New Production Systems and Workers' Participation – a contradiction?
Some Lessons from German Automobile Companies

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At the beginning of the 1990s the international automobile industry was quite easy to understand. The final report of the *International Motor Vehicle Program* at the Massachusetts Institute of Technology was published in 1990 as a – later on very successful – book (Womack et al. 1991). It presented a simple message: The Japanese lean production system is the new best way for the international automobile industry, and it "could be transplanted successfully to new environments" (Womack et al. 1991, p. 84). For the MIT-authors Western mass-producers like General Motors, Renault, Volkswagen, and Fiat were identified as the "greatest obstacle in the path of a lean world" and "many have proved remarkably incapable of reforming their ways in the 1980s" (ibid., p. 257). European carmakers were given quite bad benchmarking indicators and the experts stated: "Europe, once the cradle of craft production in the motor industry, is now truly the home of classic mass production" (ibid., p. 86). So the automobile world was quite simply to capture: There is a *one best way* of producing cars, the Japanese *lean production* system; MIT-experts tell us how it works; this production system could be applied everywhere, and due to globalization pressures it will spread out all over the world; for car production there are promising world regions like Japan and the emergent markets and there are hopelessly sclerotic regions like Western Europe.

One decade later, the German carmakers Volkswagen, Daimler-Benz (now DaimlerChrysler), BMW and Porsche (and also the French carmakers Renault and PSA-Citroen) demonstrated a quite successful performance, meanwhile the situation for Asian and US-American carmakers and for the emergent market regions was very difficult. BMW as the smallest of the *German Big Three* (Volkswagen, Daimler-Benz and BMW) had doubled its car production and turnover during the 1990s. Despite the short (and failed) Rover adventure the BMW Group reported cash flow of 2,4 billion Euros for 2001. At the same time Daimler-Benz experienced a very successful decade of concentrating on the core competencies of car and truck production – after the 'lost 1980s' with a diversification strategy aiming at being a 'technology consortium'. Daimler-Benz was definitely the stronger partner in the merger with Chrysler. Volkswagen as an even highly internationalized company since the 1960s grew in Western Europe, Eastern Europe, in Latin America and also in Asia. In 2001 the cash and cash equivalence of the Volkswagen AG was about 4,3 billion Euros, and the return on capital after tax raised from 5% in 1997 up to 9,4% in 2001![1] Considered for a long time by managers (and scientists) as a highly bureaucratic, state and union dominated company without attractive profits, Volkswagen defended itself against EU-attempts of abolishing the unique Volkswagen-Act that prohibited free share trafficking. Ferdinand Piëch modernized the consortium and was selected by the prestigious Financial Times' *Automotive World* review winner of the *Lifetime Achievement Award* in 2001.

In sum, obviously there was something wrong in the diagnostics at the end of the 1980s (see also Freyssenet et al. 1998). Not the Japanese but mainly the German and French carmakers revealed the most considerable dynamics, innovation and competitiveness during the 1990s. This is a severe threat for the previously predominant explanations both among politicians and academics. How could the old 'euro-sclerotic' companies be so successful? Was it because of a rigorous application of the lean production system? Was it due to a thorough eradication of the old 'out-fashioned' tradition of high-qualified work and workers' participation in company affairs? Concerning the scenery of the world car industry, the last decade of the 20th century raises a lot of questions. Concerning the number of sold books, the MIT-study was a success, and concerning the scientific analysis and predictions it obviously failed.

In order to add some scientific explanation to the obvious success of the German carmakers during the 1990s, this chapter aims at answering just two specific questions. First: Which type of production system did the German carmakers develop in their all-new plants in the USA? and, second: Are there tangible 'backlash' effects of these new production systems on the German system of labor regulation and workers' participation in the sense that global competition is irreconcilable with workers' participation? The first query is important because, like the Japanese carmakers did during the 1980s, BMW and Mercedes-Benz opened new *transplants* in the USA during the 1990s. Did they simply export their German production system? Or did they succeed in the application of the Japanese *lean production* system? The second question deals with the stability or change of some basic features of the German business model, especially workers' participation. Has the success story of the German carmakers during the 1990s to be explained by a clear friction of the traditional German production and labor regime? Or were BMW, Daimler-Benz and Volkswagen successful in the past decade *in spite of* or even *because of* the stability of basic productive and labor features?

[1] See http://hv.volkswagen.com/docs/charts_engl_piech.pdf, 16. October 2002.

1. Production Systems, adaptation-application and performance

The production system as a specific configuration of technologies, organization and work in a given factory which facilitates the output of specific products and services is crucial for explaining success and failure in the international automobile industry. The main focus of the MIT-study (Womack et al. 1991) was on the production systems of single plants that John Womack and colleagues had compared in 15 countries and 90 factories. Even if the production system is only one part of what could be called the overall business model, it helps to address some crucial issues: What happened with the production systems of the *German Big Three* during the 1990s? Did they import the Japanese or Toyota production model? Did they simply export a German production model to their new overseas plants, for instance in Brazil, Mexico or the USA? Or has the success of BMW, Mercedes-Benz and Volkswagen to be attributed to a 'hybridization' of their production systems?

In order to discuss the characteristics of the production system of the *German Big Three* as explaining factors of their 1990s success it is worse to have at least a sketch of different national traditions of such production models.[2] The traditional *German production model* of automobile assemblers, for instance, could be characterized by relative high rates of aggregated value and of internal value chains (of normally more than 50% of the car value), by long-term supplier relations and procurement strategies, by relative high automation level and sophisticated production technologies, by production and engineering oriented factory organization, by clear division of production, maintenance and quality control tasks, but by a low level of job demarcations inside these functional areas, by work-place and profession-oriented design of tasks and responsibilities, by a mix of internal and professional labor market segmentation, by high internal and low external labor flexibility, by qualified workers with vocational training and strong product and quality oriented work attitudes and by a strong but 'production-responsible' dual structure of collective interest representations (factory based Workers' Councils and an industry based union).

