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## **The Tertiarization of Manufacturing Industry or the Role of ICT in the Second Phase of Restructuring**

### Introduction

Academics, corporate analysts and amateur investors are perfectly uniform in stating that the “new economy” has altered the market valuation of firms: the relation between equity value and traditional financial and balance sheet variables has changed. Practitioners, i.e. strategic managers are aware, that in the new era companies have to capitalize on their own as well as on outside knowledge and the strategy of simply slicing up the value chain and geographically optimizing factor costs does not guarantee sustainable competitive advantage any more.

One meaning of the “new economy” is that economic actors operate under the circumstances of a new business model. In this model, corporate competitiveness is determined by factors that are different from its traditional determining factors. In the new business model knowledge as a production input is more important than physical capital. The value of goods is determined more and more by intangible elements, like brand name, or the complexity of services related to the products etc.

*One highly important determinant of competitiveness in the new business model is the capability of economic actors to combine new elements of knowledge with traditional ones and thereby create new, complex value.*

This combination of new and traditional knowledge elements blurs corporate boundaries: companies are more and more frequently competing outside their traditional boundaries as well. The best example that demonstrates both the existence of blurred boundaries, the increasing role of intangible elements in value creation, and the widespread combination of new and old elements of knowledge is the fact that *manufacturing companies carry out a quickly increasing number of service activities as well. We can observe a kind of “tertiarization of manufacturing industry” the blurring of the two sectors’ boundaries.*

With a considerable time-lag advanced transforming countries have also stepped on this evolutionary path. In the early transformation years, their incorporation in the global structure of manufacturing was characterized by a partial geographical separation of production related service activities from production (physical processing activities). Part of the physical processing tasks has been assigned to the newly acquired and modernized enterprises in the transforming countries. These companies have become single-functional production facilities within their multinational owners' organization. With rapid factor costs increases however, the initial competitiveness of simple processing activities based on low labor costs has more or less eroded in transforming economies. Both the local subsidiaries and their parent companies recognized that the only way to compensate for the declining profitability of certain manufacturing activities is to redefine the value chain role of subsidiaries in transforming countries. Abandoning the strict restriction of their activity portfolio, breaking with the status of a single-functional production facility, and including services into the range of their activities has become inevitable.

This paper gives account of the results of a field survey we carried out in 2002. We interviewed 10 Hungarian manufacturing companies, local subsidiaries of large multinational companies (MNCs) in the machinery industry, to find out whether we can observe the integration of manufacturing activities with service activities at Hungarian manufacturing companies. We investigated the way in which the activity portfolio of local subsidiaries has become more diversified, as well as the implications of this diversification process on their profitability.

The first section of the paper describes the conceptual basis of the tertierization of manufacturing. Next, the paper develops some predictions about the changes in the structure of international trade in services resulting from the tertierization process. The third section summarizes the findings of the empirical survey.

#### The integration of manufacturing and service activities – Conceptual basis

The term tertierization of manufacturing refers to two phenomena. One is that above and beyond the traditional determining factors of corporate competitiveness at manufacturing firms – like the quality of corporate technology and that of human resources, the efficiency of

operation, the volume of physical assets and of current capital – *the efficiency of internal services* related to the production process has become an increasingly important determinant of competitiveness. Internal services include product and process development, design, logistics, internal training, the training of new, would-be employees, as well as value chain management. This latter is in itself is a complex bundle of internal services, not only material purchase: it comprises the identification of new suppliers, their audit, technology transfer to the suppliers and co-operation with them to jointly increase their efficiency, improve quality, cut costs etc. Internal services also comprise organizational development and coordination, human resource management, accounting, book-keeping, legal and financial services. In short, besides the efficiency of traditional processing activities, the efficient organization and provision of these internal services also matters for competitiveness, and the number of these internal services, as well as their complexity keeps increasing.

