a center of excellence/competence regarding a function or a product, only Fratocchi and Holm (1998, p.190) and Forsgren, Johanson, and Sharma (2000, p.48) are in line with our definition. However, their definitions lack the specification of the center's geographic area of responsibility.

of excellence", although the latter is used more frequently in the IB literature (Forsgren, Johanson, & Sharma, 2000, p. 48).

2.2. Capabilities and competences

The most important decision a MNC must take, is the decision of what type of center of competence shall be established (Moore, 2000). The type of center of competence describes the area of responsibility that a center of competence has due to its specific resources, capabilities, and competences. This comes close to what has been labeled "value-added-scope" by White and Poynter (1984). When defining the areas of responsibility for centers of competence, the MNC has basically the choice among two different types: functional centers of competence or product-oriented centers of competence.[3]

Functional centers of competence are subsidiaries in which one or several value activities are particularly well developed in terms of capabilities and competences. Possible examples are research, development, purchasing, production, sales, marketing, logistics, and distribution. Even subsidiaries which are not involved in such primary activities, but in supporting or coordinating activities may be centers of competence.[4] Product-oriented centers of competence are those subsidiaries which are responsible for all value activities for one or several products due to their specific capabilities and competences. Whereas the responsibility of functional centers of competence is concentrated on one or several specific value activities, the responsibility of product-oriented centers of competence is concentrated on all value activities con-

[3] This paper distinguishes only between functional and product-oriented centers of competence. There may also be process-oriented centers of competence, existing in process-oriented companies, which will not be considered in this publication. See Schmid (2003) for further information on process-oriented centers of competence.

cerning one specific product. In some cases, the responsibility can extend beyond one specific product to include responsibility for several products, a specific group or line of products or even a certain area of business (Schmid, 2003, p. 275).

2.3. Geographic responsibility

The definition mentioned above makes clear that a subsidiary assigned to be a center of competence should not only have specific capabilities or competences; it should also apply these capabilities or competences for several other (country-) markets. Thus, MNCs have to define the geographical responsibility of centers of competence. By geographical responsibility we refer to the (country-) markets which are covered by any center of competence. This is similar to what has been called "market scope" by White and Poynter (1984). Whereas the "value-added scope" defines the areas for which a center of competence is responsible (i.e. functions or products), the "market-scope" describes the geographical region of responsibility.

Three basic options of geographic responsibility may be distinguished: world-wide responsibility, regional responsibility, and country-portfolio responsibility. If subsidiaries are functioning as centers of competence with truly global responsibilities, we may speak of world-wide centers of competence (Birkinshaw & Morrison, 1995, p. 734). If a subsidiary's geographic responsibility comprises only a specific region (e.g. Central and Eastern Europe), the subsidiary represents a regional center of competence. Some centers of competence may neither have world-wide responsibilities nor regional responsibilities. However, there could be

[4] The distinction between primary and secondary activities is advocated by Porter (1986, pp. 15-60). Not all authors, however, share Porter's view on how to differentiate between primary and secondary value adding activities (see for example Bäurle & Schmid, 1994, pp. 4-5).

an individually defined portfolio of (country-) markets that these centers of competence serve. These subsidiaries can be considered centers of competence for selected countries.

To summarize, table 1 shows the types of centers of competence by considering the different options of geographical responsibility. It illustrates that there is a wide range of possibilities for MNCs wishing to establish centers of competence.

Table 1 Basic types of centers of competence.
Source: Adapted from Schmid (2003, p. 276).

Geographic responsibility	Functional center of competence	Product-oriented center of competence
Worldwide responsibility	Worldwide functional center of competence	Worldwide product-oriented center of competence
Regional responsibility	Regional functional center of competence	Regional product-oriented center of competence
Responsibility for selected countries	Functional center of competence for selected countries	Product-oriented center of competence for selected countries

2.4. Integration into the company's network

The definition of a center of competence implies that centers of competence are subsidiaries which have a certain degree of independence, but which are also an integral part of the MNC to make use of their resources, capabilities, and competences for other parts of the corporation. Thus, a basic feature of a center of competence is to function quite autonomously while being simultaneously a decisive part of the entire MNC; they are no "stand-alone-subsidiaries". For example, a center of competence might influence positively the development of resources, capabilities, and competences within other units. Thereby, the MNC is clearly seen as an intra-organizational network, characterized by complex flows between

headquarters and subsidiaries (Kutschker, Schurig, & Schmid, 2002a; Schmid & Schurig, 2003).

Becoming a center of competence is linked to building up capabilities and competences. The following in-depth case study will show how Audi Hungaria enhanced its resources, capabilities, and competences and thus developed into a center of competence within Audi AG.

3. From assembly plant to center of competence: The rise of Audi's subsidiary in Hungary

3.1. Methodological notes

Our research about Audi Hungaria as a center of competence within Audi AG grew out of the exploratory questions how subsidiaries develop towards centers of competence and how they evolve after having achieved this status. Audi Hungaria was chosen as focal subsidiary because automotive experts have already pointed out how successful the subsidiary's development has been: inside and outside of Audi, the Hungarian subsidiary is well known as a center of competence for engine production and regarded an offshoring success story (Keune & Toth, 2000, pp. 17-23; Sabatini, 2000; Schmid & Grosche, 2008, pp. 118-119). However, while automotive experts acknowledged the positive development of Audi Hungaria in the past, they have not yet analyzed in detail the reasons behind nor have they tried to establish a strong link to the center of competence phenomenon.

A case study methodology was considered appropriate for analyzing the subsidiary's development for three reasons. First, case studies are generally recommended for exploratory research questions like ours (Creswell, 2009, p. 4). Second, case studies enable researchers to

study a phenomenon thoroughly (Ghauri & Grønhaug, 2005, pp. 109-112). For example, we did not have to specify the variables that played an important role during the subsidiary's development beforehand; instead, we could easily integrate them when they emerged in the research process. Third, we could combine information from several data sources within this research approach to increase validity (Yin, 2009, pp. 40-42, 99-102).

We collected data on Audi Hungaria from its founding in 1993 until September 2008. Various sources of data were used. Semi-structured interviews with experts from the automotive industry provided information about the relevance and strategic role of Audi Hungaria and centers of competence in general. Interviewees included a high-ranking manager from Audi, an executive member of the German Association of the Automotive Industry (VDA) and several management consultants working on strategy and the organization of automotive companies.[5] The interviews took place from June 2008 until September 2008. Furthermore, the subsidiary's development process was reconstructed by an extensive analysis of official company documents, including annual reports and management presentations, as well as through comprehensive research in German and international newspaper archives.[6] Thus, we obtained detailed information about Audi Hungaria for the period under investigation, including the precise year dates, financial data, and operating figures. The archival analysis was also performed from June 2008 to September 2008.

Our definition of "center of competence" is based on the peculiarity of a subsidiary's competences and capabilities. To assess the peculiarity of Audi Hungaria's competences and capa-

[5] Originally, we wanted to carry out more interviews at Audi headquarters and Audi Hungaria. This, however, was not made possible by Audi AG due to secrecy concerns. Nonetheless, we could obtain a rich dataset using other sources of information. Company documents and newspaper articles even proved to be more reliable sources for precisely reconstructing the subsidiary‘s development than interviews. Respondents normally overlooked the development process in general but did not have exact dates or figures at hand.

[6] Needless to say, Audi AG's plans to offshore value activities to Hungary and Audi Hungaria's development were mainly discussed in German and Hungarian newspapers. Due to the fact that the authors of this paper are not proficient in Hungarian, most of the newspaper articles that were consulted were of German origin.

bilities, we compared the Hungarian subsidiary's capabilities and competences to those of other units of Audi AG and, based on the resource-based view, asked the following questions regarding all value activities carried out at the Györ plant: (1) Does Audi Hungaria own capabilities and competences that no other unit of the MNC offers? (2) Are these capabilities and competences valuable to other units of the MNC? (3) Are these capabilities and competences imperfectly imitable and difficult to substitute? To evaluate Audi Hungaria's capabilities and competences as being specific, all questions had to be responded with "yes". The questions were either answered by the interviewees or by the authors relying on information from the documents analyzed.

3.2. Establishing Audi Hungaria as a subsidiary of Audi AG

3.2.1. Reasons for choosing Györ

In February 1993 the German premium car manufacturer Audi AG, which belongs to the Volkswagen Group, established a wholly owned subsidiary called Audi Hungaria Motor Kft. in the Hungarian city of Györ, located between Vienna and Budapest. This subsidiary began its activities as an assembly plant for engines in October 1994. This represented a major change in Audi's production strategy; for the first time, the company was moving some of its production abroad. Until then all of Audi's production had been carried out at the company's home country locations, i.e. in Ingolstadt, also home to headquarters, and in Neckarsulm ("Audi: Motorenmontage in Ungarn", 1996; Audi, 2008a, 2008b).

Establishing a subsidiary in Györ was part of a strategic reorientation of the entire company. Audi began an extensive expansion and reworking of its vehicle range in 1994, introducing the reengineered A4 and A6 models and launching the A8 luxury sedan. This was an effort to

counteract weak sales of existing vehicles caused by the 1992 economic slump, while also structurally generating new sales growth (Audi 1995, p. 11; 2008c; "Neue Modelle polieren Audi-Bilanz auf", 1995; Keune & Toth, 2000, p. 22). The reorientation required a new production strategy as the existing facilities were not equipped to produce some of the parts of the new models. Expected sales growth would also require new engine assembly lines to expand capacity. Furthermore, in the interest of long-term competitiveness, Audi was looking for a site that would provide distinct cost and productivity advantages ("Audi: Motorenmontage in Ungarn", 1996; Keune & Toth, 2000, p. 21; Audi, 2008d; Volkswagen, 2008).

