



EUROPEAN ENLARGEMENT AND STRATEGY OF TRANSNATIONAL CORPORATIONS
IN CENTRAL AND EAST EUROPEAN ECONOMIES.
THE CASE OF THE CAR INDUSTRY¹

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Introduction

In this paper we study how the car industry in some Eastern European Transforming Economies is restructuring. The car industry is an interesting sector to consider if we think that it was underdeveloped both in terms of quantity, standards, and technology, compared to capitalist Western competitors. The opening up of these economies, their integration into regional markets (EU especially) and the strategy of few big world car makers give some room for the development of this industry in Central and Eastern European Economies (CEEEs) in the coming years. Already, the main producers have invested in almost all these countries, some local enterprises are already integrated inside big international groups, other are setting some industrial co-operation and strategic alliances with main Western car makers.

The car industry is a complex sector, it is the "industry of industries" according to Drucker (1946) as it includes almost the full range of industrial and services activities we can find in a developed economy such as steel, electronics, finance, insurance. The nature of this industry, its asset specificity, its reliance on networking, on the one hand, the state of development attained under the former socialist system, on the other, rise many questions to which we intend to answer in this chapter. Some other works (Meyer, 1998; Brezinski and Flüchter, 1998; Buck and al, 1996) explain how the setting up of joint ventures (JV) of foreign automotive firms were successful by setting the different performances of the enterprises and explaining it by its strategic investments. Few works focus on the innovation process and its deep influence on restructuring and what the role of science and technology (S&T) could be. There are the points we will address in this paper.

Our main working hypothesis is that the restructuring and catching up of CEEEs enterprises are faster through their integration into international networks than through independent strategies. For instance, the Polish or Hungarian car industry, not to speak of the Czech one, are more advanced in its restructuring than the Russian or the Ukrainian industries.

The study is divided in four sections. A first section recalls the pattern of competition in developed market economies, the second section emphasises on the restructuring of the car industry in CEEs, section three concentrates on two case studies: the Czech Republic and Russia. The final section concludes on the most salient points drawn from this research and discusses some policy-oriented proposals.

1 - Analysis of the western automotive industry

In order to analyse East European automotive industry an understanding of the Western automotive industry is required. We include in the Western automotive industry the Japanese and South Korean industries. This section provides discussion of the development of the western car industry (1.1), an analysis of the structure of the industry worldwide is developed (1.2). In part 1.3 we will stress on the outsourcing and the networking in this sector. Finally, part 1.4 will analyse the links between the western industry and the science and technology systems (S&TS).

1.1 Development of the Western Automotive industry

Historically, the car production in developed market economies has experienced three phases (Graves, 1994). The first one, "*the Fordist system*" emphasised on standard products and the development of mass production systems increasing efficiency by rationalising the production, controlling costs but using large capacities and a high level of inventories along the production line. A second phase, from the 1950's, has developed among European car makers who have concentrated more on product competition by developing new concepts of cars, new motoring, transmission systems, brakes, etc. The number of carmakers and segmented markets facilitated these innovations, by the know-how and skill accumulated. The third phase of innovation came from Japan under the name of "*lean production*" consisting in a combination of organisational innovations, the use of a very skilled workforce and the effort made by firms and governmental institutions to catch up and appropriate foreign technologies, notably through "reverse engineering" according to the concept coined by Freeman (1987). Lean production means avoiding the rigidity of the mass production system through the setting up of an alternative system, less hierarchical, relying on the competence of the different layers of workers inside the

factory. The skill of the workforce has facilitated the development of just in time, quality control, overlapping among different functions on the assembly line, contrary to the "Taylorist model". The combination of competence and organisational changes has led to reduce inventories, the time to produce a car; it has also allowed to develop a continuous feedback at different levels and among the different functions performed inside the firm (R&D, production, marketing). As carmakers are depending on suppliers for their parts, the lean system has developed upstream in forcing suppliers to integrate this new organisational constraint. This conception has allowed incremental innovations to take place and has facilitated the *kaizen* or continuous improvement, not only at home but also in the development of new plants abroad.

1.2 World Oligopoly, competition and overcapacity of western industry

The automotive industry has developed among the Triade countries generating flows of crossed investments among member countries being one of the first industry to delocalise its activities and to become "global". Main carmakers have set up international strategies, being present where expectation in the growth of the market is relatively high, mainly due to the stagnant demand on mature market of the Triade. Table 1 shows that the sales in the EU and in the NAFTA are predicted to be stable or decreasing for some years. Nevertheless, the main functions of the firm (finance, R&D, strategy) generally remain at the headquarters in the home country.

