The Evolution of Innovative Competencies in Subsidiaries of Multinational Companies [1]

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Abstract

In order to better understand the competitiveness of companies and with this their surrounding regions, economic geographers have focused on competencies in manufacturing companies for more than two decades. This paper discusses the development of innovative competencies at plant level. Using subsidiaries of international automotive supply companies in Poland as an example, we analyze and typify the innovative changes of competencies that have taken place and the conditions required for these changes. Based on a critical review of the evolutionary perspective and additional empirical insights we look at junctions that open up by innovative competencies and lead to new pathways of development in peripheries of large existing markets.

1. Introduction

Competencies in manufacturing companies have long since been a focus of economic geographers wishing to obtain better insights into the competitiveness of companies and therefore the regions where they are located. In general, we can distinguish between adaptive competencies and innovative competencies. For companies unable to compete with low-cost competitors, obtaining innovative competencies is the best way to safeguard jobs, with significant positive repercussions on regional employment. Such knowledge-intensive firms employ better skilled people, often taking extra measures to ensure their employees are appropriately qualified. This leads to a better qualified workforce at a regional level, which in turn makes the region more attractive for other companies to invest. In the following, we discuss the development of innovative competencies at plant level as an important driving force for regional change (Fuchs 2008).

Our central question is: Do subsidiaries of multinational companies develop innovative competencies in 'peripheries'? And if so, under which conditions of the socio-economic environment?

Obviously, there are – at least limited – chances for peripheral plants to acquire innovative competencies (Holm, Malmberg, and Sölvell 2003, 392, Malmberg and Sölvell 2003, 394, Cumbers, Mac Kinnon, and McMaster 2003). However, such processes of learning do not occur every time and everywhere (Carmona and Grönlund 1998). Changes of competencies are therefore not invariably positive developments of learning, but must be considered an open process.

In our contribution we analyze and typify competency changes in subsidiaries and the socio-economic conditions required for these changes to take place. Based on a critical review of the evolutionary view for a better understanding of innovative competencies and additional empirical insights we look at junctions that open up new potentials on the basis of new competencies. Concentrating on situations of change, our focus is not on long-term evolution, but on the specific state of affairs at the moment of change. In our paper, we consider sales markets and the relationship between headquarters and the subsidiary the most important socio-economic drivers of change towards more innovative competencies. We then describe the automotive component companies in Poland and suggest a typology of different changes of competencies.

2. Innovative competencies from an evolutionary perspective

In recent economic geography, change of competencies is often discussed from an evolutionary point of view (Nelson and Winter 1982): In behavioral economics, the ‘satisfier’ is behaving under uncertain conditions and with incomplete information. The actor depends on the multiplicity of vague and opaque economic conditions. Because of the inherent insecurity, actors therefore create routines which subsequently guide the evolution of the company (Lambooy and Boschma 2001, 114ff). Thus, adaptation to the conditions of the socio-economic environment does not take place automatically or as a blind reaction (Morgan 2001, 6) – the new routines are guided by the competencies of the company (as well as they create competencies).

Such behavioral perspective does not differentiate if the competencies are innovative or adaptive; however, with the focus on adaptation the view stresses more continuity than innovative change. Yet, the assumption of open paths of development and the focus on innovative competencies has recently challenged those economic geographers who subscribe to a social science view. Such perspectives often look for the junctions, e.g. at which a company leaves its former path and moves onto another one based on different kind of competencies (Bridge and Wood 2005, 200; Pinch, Henry, Jenkins, and Tallman 2003, 377).[2]

For our focus on *innovative competencies*, we go back to the resource-based view. In that sense, 'competency' means that the socio-economic framework exerts no straight influence on the internal processes of gaining competencies. Instead, the organization's resources do play an important role (Argyris/Schön 1978). Modern economic geography goes along with this perspective, stressing that it is not simply a set of location factors that control the strategy of the organization, but that the internal processes of the organization play a part. Still, such a resource-based view has some important shortcomings: It highlights the assets, i.e. what competencies the firm 'has'. Yet, this view tends to ignore what the organization can really do and can learn. Moreover, an organization, and within it the subject of innovative competencies, does not exist on the head of a pin. Competencies do not apply to any non-spatial organization, but are always linked to a spatial pattern, resulting from the differentiation of competencies between the core and the peripheries[3] of organizational units. In sum, an organization needs 'dynamic capabilities' (Amin/Cohendet 2004) which permit an organization to react to the complex dynamics of its socio-economic framework and to solve difficult and complex tasks.