The other meaning of tertierization *is the growing complexity and importance of external, product related services*, granted to the customers of the products. Product-service packages include not only maintenance and repair, but the financing of the purchase of the product, transportation, installation, system integration, technical advice how to maximize the product's benefits, and operation support as well. Product associated services i.e. the intangible part of the output account for an increasing share of the total value of products and for an increasing proportion of the manufacturing firms' turnover.

The consequence of these phenomena is that the traditional profitability calculations are becoming meaningless: analysts do not calculate the profit margin of individual products because products must be seen as the bundle, or the system of products, related products and related services. The pricing strategy that allows zero or negative profit associated to the core product itself becomes more and more common. Profit can be drawn from related products and from related services.

The integration of manufacturing and service activities is not a new phenomenon. In 1995 the TOP 500 issue of Fortune decided to make a demonstrative step: it stopped publishing separate lists of manufacturing and of service companies. It published the unified list of top American companies abandoning thereby the method of classifying companies with the help

of their “primary” products. This classification method – they argued<sup>1</sup> – has caused significant distortions for a long time. In an era when the outsourcing of manufacturing activities has become common on the one hand, and a significant proportion of the revenue of par excellence manufacturing firms comes from services, separate lists of manufacturing and service companies makes no sense. At that time 40% of the revenue of General Electric, the manufacturing giant could be traced back to its service activities. Six years later, in 2001, it was the share of revenues from manufacturing, from selling goods that was similar: 41.8% (Source: GE Annual Report 2001, p. 2 own calculation). The share of selling goods at another par excellence manufacturing firm, IBM was 42.7 % in 2000 (IBM Annual Report, 2000, p. 16, own calculation).

We can claim that *the incorporation of services within manufacturing represents the bridge between the old and the new economy: the way how “new economy” characteristics filter down to the traditional “old sectors” of the economy, and make them more knowledge and technology-intensive.*

*Cowan et al.* [2001] identify three factors with the help of which the difference between manufacturing and services can be described. Firstly, the authors underlined the intangible nature of services. Another differentiating factor was the intensive participation of customers in the production of services as well as the fact that the production and the consumption of services takes place at the same time. *Zagler* [2002] added a fourth differentiating factor: that of the uniqueness of services (each service is produced individually for the individual customer) as opposed to the production of goods in massive quantities.

*The integration of manufacturing and service activities is best demonstrated by the fact, that none of the above-enumerated factors with the help of which the properties of services have been described – applies exclusively to services.*

Take a look at the characteristics of manufacturing goods in the era of the “new economy”! One element of the definition of the “new economy”<sup>2</sup> was the “dematerialization

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<sup>1</sup> A New 500 for the New Economy. Fortune, 15 May, 1995

<sup>2</sup> In the new business model sense of the „new economy”. There are several definitions for the term „new economy” (See: Szalavetz [2000] for details)

of products”, i.e. the fact that intangible elements account for a large and increasing share of the total value of manufacturing products.

As far as the participation of customers in the production of services is concerned, in the era of mass customization, and the widespread practice of manufacturing to order: according to the specifications of the would be consumer of the product in question, this property of services applies to the production of manufacturing goods as well. There are more and more products in the production of which consumers participate intensively.

What about the length of the time that elapses between the provision and the consumption of services? Does the coincidence of production and consumption apply to manufacturing goods as well? We can claim that in a sense it does, at least we can observe some convergence between manufacturing and services in this respect. Modern inventory management practices, “just in time delivery” and “make to order” manufacturing practices have contributed to a significant shortening of the time that elapses between the production and the consumption of manufacturing goods. The other side of the coin is that many types of services have become standardized, entered international trade almost like products (think of packaged software the trade of which is currently classified as trade of services). The time between the production and the consumption of these “services” has become longer.

On the other hand, the standardization of services was a step away from their uniqueness and individuality, a step towards mass production, whereas mass customization in the case of manufacturing goods was a step towards individuality. In short, we can observe a clear convergence process between manufacturing and services in this respect as well.