In comparison, the traditional *US-American production model* of carmakers could be typified by moderate rates of aggregated value (normally under 50% of the car value), by short-term and market structured supplier relations and procurement strategies, by medium automation levels, by finance and marketing oriented factory organization, by clear division of

[2] We use the term production *system* to refer to a specific plant related configuration and the term production *model* to refer to a more general model thinking and action guiding framework (see also Abo 1998).

production, maintenance and quality control tasks and a high level of job demarcations inside these functional areas, by work-place demarcated design of tasks and responsibilities, by completely internal labor market segmentation, by low internal and high external labor flexibility, by on-the-job-trained semi-skilled workers with low work identification and by a strong and power oriented business unionism.

The corresponding traditional *Japanese production model* could be described by relative low rates of aggregated value and of internal value chains (of about a fourth to a third of the car value), by long-term procurement strategies and pyramidal supplier relations, by medium automation levels, by design-, engineering- and production-oriented factory organization, by integration of production, maintenance and quality control tasks, by working group based definitions of tasks and responsibilities, by internal labor market segmentation, high internal and low external labor flexibility, by qualified workers with strong company oriented work attitudes and by a weak system of company oriented unions as interest representations.

Based on this basic idea of production systems, during the 1980s and 1990s the 'adaptation-application-hybridization'-discourse was prominent in automobile research. Meanwhile, on the one extreme, some authors pointed at the socio-cultural embeddedness of the Japanese production system, which would restrain its transferability (Dore 1973 and 1992; Clark 1979), on the other extreme, some researchers stated its almost full applicability under every condition. In this line, the MIT-Study of the international automobile industry stated: "the new best way – lean production – could be transplanted successfully to new environments" (Womack et al., 1991: 84). Between these two extremes there spans a broad range of empirical studies of the degree of *application* (complete transfer of the production system from Japan to other countries and environments) and *adaptation* (flexible conversion and reworking of the Japanese production system according to the specific regional and national conditions; see Abo 1994).

Besides general and methodological criticism on the *one-best-way*-thesis of general transferability (Williams et al. 1992) empirical studies reveal a complex mix of application of 'Japanese' production *principles* and of adaptation to the specific *circumstances* of automobile firms all over the world. Richard Florida and others analyzed Japanese transplants in different sectors of the U.S. industry and found that "Japanese automotive transplants effectively transferred core elements of Japanese production organization, human resources systems, and supplier linkages to the USA" (Florida et al. 1998, p. 189; see also Florida/Kenney 1991 and Kenney/Florida 1993). Another study realized in 1994 included also US-owned component suppliers of the automobile industry and found that "there is very little difference in adoption of innovative production work systems between Japanese affiliated and US-owned suppliers of components to the transplant automobile assemblers" (Florida et al. 1998, p. 204).

The study of Abo (1994) and his colleagues is based on a complex operationalization of what they called a 'typical American production system' and a 'typical Japanese production system'. Based on 23 variables in seven dimensions and a five-point ordinal scale for each of them a 'hybrid ratio' of the production system is calculated, where '1' represents a typical American system or a complete *adaptation* and '5' a typical Japanese system or a complete *application*. The hybrid ratio for the automobile assembler industry was 3,5 – when the score 3 would have represented a perfect mix or a completely hybrid production system. This result was astonishing because a higher rate of application of the Japanese system had been expected for the Japanese transplants in the USA. Later studies of Japanese transplants in other regions of the world revealed – although with particularities for the USA (Abo, 1998: 221-223) – similar results for the three branches of auto assembly, auto parts and consumer electronics: "Overall, Japanese transplant factories are characterized by a barely equal mix of Japanese and local elements, and we have called this mixture 'hybrid factories'" (Abo, 1998: 220).

In general, empirical findings suggest that production systems vary according to companies, to countries, to socio-cultural macro-regions, and in time (Boyer/Freyssenet, 1995; Freyssenet et al. 1998; for work systems: Lewchuk et al. 2001; Steijn 2001). In international comparisons production systems were analyzed for old automobile plants and regions 'between transfer and hybridization' as well as for newly developed automobile plants and regions 'between adaptation and innovation' (Boyer et al. 1998b). If production systems vary significantly according to the above-mentioned dimensions, the question arises if it is useful to handle a stereotyped 'Japanese production model' as the main or exclusive point of reference for empirical analysis (as it was the case in the studies of Womack et al. 1990; Kenney/Florida 1993; Abo 1994). This doubt is even more important for the 1990s, when the Japanese automobile industry as well as quite all South-East Asian countries fell in a deep crisis. Renault bought a considerable share of Nissan in 2000, DaimlerChrysler bought important shares of Mitsubishi in 2000. At the beginning of the 21st century there remained only two independent Japanese owned international carmakers (Toyota and Honda). Contrary to the decline of the 'Asian tigers' the US-American and Western European carmakers were relatively successful. In Europe, especially German and French carmakers gained international terrain. All *German Big Three* (Volkswagen, Daimler-Benz and BMW) opened *new production plants* all over the world.

It seems that Abo (1998: 229f) was wrong when he stated, that the "European pattern lacks any clear competitive advantage". But then the question is: On which type of production systems are the new dynamics of German automobile companies based on? Were German carmakers successful *because of* copying a specific production system (for instance: the Japanese model in general, the Toyota system or *lean production*)? Or did they invent or develop a new production model? Or has the renaissance of the German Big Three during the 1990s nothing or little to do with production systems and production models? Was it perhaps the 'going global' in terms of new market activities or new product structures which explains the outcome of BMW, Daimler-Benz and Volkswagen? Did the new production facilities in overseas have any influence on the overall company performance? Which type of production system is, for instance, emerging in these new plants like those of Mercedes-Benz in Tuscaloosa/USA or BMW in Spartanburg/USA?