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[2] Focusing on the social and political conditions, such a social science view is in danger of underestimating the importance of the market and the dependence of the subsidiaries on headquarters. At the same time, there is a danger of overestimating the influence of the political and social surroundings (Herrigel and Wittke 2005, 324ff).

[3] First, the debate was on the dependence of subsidiaries in the *peripheries* of the Third World in the 1970s. Later, it also included the countries of Central Europe which joined the European Union in 2004 as *peripheries of large existing markets* (Sturgeon 1999). We refer to such peripheral plants in Poland, explicitly without claiming Poland as a periphery in general.

Especially *innovative competencies* – as a part of dynamic capabilities – *do not merely solve everyday or standardized problems,* but complex, unusual challenges (Teece/Pisano 1994).

With regards to innovative competencies, we differentiate between technical-organizational and steering competencies in Research and Development (R&D) and in production. Technical-organizational competencies include the ability to adapt as well to improve innovatively techniques and organizational matters. Steering competencies are strategic, innovative competencies.

3. Method

Our investigation was based on a qualitative approach to uncover the reasons for centralizing or delegating competencies in multinational companies: These are motives that cannot be discovered using standardized methods. The empirical survey took place in 2005 and 2006 and was based on expert interviews with managers of 32 automotive plants, which represents about a fifth of all foreign automotive plants in Poland. The first survey in 2005 covered all locations where management had been willing to give insights into the plant. The underlying database was compiled from different sources such as chambers of commerce, automobile associations, public authorities etc. in Poland, Germany and the EU. The database included 240 foreign automobile investors in Poland, with headquarters mainly in Europe, the USA and Japan. The interviews took place in 22 supplier plants, most of which represent first-tier suppliers, as well as in eight plants of four car manufacturers and in two independent R&D centers. A second survey in 2006 represented an in-depth exploration of some important and promising case studies. Additional interviews were conducted in other organizations, such as trade unions, chambers of commerce, associations and public organizations at different regional levels. The study covered the most important automobile regions in Poland, such as Wielkopolska (Poznań), Dolny Słąsk (Wrocław), Słąsk (Katowice/Gliwice/ Tychy), Małopolska (Kraków) and Mazowsze (Warszawa). With regards to the time frame, we can state that investments began in 1989 with the transformation of Poland into a market economy, and – accelerating rapidly – with Poland's integration into the EU and the run-up to full membership. Given that most of the

plants need some time to consolidate their operational processes before subsidiary upgrading, the process of gaining additional competencies mostly happened between the early 2000s and our last sampling period in 2006 (Fuchs/Winter 2008).

4. Empirical insights: Evolution of innovative competencies in subsidiaries of automotive supply companies in Poland

We chose Poland as a 'periphery of large existing markets'. Numerous direct investments in automotive industries were made in Poland since the early 1990s. The automotive industry has emerged as a very important part of the Polish economy, comprising a fourth of all direct investments in manufacturing industries and about (see Fig. 1).

[Fig. 1]

We identify two main conditions as socio-economic environments for the evolution of innovative competencies in an automotive supply subsidiary in Poland. The first are the sales markets, the second the relations between headquarters and subsidiary.

The *sales markets*[4] are an important setting in that they influence the opportunities and limitations for gaining competencies. A first important factor in this context is company-client relations. Trade relations can vary between dependence on a single large client and relations to many clients. Furthermore, it is important whether only a single product or a broad spectrum of products is offered to clients. Last not least, it matters whether the product and production process can be characterized as either simple or knowledge intensive. In terms of the sales markets, we can generally assume that high diversity of clients and of products, as well as high knowledge intensity of product and process, offer better chances for obtaining more

[4] Aspects of backward linkages to the sales markets are also discussed in the context of upgrading in global value chains (Schmitz 2004). In contrast to the value chain approach, which focuses on this to a lesser degree, we include another basic condition: the relationship between headquarters and the subsidiary. Through this we aim to establish whether there is a strong, one-way dependence of the subsidiary on headquarters, or if the subsidiary can gain independence at least to some degree.

competencies. Conversely, dependence on a single client and a single product, as well as on a simple product and production process offers fewer chances.