Table - 1

	Global Car Sales by Region (000s)										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
W. Europe	11,263.0	11,949.0	12,032.0	12,798.0	13,413.0	13,748.0	13,576.0	13,831.0	14,104.0	14,211.0	14,198.0
E. Europe	1,769.0	1,527.0	1,597.0	1,927.0	2,427.0	2,650.0	2,872.0	3,171.0	3,386.0	3,610.0	3,873.0
NAFTA	9,640.0	10,139.0	9,454.0	9,384.0	9,312.0	9,253.0	9,100.0	8,915.0	8,774.0	8,872.0	8,973.0
Asia	6,651.0	6,782.0	7,227.0	7,660.0	7,530.0	6,996.0	7,198.0	7,580.0	7,863.0	8,075.0	8,321.0
Lat. America	1,593.0	1,865.0	2,024.0	2,033.0	2,332.0	2,273.0	2,416.0	2,618.0	2,834.0	3,068.0	3,296.0
Other	2,062.0	2,330.0	2,491.0	2,503.0	2,533.0	2,489.0	2,446.0	2,506.0	2,546.0	2,564.0	2,627.0
Total	32,980.0	34,591.0	3,4824.0	36,308.0	37,545.0	37,410.0	37,609.0	38,622.0	39,506.0	40,400.0	41,290.0

Source: DRI World Car Forecast Report, May 1998

This expansion and the need to make economies of scale, had resulted in the formation of an oligopolistic market with very few makers per country of origin, from one to five (see Annex 2-figure B).² This trend will go on, according to the Economist Intelligence Unit (EIU) Car

² Even in presence of very high asset specificity, high technological and finance barriers to entry, new entrants, in the last thirty years, have been able to take significant market shares, first by developing a national industry (Japan,

Forecast (1997), the rate of utilisation of worldwide existing capacities is about 75%³, profitability is declining and the return on profits of the big three⁴ is estimated at around 5%. Profits have been regularly declining during the last decade. The OECD (1996) has predicted that from the 26 carmakers, which were active in 1995, only 10 would remain in 2015.

For this market driven industry competition through the increase of capacities has to follow three major downstream competition axes: (Table 2 shows the segmentation of Western Europe markets, and the relative importance of each segments)

- Price is the main axe on which the competition on the lowest segment of the range is going on. In order to cut costs of production, different strategies are implemented, such as delocalisation in region where production costs are lower, creating economies of scale by producing bigger volumes and the platform strategy which intend to use as much as possible the same bases for different models (body, engine, transmission).
- Model policy is another strategy which is important on the two medium segments and which tend to reduce the life cycle of each model and to add more distinct models in the range of the constructor and are supplied in order to have an important product differentiation. The number of non-classic segments is growing with the Multi-purpose vehicles (MPV), roadsters and off-road vehicles. This necessitates the development of the platform strategy and the merger of generalist and specialist car manufacturers.⁵
- Having one model on the high segment is a good strategy because this segment is the most profitable. This implies that R&D is undertaken in order to incorporate high-tech devices in those models.

Innovation is a key upstream competition axe in order to lower costs in the process of production and design. This is true for all models. To remain competitive, Western car manufacturers have to use available and breakthrough technologies to attain the efficiency and environmental

South Korea) and then by internationalising their companies in the other regions of the Tirade (North America, Western Europe).

³ The picture is worse in some places than in others, Germany produces 6 million vehicles less than it would be possible (33% under its capacities), Japan, 4 million (50 % of its capacities) and North America 3.9 million (21% under its capacities).

⁴ General Motors, Ford and Chrysler (now Daimler-Chrysler)

⁵ Examples of this trend are to be found at: BMW and Rover, Mercedes-Benz and Chrysler, VW and Rolls Royce, Ford and Jaguar, GM and Saab.

normalisation and security regulations. A competitive advantage⁶ is given to manufacturers that have the technology responding to new regulations (OCDE, 1996).