The following sections focus on two aspects and could help answering great part of the questions raised above. The arguments presented are based on an empirical study, which was conducted during the second half of the 1990s. Expert interviews were realized in Germany (in the headquarters and important plants of Volkswagen, Daimler-Benz and BMW, also in organizations like the trade union IG Metall, the Association of the German Automobile Industry VDA and with other scientists), and full case studies were done in two plants in the USA (Mercedes-Benz/Tuscaloosa, and BMW/Spartanburg), in one plant in Mexico (Volkswagen/Puebla) and in one plant in Brazil (Volkswagen/Anchieta-Taubaté). Additionally, short studies were made in two other plants in Mexico and in three other plants in Brazil. Including the factories in Germany a total of 13 plants was visited and 120 interviews with experts were realized. These experts included top level managers (CEOs), middle range managers of the areas of strategic planning, sourcing, production planning, production, and human resources, as well as workers' representatives.

On the one hand, we present some basic elements of the production system of one of the most interesting new production sites all over the world: the Mercedes-Benz U.S. International (MBUSI) plant in Tuscaloosa/Alabama in the USA. This helps to evaluate the adaptation-application-innovation-question (section 2) and the role of new production systems in the German carmakers success (section 3). On the other hand, we will analyze some of the features of what we call the German business model in the automobile industry and, especially, we ask for the role of workers' participation in the restructuration process (section 4): Was German carmakers' success during the 1990s possible because of a tangible reduction of workers' participation and due to abandoning the supposed 'rigidities' of the labor regulation system?

2. Daimler-Benz in Tuscaloosa: Laboratory for a new production system?

Until the beginning of the 1990s, Daimler-Benz was defined and defined itself as a premium segment producer that exported high technology and high quality automobiles *made in Germany* all over the World. Therefore, until the foundation of the new Tuscaloosa-plant the company had no single important production plant for cars outside Germany (only small assembly-facilities for CKD (completely knocked down) kits in many countries all over the World and specialized subcontractors like Steyr-Daimler-Puch in Graz/Austria). In contrast to this situation in car manufacturing, the Daimler-Benz consortium had a worldwide network of truck production, namely in Brazil and in the USA with the Freightliner company. From the beginning of the 1990s the Daimler-Benz consortium began its 'globalization offensive'. The announcements of new factories in Hambach/France and in Tuscaloosa/USA were part and result of these globalization efforts that finally led to the merger with Chrysler in the year 1998.

The decision to open a new production plant in the USA for a new type of vehicle was taken in April 1993, and Tuscaloosa was announced in September 1994 as the location for producing a new Sport Utility Vehicle, the M-class. This reflects the very intensive search and investigation during more than one year (Renschler 1995). The plant began its production in May 1997, and – similar to the case of the BMW plant in Spartanburg/South Carolina – it represented an *all-new experiment*: new country for car production, new product, new production system, and new plant. From the very beginning the Tuscaloosa project could rely on the know-how and on the material and personal infrastructure of the truck company Freightliner. The plant project could also take profit from the BMW experiences in Spartanburg. One part of the new Tuscaloosa employees and workers came from Freightliner, but managers were recruited also from all other automobile companies – this differs from the BMW strategy in Spartanburg where a great part of managers was recruited (or 'rubbed') just from one company: Honda. One of the interviewed top managers stressed that after the critical experience of BMW to recruit managers 'aggressively' from some other companies (mainly Honda and other Japanese transplants), Daimler-Benz tried to negotiate or at least communicate with the companies where they were going to 'hunter heads'.

As indicated by the large time of searching an adequate locality for the new plant, Mercedes-Benz realized an excessive *location bargaining* with the State and Community authorities of various places. Although the connection to an overseas port is more complicated than in the case of the State of South Carolina, and although many positive factors favored this state, the decision was made for Alabama (due to concessions but also to the fact that for reasons of prestige Daimler-Benz could not follow its rival BMW in the same state).

Product structure and market strategy

In contrast to BMW that had planned its factory in Spartanburg as a platform for worldwide exports, the strategic market orientation of the new Daimler-Benz plant in Tuscaloosa at the beginning was quite exclusively the US-market. The USA were (and are) the most important market for Sport Utility or All Activity Vehicles, and therefore production of the new Daimler-Benz SUV M-Class – that was developed on the basis of production experiences and engineering capacities of the G-Car group in Austria – was located strategically in the USA. From the beginning it was planned to sell at least 60% of the Tuscaloosa production in the USA. This business strategy to produce cars in all most important markets was successful: in 1998 70% of buyers of the M-Class units produced in Tuscaloosa were new clients for Daimler-Benz. A great part of these new customers probably would not have been gained with a product made outside the USA. Since spring 1998 units were exported also to Europe, were production of the M-Class began in 1999 in Graz/Austria due to the success and demand of the vehicle (and because of the more complex clients' demands in Europe).

Annual production in Tuscaloosa was planned initially for about 60.000 units. In contrast to the BMW-Spartanburg plant, at the very beginning Daimler-Benz concentrated on only one model with few equipment variations. In the year 1998, there was only one type of body (with two roof variations) with two different engines, seven different outside and two different inside colors plus two distinct inside finishing materials. Compared to BMW, the initial product structure was relatively simple and very similar to a typical Japanese transplant (with annual production of about 60.000 to 80.000 units of one model). In the same way the market strategy corresponded more to the typical case of a Japanese transplant (orientation mainly towards the local market of the new plant and not to exports) and differed from the BMW-case.