Our case studies show that Polish automotive supply companies differ significantly in terms of *client diversity*. Large supply companies have a number of clients. Such mega-suppliers deliver directly – as a so-called first tier – to the car manufacturers. Usually, their clients comprise a significant section of the European car manufacturers. Because of the variety of clients, topographical proximity to a *single* client is not an issue. Instead, they combine the proximity of Poland and other Central European states to the European core markets with the local advantages of lower costs and higher flexibility. Mega-suppliers, in this case Valeo, Delphi, Bosch and TRW, use their Polish plants as European platforms for specific groups of products, thus providing these plants with specific tasks as part of their international division of competencies. As shown by our case studies 2, 3 and 4 the Polish plants acquire some innovative technical-organizational competencies, some limited steering competencies and – on occasion – some specific R&D-competencies.

The *product range* differs from a single product (case study 1) via some variants of a product for different clients (case study 2) to different products altogether (case study 3). This needs to take into account that the assortment provided by a single automotive subsidiary is limited, even though the corporation as a whole often produces a wide range of products. This limitation is the result of world market competition; plants are forced to concentrate on specific core competencies. The demanded quality standards are such that it is difficult for a subsidiary to be competitive with a large range of products.

There is also a great variety of *knowledge intensity* as far as products and processes of production are concerned. We find simple and multipart products, with the vertical range of manufacture varying between final assembly and complex tasks. Hence, the market does not have any general requirements with regard to these criteria. Rather, the market creates specific needs and desires that result from the degree of dominance of a car manufacturer.

The sales market also has specific requirements with regard to the *location of strategic R&D*. Car manufacturers began to transfer tasks and competencies to large supplier corporations in the 1990s (Freyssenet and Lung 2004). Since then, the mega-suppliers have become important producers of complete modules and co-ordinators of the value chain with respect to the downstream suppliers. They have also received new R&D tasks and knowledge-intensive production from the car manufacturers (Sturgeon and Florida 2004, 74ff). This shift however does not directly lead to more competencies in the peripheral plants of the mega-supplier. In Poland for instance, strategic R&D-related competencies do not trickle down to the locations of foreign direct investment. This is because car manufacturers keep their strategic R&D in or near headquarters, which are located in places such as Toyota/Aichi (Japan), Detroit (USA), Wolfsburg (Germany) etc. Component supply companies are thus forced to keep their core development near these same headquarter locations because car manufacturers expect short pathways of transactions and face-to-face contact. Only few projects internationalize some of their core activities in R&D and obviously limit this to a specific time span (Pries and Schweer 2004). We can therefore state that hierarchical concentration of core competencies in client corporate centers actively prevents decentralization of competencies in the supplier company. In an extreme case the supplier company becomes a highly specialized branch plant which produces in a niche without expecting any gain in competencies (case study 1). Some few subsidiaries receive some selected tasks of R&D, but no core development (case studies 2 and 3). However, not every mega-supplier looks for topographical proximity in R&D. Delphi is a company which built up more decentralized R&D than the other companies (case study 4).

In general, and with regard to the *relationship between headquarters and subsidiary*, automotive supply company headquarters are cautious with decentralizing innovative steering competencies, while decentralization of adaptive technical-organizational competencies is more widespread. In many cases, increases of technical-organizational competencies in a subsidiary result from successful problem solving at the local plant level, leading to a gradual build-up of plant competencies. Processes of aging and maturing as described in literature (de Meyer 1992)

are found especially with regard to the technical-organizational competencies. The longer the subsidiary has existed the more probable it is that the plant has had to solve problems at the local level, for example to keep down repair time and costs or to avoid a stop in production until headquarter expert arrive. In this respect headquarters and subsidiaries can learn to decentralize also some innovative tasks (Fuchs 2003; Fuchs 2005b).[5]

5. Typology based on case studies

The following is a more detailed study of the changes of competencies. Drawing on 32 case studies, our typology is clearly not as representative as a quantitative survey. Our types are based on the degree to which subsidiaries gain competencies, thereby reaching a junction that leads them towards a new path. Below we describe the specific situations of subsidiaries at the point of change, i.e. the set of circumstances that exists when a junction towards a more competent path is reached. As shown by our first example, there are also cases without a junction (Fig. 2). Such plants, producing in a niche with low competencies, were typical for peripheries during Taylorism. Examples still exist in many places in the Polish automotive supply industry, often located in close proximity to customer plants, e.g. in automotive supplier parks. A common type is the 'integrated production plant', which is successful in its move towards more competencies, with some few innovative competencies and some adaptive competencies. Another type, found in one of five cases, is the 'integrated production plant with some R&D', with some more, but still few innovative competencies and some adaptive competencies. The last type is a rare and specific case, which we termed the 'R&D center with high innovative competencies throughout' and which does not have any manufacturing.