A major factor in selecting Györ was labor costs, which were considerably lower than in Germany. In 1992 labor costs (wages and salaries, along with fringe benefits) in Hungary were only one-eighth compared to Germany (Bender, 1994).[7] Hungarian labor law was also considered more employer-friendly, because the unions had less influence (Hank, 1993; Graz, 2004). Many of these advantages still hold true today, although they have diminished in their scope. This allows Audi not only to cut costs, but also to make production much more flexible, leading to further savings (Dunsch, 2005). Moreover, Hungary granted Audi full exemption from business and earnings taxes for a period of 10 years (Bender, 1994; "Audi: Motorenmontage in Ungarn", 1996; Keune & Toth, 2000, p. 22; Schmidt, 2000). Consequently, total costs of investment in Györ were between 30 and 40 percent lower than the cost of establishing a new plant in Germany, and at that time ongoing production was roughly 60 percent less expensive than at home (Keune & Toth, 2000, p. 22).

Along with these financial advantages, the high level of education and training of the Hungarian workforce argued in favor of investing in that country. Györ, the sixth largest city in Hun-

[7] Labor costs in Hungary have risen since that time, but they are still considerably lower than in Germany. In 2007 labor costs per hour amounted to €7.70 in Hungary, compared with €29.20 in Germany. While such comparisons are problematic, we can conclude that the ratio is roughly one to four (Destatis, 2008).

gary, offered sufficient numbers of well-trained potential employees, including both skilled workers and university graduates. Furthermore, Györ is only 610 kilometers away from the company's headquarters in Ingolstadt. The German production sites and the existing supplier network are thus within a reasonable distance ("Audi: Motorenmontage in Ungarn", 1996; Keune & Toth, 2000, pp. 17, 21).

3.2.2. Cultural, structural, and process-related innovations

When setting up the new subsidiary, Audi integrated several innovative characteristics. In particular, Audi established new organizational and cultural elements at the Györ plant, aiming at promoting entrepreneurship within the subsidiary. In the interest of creating unbureaucratic and flexible structures, only two management levels were instituted. In contrast to the situation at the German plants, where the organization was still based on a traditional division of labor with fixed responsibilities, employees at the Hungarian plant worked in flexible teams from the beginning on. The teams consist of several skilled workers who are in charge of operations, facility maintenance, and quality assurance. They handle all organizational and operational issues related to the respective production stages and play a central role in constantly optimizing production, an arrangement that streamlines decision making. Whereas, at conventional plants, executives are responsible for organizing work, solving problems, and improving processes, at Audi Hungaria these management tasks are performed by skilled workers. ("Györ sichert Arbeitsplätze in Deutschland", 1995; Sabatini, 2000, p. 74; Syska, 2006, p. 52). Clearly, Audi adopted elements of the organization and culture of Toyota, the industry model (see on Toyota as an industry model Ohno, 1988; Liker, 2004).

Audi also had to take a new approach to integrating the Györ plant into its operations, since it was implementing a network production for the first time. To fit the Hungarian plant in the production process of Audi AG, a sophisticated external logistics system was realized. Freight trains transport some 3,000 individual parts that are needed to assemble the engines from Ingolstadt to Györ and return the finished engines to Ingolstadt. From there, the engines assembled in Györ are distributed to their destinations. All aspects of the logistics network are managed by Schenker, a subsidiary of Deutsche Bahn, Germany's national railway company, ("Györ sichert Arbeitsplätze in Deutschland", 1995; Schmidt, 2000; Schenker, 2008).

But Audi not only had to synchronize the flows of goods between Audi Hungaria and its German sites. Equally important was the integration of the newly dispersed value activities into the whole company. This is usually accomplished by coordinating them using structural, technocratic, or personal coordination mechanisms. The establishment of Audi Hungaria particularly led to an increase in the application of personal coordination mechanisms within Audi AG. Executives from German sites were sent to manage or help manage the subsidiary; for instance, three out of four members of Audi Hungaria's board of management are of German nationality. Additionally, frequent personal visits in both directions are the rule and project teams working on cross-border issues are staffed with mixed nationalities (Audi, 2008e; Schmid & Grosche, 2008, pp. 22, 120).

As internal logistics is crucial for achieving a high level of efficiency, the internal logistics systems in Györ were also structured in an innovative way: all internal plant logistics were outsourced. Rudolph Logistik Kft., the Hungarian subsidiary of the German logistics specialist Rudolph Logistik Gruppe, took over complete responsibility for the movement of goods within the Audi plant, including inside the production buildings and between the various as-

sembly stations. Since Audi employees are not involved in moving goods, they can concentrate exclusively on the production process (Sabatini, 2000, p. 73; Schmidt, 2000).

3.3. Developing Audi Hungaria as a center of competence within Audi AG

The development process of Audi Hungaria will be explained comprehensively in the following sections. The Hungarian subsidiary first developed into a center of competence for engine production (section 3.3.1), but shortly also advanced to a center of competence for convertible assembly (section 3.3.2). Later on, the center of competence for engine production was enhanced by adding development responsibilities (section 3.3.3). Furthermore, the subsidiary was continuously acquiring new capabilities and competences which could transform it into to a center of competence for vehicle production in the future (section 3.3.4). Altogether, the successful development of Audi Hungaria led to several positive feedback effects within the corporation Audi AG (section 3.3.5).

3.3.1. Ongoing development as a center of competence for engine production

Originally, the Györ site was to be built and expanded based on a three-stage investment plan totaling €409 million. The first stage, carried out in 1993 and 1994, included the basic construction of the plant and its facilities. Upon completion of this stage, the plant had an assembly capacity of up to 750 engines per day, and its task was exclusively to assemble four-cylinder engines for the A4 model. All of the necessary engine parts were brought in by train from Germany (Bender, 1994; “Györ sichert Arbeitsplätze in Deutschland”, 1995; Keune & Toth, 2000, p. 23).

During the second stage of the investment plan, completed in 1996, Audi doubled the plant's capacity to 1,500 engines per day. According to plan, the Györ site also began manufacturing the cylinder housing for the four-cylinder engines assembled. However, departing from the original plans, the Board of Management of Audi AG decided that same year to have Audi's entire range of engines produced at the Györ plant. The introduction of the A4, A6, and A8 models two years earlier had led to sales growth, as the company had hoped, which meant that the company's engine and vehicle production capacity had to be increased. Since the company was pleased with the engines assembled in Györ and with the plant's high productivity, it seemed only logical to move all engine assembly to Hungary in the long run. This freed up capacity for vehicle production at the German plants and made good use of the capabilities and competences in building engines that the subsidiary had already developed. Thus, only 4 years after its foundation and 3 years after beginning of the engine assembly, Audi Hungaria's specific capabilities and competences had been recognized by headquarters ("Neue Modelle polieren Audi-Bilanz auf", 1995; Audi, 2008f, p. 155; 2008g).

The third stage of the original investment plan followed in 1997 and 1998 with the expansion of production capacity to 2,200 engines per day, and also included the relocation of the crankshafts and piston rods manufacture to Györ for all engine models assembled at the Hungarian site. Thus, altogether, Audi Hungaria took over responsibility not only for all aspects of Audi's engine assembly, but also for producing all those engine components that Audi did not obtain from outside suppliers ("Audi baut jetzt auch in Ungarn Autos", 1996; Keune & Toth, 2000, p. 23; Audi, 2008g). Engine production remaining in Ingolstadt was gradually moved to Györ. Production volume in Ingolstadt continued to drop until engine production was suspended there entirely in 2000 (Audi, 2001, pp. 57-58; 2002a, p. 60). From 2000 on, all of Audi's value activities related to engine production were concentrated in Györ, and Audi Hungaria had thus become a functional center of competence for engine production. As the

Györ site is Audi's only engine production plant in the world, except for the small Italian plant in Sant' Agata Bolognese, which is exclusively devoted to producing engines for Audi's Lamborghini subsidiary, Audi Hungaria can be said to have a worldwide functional mandate.

The increase in Audi Hungaria's responsibilities and growth in Audi's sales led to a steady increase in the number of engines produced in Györ each year, as shown in Figure 1. By 1999, five years after the Hungarian plant had opened, its annual engine production had already exceeded the one-million mark. In the 14 years since the plant commenced operations, a total of 14.8 million engines have been produced in Györ. This was made possible by further expansions that gradually increased production capacity from 750 to 6,900 engines daily (Audi, 2008d; Volkswagen, 2008).