Table - 2

Market Segments in the West-European countries:
(% of registrations of new cars by country)

Countries	Low segment	Lower-medium segment	Upper-medium segment	High segment	Other (off-road and multi-purpose vehicle)
Austria	18	41	21	15	5
Belgium	23	34	24	17	2
Denmark	21	40	32	6	2
Finland	11	41	34	11	2
France	44	29	17	8	2
Germany	21	32	20	22	5
Greece	36	44	11	5	4
Ireland	33	40	34	5	1
Italy	50	27	12	10	2
Luxembourg	22	30	22	22	4
Netherlands	27	36	25	11	1
Portugal	56	31	8	4	0
Spain	37	38	19	6	0
Sweden	6	27	24	41	2
United Kingdom	28	34	23	12	4
European Union	32	32	19	14	3
Norway	12	42	33	11	2
Switzerland	20	30	22	22	7
Total (17 countries)	32	32	19	14	4

Source: CCFA, 1996

The industry will have to adjust by pursuing the globalisation of the industry allowing the rationalisation of the production at different stages and to produce cars for the world market.⁷ Upstream, the rationalisation should reduce the number of suppliers from thousand to a few hundred. The concentration of suppliers could lead in a few years, to generate a 1st tier supplying industry of only few actors, each of which will have around 20 specialities (XERFI, 1997).

1.3- Outsourcing and stabilising these relations by networking:

Networking in the car production has witnessed a lot of developments since the last decade. Automotive production networks are characterised by their pyramidal shape. On the top, the

⁶ The technology such as security or environmental purpose, usually belongs to one owner and is certified by international regulations. The first mover enjoys a technological leadership. The production has to be made under license and the competition is to produce it for a lower price (Chanaron, 1997). Innovation, in this type of market driven industry, has to be in line with customers expectations and process production.

⁷ Projects of "Global Cars", by Ford (Mondeo) and by Fiat (Paleo) illustrate this trend.

manufacturer sub-contracts to some system suppliers (1st tier) who, then, are sub-contracting themselves to 2nd and 3rd tier suppliers. Tasks of those 2nd and 3rd tier suppliers are less and less complicated and the profit margin smaller but delivery delays and quality level are extremely tight. This gives the suppliers the same opportunities to concentrate on their core business and to make the same type of economies of scale. With the externalisation of the production of non-core parts, the externalisation of some R&D tasks will also be given to suppliers.

According to Ruigrok and van Tulder's (1995) network typology, this type of network is an *Informal control hierarchy network*. In this network the core assembler (the car manufacturer) is positioned as a monopsonist, so all suppliers face one powerful customer. In reality suppliers, although they develop close ties with the core firm, have other core firms as customers too. Because the core assembler can impose tight quality requirements and very frequent deliveries, it puts suppliers in a more dependant situation. The price agreed may also decline over time. Suppliers will still have to invest in R&D for new products projected by the core assembler.

1.4 Connection with the S&TS

The innovation process is mainly a process of communication and co-operation to seek technical solutions at the lowest cost to solve problem which arise in the enterprise (Moore, 1997). In the car industry, it's especially true, because innovation do not depend upon research in one specific subject (like biology for the biotechnology) but it depends upon a multiplicity of small scientific discoveries and on their industrial applications.⁸ The globalisation principles push enterprises that are integrated in international production networks to be flexible enough to find solutions by tapping in their comparative advantages to produce world-class products.

- In-house R&D:

Sources of innovation in this industry are mainly in-house researches. Innovation in this sector depends upon other industries development for a large part. Almost all existing technologies are used in the car design (Banville and Chanaron, 1991). Because the market imposes more and more quality, security, comfort constraints, the choice of options and complex equipments in new

models, cost of R&D become more important. Automotive firms are among the world's biggest R&D investors (see Annexe 4- R&D Scores).

- Co-operative R&D:

There is a strong tendency for manufacturers to reduce their R&D costs. This is being done by externalising a part of R&D activities to suppliers and by co-operating with other enterprises in some common research projects. This explains the growth of R&D expenses in supplier's budget. The R&D organisation and the links with the production are well embedded. The current trend is to link the design of a new model with the conception of its manufacturing. Naturally, the 1st tier suppliers are expected to cooperate in this process, as they are specialists in their own core business. Suppliers get a bigger part of value-added in the production in which they are specialised. So innovation becomes more and more a co-operative process between different actors with their own specialisation in the field of R&D.