Table 1: Basic figures Mercedes-Benz/Tuscaloosa plant

Location	Mercedes-Benz U.S. International Inc. P.O. Box 100, Tuscaloosa, Alabama (Highway Tuscaloosa-Birmingham)
Area	totally 966 acres; built area 1 mio. square feet, investment over 300 mio. US $ (initiated May 1994); until 2001: two expansions totaling 80 Mio. US $ additional investment
Capacity	initially scheduled 270 units/day and 61.000 units/year (for 1998); planned 80.000 units for 1999 and 90.000 units for 2000 total production in 2001: more than 80.000 units, 3.155 Mio. € in sales in January 2001: the 250.000th M-Class rolled off the production line
Products	initially one model (ML 320) with 2 engine options; since 1999 5 engine options; in general very few equipment options (less than 50) until 2000; in 2001: ML320, ML430, ML55 AMG, and the ML270 CDI for sale in more than 135 countries
Production Technology	Body shop, painting, final assembly; initiated beginning 1997 direct suppliers: 75, local content 60-65%; about 50 robots (40 in body shop); value added: about 25%; buffers: 80 (body shop-painting) + 30 (painting-assembly) units
Organization	Five hierarchy levels, work groups (about 30 members), re-working area: about 15 workers; tact time as in 1999: about 3,8 min.
Employees	about 1.500 in 1999; average age 34 years, 30% women; worker's average wage/hour 19 US $ (end 1998), three wage categories (group members, technicians, staff); no union representation, but UAW claims 1.888 employees at the end of 2001

During the last years, this initial strategy shifted towards a more complex product scope. In 1999 the Tuscaloosa plant started assembling M-class models with five different engines. At the end of 2000, there were produced the models ML320, ML430, ML55 AMG, and the ML270 CDI for sale in more than 135 countries (see Table 1). In autumn 2002 production start of the new cross over car Mercedes-Benz Grand Sports Tourer (GST) was announced at a dealers' conference in Canada to be realized at the Tuscaloosa plant at the end of 2002. Therefore the production facilities are being expanded, and about 600 Mio. US $ will be invested in the plant expansion over the coming years. Jürgen Hubbert, Board of Management Member of DaimlerChrysler AG responsible for Mercedes-Benz Passenger Cars & Smart stated: "With the Grand Sports Tourer DaimlerChrysler is systematically advancing its product offensive, while also defining a new and promising market segment in the premium market area. The GST establishes a new vehicle class that combines the features of various car concepts to form a new independent profile." (press release 27.08.2002, see http://www.daimlerchrysler.de/index_e.htm, at 20.10.2002).

Production system

Based on the characteristics of product structure and market strategy it is understandable that the production system of the Tuscaloosa plant initially was oriented more on Toyota than on Honda. In interviews and other documents the plant management underlined the strategic orientation of the plant as a concentrated learning process, but not as a radical experimenting. The focus was on maximum outsourcing and on standardization of processes and rhythms. In contrast to a Mercedes-Benz traditionally high level of OEM-added value of about 50% or more in Tuscaloosa the outsourcing reached unknown levels of about 75% of the car value produced outside the plant. Just-in-time-philosophy is applied in a central MBUSI-own warehouse were the suppliers have to send their parts in time and sequence. For instance, the supplier of the cockpit is located six kilometers away from the Tuscaloosa plant, and time from demand of a specific cockpit over its assembly, transportation and put-in in the MBUSI-assembly line lasts about 170 minutes. Hand in hand with just-in-time delivery the total number of first-tier-suppliers was reduced from traditionally about 300 to about 80. Just 18 system suppliers (of which half are located in a 100-km-radius from the Tuscaloosa plant) are responsible for coordinating the delivery of complex car pieces including the control of second-tiers-suppliers. These system suppliers were integrated into the planning, design and engineering process at a very early stage so that product development was realized as simultaneous engineering (Martin 1998).

Since the end of 1994 management paid a lot of attention on developing an innovative and coherent production system for the Tuscaloosa plant. This was part of the strategic destination of the plant in the overall orchestra of Mercedes-Benz production sites. Compared to the German plants the Tuscaloosa site developed an almost completely new production system, but according to interviewed MBUSI-managers who had worked in other automobile transplants in the USA Tuscaloosa was quite a “pretty normal” production system. In 1995, plant management resumed and concentrated the production system in the following eight pillars: (1) *Safety*: that means preventing work accidents, a very important issue from labor law, and union intervention that often begins with conflicts on work accidents; (2) *Training*: it is ongoing and everybody’s responsibility, mainly as - standardized - training on the job; (3) *Clean plus S*: that means, first, keep the workplace and work area clean, but, second, also to organize all work instruments and the workplace in general in a standardized manner to secure predictability, repeatability and process standardization; (4) *Quality*: focus is on ‘built in quality’ not on ex-post-checking and repairing, workers have the facility to stop the process in case of severe quality problems; (5) *Visual management*: refers to make transparent the performance of each work place and work-team, but also to visualize the standardized operations and processes; (6) *Pull system*: means to reduce buffers in the process and to have the parts in the line right in the moment and sequence they are needed; (7) *Standard Method and Procedure (SMP)*: that means standardization of all operations in forms/sequences and times they have to be done, standardization comes ‘from above’ (Master Process Sheet, worked out by engineering department) and ‘from below’ (improvements by team-members, mainly in reducing non-added-value-times), and (8) *Continuous improvement*: that refers to the ‘continuous reduction of costs’ by identifying and reducing waste and non-added-value - the focus is not on ‘quality of work life’.

Concerning technical outline and standards, the Tuscaloosa plant integrates body shop, painting and final assembly. The assembly line is designed in a quite traditional U-form. Production capacity was of 280 units per day in 1998 and grew up to more than 300 in 2000, the only buffers are between body shop and painting (80 units) and between painting and assembly (30 units). Production automation is much higher than in BMW-Spartanburg, in total there are 50 industrial robots, 40 of them in body shop (for the critical and safety relevant welding points). The share of value-addition in the plant is of about 25% to 27%, and a unit lasted about 10.5 hours in final assembly in 1998 (which was reduced to about the half until 2000 in the context of production line restructuring and more workers in the line).