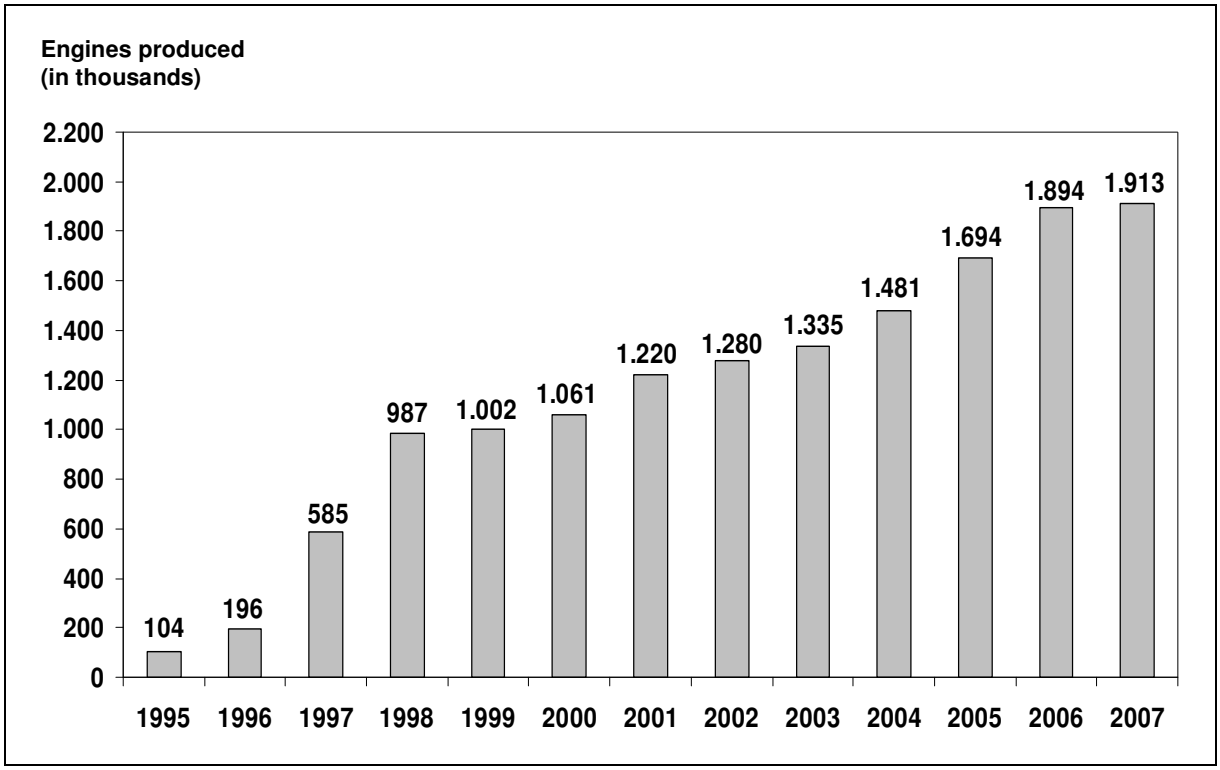


Figure 1 Development of annual engine production at Audi Hungaria.
Source: The authors, based on Audi (2006, 2007a, p. 1; 2008g, p. 9).

The case of Audi Hungaria demonstrates in a number of ways that centers of competence have a positive effect on the company as a whole. In the past, the transfer of knowledge went both ways, not only from the German plants to Hungary, but also in the other direction. For instance, the production system implemented, approved, and refined in Györ, which increased efficiency and introduced innovative procedures, became the model for the production system that was put in place at all Audi AG sites in 1999. The Györ site today ranks at the top among Audi AG locations in terms of efficiency, productivity, and product quality. Therefore, the Hungarian plant serves as a company-wide benchmark for measuring the efficiency, productivity, and product quality of other sites. In that way, the MNC gained additional benefits from its center of competence. Managers of Audi confirm that internal competition between sites has particularly boosted productivity at the German plants (Bender, 1994; "Györ sichert Arbeitsplätze in Deutschland", 1995; Sabatini, 2000, p. 73; Prokop, 2008).

Furthermore, in becoming a center of competence, Audi Hungaria has not only contributed to the international growth of its parent company Audi AG; it is now a leader in engine production within the entire Volkswagen Group. Only about 37 percent of the engines produced in Györ in 2007 were intended for vehicles sold under the Audi brand name. The remaining engines went to other customers within the Volkswagen Group that also recognized the capabilities and competences of Audi Hungaria. As shown in Figure 2, the Volkswagen brand, also known as VW, now uses nearly as many engines produced in Györ as Audi AG does.

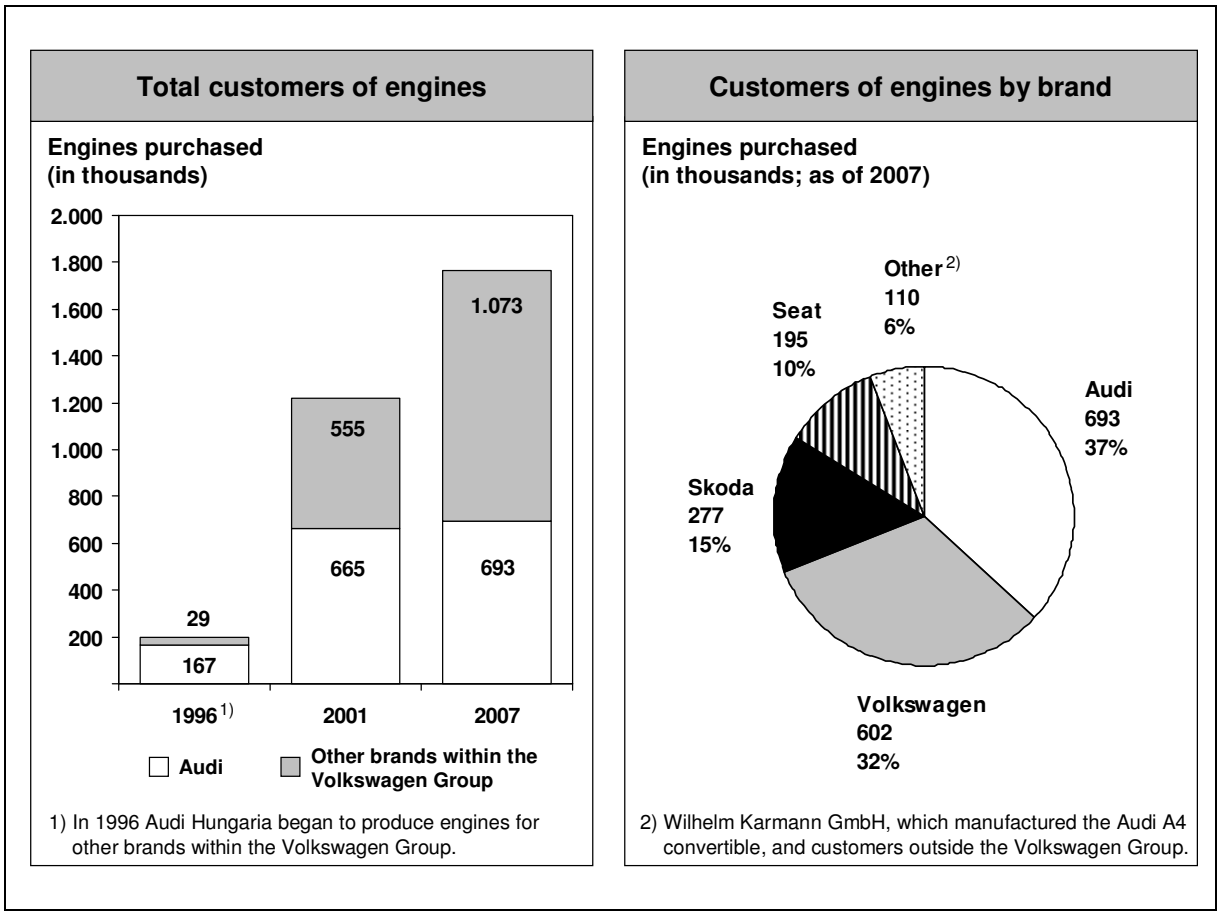


Figure 2 Engine production by Audi Hungaria and customers within the Volkswagen Group.
Source: The authors, based on Audi (1997, p. 10; 2002a, p. 61; 2008e, p. 75).

3.3.2. Simultaneous expansion as a center of competence for convertible assembly

In 1998 there was a further increase in the value activities carried out at Audi Hungaria. The Hungarian subsidiary took over all assembly work for the Audi TT model, which was available as a coupé and as a roadster (convertible sports car) (Appel, 1998; Audi, 2008e). As with the production of engines, vehicle assembly was integrated into Audi's existing value chain, in keeping with the network principle. Vehicle bodies are still welded together and painted in Ingolstadt, then transported by rail to Györ for final assembly; the assembled vehicles are then returned to Ingolstadt by rail. Network-based production allows Audi to benefit from the advantages offered by both sites: the use of existing facilities in Ingolstadt eliminates the need

for further investments, while lower wages in Györ lead to savings on labor-intensive assembly work (Appel, 1998).

Again, Audi Hungaria was quickly able to establish itself as a serious alternative to Audi's other sites in the area of vehicle assembly. Since officials at company headquarters in Ingolstadt were also pleased with the quality of vehicle assembly in Györ, between 2001 and 2003 the plant was chosen to assemble the A3 model and its sports car version, the S3. Since the end of 2007 the Györ plant has also assembled the A3 convertible, along with the two versions of the Audi TT (Appel, 1998; Audi, 2004a, 2007b, 2008g). Temporarily, the Györ plant was thus the only Audi facility that assembled convertibles – the Audi TT roadster and the A3 convertible. The A4 convertible, the third "open" model sold under the Audi name, was manufactured under a contract manufacturing arrangement with production service company Wilhelm Karmann (Audi, 2008h, p. 54). Audi's Hungarian subsidiary could therefore be called a functional center of competence in the area of convertible assembly, again with a worldwide mandate.

Producing a convertible involves special requirements during the manufacturing process. The process is less automated and far fewer vehicles are built as compared with conventional vehicles. This makes it difficult to integrate convertible manufacturing into a traditional production process, and many car manufacturers outsource convertible production to external production service providers. In contrast to the automotive industry's common practice, Audi decided to take advantage of its Györ site, as Audi Hungaria features the necessary flexibility. Indeed, the Audi TT coupé, the Audi TT roadster, and the A3 convertible are even assembled on the same production line (Audi, 2002b; "Audi Celebrates 15th Anniversary of Plant in Hungary", 2008; Sabatini, 2000, p. 74).