#### The tertierization of manufacturing and changes in the structure of international trade in services

Structural change, i.e. shifts in the GDP-shares of the three main economic sectors is one of the most conspicuous phenomena of economic development. Though researchers extensively discuss the changes of the individual sectors’ shares (in GDP or in employment), make international comparisons, or examine the relation between changes in the sectoral composition of manufacturing and economic growth (*Lucas [1988]; Fagerberg [2000]*) – little previous research has been performed on the above described aspect of structural change, on

the integration of manufacturing and services.<sup>3</sup> This topic is discussed rather in international business literature, with a focus on corporate strategy and on the restructuring of MNCs' organization, on the emergence of networks.

The paper of Wise and Baumgartner [1999] for example, has reminded practitioners that manufacturers' traditional value-chain role of producing and selling goods has become less and less attractive. Manufacturers have to reconsider their strategic priorities, redefine their core competence and move downstream, because that's where the value (and of course profit) is.

As opposed to past restructuring moves, the concentration on one's core competence did not involve a selection among (i.e. the narrowing of) manufacturers' own *product portfolio* but rather a selection among the *activities, the corporate functions*. Instead of giving up the production of specific products and concentrating resources on the production of other products, many of the traditional manufacturing companies have abandoned manufacturing as a corporate function, they have given up (contracted out) the physical processing activity, sold their physical assets and specialized on intangible activities: strategic management, research and development, marketing and so on.

The flip side of the coin was the spectacular expansion of contract manufacturers' turnover and business power. Considering, that the best known contract manufacturers, many of them listed among the Fortune TOP 500 companies are far from assuming exclusively *manufacturing* activities – just the opposite, their success lies in the fact that they undertake all the product related services – we can conclude that the integration of manufacturing and service activities had a twin effect on corporate boundaries: that of narrowing and that of broadening their activity portfolio. On the one hand, firms try to narrow their activities and concentrate on their core competence and on the other hand, more and more firms diversify into product and process related services in order to increase their value added.

These – in principle mutually exclusive – tendencies manifested themselves in the emergence of global production networks (GPNs) including both equity and non-equity relations – as documented by Ernst and Kim [2002]. The flagships, i.e. the system integrators

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<sup>3</sup> Exceptions include *Marceau–Martinez* [2002]; *Tomlinson* [2000]

of these GPNs tended to narrow their activity portfolio. In most cases they have given up manufacturing activity and concentrated on various internal services besides providing strategic and organizational leadership.

Companies at the second hierarchical layer: the regional headquarters or product division leaders tended to broaden their activity portfolio. Some of them might have abandoned part of their manufacturing activity, keeping only the technologically most demanding part of it, and at the same time, they considerably diversified the range of internal service activities.<sup>4</sup> They granted services both to the flagship company and to the companies at the third hierarchical level: to specialized suppliers.<sup>5</sup> This latter type of actors – at the lower end of hierarchy – were incorporated into the production network as mono-functional entities, i.e. production facilities. However, in order to improve their network position they tended to do their best in order to diversify their activity range and assume production related internal services – in cases of local market-oriented investments, even also product-related external services.

The spread of GPNs had a twin effect on the structure of international trade as well. On the one hand, the volume of internationally traded services increased spectacularly as well as the share of network related trade within total trade. On the other hand the volume of intra-firm trade in services increased considerably as well which presents a number of methodological difficulties for analysts trying to quantify and document this type of trade in international trade statistics.

The increase in the volume of internationally traded services is well documented in trade statistics. According to OECD, in 1999 the value of service export of 30 OECD member countries amounted to USD 1097.3 billion,<sup>6</sup> which represents 3.2 % annual growth since 1995.

As far as the increasing importance of intra-firm services is concerned, international trade statistics provide only indirect evidence. A piece of such indirect evidence is the fact that

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<sup>4</sup> Companies at the second hierarchical layer provided of course a complex range of external services as well.

<sup>5</sup> The above described three hierarchical layers can of course be further refined, including higher-tier suppliers and lower-tier ones. However, since the issue at focus is the pattern of narrowing or broadening the corporate activity range, this simplification is affordable.