[Fig. 2]

[5] Remarkably, the specifics of the relation between headquarters and subsidiary, as the participation by European Works Councils, have no clear influence on the relationship between headquarters and subsidiary as far as innovative competencies are concerned (see case study 2).

Case 1: A branch plant – no junction towards more competencies: Fastek in Swarzedz

This type can be characterized as a subsidiary which has to carry out some small, specific tasks prescribed by headquarters. Being highly specialized, the plants can be quite small. Often the plant operates at a second- or third-tier level for a specific part or module. The subsidiary is dependent on a single client. However, there are some first tiers, as our case study shows. Usually, the plant produces just-in-time in a supplier park near the client. Production is monostructured, and the vertical range of manufacture is very limited. Production only comprises final assembly. As the client hardly requires any initiative from the branch plant, the only competencies are technical-organizational. Clients, other plants of the company, or headquarters offer means of qualification to enable the plant to fulfill its tasks. There are virtually no R&D or steering competencies; only technical-organizational competencies exist.

Fastek Fitting Polska is a subsidiary of the Italian automotive component supplier for wheels and tires, Handling Technologies and Logistic (H.T.&L.). Headquarters is located in Turin. In 1997, H.T.&L. built up the first foreign plant in Tychy, Poland, a subsidiary which supplies the nearby Fiat Auto Poland plant. Fastek Fitting Polska, the plant analyzed in our case study, was established in Swarzedz near Poznan in 2003. The plant is a first-tier supplier to Volkswagen in Poznan for the commercial vehicles Volkswagen Caddy and Transporter, delivering the wheels just-in-time. The subsidiary has only 25 employees, most of them workers.

Headquarters managed negotiations and the completion of contracts with Volkswagen concerning the contract period and amount of production. Headquarters also brought machines and equipment from Italy to Poland. Employees from the plant in Turin told the managers of each shift in Poland how to run the machines and equipment. During the start-up phase of the plant, the Polish executives were responsible for setting up the machines and equipment, selecting personnel, further training, the pilot run of production, the specification of contacts to the client Volkswagen, the implementation of standards and certifications, and process control in the plant. These are mainly competencies on a technical-organizational level. There are some steering competencies related to production, process control or the responsibility for the pilot

run, but we did not find any strategic steering competencies. The plant has no R&D-competencies.

This characterization holds true not only for the start-up phase of the plant, but also its subsequent evolution. The core competence of Fastek is the final assembly of 800,000 wheels and tires each year, a process with a high degree of automatization. Production consists of the following steps: Components identification and automatic lubrication, automatic fitting with torque check and monitoring, wheel and tire fitting, automatic inflating, optimization and balancing, tire uniformity as well as radial and lateral run out measurement. Working in two shifts, workers assemble small parts such as valves, caps and weights, add lubricants, operate and control the machines and the processes, and, after assembly, check the quality of all parts. Headquarters holds all strategic steering competencies related to production planning and control, construction of the equipment and machines, marketing and distribution. Even larger problems in production are solved by headquarters and not in the subsidiary; thus, there are no opportunities for learning in the Polish plant.

The example illustrates how dependence on headquarters and reliance on the client are strong restricting factors in gaining competencies. The specific situation of Fastek as a hierarchically organized corporation and the role of the Polish plant as a mere assembly site, together with a single client context and a low vertical range of production, prevents the plant from leaving its existing path of low competencies.

Case 2: Integrated production plant with a junction towards higher competencies: Bosch in Mirkow

In this category, the diversity of clients is higher than in the first type and there are more variants of the products. There are also some successful specialists in this category. Products are more complex and more knowledge-intensive, and the vertical range of penetration covers more steps than only assembly. Technical-organizational competencies are high and include process control, logistics, work organization and quality improvement. However, there are very few innovative competencies as far as steering competencies and core R&D activities are concerned;

such tasks are held at headquarters and in R&D centers. However, there are junctions towards more competencies as our case study will show.