However, with the replacement of the A4 convertible through the new A5 convertible at the beginning of 2009, the status of a center of competence was challenged. The A5 convertible is manufactured and assembled at the Neckarsulm plant which is also home to the conventional A5 production ("Audi: A5 Cabrio und R8 Targa aus Neckarsulm", 2008). Given Audi Hungaria's capabilities and competences in the field of convertible assembly, this is surprising. But an Audi official admitted that there were also political reasons for charging the Neckarsulm plant with the A5 convertible assembly (Grundhoff, 2009). Audi's board of management might have felt politically obliged to strengthen the German plants, particularly during the economic crisis that currently affects the German automotive industry and the whole country's economy. Nevertheless, the Neckarsulm plant is now able to build up capabilities and competences in the field of convertible assembly. Audi Hungaria might therefore loose its status of a center of competence in the nearer future, as its capabilities and competences would not be specific any more.

3.3.3. Upgrading the center of competence for engine production by adding development responsibilities

At its own initiative, rather than at the suggestion of the company's headquarters in Ingolstadt, Audi Hungaria was given responsibility for development activities related to engine series production in 2001. These activities include adaptive development, redesigning engines during their life cycle, minimizing product costs, engine testing, and production support like solving technical problems during the production process (Audi, 2004a, 2004b). Audi Hungaria has thus gained additional expertise and is now able to solve production problems independently, without help from the German plants.

Originally, Audi Hungaria's advance to take over these development activities was met with skepticism at headquarters in Ingolstadt. While the capabilities and competences of the Hungarian subsidiary and its engineers were not in doubt, there was anxiety about an unchecked "knowledge drain" and a loss of power (Gallarotti, 2000). "We spent two years trying to convince those in charge," observed Jürgen Hoffmann, former Chairman of the Board of Management of Audi Hungaria. Norbert Pauli, head of engine development at the Györ site, added, "There was such skepticism in Ingolstadt that we gave our project the code name of Csárdás [*Authors' note:* Hungarian national dance]" (Sailer, 2000). But ultimately the Hungarian subsidiary prevailed and could expand the value activities carried out.

Audi AG funded this project in two stages, investing €18 million in 2001 and €8 million in 2004 (Audi, 2004a, 2004b). A total investment volume of €26 million may seem insignificant, but today Audi AG benefits greatly from its Hungarian subsidiary's enhanced responsibility and competence. The enhancement of responsibility led to greater efficiency and higher productivity in the network's production process. Before, problems arising during the engine production process that required input from a development engineer – during testing, for example – usually meant a time-consuming process of shipping the engines back and forth between Hungary and Germany and required extensive coordination between the respective employees. This additional effort is no longer necessary (Sailer, 2000).

Overall, the expansion of Audi Hungaria's responsibilities, to include more than production alone, implied an increase in autonomy. Autonomy is essential for successful centers of competence because the respective subsidiary has to be able to apply its particular competences (Schmid, 2003, p. 275). From that point on, the Györ plant was more than just an "extended workbench" for the German sites. Audi Hungaria had thus reinforced its strategic position as a center of competence for engine production and enhanced its capacity to act within the Audi

AG. In the long run, it would be even wise for Audi to charge its Hungarian subsidiary with all aspects of engine development. This would greatly simplify interactions between development and production and among the workers concerned. Audi Hungaria could then become a center of competence in the area of engine development as well.

3.3.4. Ongoing acquisition of additional capabilities – expansion as a center of competence for vehicle production?

The opening of tool production facilities at the Győr site in 2005, at a cost of €40 million, was the final step, so far, in the development of the Hungarian subsidiary and further complemented Audi Hungaria's production capabilities and competences. In an in-company selection process, Győr outrivaled the other Audi AG sites in Europe (Brussels, Ingolstadt, and Neckarsulm).[8] Tools and equipment for vehicle series production are now being produced in Hungary, including stamping equipment, drawing, cutting and copying tools as well as grippers that are used to join vehicle body parts (Audi, 2007c, 2008a, 2008i, 2008j).

The center for tool manufacture also produces vehicle body parts for Audi's small-batch series. The Győr plant supplies vehicle body parts for Audi's top-of-the-line RS4, S6, RS6, and R8, which are sold in considerably lower numbers than the company's regular series models. Production includes outer skin panels, doors, and hatchbacks, parts that require a complex cutting and joining technique as well as a great deal of manual labor to achieve the superior quality offered by these premium vehicles (Audi, 2008j). Altogether, the value chain at the Győr site today includes all of the steps shown in Figure 3.

[8] Today Audi AG owns six production sites worldwide. Besides its two German sites in Ingolstadt and Neckarsulm, it has two other European sites in Brussels, Belgium, and Győr, Hungary. Furthermore, there is one location in Aurangabad, India, and one in Changchun, China (Audi, 2008f).

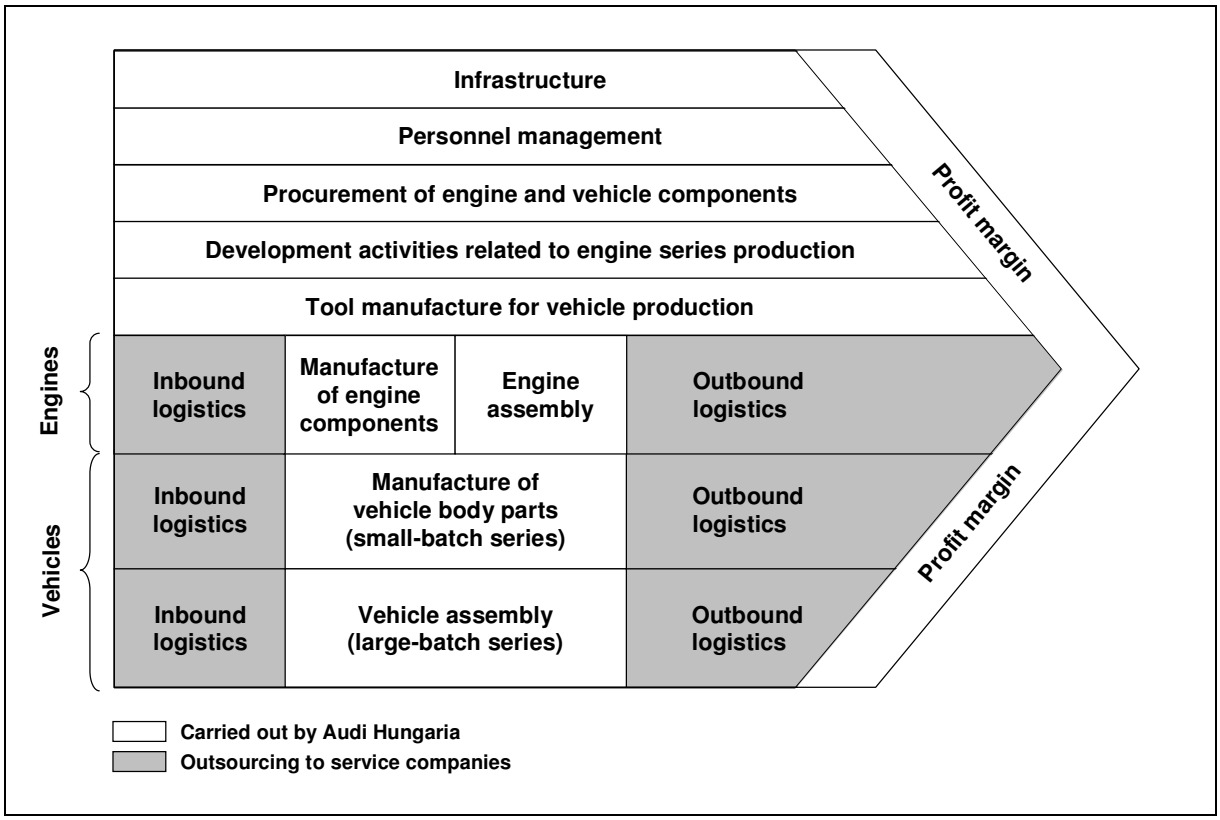


Figure 3 Audi's Value chain at the Györ site.

Audi Hungaria's responsibilities are likely to continue to grow. A look at small-batch series production is helpful in determining whether Audi Hungaria might be capable of taking on additional vehicle production tasks. Two options are conceivable: first, the Györ site could expand to include not only assembly, but also manufacturing of certain parts for its current models, for example building vehicle bodies. If Audi Hungaria's vehicle production proved to be as satisfactory as its engine production and vehicle assembly, the Györ site might take over the entire process of manufacturing the Audi TT coupé and roadster models as well as the A3 convertible. Another possibility would be for the Hungarian subsidiary to produce a specific higher-volume model, such as the A3, which was assembled there for a limited period of time in the past. Both options would make Audi Hungaria a functional center of competence for the complete production of the respective model.

Figure 4 summarizes the increase in Audi Hungaria's value activities and competences over time.