In general, the technical aspects of the production system reveal a ‘lean’ and ‘one piece flow’ design. Technical facilities have a clear structure, displays in all lines inform about production and quality goals and real status. In the assembly line units are transported by a continuous chain, there is no disconnection of this transportation between areas, although ‘station lines’ distinguish these. The overall design coincides completely with the above-mentioned general strategy of a learning plant but not an experimental plant. But according to the broadening of the product scope assembled in Tuscaloosa, the plant could change its character from a lean Toyota one product plant towards a highly flexible several-products-in-one-line-plant and thereby come nearer and nearer to the BMW-Spartanburg philosophy. The philosophy was to reduce buffers to a minimum. Nevertheless, between body shop and painting there is a buffer with a capacity of one to one and a half shifts. Another buffer between painting and assembly line could hold about 35 units. Final assembly is distributed in 123 workstations and began with relatively long working tact times of 3,6 minutes. Though management underlined to reduce this long tact times to about three minutes, this would still be more or less the double of the one and a half minutes aspired as the new tact time standard for the major assembly lines in Germany.

Work Organization

There are six levels of hierarchy (President, Vice-Presidents, Managers, Assistant Managers, Group Leaders – Team-members). One group has about 30 team-members, and each group consists of about five teams. So the teams are composed by five team-members and one team-leader (who is chosen by the assessment center, is a type of foreman but has no disciplinary functions). Work place related ‘Master Process Sheets’ (MPS) define all value-adding operations in the product, they were developed in engineering departments (originally mainly in Germany) and define exactly the sequence and times for each operation. They hang out in each working area. Tact time was about 4 minutes and aimed to be reduced to 3.6 minutes. Totally there are only 15 workstations for rework. The main mission and function of the teams is to fulfill production norms and make proposals of improvement.

All team-members are trained in reading the MPS’s and in developing proposals in the context of continuous improvement. These proposals are fixed in the Standard Method and Procedure Sheet (SMP-sheet) in each working station. These SMP-sheets include value-adding and non-value-adding activities, and the improvement process of team-members concentrate on the latter. Proposals of improvement have to be signed by the Group Leader (in the case of non-value-adding activities) or by the Manager (in case of value-adding-activities) and also by the corresponding authorities of the second turn. By this way, the MPS’s are ‘enriched’ and amplified continuously by the SMP-sheets. The system of standardization of work and process related proposals of improvement is one of the most interesting aspects of the Daimler-Benz/Tuscaloosa production system. It combines continuous and decentralized improvement ‘from below’ with a continuous process of selection and standardization.

Human resources management

As in autumn 1998, there were in total about 1.500 employees in the Tuscaloosa plant, with a relatively high share of women of about one third. The vast majority of the team-members had no former experiences in the automobile industry, many of them did no industrial work at all before. The average age was 34 years, which reveals the plant politics to recruit a broad and representative selection of the local workforce (see also the diversity politics of MBUSI at http://www.mbusi.com/). Fluctuation and absenteeism were very low (about 0.5%), and the hourly wage was about 19 US $ for team-members at 1999. Salaries are oriented in the increases of the (former) American *Big Three* although a little lower than there, but higher than the regional average. Similar to the BMW-Spartanburg plant a yearly productivity bonus is paid. Work was organized in two shifts with 7 hours and 55 minutes effective working time. After two years, all team-members gain the same maximum wage level, there are 15 days of paid vacations a year. In 2001 employment raised up to about 1.800, and the future investments in Tuscaloosa for the Grand Sports Tourer (GST) probably let grow employment. In the production philosophy of MBUSI special attention is given to labor: "Team Members are both the focus and the content of the Production System. They carry the Production System and are carried by it. The team Members take our Production System from concept to reality" (Information brochure "Mercedes-Benz Production System", Mercedes-Benz U.S. International, Inc. 1995). Despite of this focus on the 'human factor', the plant has no union representation, although the United Automobile Workers' Union (UAW) realized a campaign for organizing the company. During field research in 1999 on the highway between Tuscaloosa city and the plant there were large announcements of the UAW directed towards the Daimler-Benz workers. Like in the case of BMW the indirect influence of the UAW was tangible in many interviews with managers. The case turned much more complicated with the Daimler-Chrysler merger due to the fact that Chrysler is a 'bargaining unit' controlled by the UAW that now claims the organization and representation of the Tuscaloosa workers. It is almost just a question of time when a union organization will work directly and explicitly in the Tuscaloosa plant. This is not only because of the power of the UAW in the USA and of the Workers' Council Secretaries in Germany, but also because of the declarations and policies of the company itself. During the last years DaimlerChrysler intensified its activities in the context of the United Nations initiative GLOBAL COMPACT which states as one of its nine principles: "3. Businesses should uphold the freedom of association and, the effective recognition of the right to collective bargaining".[3] Even during field research in Tuscaloosa in 1999 one could feel the special pressure deriving from the non-union-policy of the management, that is, the policy to hinder the unionization of workers: in order to obstruct a workers' majority favoring a UAW representation, the MBUSI management had to offer the same or even more to workers than they could expect with a union collective bargaining

[3] See http://www.daimlerchrysler.de/company/gc/dcx_global-compact.pdf (from 20.10.2002).

procedure. In the long run it will be very difficult not to recognize the right of workers to build a collective interest representation.