<sup>6</sup> At the same time, the value of export of goods was USD 4,100 billion (OECD [2001], p. 30)

although the volume of internationally traded services keeps increasing, the ratio of internationally traded services compared to total trade has remained fairly constant (of an average of 21 %) over the past few years (OECD [2001], pp. 30–31). Considering that the share of services in total value added has kept increasing, amounting to an average share of 70% in OECD countries<sup>7</sup> the low and stagnating share of internationally traded services calls for an explanation.

The explanation OECD offers (OECD [2001]) is in line with Cowan et al.'s [2001] reasoning: OECD traces the stagnation of the share of internationally traded services back to the fact that service providers are located near their potential customers and therefore a large share of services is not traded internationally.

However, there is reason to believe that the increase of intra-firm services and the ambiguity with which this increase is documented in international trade statistics provide additional explanation.

With the tertiarization of manufacturing and the emergence of GPNs an increasing share of the intangible determinants of value is produced in the form of internal, intra-firm services.

Although subsidiaries usually pay for the services granted by their parent companies, the costs of these services are listed under the item of other costs, which item includes the costs of services bought from non-affiliated services providers as well. Although OECD statistics contain an item that quantify the service transactions among affiliated companies, this is a residual item containing management services, overhead costs and “other services” not elsewhere classified. This means that an increasing share of service transactions between affiliated parties remains undocumented.

Another methodological difficulty arises from the fact of transfer pricing, from the fact that the fee of internal services rarely corresponds to the fee of similar services bought from non-affiliated service providers. This fee can exceed the market price of the service, but it can

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<sup>7</sup> The world average is of course somewhat lower, but not less than 60 % (*Freund – Weinhold, 2002*). Some data for the GDP-share of services in 2000: Belgium: 70,9 %; Denmark: 70,2 %; Finland: 62,1 %; France: 70,9 %; Germany: 67,3 %; Great-Britain: 70,1 %; Hungary: 61,4 %; Ireland: 55 %; Japan: 66,6

also be inferior to it, for strategic reasons. One of the best examples of this latter type of distortion is the system of internal financial pools, which offers subsidiaries investment financing at a cheaper interest rate than the one of commercial loans.

Each multinational company elaborates its own system of pricing internal services, and these firm-specific systems – similarly to some firm-specific organizational decisions – greatly influence corporate competitiveness.<sup>8</sup>

Thus, the gap between the real volume of international trade in services and the one documented by official trade statistics keeps increasing. *Our hypothesis is that the evolving complexity of the integration between services and manufacturing is strongly correlated with the increase of this gap.* The more integrated the two sectors are, the more difficult it is to quantify either the contribution of services – as “intrinsically different sectors of the economy” – to national value added, or their share in total trade.<sup>9</sup>

#### Tertierization of manufacturing in Hungary – Results of field investigations

We carried out field investigations at a sample of ten companies, local subsidiaries of large, blue chip multinational companies in the machinery industry, to find out more about the patterns of local manufacturing subsidiaries’ functional diversification. We carried out semi-structured interviews with representatives of the top management of the companies in our sample.<sup>10</sup> Because of the explorative nature of the research the selection of the cases was not a

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%; Netherlands: 70.1 %; Spain: 66,0 %; USA (1999): 73,9 %. (OECD in Figures. OECD Observer 2002. Supplement 1, Paris, OECD.)