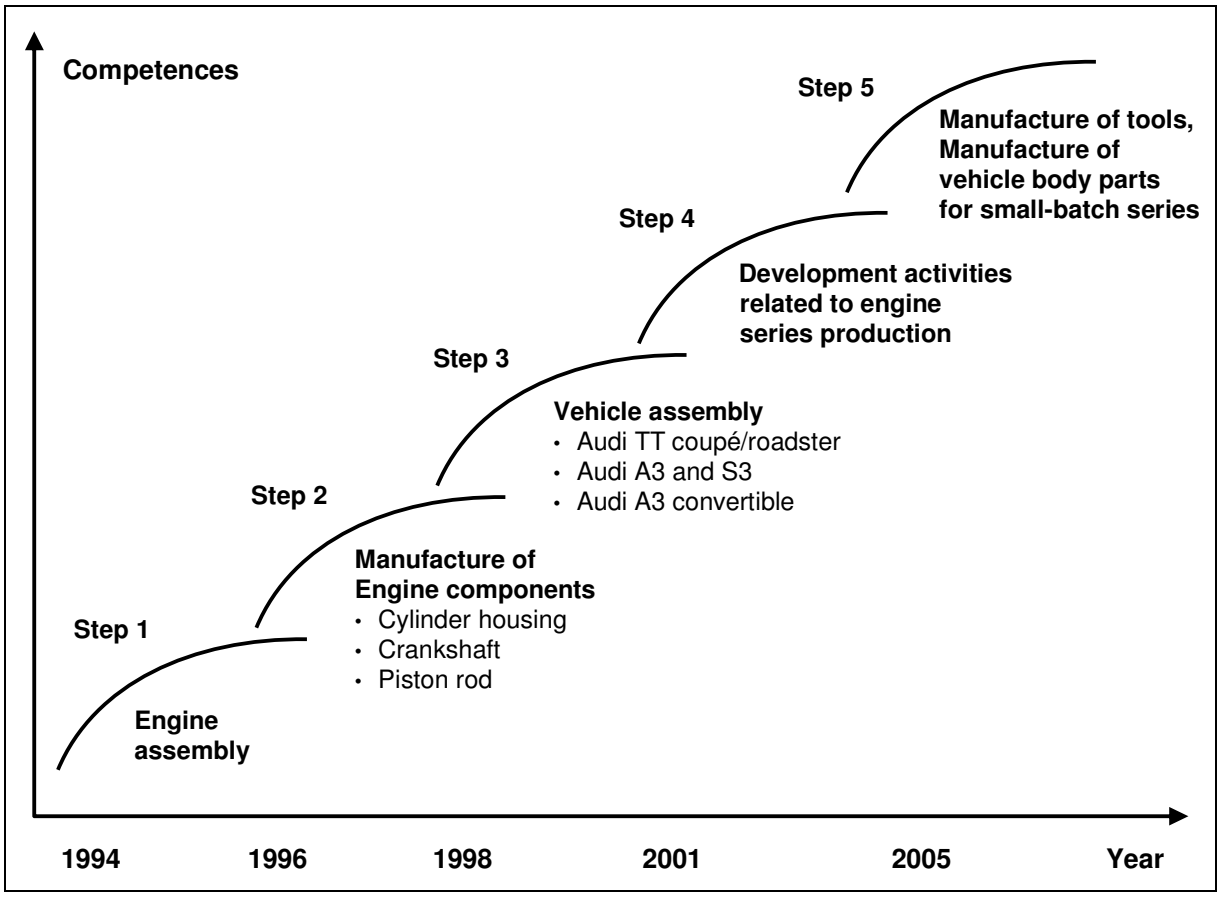
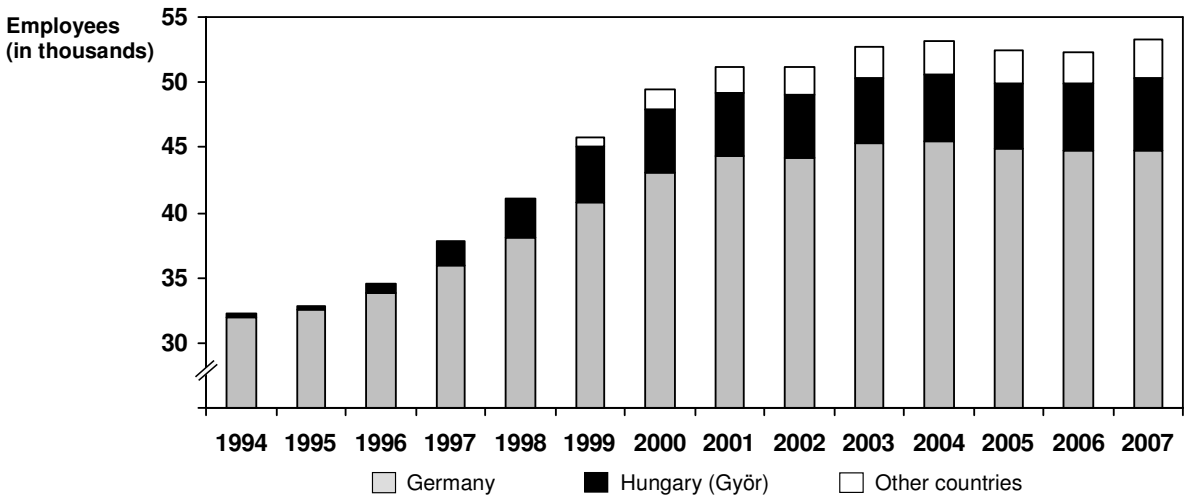


Figure 4 Increase of Audi Hungaria's value activities and competences.

3.3.5. Audi Hungaria as a cornerstone of Audi AG's growth strategy

Audi Hungaria has helped Audi in realizing its strategic reorientation and acted as an important part of Audi's growth strategy. As a multiple center of competence, Audi Hungaria has provided Audi AG with competitive advantages in this context – a clear win-win situation for both foreign and domestic subsidiaries as well as headquarters. Furthermore, fears that Audi Hungaria and its expansion would lead to a loss of jobs in Germany have not been borne out. On the contrary: there has been a steady increase in the number of employees at the German

plants since the mid-1990s, as shown in Figure 7 ("Györ sichert Arbeitsplätze in Deutschland", 1995). The much discussed "job drain" to Hungary (or other foreign plants founded later on) has not occurred.[5]



Country	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Germany	32.013	32.558	33.805	36.001	38.097	40.736	43.118	44.374	44.261	45.316	45.511	44.902	44.701	44.698
Györ	202	265	724	1.760	2.914	4.312	4.831	4.857	4.767	4.939	5.146	5.046	5.204	5.623
Other Countries[1)]	0	0	0	0	0	752	1.447	1.910	2.170	2.434	2.487	2.464	2.392	3.026
Total	32.215	32.823	34.529	37.761	41.011	45.800	49.396	51.141	51.198	52.689	53.144	52.412	52.297	53.347

1) Only countries consolidated in the annual report.

Figure 5 Employees of Audi AG in Hungary, Germany, and other countries.
Source: The authors, based on annual reports for the respective years.

4. Discussion

4.1. Implications for research and theory

The case study has shown how Audi Hungaria, the Central European subsidiary of the Western MNC Audi AG, has gradually developed towards a functional center of competence for engine production and convertible assembly. Furthermore, it was analyzed how the subsidiary has evolved after having achieved the status of a center of competence. Thus, our study con-

tributed to closing a research gap: whereas previous publications mainly focused on the mere existence of centers of competence at a certain point in time (e.g. Fratocchi & Holm, 1998; Forsgren & Pedersen, 1998; Benito, 2000; Moore, 2000), we examined in detail the development of a center of competence in the course of time. Thereby, we were also able to show that a foreign subsidiary may represent several types of centers of competence simultaneously (see for example Surlemont, 1998 for a typology of different centers of competence).

In particular, our research pointed out that being a center of competence is not a stable state that – once achieved – does not change, as the relevant cross-sectional studies may suggest. Instead, a subsidiary may refine its specific role, for instance by taking over additional value activities in related value functions, just as Audi Hungaria did in the field of engine development. A subsidiary may also relapse and loose its position as a center of competence, a step that Audi Hungaria might potentially experience in terms of convertible assembly in the near future. This case study took these dynamics into account and demonstrated that there may be certain life cycles for centers of competence (see also Birkinshaw & Hood, 1997 on common development processes of subsidiaries and Birkinshaw, 1996 on gain, development, and loss of subsidiary mandates in general).

Although generalizability from one case study is limited, this paper indicated which measures may contribute to developing a subsidiary towards a center of competence or to refining an existing one. In the case of Audi Hungaria, a steady increase in value activities carried out and responsibilities taken over turned out to be the basis of enhancing the subsidiary's capabilities and competences. Hence, our research combined objectives of the IB literature interested in the development process of subsidiaries (e.g. Birkinshaw, 1996; Birkinshaw & Hood, 1997) and the IB literature analyzing the factors fostering subsidiary development (e.g. Frost, Birkinshaw, & Ensign, 2002; Pedersen, 2006).

Our case study also shed light on the concrete feedback effects an MNC may receive from its centers of competence. Audi AG and its German sites have benefited in a variety of ways from the Hungarian subsidiary being a center of competence. Besides the knowledge transfer from Hungary to Germany, consisting of the diffusion of Audi Hungaria's production system to all other plants and the subsidiary's role as benchmark for efficiency, productivity, and quality within the whole company, Audi Hungaria's capabilities and competences were a cornerstone of Audi's growth strategy. Thus, the case study contributed to bridging the gap between theoretically identified influences of subsidiaries on MNCs (e.g. Forsgren, Johanson, & Sharma, 2000) and empirically observed outcomes on MNC level, such as superior performance of the corporation (e.g. Holm & Sharma, 2000; Frost, Birkinshaw, & Ensign, 2002).

Eventually, compared to the few existing publications on the development of centers of competence (see Andersson & Holmström, 2000; Pahlberg, 2000; Schmid, 2003), this in-depth case study of Audi Hungaria delivered a much more comprehensive analysis of the process of becoming a center of competence. In this way, it contributed to a thorough understanding of how to upgrade subsidiaries.

4.2. Implications for managers

The possibilities for managers to learn from the case of Audi Hungaria are manifold. We will discuss the most important ones in the following paragraphs.

First, by considering a wider array of financial and non-financial location factors, such as for instance the availability of an adequate workforce, Audi AG provided a solid ground for Audi Hungaria's development of capabilities and competences. Furthermore, the innovative struc-

tures and processes as well as the entrepreneurial corporate culture contributed essentially to the fact that the subsidiary had something special to offer to other parts of the MNC. Audi AG thus initiated – rather in an unintended manner – the process of establishing a center of competence. Managers can learn from this case that the future growth of a subsidiary may be guided by ensuring particular initial conditions that already point towards the development of certain specific capabilities and competences.