The *Bosch* group is a German industrial conglomerate. The automotive supply division has 158,000 employees. The subdivisions Chassis Systems Brakes and Chassis Systems Control employ 15,300 persons. Headquarters is located in Heilbronn, Germany. When Bosch established the subsidiary in Mirkow near Wroclaw in 1995/1996, it shifted a plant from Twardogora, formerly of Fiat and later the competitor Allied Signal, to this new location 60 km away, where it began with final assembly for brakes. After gradually acquiring more and more production steps, today the subsidiary is an integrated production plant for hydraulic braking systems and components such as booster, disc brakes and drum brakes. In 2006, there were 550 employees in the plant, with 450 working in three shifts in the production area. The reason for direct investment in Poland was to build up a basis, combining lower production costs with the ability of supplying car manufacturers within about 1,000 km, especially in Germany, Poland, the Czech and the Slovak Republic and Hungary. These are typical motives of mega-suppliers as described above.

Because of the broad range of clients, essentially the large car companies in Central and Western Europe, there is lower dependence on individual clients than in the first case study. Also, the relationship between headquarters and the subsidiary allows for greater flexibility. Although strategic R&D is located in the R&D centers of Bosch and conducted in close co-operation with the car manufacturers - the latter specify the required characteristics of the brakes, the quality and amount of production - there was one instance where the subsidiary gained some liberties in decision-making concerning product, production, organization and client relations. Usually, R&D for hydraulic brakes is done in the R&D centers in Germany and also France and Spain, where Bosch took over R&D of brakes from Allied Signal. In this single instance of Bosch in Mirkow, the subsidiary co-developed a complex application of a braking system for a Fiat relaunch product. In 2003, before the Panda model came on the market, Bosch Poland worked closely with Fiat Auto Poland and adapted an existing Bosch braking system to

the new Fiat car model. Thus, the Polish subsidiary gained access to knowledge-intensive application engineering. In addition, Bosch gained experiences in project management and co-operation with local customers.

However, in such a final stage of the R&D process the scope for individual ideas remains low. At this point the client has already decided on any necessary changes. Also, strategic R&D remains with the R&D centers. In this sense, Bosch Poland is an integrated production plant which has found a way to build up some R&D competencies, but this only applied to a small segment and a limited period of time. Whether this junction will lead to similar projects in future, when Fiat brings new cars onto the market, remains to be seen. The "sustainability" of this new path is therefore uncertain.

It is difficult to establish the degree to which the institutional setting of Bosch as a corporation plays a role in this case. In the Bosch group, 92% of the capital is held by a foundation, which has no voting power and thus no influence on strategy. The main strategic influence is exerted by Robert Bosch "Industrietreuhand" (Industrial Trust), which has 93% of the voting power. Although the Bosch group does respond to international competition, it appears to be less concerned with immediate shareholder value. This should lead to a fairly moderate strategy in terms of decentralizing competencies, giving due consideration to the rights and privileges of the mother country plants. In addition the Bosch group has established a European Works council, which strives for fair co-operation between the different plants of the group. This means early information is provided concerning important changes and enables all participants to contribute their ideas and desires. The European Works Council also stands for a moderate strategy of internationalization. Although we did not detect any measurable effect of the institutional setting as far as competencies are concerned in the Polish plant, it seems plausible that these rules of conduct supported the moderate decentralization of competencies.

Case 3: Integrated production plant with some R&D: TRW in Czestochowa

This type is comparable to the last type in terms of client diversity, the range of products and knowledge intensity of the production process. The technical-organizational competencies and

steering competencies are similar, too. During its evolution this type can also reach a junction which leads towards more innovative competencies, especially in R&D. In this case, the plant took over parts of a complex application and process planning in co-operation with centrally located R&D- and Excellence Centers. This not only applies to the context of a single clients' demand, as happened in case 2, but is actually a strategic component of the company. Sometimes, these R&D tasks are not only important for the plant itself, but also for the central plants and other plants at international level.