- Public policies:

Automotive firms are, in most of cases, private stock-companies. R&D expenses is seen as a strategic investment. The results at plant level, most of the time, are incremental innovations. But public policies are subject to very tight monitoring measures by competition authorities worldwide. As the automotive industry occupies such an important place in a country's economy (it concerns more than 13% of the industrial production), regional authorities are financing technology breakthrough projects that can help companies to cope with upstream competition in the field of R&D.⁹ We can see however that in the history of all Western car manufacturers, that their home State played key roles in their development, especially with army and defence contracts.¹⁰

⁸ The development of certain industries such as chemistry, electricity, mechanics rely on the supply of a set of knowledge provided by technical and engineering schools in each country.

⁹ As example, the pre-competitive technology programmes BRITE, EUREKA, EUCAR, PROMETHERUS, ESPRIT, RACE projects . Some companies from different countries, can work together on specific projects at this stage in order to beneficiate from these discoveries and then apply them and develop new products or new systems. As a result example, Peugeot has been able to develop its car navigation with the co-operation undertaken in the framework the PROMETHERUS project, financed by the European Union.

¹⁰ Ruigrok and van Tulder (1995) are making a parallel between the growth of multinational firms and the state intervention. For almost all multinational firms, and automotive firms are no exception, defence and military funding were crucial in their development.

It is impossible to assess if S&T policies regarding the Western car industry has been a success or a failure. First, as we said, the government did not get involved directly in this industry, its industrial policies were horizontally oriented and supposed to target all sectors. Second, the automotive industry has more than a hundred-year history, and it never had any major crisis, like textile and shipbuilding had 30 years ago. So no emergency policies had to be launched. The industry has always adjusted to the business cycle either through price, employment policies, either through innovation policies. National frontiers are disappearing in this industry and programs of international co-operation have been set up to study future important task like pollution, traffic, and security.

2 Restructuring of the car industry in Eastern Europe

The situation of the car industry in Eastern Europe at the beginning of the transition highlights the huge gap which has developed between market and planned economies during the four decades of socialism in Central and Eastern Europe, and seven decades in Russia. The car industry in the region has suffered of the planners' ostracism who considered cars - except big limos for *apparatchiks* - as a luxurious good which represented almost all what the system was fighting against: wealth, social aspiration, freedom and autonomy. The necessity to answer to social needs of some limited segments of the population after that economic growth has allowed to increase the share of consumption in the GDP permitted to develop this sector, often through imitation of western products. As other goods, the supply of cars was constrained by huge shortages, pushing consumers to queue up for many years if they did not have access to some privileged distribution channels.

2.1 Point of departure: Socialist industrial structures and transformation in the early 1990's

There are three different modes of industrial development of the car industry in CEECs:

- *The development of a car industry based on a domestic technology and know how prior to the socialist system.* This is the case of the Czech Republic even if other countries had a car-

industry sector before the Second World War like Poland and Russia. Skoda and Tatra, which were founded at the end of the last century have been able to develop their products under the former socialist system even if priority was given to heavy industry, to trucks construction and the development of mass transportation systems. The domestic technology and the import of foreign technology from the West (motoring, design) helped to maintain a certain level of quality and know how.

- *The development of a car industry based on technology import.* This is the case of Poland, Romania, Russia and Yugoslavia. Poland has imported technology and has co-operated with Fiat to develop and build small cars for its own market and for COMECON markets¹¹. Romania has also imported technology in the 60s notably from France (Renault, Citroen) to supply its own market but also to export cars on COMECON and Third world markets.¹²
- *The absence of a domestic car industry.* This is the case of Hungary (which had developed a small car-industry before WWII) and Bulgaria mainly for political reasons: the Soviet Union refused Hungary to develop its own industry. The same occurred for Bulgaria even if by the end, this country has been allowed to assemble cars on its territory. But Hungary has developed a strong supply network for domestic and COMECON markets both for cars, trucks and buses. Bulgaria, and Slovakia had no car industry of its own in spite of a very strong mechanical industry.