Second, the case of Audi Hungaria demonstrated how a subsidiary can be developed into a center of competence. Audi's Hungarian subsidiary grew by gradually taking over additional value activities and further responsibilities. The subsidiary could acquire new capabilities and competences step by step, slowly expanding its field of activity. Managers may therefore consider the possibility of enhancing a subsidiary's capabilities and competences by adding related tasks to its portfolio of activities and responsibilities.

Third, our research also revealed that Audi Hungaria's development was only partially planned and determined by Audi AG. Although headquarters were actively involved in the subsidiary's development process, for example when assigning new activities to the Györ plant, the overall process of becoming a center of competence was rather emergent, to speak with Mintzberg's terms (see Mintzberg, 1978; Mintzberg & Waters, 1985). To some extent this was due to the subsidiary's own efforts and initiatives, for instance regarding the advance to take over development tasks related to series production (see for example Delany, 2000 on subsidiary initiatives). At the beginning, Audi AG did not plan to create a center of competence, but in the end establishing one was a logical decision. Managers should bear in mind that both headquarters and subsidiaries are involved in shaping a subsidiary's activities, competences, and responsibilities – and thus its eventual status as a center of competence.

Fourth, as we pointed out in the case study, the role of a center of competence requires a certain amount of autonomy. The subsidiary must be allowed to take advantage of its specific capabilities and competences without being restrained by headquarters. For instance, Audi Hungaria has been able to assume responsibilities within Audi AG in engine production and now decides on all issues of engine production, such as maintaining and increasing quality. This position has even been enhanced by taking on related development activities. Managers from headquarters should be aware of the fact that upgrading a subsidiary into a center of competence must be accompanied by granting subsidiaries more autonomy. If not, the potential benefits of establishing a center of competence cannot be realized.

Fifth, the case study also showed that centers of competence need to be well integrated into the corporate network, vertically as well as horizontally. If not, other units of the MNC would not be able to use the capabilities and competences of the center of competence. Audi Hungaria is tightly integrated into Audi's network, for instance by means of a complex logistics system and coordination of value activities. As can be seen in the case of Audi AG, personal coordination mechanisms are particularly useful for integrating the various units of an MNC (Hedlund, 1986, p. 27; 1993, p. 231; Hedlund & Kogut, 1993, pp. 354-355). Therefore, both autonomy and integration are required to make use of the subsidiary's capabilities and competences, which poses a special challenge to coordinating centers of competence. Since their capabilities and competences differ, the individual role of a center of competence plays a crucial part in determining what type of coordination will maximize the respective subsidiary's contribution to the company's success. Managers have to design a highly specific set of structural, technocratic, and personal coordination mechanisms for each center of competence.[9]

[9] If, for example, Audi AG were to develop its Brussels plant into a center of competence, its coordination would need to be adjusted accordingly. Simply copying the methods used at the Györ site would hardly be successful. More information on different sets of coordination mechanisms may be found in Martinez and Jarillo (1991), Kim, Park, and Prescott (2003) or Kutschker and Schmid (2008, pp. 1031-1058).

5. Conclusion

This case study has highlighted how Audi's Hungarian subsidiary developed into functional centers of competence for engine production and convertible assembly. Gradually taking over additional value activities and responsibilities fostered the subsidiary's growth of capabilities and competences. The case study represented a dynamic approach of looking at centers of competence; in the past, such a dynamic perspective was rather neglected by researchers. Additionally, we pointed out how Audi AG and its various plants benefited widely from the Hungarian subsidiary being a center of competence. Audi Hungaria supported the MNC's growth strategy and helped to improve production processes within the whole corporation. Our research has thus stressed the relevance of centers of competence for gaining and sustaining competitive advantage.

Altogether, establishing centers of competence calls for new ways of strategic and organizational thinking within MNCs. It has to be recognized that Audi Hungaria's rise within Audi AG was accompanied by a fundamental change of the company as a whole. While its subsidiary developed into a center of competence, Audi AG began transforming itself into a network organization. The traditional center-periphery view was partially abandoned and the incorporation of a modern network view was initiated. This was an essential condition for benefiting from Audi Hungaria's capabilities and competences.

Based on the case study and its discussion, six fundamental changes describing a company's move from the traditional center-periphery view to a modern network view can be identified: (1) companies transforming into network MNCs with centers of competence develop into complex multi-center enterprises characterized by a variety of vertical and horizontal flows of goods and information between the corporate units. Such characteristics clearly emerged

within Audi AG over time. (2) Sources of competitive advantages can then be found in home countries as well as in host countries. In this case, Hungary proved to be a source of competitive advantage for the German car manufacturer Audi AG and the Volkswagen Group. (3) In becoming centers of competence, subsidiaries leave their roles of implementers of headquarters' instructions behind and take over strategic positions within their specific area of competence. Audi Hungaria exercises such a strategic position in the field of engine production and convertible assembly. (4) By doing so, subsidiaries' responsibilities are no longer restricted to domestic markets, as is for example illustrated by Audi Hungaria's worldwide functional mandate in engine production. (5) Decisions within the specific areas of competence are taken by the respective centers of competence, not by headquarters. This leads to a so-called decentralized centralization. For instance, in engine production it is Audi Hungaria that represents Audi AG's center of decision making. (6) As a result, MNCs must turn away from purely top-down driven management styles and take bottom-up proposals into account, such as Audi Hungaria's initiative in terms of development activities.

These six moves are important conditions for successfully establishing centers of competence; but they are difficult to be reached and cannot be made overnight. Moreover, during our research we discovered that Audi AG seems to be not yet ready to depart completely from the traditional center-periphery view. While Audi's top-management in Germany is generally proud of the Hungarian subsidiary, the latter still suffers from being not always valued properly regarding its specific capabilities and competences, for example when decisions related to Audi Hungaria's activities are still made at headquarters in Ingolstadt. Apparently, moving fully to a network view turns out to be difficult for many top-managers since this would require another fundamental change, namely (7) adopting a rather geocentric orientation. As Perlmutter (1969, pp. 15-16) already noted, there are many difficulties on the way geocentrism, like for example economic nationalism in the company's home country or international

inexperience of the company's top-management. Such barriers have to be overcome when trying to realize network organizations in practice. The changes necessary for entirely incorporating the modern network view are summarized in Figure 6.

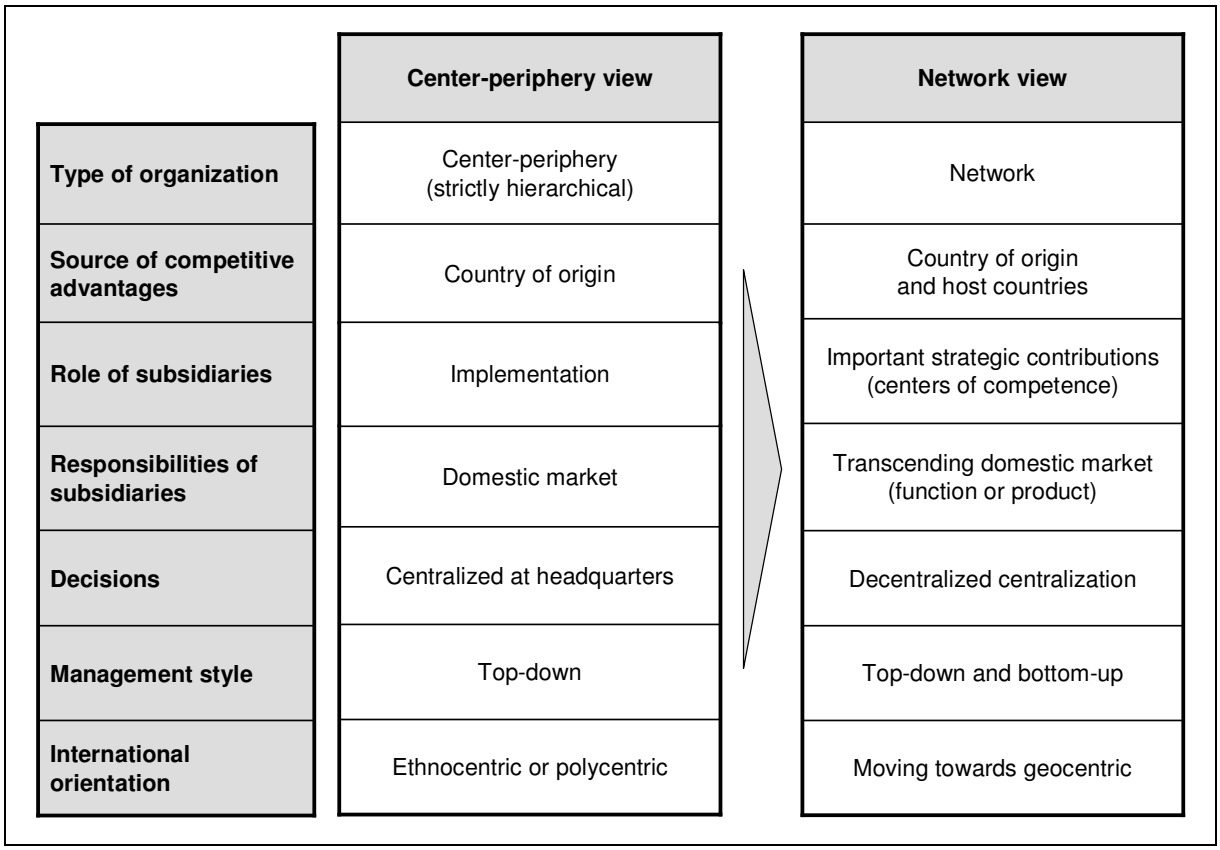


Figure 6 Center-periphery and network views of MNCs.
Source: Adapted from Schmid (2003, p. 278).