3. The Tuscaloosa plant experiences revisited

In general, the Tuscaloosa plant of Daimler-Benz is definitely a successful mixture and hybridization of German product philosophy and of American and Japanese, and here especially of Toyota transplants' production philosophy. But the MBUSI plant is far from being a rigid copy of the Japanese *lean production* system that was pushed so strongly by the MIT-study. It rather has to be interpreted as a complex and open end learning process, both for management and workers. As was outlined in many interviews, the innovative and successful application of standardization and documentation methods in the work process could represent a severe challenge of the traditional German Daimler-Benz production principles. These were based on the philosophy of craftsmanship and high production and work flexibility based on a low level of standardization. The Tuscaloosa plant is proving that it is possible to combine high flexibility in production with high standardization in processes, and that one could combine production of premium segment cars with employment of unskilled or semi-skilled labor.

This could end in a 'backward learning from the periphery to the center' and threat the dominant production systems in German Mercedes-Benz plants. In the last two years or so pressure grew up significantly for standardizing production systems at the German and international DaimlerChrysler level (see Springer 1997 and 1999). At the moment of our empirical field study it was an open and unresolved question if the Tuscaloosa plant would stabilize in this sense as a successfully learning company or if the first one or two years of its functioning were few for really judge the overall outcomes and possible 'backlashes' within the consortium as a whole. The initial success of the Tuscaloosa production system was due to a mix of American and Japanese production principles: concentration on few product variants and optimum of process standardization for continuous improvement of overall performance.

Compared to the BMW plant in the Southeastern state of South Carolina the Mercedes-Benz/Tuscaloosa experience in the Southeastern state of Alabama reveals more elements of the logic of *application* of Japanese production principles and fewer elements of experimental learning than in the case of BMW/Spartanburg. This could be explained in part by the different overall corporate business strategies for the two plants, but also in part by a time or learning factor itself: The Mercedes-Benz plant began about three years later than the BMW plant in Spartanburg and focused on catching the positive experiences of the German competitor and on preventing its negative experiences. Similar to the BMW/Spartanburg case the dynamics of the production system are strongly related to the product structure and market strategy. Therefore, relatively standardized production processes fit with a relatively simple product structure. Both elements – the specific design of the product structure/market strategy and of the production system – are interrelated and reflect different courses of organizational learning and innovation of the two plants.

At the same time, the Tuscaloosa production system differed completely from the traditional German Daimler-Benz production philosophy of high product variety and high production flexibility guaranteed by highly skilled workers. The last few years have proven that even semiskilled workers – as in Tuscaloosa – can produce a wider range of different products and models with relatively high quality standards. There does not exist one optimum production system but different effective and more or less attractive ones. It will be interesting how the new Tuscaloosa production system will work when the announced differentiation of product structure (for instance, with the GST-model) and therefore necessarily the differentiation of production process will be realized.

From the beginning of the 1990s, the German automobile industry made a considerable globalization push that could be seen in the radical restructuring of older overseas production plants (for example, the case of Volkswagen in Mexico and Brazil) and in the opening of new production facilities abroad, as in the case of Daimler-Benz and BMW in the USA. The latter examples of the Daimler-Benz/Tuscaloosa plant and the BMW/Spartanburg plant reveal *similarities* and differences. In comparison with the Japanese transplants of the 1980s, in both cases the German consortiums realized quite risky and innovative *all new plants* in the USA that – from the very beginning – were designed as hybrid plants combining Japanese, German and US-American experiences. Concerning the production system both plants were not aiming mainly at application or adaptation of a certain Japanese or German production model, but at setting up explicit processes of organizational learning to develop innovative production systems which correlated with the specific product structure and market strategy of the plants.[4] During the 1990s both plants have been very successful with their newly developed products and with their new production systems as well.

[4] Our results are consistent with the conclusions of Kenney et al. 1998: 295, who for the Japanese consumer electronics maquiladoras in Mexico found a "hybrid labor management system [...] that is similar to but yet

There are quite considerable *differences* concerning the initially learning and standardizing (Daimler-Benz) or experimental and individualizing (BMW) character of the plants and the initially US-concentrated (Daimler-Benz) or worldwide (BMW) strategic market orientation. The production system varies between – in the case of BMW – a radically decentralized, little normalized, highly process-flexible one that remains critical in terms of productivity and – in the case of Daimler-Benz – a more 'traditional', Japan-inspired one with high performance but lower product and process flexibility. In the case of BMW there could not be observed many 'trickle back'-effects in the sense of learning outcome from Spartanburg to the German headquarters or plants. Probably it is just the other way round that at the end of the 1990s the BMW-headquarters sent the message 'stop experiments, bring up efficiency and quality'. In the case of Daimler-Benz, the Tuscaloosa plant seems to have some consortium-wide effects on the discussions about production systems and production principles in the sense of higher process standardization.

Summarizing, there is no *one best way* of production system but do exist *some best practice production principles* like horizontal and vertical integration of functions, team work organization, visual management, built in quality processes, pull system of procurement, continuous improvement. These could be found quite everywhere in all plants (in the USA, in Mexico, in Brazil as well as in Germany) we studied. They are, for instance, at the heart of the very complex and highly formalized Audi-Production-System (APS), the Mercedes-Benz Rastatt-Production-System (RPS) or the Tuscaloosa-Production-System (TPS). Referring to these production *principles* – and not to lean production as a coherent production system – it makes sense to say: 'they could be transplanted successfully to new environments' (Womack et al. 1990: 84). By this, we take a position in between the MIT-hypothesis of lean production as a *one best way production model* on the one hand (Womack et al. 1991), and the opposite thesis of non-related distinct firm trajectories and production systems, as developed in many statements of the GERPISA-network (see Boyer/Freyssenet 1995: 134-136; Freyssenet 1998: 45; Boyer/Freyssenet 1999: 95).