<sup>8</sup> IBM for example uses a shared resources concept: expenses of internal services are shared by all of the company’s segments (allocation of expenses is based on the headcount of the individual segments) (IBM Annual Report, 2000, p. 42: <ftp://ftp.software.ibm.com/annualreport/2000/pdf/IBM2000F.PDF>)

<sup>9</sup> Our hypothesis is supported by Tomlinson’s [1999] calculations. Drawing on the OECD’s Input-Output Database, (the share of intermediate flows of services as % of total) Tomlinson finds, that the integration between manufacturing and services is of the highest degree in Germany, among the four countries compared. This is all the more interesting, since based on international comparisons of sectoral contributions to national value added, Germany is considered a service laggard by many analysts. (See footnote No. 7)

<sup>10</sup> The companies in our sample were the following: Alstom Power Hungária Ltd. (The former ABB subsidiary ABB Power Generation Ltd. which has become an Alstom company in 2000. [In 1999 Asea Brown Boveri and Alstom merged their turbine businesses to form ABB Alstom Power, a Brussels-based, joint venture.]) Audi Hungária Motor Ltd., Bosch Rexroth Ltd., Flextronics International Ltd., GE

random process but observed predetermined selection criteria of size, ownership, sectoral affiliation (we assumed, that the type of service activities the companies undertake is industry-specific, therefore we restricted our sample to one industry: machinery) and owner's integration strategy. The main selection criterion was that the surveyed subsidiaries should represent the various possible integration strategies.

We also assumed that the playing field of local subsidiaries to diversify their activity and alongside manufacturing engage into service activities as well, is greatly influenced by their parent companies' integration strategy. If the multinational owner adopts a global strategy, the playing field, i.e. the autonomy to diversify the corporate function portfolio – of local subsidiaries is much more limited than it would be in the case of a multi-domestic strategy.<sup>11</sup> Local subsidiaries integrated in the multinational organization with a multi-domestic strategy usually offer various external and internal services. These companies are domestic market oriented. They co-operate with their domestic customers, according to their specifications, offer various after-sale services etc.

One of the objectives of our in-depth interviews was to investigate the characteristics and the evolution of the relation between manufacturing and service activities within the individual companies in the sample.

We had two preliminary working hypotheses.

The first one was that manufacturing and service activities are closely related to each other. The diversification towards a more complex package of activities, or corporate functions is the result of a corporate evolution process. The owners recognize the local talent, the fact that local subsidiaries are capable (possibly as a result of a corporate competence accumulation process) to assume corporate functions other (and more knowledge-intensive) than production as well.

The second working hypothesis was that the profitability of local subsidiaries that assume a complex range of corporate functions exceeds the one of single-functional subsidiaries.

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Hungary Plc., Knorr Bremse Fékrendszerek Ltd., Nokia Hungary Kommunikációs Ltd., Schneider Electric Hungária Villamossági Rt., Siemens Rt., Temic Hungary Ltd.

<sup>11</sup> See Martin [1998] about the multinationals' integration strategies.

The results of our field investigations made us reject or at least modify both of our preliminary hypotheses. Whereas in the case of the first hypothesis, about the close relation between physical processing and service activities, reality turned out to be much more complex than initially supposed, in the case of the second, our assumption turned out to be completely wrong.

*Incorporation of service activities into manufacturing or two types of activities under the same roof?*

There were several companies in our sample, in the case of which we could discover both manufacturing and service activities at the same company, but the two types of activities had minimal no relation to each other. Diversified multinational investors created “local empires”, they established manufacturing subsidiaries and service subsidiaries, operating “under the same umbrella”: they had software companies, consultancy firms, banks, etc. alongside to their manufacturing subsidiaries.

Another pattern of “integration under the same umbrella” of unrelated manufacturing and service activities could be observed in the case of some companies, which had R&D centers in addition to their manufacturing facilities. The activity carried out at the local R&D centers however, was completely isolated from the local manufacturing activity: it was incorporated in the global R&D undertakings of the owner. There were of course companies in the case of which product development was related to the products manufactured on-site. As a rule of the thumb, we found that the closer a company’s R&D activity is to basic research, the more probable it is, that the local R&D activity is unrelated to the local manufacturing activity. The closer the local R&D activity is to the other end of the spectrum, to adaptive development, the more it is related to local manufacturing activities.