Acknowledgements

The research for this in-depth case study was done within the framework of a research project, which was carried out together with and financed by the Bertelsmann Foundation, Gütersloh/Germany. The authors thank the Bertelsmann Foundation for financing the project and for its joint realization. Many thanks also go to Manuela Geipel and Cornelia Graf-Chmiel for their commitment and support in collecting and analyzing data.

References

Andersson, M. and Holmström, C. (2000). The Dilemma of Developing a Centre of Excellence – A Case Study of ABB Generation. In U. Holm and T. Pedersen (eds.), *The Emergence and Impact of MNC Centres of Excellence*, London: MacMillan, 240-258.

Appel, F.-H. (1998). Im Motorenwerk Györ laufen die ersten Autos vom Band, *Frankfurter Allgemeine Zeitung*, May 16, 25.

Audi (1995). *Annual Report 1994*. Ingolstadt: Audi.

Audi (1997). *Annual Report 1996*. Ingolstadt: Audi.

Audi (2001). *Annual Report 2000*. Ingolstadt: Audi.

Audi (2002a). *Annual Report 2001*. Ingolstadt: Audi.

Audi (2002b). *Fertigung des neuen Audi A4 Cabriolets. Die „emotionale Speerspitze" der Modellreihe entsteht*. Ingolstadt: Audi. Retrieved July 2, 2008, from http:// www.presseportal.de/pm/6730/ 319792/audi_ag/

Audi (2004a). *Annual Report 2003*. Ingolstadt: Audi.

Audi (2004b). *Ausbau des Motorenentwicklungszentrums*. Ingolstadt: Audi. Retrieved July 2, 2008, from http://www.audi.hu/deu/hirek/hir.php?hir_ id=27

Audi (2006). *Audi Hungaria Motor Kft. Annual Report 2005*. Györ: Audi.

Audi (2007a). *Audi Hungaria Motor Kft. Annual Report 2006*. Györ: Audi.

Audi (2007b). *Produktionsstart und Weltpremiere des Audi A3 Cabriolet in Ungarn*. Ingolstadt: Audi. Retrieved July 2, 2008, from http://www.audi.hu/deu/hirek/ hir.php?hir_id=123

Audi (2007c). *Karosserieteile für Audi RS6 aus Györ*. Ingolstadt: Audi. Retrieved July 2, 2008, from http://www.audi.hu/deu/hirek/hir.php?hir_id=127

Audi (2008a). *Produktionsstandort Ungarn in Györ*. Ingolstadt: Audi. Retrieved July 2, 2008, from http://www.audi.de/audi/de/de2/unternehmen/produktionsstandorte/ ungarn.html

Audi (2008b). *Produktionsstandorte weltweit*. Ingolstadt: Audi. Retrieved July 2, 2008, from http://www.audi.de/ audi/de/de2/unternehmen/produktionsstandorte.html

Audi (2008c). *Audi Modelle der 90er Jahre*. Ingolstadt: Audi. Retrieved July 2, 2008, from http://www.audi.de/audi/de/de2/unternehmen/historie/letzte_jahrzehnte/ 90er_jahre_bis_heute.html

Audi (2008d). *Produkte. Motoren*. Ingolstadt: Audi. Retrieved July 2, 2008, from http://www.audi.hu/deu/termekek/ motorok.html

Audi (2008e). *Audi Hungaria Motor Kft. Jahresbericht 2007*. Györ: Audi.

Audi (2008f). *Annual Report 2007*. Ingolstadt: Audi.

Audi (2008g). *Chronologie einer Investition*. Györ: Audi.

Audi (2008h). *14. Rekordjahr in Folge bei Audi Hungaria*. Ingolstadt: Audi. Retrieved July 2, 2008, from http://www.audi.hu/deu/hirek/hir.php?hir_ id=131

Audi (2008i). *Meilensteine der Investition*. Ingolstadt: Audi. Retrieved July 2, 2008, from http://www.audi.hu/deu/profil/beruhazas_merfoldkovei.html

Audi (2008j). *Werkzeugbau*. Ingolstadt: Audi. Retrieved July 2, 2008, from http://www.audi.hu/deu/termekek/szerszamgyar

"Audi. A5 Cabrio & R8 Targa aus Neckarsulm." (2008). auto motor und sport. Retrieved October 2, 2008, from http://www.auto-motor-und-sport.de/news/wirtschaft_-_handel/hxcms_article_504459_13987.hbs

"Audi baut jetzt auch in Ungarn Autos. Coupé und Roadster aus Györ. Mehr Stellen in Ingolstadt." (1996). *Frankfurter Allgemeine Zeitung*, May 2, 23.

"Audi Celebrates 15th Anniversary of Plant in Hungary." (2008). *MIT – EcoNews*, April 21, no page listed.

"Audi. Motorenmontage in Ungarn. Angeblich auch Montage von Sechs- und Achtzylindern in Györ." (1996). *Süddeutsche Zeitung*, April 30, 22.

Bäurle, I. and Schmid, S. (1994). *Process Orientation and Deep Structure – Perspectives on the Internationalising Corporation*. Discussion Paper No. 59, Catholic University of Eichstätt-Ingolstadt/Germany.

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage, *Journal of Management*, 17/1, 99-120.

Bartlett, C. A. and Ghoshal, S. (1986). Tap Your Subsidiaries for Global Reach, *Harvard Business Review*, 64/6, 87-94.

Bender, K. W. (1994). Audi hat jetzt in Ungarn ein modernes Motoren-Werk, *Frankfurter Allgemeine Zeitung*, October 13, 26.

Benito, G. (2000). Industrial Clusters and Foreign Companies' Centres of Excellence in Norway. In U. Holm and T. Pedersen (eds.), *The Emergence and Impact of MNC Centres of Excellence*, London: MacMillan, 97-112.

Birkinshaw, J. (1996). How Multinational Subsidiary Mandates Are Gained and Lost, *Journal of International Business Studies*, 27/3, 467-495.

Birkinshaw, J. and Hood, N. (1997). An Empirical Study of Development Processes in Foreign-owned Subsidiaries in Canada and Scotland, *Management International Review*, 37/4, 339-364.

Birkinshaw, J. and Hood, N. (eds.) (1998). *Multinational Corporate Evolution and Subsidiary Development*. Houndmills, London: MacMillan.

Birkinshaw, J. and Morrison, A. J. (1995). Configurations of Strategy and Structure in Subsidiaries of Multinational Subsidiaries, *Journal of International Business Studies*, 26/4, 729-753.

Chiesa, V. (1995). Globalizing R&D Around Centres of Excellence, *Long Range Planning*, 28/6, 19-28.

Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Thousand Oaks etc.: Sage.

Delany, E. (2000). Strategic Development of the Multinational Subsidiary through Subsidiary Initiative-taking, *Long Range Planning*, 33/2, 220-244.

Destatis (2008). *Jahresschätzung Arbeitskosten. Arbeitskosten je geleistete Stunde im Jahr 2007*. Wiesbaden: German Federal Statistical Office. Retrieved August 14, 2008, from

http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/DE/Content/Statistiken/VerdienstеArbeitskoten/Arbeitskosten/Tabellen/Content75/JahresschVeraenderungAK,templateId=renderPrint.psml

Dörrenbächer, C. and Geppert, M. (2005). *Micro-political Aspects of Mandate Development and Learning in Local Subsidiaries of Multinational Corporations*. Discussion Paper SP III 2005-202, Berlin: Social Science Research Center.

Dunsch, J. (2005). Auf nach Ungarn – und weiter gen Osten, *Frankfurter Allgemeine Zeitung*, June 23, 18.

Ensign, P. C., Birkinshaw, J. M. and Frost, T. S. (2000). R&D Centres of Excellence in Canada. In U. Holm and T. Pedersen (eds.), *The Emergence and Impact of MNC Centres of Excellence*, London: MacMillan, 131-153.

Ferdows, K. (1997). Making the Most of Foreign Factories, *Harvard Business Review*, 75/2, 73-88.

Forsgren, M. (1990). Managing the International Multi-Centre Firm. Case Studies from Sweden, *European Management Journal*, 8/1, 261-267.

Forsgren, M., Holm, U. and Johanson, J. (1992). Internationalization of the Second Degree. The Emergence of European-Based Centres in Swedish Firms. In S. Young and J. Hamill (eds.), *Europe and the Multinationals. Issues and Responses for the 1990s*, Aldershot/Hantshire, Bookfield/Vermont: Edward Elgar, 235-253.

Forsgren, M., Johanson, J. and Sharma, D. (2000). Development of MNC Centres of Excellence. In U. Holm and T. Pedersen (eds.), *The Emergence and Impact of MNC Centres of Excellence*, London: MacMillan, 45-67.

Forsgren, M. and Pedersen, T. (1998). Centres of Excellence in Multinational Companies: The Case of Denmark. In J. Birkinshaw and N. Hood (eds.), *Multinational Corporate Evolution and Subsidiary Development*, Houndmills, London: MacMillan, 141-161.

Fratocchi, L. and Holm, U. (1998). Centres of Excellence in the International Firm. In J. Birkinshaw and N. Hood (eds.), *Multinational Corporate Evolution and Subsidiary Development*, Houndmills, London: MacMillan, 189-209.

Frost, T., Birkinshaw, J. M. and Ensign, S. (2002). Centres of Excellence in Multinational Corporations, *Strategic Management Journal*, 23/11, 997-1015.

Gallarotti, E. (2000). Erfolg von Audi Hungaria auf der „grünen Wiese“, *Neue Zürcher Zeitung*, June 20, no page listed.

Ghauri, P. and Grønhaug, K. (2005). *Research Methods in Business Studies. A Practical Guide*. London: Prentice Hall Financial Times.

Graz, G. (2004). Personalrecht in den neuen EU-Staaten, *Infodienst Mitbestimmung*, No. 9/2004, 3-4.