At the same time we did not find *a one best practice way* of production systems in the case studies, we neither did not find an export of a 'German production model' and no direct backward effects of the overseas plants, but mutual learning and intra-organizational 'interest wrestling'. The effect of the new production systems and production principles at

differs from the labor-management system of consumer electronics factories in Japan" and see the analyzed plants more as 'learning factories' than as 'reproduction factories'.

BMW/Spartanburg and Mercedes-Benz/Tuscaloosa plants on the overall consortium-wide production principles or production model is more complicated than the metaphors of exportation or re-importation could catch. Learning processes from the center (of the headquarters or Germany) to the periphery could be proven as well as learning processes the other way round from the periphery to the center.

At the same time, there are different power and interest groups fighting for their corresponding version of reality and the conclusions they think have to be drawn for the plants and the consortium as a whole. The most important seems to be that the *power of definition of conditions and situations* is located and structured in a very specific and hierarchical manner. Even if a peripheral plant is quite successful in internal and external benchmarking, there are different ways of influencing this (for example, by the global procurement process or global distribution of investment and production resources) and of perceiving and interpreting it (for example, by ascribing certain results to plants or to the headquarters). Our empirical findings suggest that organizational learning between different units of an international consortium is a highly 'contested terrain' structured by interests, power, and status.

Finally, comparison of the case studies indicates a certain *muddling through* and *struggling forward* rather than unique management rationality. This has to do with a quite complete change in the conditions under which management has to act in nowadays comparing with the situation twenty years before. At least for the *Big Three* of the German carmakers, the 1990s brought a sequence of very fast changes in internal strategies and models as well as in external market and localization conditions. There is much indicating that, compared with the postwar period of prosperity and more or less continuous growth and even with that of economic crisis and decline in the 1980s, the 1990s brought increasing market uncertainties and a qualitative shift of the international automobile industry scenery. Market saturation in the old economies, globalization of production, procurement and marketing (and the value chain in general), concentration from about fifty world-wide automobile companies to a handful or dozen of global car producers, radical shortages in product cycle time (from about eight or ten years to the half of this) and the corresponding shortages in product development times, qualitative changes towards forward sourcing and 'reflexive engineering' and declining *relative* importance of the car production itself in comparison with the forgoing Research & Development and engineering processes as well as in relation to the following (emotion and life-style oriented) marketing: all these factors lead to the declining importance of fixed and closed production models. In times of rapid change a strategy of *struggling forward* oriented on some production *principles* and general 'philosophies' is more important than an orientation in static production *systems* or *models*.

4. Successful production systems only with lean workers' participation?

Starting from the MIT-thesis of the general superiority and applicability of the *lean production model* our empirical finding was that production systems are not simply imported, exported or applied, but developed and innovated in a complex learning and negotiation process and that different production systems could be equally successful. This opens a general space for thinking and action against economic and globalization determinism. According to a dominant thinking of the 1990s, which was not explicitly expressed by but often implicitly linked with the lean production argument, competitive production models have to be 'lean', respectively, free from workers' participation. In this sense, collective agreements and interest representation constraint productive flexibility and management action spaces. Corresponding to such thinking, the Japanese lean production model was successful in the international automobile industry because it went hand in hand with 'lean' or not-existing collective representation of workers' interests. The argument was: new and innovative plants all over the world are located in union free or 'union lean' regions (such like those in the new Southern automobile states outside the UAW-influenced old automobile belt of the Detroit region in the North-East of the USA); and the implicit argument often was: they are innovative and successful *because* they are union free. In accordance to this, the MIT-study had foreseen no future for the old, over-regulated and inflexible European production sites (except perhaps the liberal case of the Japanese transplants in the United Kingdom).

At the beginning of the 21st century some international carmakers like Volkswagen are successful in spite of – or perhaps even because of – strong workers' participation. Renault was successful during the 1990s regardless of – or perhaps even due to – its tradition as state dominated company. Obviously the *lean production*-argument was not only wrong in the narrow sense of a *one best way production model* but also in the wider sense of the (supposed negative) role of workers' participation for company competitiveness. Workers' participation and the power of unions and Workers' Councils are central issues of labor relations in Germany. Was the renaissance of the *German Big Three* possible *due to* or *despite of* these characteristics? First of all there seems to exist a certain coincidence of scholars holding that during the 1990s there was no real friction in the overall labor regulation regime in Germany

(Pries 2001). Even if globalization was and still is a strong challenge for the labor regulation system, this did not destroy or alter fundamentally the basic columns of the *dual regime of ‘conflict partnership’* (Martens/Peter 1989; Müller-Jentsch 1993). These two pillars are (1) strong independent unions and employer associations in a system of collective bargaining (which covers about three fourth of all workers’ and employees’ work contracts, see Waddington/Hoffmann 2000) at a branch and regional level and (2) Workers’ Councils at the factory level with a strong legal and legitimate action scope (Pries 2001). In contrast, monistic systems of industrial relations like in the USA (with only unions as collective actors on the labor side) seem to have been more affected by the globalization process during the 1990s (Cook/Katz 1994; Köhnen 2000). The German system of co-participation is stable and recognized in economy and society (Bertelsmann Stiftung/Hans-Böckler-Stiftung 1998). It was not reduced but even widened by legal reform act in 2001 and radiates in the European Workers’ Councils at the EU level (Lecher et al. 1998; Platzer/Rüb 1999).

The renaissance of the German carmakers in the international automobile scenery obviously cannot be explained by a generalized context of neo-liberally inspired labor politics of ‘unions beating and workers bashing’ – such an environment definitely did not exist. Concerning the automobile industry in general, only a minority of ‚going global’ activities of assemblers and suppliers was a *shifting* or *moving* of plants (due to higher overall costs in Germany), but the majority of internationalization was *expansion* and *extension* (Kilper/Pries 1999). Especially in the case of the *German Big Three* there could be observed a certain *increase* in the power and influence of workers and their corporate organizations. For instance, influence of unions and Workers’ Councils in the designation of *car guys* CEOs like Pischetsrieder, Schrempp or Piëch and in important internationalization steps (Rover-deal, DaimlerChrysler merger, Volkswagen’s Skoda acquisition etc.) was decisive. Some scholars state a certain transnationalisation of the labor regulation regime (Kädtler/Sperling 2001; Zagelmeyer 1999).