There was a company in our sample in the case of which even local sales activity was unrelated to local manufacturing: two corporate functions, which we can hardly imagine being unrelated! The company was operating in a customs-free area, manufacturing products that were exported and distributed through the owner’s global distribution chain. On the other hand, the owner had local sales offices as well, distributing imported products! Imported and locally manufactured and exported products were identical; the ones manufactured in

Hungary were exported because of the customs free zone, while the ones distributed in Hungary were imported.

Although our interviews shed light on the multiplicity of relations between manufacturing and service activities, still we could identify several firms in the case of which the incorporation of services did follow an evolutionary path, just as we hypothesized at the outset of our investigations.

One of the basic terms in international management literature on subsidiary evolution, is world product mandate (Birkinshaw [1996]; Birkinshaw–Hood [1998]) which means that as a result of its evolution process, the subsidiary gains a complex responsibility for a specific product or group of products. A world product mandate means, that each corporate function associated to a specific product is assigned to the subsidiary. The subsidiary bears a complex responsibility for the product in question, which responsibility is neither functionally<sup>12</sup> nor geographically limited.

Our interviews revealed that each of the surveyed local subsidiaries tried to step on this evolutionary path, but only one of them had achieved to acquire a real world product mandate.<sup>13</sup> Local subsidiaries managed to acquire the responsibility for a couple of corporate functions, but in most cases it was not world product mandate that could be a realistic long-term objective of their evolution, but rather a regional mandate. Some of the surveyed companies have become regional headquarters over time, or at least they managed to become regional competence centers of specific corporate functions.<sup>14</sup> Regional competence centers assume the responsibility for specific corporate functions at a regional level: they manage sales, distribution, logistics, training etc. at a regional level. Regional headquarters have a nod position in the knowledge network of their multinational owners: they transfer knowledge and

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<sup>12</sup> Responsibility includes the product's design and development (all over the product's life cycle), the elaboration of process technology, manufacturing, as well as production related and product related services.

<sup>13</sup> The position was acquired by the local subsidiary of the Lighting division of GE, in the case of which global R&D undertakings are carried out and managed from the premises of the Hungarian subsidiary. The chief financial manager as well as the CEO of the division has moved to Hungary from London. Various corporate functions at least at EU level – like purchasing, marketing, controlling etc. were also located in Hungary, and they are carried out by the global teams of the corporation.

technology at regional level. They transfer the knowledge they have accumulated so far to less developed regional subsidiaries.

In some cases the process of becoming a regional competence center is paralleled to the divestment of certain low value added manufacturing operations. Local subsidiaries assume responsibility for the management of the relocation process and for the launching of production at the new location. They provide technological assistance, consultancy services in a variety of functional issues (logistics, quality control etc.). In sum, the subsidiaries that lose a specific type of production activity diversify into service provision when managing the relocation process. (Besides, in the majority of the cases they continue to carry out production activity as well, specializing on more technology- and knowledge-intensive production activities than before.)

This optimal scenario takes place only if the new location is geographically close to the divested one and not in a say, Far Eastern country. Recently, several multinational companies decided to relocate their Central European facilities because of increasing local factor costs. However, they haven't chosen neighboring Eastern European countries as a new location, but rather South-East Asian ones. It became clear that most multinational investors do not consider the less advanced Eastern European countries safe, developed and predictable enough to choose them as a location for their production facilities. It must be emphasized again and again, that from the point of view of becoming a regional competence center, they state of development of our Eastern neighbors is a crucial question for Hungary.

Besides the options of acquiring a world product mandate by integrating all production related service activities, or becoming a regional competence center, there is a third one, that of acquiring a complex local product mandate. The integration of manufacturing and service activities took a special form at some brand leaders' local subsidiaries. Integration of the two sectors took place under the auspices of services (and not under manufacturing). Many originally manufacturing firms label themselves nowadays "solution providers". Their core competence, or their most important business segment – they claim – is the provision of strategic business services, complex solutions to customers' problems and needs.

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<sup>14</sup> It is important to make difference between the terms regional headquarters and regional competence center. A local subsidiary that has acquired the position of regional competence center in most corporate functions may become a regional headquarter.