Yet, such R&D activities do not form core competencies, which are still concentrated and carried out centrally. Strategic and complex R&D tasks, which need close face-to-face contact to the R&D of the car manufacturers, still remain with headquarters. No automotive component supplier received the basic R&D activities for a complete component, part or system. We only found a single example for this, and it is not located in Poland, but in the Czech Republic, where Visteon, formerly part of the Ford corporation and now an independent supplier firm, carries out the whole R&D process for heat exchangers and components of air condition and cooling systems. In Poland, only some limited projects exist, including TRW in Czestochowa and also Delphi projects in Cracow, Tenneco in Gliwice and Remy in Swidnica.

The US-American industrial conglomerate *TRW* originated from a merger between the automotive component supplier Thompson Products and Ramo-Wooldridge. In 2002 the division of armament was sold to Northrop Grumman; since then, the automotive division has operated independently under the name of TRW. Central headquarters is in Livonia (Michigan, USA), and the company has 63,000 employees working in eight divisions. The division of Occupant Safety Systems employs 24,300 people working in more than 40 subsidiaries in 20 countries. Two subsidiaries are located in the city of Czestochowa in Poland.

TRW Occupant Safety Systems produces as first tier for car manufacturers in Central and Western Europe. Thus, there is a wide range of clients. Also the assortment of products is large and includes not only variants, but different types of products. Production started as a small shop floor in Czestochowa, producing safety belts only for FSM, the formerly state-held Fiat

company in Poland. In 1993, TRW bought the plant and gradually extended the subsidiary to an integrated production plant. Today, there are 3,800 employees, producing airbags, safety belts and locks for seat belts.

In 2005, a new technology center was integrated into one of the plants in Czestochowa. Apart from cost reduction, the objective was to provide R&D activities specifically for clients in Central Europe. A further advantage of an integrated technology center in the plant is closer contact between R&D and production, with engineers able to directly share experiences gained in production. At the end of 2006, more than 200 engineers and technicians were carrying out product application for mechanical components, airbags and safety belts. They also apply safety systems for steering wheel systems and electronic control units for occupant safety systems. The technology center is tasked with supporting the worldwide activities of the occupant safety systems division through R&D application. This includes support with regard to product design, simulation, modeling, testing, hard- and software design and building of prototypes. Thus, some basic R&D applications are also carried out in the Polish subsidiary. In a decade the subsidiary therefore changed from a small workshop to an integrated production plant with R&D. Good performance of the occupant safety systems provided by the plant supported the development of this junction; headquarters' positive experiences with direct investments in Poland thus became a routine.

However, this subsidiary also has limited steering competencies. It does not have independent R&D competencies for whole projects, and it does not have an autonomous budget. The plant is dependent on headquarters in terms of knowledge-intensive tasks. Furthermore, the product is largely defined by clients that exert considerable pressure on the time and money spent on R&D. The car manufacturers remain strong players in the producer driven automotive chain (Gereffi 1999), and they influence innovative competencies even of a large supplier company such as TRW.

Case 4: R&D center with high competencies throughout: Delphi in Cracow

In contrast to the former three this type does not have any manufacturing sites, specializing instead entirely on R&D. The corporation usually opens up some production plants in one country and then builds up a technology center elsewhere. Usually R&D is targeted at a wide range of products that are designed for a wide range of clients. Typically, tasks comprise design, testing, modeling, and simulation processes. Several technical-organizational competencies are required, but steering competencies are limited and comparable to the second and the third type. In contrast to our third example, the route of development is short. Rather than starting out in manufacturing and subsequently taking some junctions towards higher competencies, R&D centers have a lot of adaptive and innovative competencies right from the beginning (Winter 2007). However, even this type of subsidiary with high startup capabilities can gain additional innovative competencies, especially with regard to the range of products catered for.

The US-American firm *Delphi Automotive Systems* was established in 1995 as a successor of a company held by General Motors. It became independent from General Motors in 1999, with headquarters located in Troy (Michigan, USA). Since then, the autonomous corporation has been designing and producing components, systems and modules such as powertrain technology, electronic systems, occupant safety systems and components for steering systems. Delphi employs 172,000 persons worldwide, more than 40,000 of these in the USA. In 2005, the firm applied for creditor protection under Chapter 11 of US insolvency law. As a result, the company is now able to restructure itself within a set time span. The subsidiaries outside the USA were not affected by these processes. Delphi started to build up six plants in Poland during the 1990s, which now employ 6,000 persons.