Grundhoff, S. (2009). *Feiner Stoff*. München: Süddeutsche Zeitung. Retrieved June 14, 2009, from http://www.sueddeutsche.de/automobil/958/459598/text/print.html

“Györ sichert Arbeitsplätze in Deutschland. Die Audi AG hat mit der Motorenproduktion in Ungarn die eigenen Zielsetzungen übertroffen.” (1995). *Süddeutsche Zeitung*, April 15, 23.

Hank, R. (1993). Was die IG Metall zum Wettbewerb der Standorte beiträgt, *Frankfurter Allgemeine Zeitung*, March 3, 16.

Hedlund, G. (1986). The Hypermodern MNC – A Heterarchy?, *Human Resource Management*, 25/1, 9-35.

Hedlund, G. (1993). Assumptions of Hierarchy and Heterarchy, with Applications to the Management of the Multinational Corporation. In S. Ghoshal and D. E. Westney (eds.), *Organization Theory and the Multinational Corporation,* New York: St. Martin's Press, 211-236.

Hedlund, G. and Kogut, B. (1993). Managing the MNC. The End of the Missionary Era. In G. Hedlund (ed.), *Organization of Transnational Corporations,* United Nations Library on Transnational Corporations, Vol. 6, London, New York: United Nations, 343-358.

Holm, U. and Pedersen, T. (2000). Introduction and Overview. In U. Holm and T. Pedersen (eds.), *The Emergence and Impact of MNC Centres of Excellence,* London: Macmillan, 1-20.

Holm, U. and Pedersen, T. (eds.) (2000). *The Emergence and Impact of MNC Centres of Excellence*. Houndmills, London: MacMillan.

Holm, U. and Sharma, D. (2000). The Impact of Centres of Excellence on MNC Performance. In U. Holm and T. Pedersen (eds.), *The Emergence and Impact of MNC Centres of Excellence*, London: Macmillan, 219-239.

Hymer, S. (1976). *The International Operations of National Firms: A Study of Direct Foreign Investment*. Cambridge: MIT Press.

Keune, M. and Toth, A. (2000). *Case Study of Area Responses to Globalization. Foreign Direct Investment, Local Suppliers, and Employment in Györ, Hungary*. SEED Working Paper Nr. 10, Series on Globalization, Area-based Enterprise Development and Employment, Geneva: International Labour Office.

Kim, K., Park, J.-H. and Prescott, J. E. (2003). The Global Integration of Business Functions. A Study of Multinational Businesses in Integrated Global Industries, *Journal of International Business Studies*, 34/4, 327-344.

Kindleberger, C. P. (1969). *American Business Abroad: Six Lectures on Direct Investment.* New Haven, London: Yale University Press.

Kutschker, M. and Schmid, S. (2008). *Internationales Management*. 6th revised and expanded edition, Munich, Vienna: Oldenbourg.

Kutschker, M., Schurig, A. and Schmid, S. (2002a). *The Influence of Network Partners on Critical Capabilities in Foreign Subsidiaries*. Discussion Paper No. 158, Catholic University of Eichstätt-Ingolstadt/Germany.

Kutschker, M., Schurig, A. and Schmid, S. (2002b). Centers of Excellence in MNCs - An Empirical Analysis from Seven European Countries. In J. Larimo (ed.), *Current European Research in International Business*, 86, Vaasa: Vaasan Yliopiston Julkaisuja, 224-245.

Liker, J. (2004). *The Toyota Way: Fourteen Management Principles from the World's Greatest Manufacturer*. McGraw-Hill: New York.

Lockett, A., Thompson, S. and Morgenstern, U. (2009). The Development of the Resource-based View of the Firm: A Critical Appraisal, *International Journal of Management Reviews*, 11/1, 9-28.

Martinez, J. I. and Jarillo, J. C. (1991). Coordination Demands of International Strategies, *Journal of International Business Studies*, 22/3, 429-444.

Mintzberg, H. (1978). Patterns in Strategy Formation, *Management Science*, 24/9, 934-948.

Mintzberg, H. and Waters, J. A. (1985). Of Strategies, Deliberate and Emergent, *Strategic Management Journal*, 6/3, 257-272.

Moore, K. (2000). The Competence of Formally Appointed Centers of Excellence in the UK. In U. Holm and T. Pedersen (eds.), *The Emergence and Impact of MNC Centres of Excellence*, London: MacMillan, 154-166.

"Neue Modelle polieren Audi-Bilanz auf." (1995). Berliner Zeitung. Retrieved July 2, 2008, from http://www.berlinonline.de/berliner-zeitung/archiv/.bin/dump.fcgi/1995/1018/none/0064/ index.html

Ohno, T. (1988). *Toyota Production System: Beyond Large-Scale Production*. Cambridge: Productivity Press.

Pahlberg, C. (2000). The Impact from Business Networks on MNC Competence Development – A Case Study. In U. Holm and T. Pedersen (eds.), *The Emergence and Impact of MNC Centres of Excellence*, London: MacMillan, 79-93.

Pedersen, T. (2006). Determining Factors of Subsidiary Development. In A. T. Tavares and A. Teixeira (eds.), *Multinationals, Clusters and Innovation. Does Public Policy Matter?*, London, New York: Palgrave MacMillan, 145-159.

Perlmutter, H. V. (1969). The Tortuous Evolution of the Multinational Corporation, *Columbia Journal of World Business*, January-February 1969, 9-18.

Porter, M. E. (1986). Competition in Global Industries. A Conceptual Framework. In M. E. Porter (ed.), *Competition in Global Industries,* Boston: Harvard Business School Press, 15-60.

Prahalad, C. K. and Hamel, G. (1990). The Core Competence of the Corporation, *Harvard Business Review*, 68/3, 79-91.

Prokop, P. (2008). Ungarn – Das Tor nach Westen und Osten, *Beschaffung Aktuell*, March 3, 38.

Sabatini, J. (2000). Assembling the Awesome Audi, *Automotive Manufacturing & Production*, No. 4, 2000, 72-75.

Sailer, S. (2000). *Kaum österreichische Zulieferer für Audi*. WirtschaftsBlatt. Retrieved July 2, 2008, from http://www.wirtschaftsblatt.at/archiv/ 145983/index.do

Schenker (2008). *Audi – Schenker und Bahnlogistikpartner. Fortschritt auf der Schiene durch Technik und Logistik*. Schenker Deutschland AG. Retrieved July 2, 2008, from http://www.schenker.de/deutsch/referenzen/automotive/vw/audi.html

Schmid, S. (1999). *Centres of Competence in MNCs. Do Japanese MNCs Differ from German MNCs?*, Discussion Paper No. 121, Catholic University of Eichstätt-Ingolstadt/Germany.

Schmid, S. (2000). Foreign Subsidiaries as Centres of Competence – Empirical Evidence from Japanese Multinationals. In J. Larimo and S. Kock (eds.), *Recent Studies in Interorganizational and International Business Research*, 58, Vaasa/ Finnland: Vaasan Yliopiston Julkaisuja, 182-204.

Schmid, S. (2003). How Multinational Corporations Can Upgrade Foreign Subsidiaries. A Case Study from Central and Eastern Europe. In H.-J. Stüting, W. Dorow, F. Claassen and S. Blazejewski (eds.), *Change Management in Transition Economies. Integrating Corporate Strategy, Structure and Culture,* Houndmills, Basingstoke, New York: Palgrave/Macmillan, 273-290.

Schmid, S., Bäurle, I. and Kutschker, M. (1999). Ausländische Tochtergesellschaften als Kompetenzzentren. Ergebnisse einer empirischen Untersuchung (Foreign Subsidiaries as Centers of Competence. Results of an Empirical Study). In M. Kutschker (ed.), *Management verteilter Kompetenzen in multinationalen Unternehmen (Management of Dispersed Competences in Multinational Corporations)*, Wiesbaden: Gabler, 99-126.

Schmid, S. and Grosche, P. (2008). *Managing the International Value Chain in the Automotive Industry – Strategy, Structure, and Culture*. Gütersloh: Bertelsmann Stiftung.

Schmid, S. and Schurig, A. (2003). The Development of Critical Capabilities in Foreign Subsidiaries. Disentangling the Role of the Subsidiary's Business Network, *International Business Review*, 12/6, 755-782.

Schmidt, B. (2000). Täglich 4000 Audi-Motoren aus Ungarn. 400 Rudolph-Mitarbeiter kümmern sich um die Logistik, *DVZ – Deutsche Verkehrszeitung*, October 14, no page listed.

Surlemont, B. (1998). A Typology of Centres Within Multinational Corporations: An Empirical Investigation. In J. Birkinshaw and N. Hood (eds.), *Multinational Corporate Evolution and Subsidiary Development*, Houndmills etc.: MacMillan, 162-209.

Syska, A. (2006). *Produktionsmanagement. Das A – Z wichtiger Methoden und Konzepte für die Produktion von heute*. Wiesbaden: Gabler.

Teece, D., Pisano, G. and Shuen, A. (1997). Dynamic Capabilities and Strategic Management, *Strategic Management Journal*, 18/7, 509-533.

Volkswagen (2008). Audi Hungaria. 15 Millionen Motoren in 15 Jahren. Wolfsburg: Volkswagen. Retrieved July 2, 2008, from http://www.volkswagenag.com/vwag/vwcorp/info_center/de/news/2008/05/audi_hungaria__15_million_engines_in_15_years.html

Wernerfelt, B. (1984). A Resource-based View of the Firm, *Strategic Management Journal*, 5/2, 171-180.

White, R. E. and Poynter, T. A. (1984). Strategies for Foreign-Owned Subsidiaries in Canada, *Business Quarterly*, 49/2, 59-69.

Yin, R. K. (2009). *Case Study Research. Design and Methods*. Applied Social Research Methods Series, 5, Thousand Oaks etc.: Sage.