The strengthening of workers’ participation during the 1990s is most obvious in the case of the Volkswagen group. Internationalization of value chains and production networks went hand in hand with stronger influence of the Workers’ Councils at company, consortium, European and world level. Workers’ representation interfere, for instance, in the annual planning rounds, where five-year-plans of production, investment and employment are negotiated and settled between representatives of all plants and the central board (Mertens 1994; Haipeter 2000; Pries 2002b). Path braking labor regulation arrangements like the reduction of the weekly work time to 28,8 hours (in order to save 30.000 employments) or the 5000x5000 collective bargaining agreement (in order to create 5.000 new jobs for unemployed workers in a completely new production system) demonstrate the strong impact of the Workers' Council in developing innovative labor regulation arrangements (Pries 2002d).

In general, there is neither a fixed 'negative binding' nor a determined 'positive binding' between workers' strength in the labor regulation regime on the one side and economic performance and competitiveness on the other side. Some employer-oriented scholars try to demonstrate the first; some union oriented scholars try to prove the second. We hold that the success of the German automobile industry during the 1990s is related to positive feedbacks between strong and cooperative workers' participation and the innovation capacity of the industry. Participation of labor in the definition of corporate structure and profit strategies, of product structures and market strategies and in the development of adequate production systems challenged management not to follow each fashion and to strengthen the basic reasoning of strategies and structures.

For instance, the inter-plant competition for production shares, models and investment is organized not only at the level of management but crosses also the interest lines of labor. When, in the case of the Volkswagen group, a new model like the New Beetle or the SUV Colorado is developed, at least two or three plants all over the world compete for getting the order. Each plant and actor group looks for arguments of efficiency, adequate use of existing resources, adequate recognition of know how and local interests as well as consideration of justice with respect to former decisions. In this complex discourse of standpoints and viewpoints workers' participation is a very important 'ferment' and 'accelerator' of what could be called reflexive company modernization (Pries 1998).

We do not aim at replacing the economic or globalization determinism by a kind of 'participation determinism' arguing that workers' participation was a *compulsory* condition for companies' performance and success. But analyzing the factors that could explain the obvious but not expected renaissance of the German carmakers in the international automobile industry during the 1990s we hold that the labor regime had rather positive than negative impacts. The success of the *German Big Three* BMW, Daimler-Benz and Volkswagen obviously is due to a certain kind of 'acceleration spiral' or mutually strengthening of shifts in the four fields of corporate structure/profit strategies, product structure/market strategies, production systems and labor regulation regimes. A specific and ‘lucky’ combination of shifts in these four business model fields led to a win-win-game for capital and labor during the past decade. At the same time, beside these modifications the following basic and deeply institutionalized features of what could be characterized as *German automobile business model* were maintained during the 1990s:

- a mixed system of corporate structure and profit strategies, where shareholder value orientation and stakeholder value interests are balanced through a system of executive boards and supervisory boards and of ‘conflictive cooperation’ between management and labor; it includes tangible influence of family networks, important banks and/or of the State in the corporate governance of companies as well as public and collective interests of labor represented through a mix of party and union representatives in the different committees;
- hand in hand with this shareholder-stakeholder-configuration goes a tradition of long term perspectives and of genuine engineer driven carmaker company identity which is reflected in the ongoing dominance of *car guys* as executive leaders;
- without the former aspect it would not have been possible to come over with a ‘product attack’ which was based actually on historically engraved strong orientation towards research and development, engineering and – in general – knowledge development;
- the aforementioned ‘product attack’ was not only technology based but also oriented towards innovative, emotional, high quality and sustainable products; these shifts in the product structure and market strategies reflect the recursive integration of social and political sensibility into the products made possible also by workers’ participation;
- this workers’ participation was not only a short time management strategy of knowledge exploitation but integrated with a decades lasting labor and personnel policy of stabile long time employment, of low external and high internal labor flexibility and of workers’ qualification as an important investment;
- finally, this combines with a general company culture of social commitment and of the double binding of participation *and* responsibility of labor that is reflected in the ‘conflictive cooperation’-culture of the labor regulation regime but also in the public relations strategies of the companies.

Conclusion

All these features of the business model kept more or less stable during the 1990s – notwithstanding pressures of global competition and neo-liberal discourses all over the world. We hold that these basics of the German automobile business model should be considered not primarily as archaic residuals of out fashioned corporatism but as key elements for understanding the resurgence of BMW, Mercedes-Benz and Volkswagen during the 1990s. Compared to Japanese and US-companies, the *German Big Three* Volkswagen, Daimler-Benz and BMW started from a situation of fragility and disadvantages, they had serious productivity problems stated not only by the MIT-study (Womack et al. 1990), but also by international benchmarking conducted by the firms themselves (Springer 1999). They improved productivity and economic performance in a considerable way and, at the same time, they proved the decisive role of non-economic factors for being successful.

The success of the *German Big Three* during the 1990s will not necessarily continue during the first decade of the current century, and corresponding prognostics for the future will also depend on the diagnostics of what happened during the 1990s. The renaissance of the German and other European carmakers was neither predicted by scholars nor by practitioners, neither by radicals nor by conservatives. Explaining this success story in the context of the outlined common features of an automobile business model leads to the conclusion that the 'varieties of capitalism' (Hall/Soskice 2001) allow for a wider range of paths of sustainable development for the future than many of us have thought in the past.

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