This shift in corporate focus occurred because these companies recognized that it is usually not the best hardware manufacturer that acquires the responsibility of providing a solution, of carrying out a complex project (let it be the safety system of a ministry, the logistics systems of a manufacturing firm, or its IT system, a communication system, the lighting and theatre technique system of a new theatre, etc.). The firm that comes out as a winner of the tender for the project is usually the one, whose solution plan fits the best the customer's ideas. Competition takes place not in the field of hardware manufacturing. The technical parameters of the hardware are not considered as a decisive factor because the various hardware elements in the system are in principle interchangeable. It is the creativity, and of course the price of the solution that matters, thus competition takes place in the field of services. The winner of the project tries to incorporate its own products, its own hardware in the system, but the selection of one's own hardware is not automatic, it is not the only option, not always the best strategic solution for the winner. In the case of providing solutions, the integration of manufacturing and service activities is co-ordinated by the service provider and not by the manufacturing firm.

Local subsidiaries of such manufacturing firms were created usually in the frame of market-seeking investments. One important finding of our field investigations is that these local manufacturing subsidiaries have the biggest chance to diversify their corporate function portfolio, engage into knowledge-intensive strategic business services activities besides manufacturing, and grant the most complex range of high local value adding services to their local clients.

#### *Diversification into production related services and the profitability of operations*

Another issue our field investigations tried to find evidence for, is whether we can claim that local manufacturing subsidiaries that diversify in the provision of services are more profitable than simple manufacturing facilities.

The point of departure of our reasoning was the fact that local subsidiaries usually pay for every kind of "assistance", i.e. internal service provision to their parent companies. The fee of an IT specialist employed and sent by the mother company is usually much higher, than that of local IT experts. If local subsidiaries are capable to carry out the services, necessary for their own operation, themselves, they can economize with costs. Although anecdotal evidence

supported this line of reasoning, the interviewed managers pointed to the fact that this, in itself did not increase the bottom line value of the subsidiaries.

Some subsidiaries established R&D centers, hired engineers to participate in the multinational owner's research and development activities. The costs of the local R&D centers (the hiring of new engineers, investments: computers, testing equipment etc.) were included in the yearly budget of the subsidiary. The owner covered investment costs either directly, through a direct transfer, or indirectly, by permitting that the subsidiary spends the locally accumulated profit for the stated objectives. This way, local R&D activity didn't affect the subsidiary's profitability, the costs of the activity were covered by the owner. If local R&D activity corresponded to the products manufactured on site or was related to the production process at the subsidiary's premises, it was the subsidiary's responsibility to finance R&D activity. *The revenue of the local subsidiary consisted of the contracted "unit production price" of the individual products.* Unit production price was multiplied with the number of units produced and this made up the net sales of the subsidiary. In principle, the contracted unit production price could be somewhat higher, if the subsidiary's activity covered a wider range of functions. However, since the owners usually made their subsidiaries compete with each other and even with potential outside contractors for the responsibility of the production of each new product – no matter how complex the local activity portfolio was, unit production price could not increase above a specific threshold. The situation was similar in the case of the other locally performed internal services (material purchase, logistics, marketing & sales etc.)

Although the diversification of the range of locally performed manufacturing related service activities did not affect the profitability of local operations, subsidiaries strove to assume the responsibility for such activities. The reason of "subsidiary entrepreneurship" (Birkinshaw [2000]) is that the subsidiaries' position within the owners' multinational organization can thereby be improved and the subsidiaries may thereby become more embedded locally. If a local subsidiary is assigned crucial corporate functions, it becomes more important for the multinational owner than, say, if it increases local market share. An increase in the local market share is always a marginal item in the multinational's consolidated bottom line, and if necessary, local market distribution can in principle be arranged from a foreign basis as well. Undertaking the responsibility of specific global or

regional corporate functions necessitates a knowledge base the retention of which within the multinational's organization is crucially important for the owner.

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