The Delphi Technical Center in Cracow was established in 2000 and is now one of 32 technical centers run by Delphi all over the world. Presently, the center supplies, together with other technical centers and production plants, the large car manufacturers in Europe. Previously, the location in Cracow had served as administrative headquarters for the six plants in Poland. Initially, the technical center started out by doing R&D for shock absorbers. Later, the center

was able to acquire more competencies by increasing the range of products it designs. R&D competencies for wire harnesses and safety systems for example were shifted from Germany and Luxembourg to Cracow. The technical center also has to carry out R&D for the electronics of combustion engines. A further junction towards additional competencies started off with software design for control units. Today, 600 engineers, technicians and other employees work in the technical center.

Delphi is unique in that the company strategy strongly focuses on labor costs. This is a general Delphi policy which is also found in the periphery of North America, i.e. in Mexico (Fuchs 2003). No other company studied is quite as daring in its decentralization of R&D and with it innovative competencies. Since the example of the Delphi Technical Center is still unique, we cannot consider the case an end point of the evolutionary process.

6. Discussion

The study has shown that for subsidiaries of automotive component companies, the last three types represent different ways of switching from a previous path to another characterized by more competencies. As we have shown, there is no imperative for one type to evolve into the next. The future development towards more or less innovative or adaptive competencies is open and not determined.

The general junctions towards pathways with more innovative competencies are framed by the socio-economic conditions. From case study 1 to 4 there is an increase in client diversity, product variation, number of products and knowledge intensity of products and processes, which is mirrored in increasing innovative technical-organizational competencies. Although the strategic steering competencies remain with headquarters, some limited innovative steering competencies can emerge in the subsidiaries, too. The same is true for R&D: The innovative core competencies remain with the central R&D centers. Innovative R&D competencies in the manufacturing plants are usually kept low. We did not find any instances where subsidiaries were assigned competencies for whole projects or given core development tasks.

The reason for this international division of innovative competencies is the geographical location of core R&D activities on the part of the clients. Car manufacturers still operate through highly centralized R&D centers and require close contact to the core R&D activities of the suppliers. In conclusion, in the subsidiaries we only found innovative competencies which at best result in the acquisition of application engineering and software development. The Delphi technical center is an exception and a result of the specific Delphi strategy of R&D decentralization. Generally, the study leads us to conclude that local 'empowerment' of a plant only implies a limited and restricted increase in power, which does not represent a shift of control in the corporation.

7. Final remarks

Thus, we cannot find a general 'post-tayloristic' trend in production which might lead to greater concentration of innovative competencies in the periphery. Once, tayloristic production in the manufacturing industries was characterized by the principle of central management control, which implied concentration of R&D in headquarters. Only the labor-intensive, less knowledge-intensive steps of the production process were decentralized to peripheral plants. In post-tayloristic production, some patterns in the international division of competencies have started to change (Casson, Pearce, and Singh 1992, 124). In theory, this could imply that peripheral plants are in a position to overcome their marginal status by receiving additional innovative competencies beyond simple product application. Our empirical case studies however demonstrate that such cases of gaining competencies are rarely found, especially because of the high spatial concentration of the core manufacturers' R&D in the world automotive regions in Europe, North America, Japan and South Corea.

Finally, it is an important insight that at least *some subsidiaries* can take junctions towards more innovative competencies. This means that upgrading in subsidiaries of automotive component supplier firms in peripheries is at least possible. However, interlocality competition for innovative competencies will probably increase in times of recession (Phelps and Fuller 2000, 239). In our case studies, we still did not encounter any losses of competencies. But there is no

reason to discount this junction as a matter of principle. After all, we focused on the Polish subsidiaries in a period when direct investments increased in the wake of political transformation and EU integration. Such expansion undoubtedly leads to gains in competencies and rarely to losses, whilst today, in times of decline, the opposite might become true.

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List of Figures:

Fig. 1: Car manufacturers and automotive supply companies in countries of Central Europe (selected component suppliers ranked in the top 100 international supply corporations)

Fig. 2: Typology of foreign subsidiaries, depending on the competencies in the 32 case studies (Source: own figure)

Type 1
Branch plant

Type 2
Integrated production plant

Type 3
Integrated production plant with some R&D

Type 4
R&D center without manufacturing