This contrasted situation had a certain influence on the strategy of Western automotive manufacturers, especially in the cases where previous co-operation links existed, like between FSM and Fiat in Poland, Skoda and VW in Czechoslovakia, Revoz and Renault in Slovenia. But the majority of investments realised in the region, since the beginning of the 90's has been done

¹¹ An earlier co-operation has been set up with Fiat and a Polish constructor before WWII

¹² According to French engineers from Renault who have been involved in the technology transfer, domestic plants have never been able to match the initial standard which had been set up even after years of development. In Yugoslavia, the different Republics have imported licences to assemble cars with different European carmakers (Fiat, Renault), specialising and developing some low models for home and foreign markets (Fiat-Zastrava). Up to now, after the disintegration of the former Federation, only the Slovenian car-industry has been able to adjust to the new economic environment. The Croatian car industry is recovering but the Serbian one has suffered from embargo measures with the recent war. Know-how and competence in R&D accumulated by Zastrava, the Serbian affiliate have been remarkable but the lack of markets and the economic crisis which has hit this country could have a

in the framework of an international expansion strategy, even in countries which had no assembling car plants (Hungary, Slovakia).

2.2 Post-socialist transformation and new enterprises structures

The creation of new enterprises was achieved mostly with foreign capital through the establishment of joint ventures¹³ (JV) and different type of strategic alliances (Radošević, 1998). National car manufacturers were sold directly by the State to foreign companies.¹⁴ Foreign investors usually took the majority control of those enterprises and the States kept in most cases a minority stake. Generally, governments during the privatisation of car enterprises, had the role of negotiator and tried to preserve the maximum employment level inside firms, to keep the production in the country and to rise the level of local content of added value (EBRD, 1995). Foreign investors negotiated some fiscal advantages and market protection. At first, some market protection regulations were enforced to restraint the importation of build-up cars. Those importation restrictions (taxes on imports, quotas, regulation for import of used cars) were efficient because it brought in some assembly plants in Poland, Czech Republic, Hungary. Today, this device is used to attract foreign investments in Russia,

Automotive manufacturers of CEEs and the CIS countries, lacked know-how to upgrade their product or engineering, they also lacked the necessary financial resources to modernise and to develop new units; they had not enough organisational skill to establish new networks and set up a new work organisation based on the lean production model. The former structure of R&D made of research units located outside enterprises, under the control of branch ministries, were already not appropriate to keep constant product innovation in the socialist times. These units did not have the proper links with enterprises which would have facilitated the transfer of new technologies and their potential industrial applications. Newest technologies for applied industry

devastating impact on the Yugoslavian plant in the future if economic growth doesn't resume and the Western embargo lasts..

¹³ At least five stylised models of taking over and restructuring can be drawn from the recent acquisition of domestic assets by Western multinational companies (See Annexe 1 - Figure A).

¹⁴ The VW group has directly bought Skoda in the Czech Republic and FSM in Poland was bought by Fiat. GM through its European subsidiary Opel, bought Raba, a Hungarian engine, part and truck producer, and has installed on its site a new production plant. GM is opening another production plant in Western Poland. BMW has created a plant in western Hungary to produce engines. Renault is taking stakes in Dacia in Romania.

were kept under secret for strategic military use. The biggest weakness of the socialist industry in this field, has been its incapacity to initiate and to rely on an endogenous process to adjust. This weak innovation system was radically devaluated. Some of these research units are now working as testing units and are performing some R&D tasks, but not as much fundamental as it was done before. They are not acting upstream the industry, they only contribute, through contracting, to orders from suppliers and car assemblers.

Foreign companies investing in the region are shaping a new car industry taking into account local advantages (cost, technological resources, distances) in order to fit their own strategy, both local and global ("*glocalization*" in Ruigrok and Van Tulder, 1995), that is supplying the domestic market but integrating local plants in the world strategy of the multinational. All foreign capital car firms in CEEs are ranked in the Top 100 of Eastern Europe enterprises (see table 4).

Table - 3

Ranking of Automotive Firms in Central Europe's Top 100 Enterprises
(by 1996 sales)

Rank 1996	Rank 1995	Enterprise	Country	Sales (\$ M)	Growth rate	Profit (\$ M)	Staff	Private	Foreign investor
7	9	Skoda auto	Czech Rep.	2173	34%	6.0	15.975	Yes	Yes
11	11	Fiat auto	Poland	1777	15.1%	115.5	11.505	Yes	Yes
27	28	Revoz	Slovenia	995	10.3%	n.a.	2.794	Yes	Yes
45	38	Opel Magyarorszag	Hungary	715	-4%	135.5	837	Yes	Yes
53	39	Daewoo-FSO	Poland	651	-8.1%	2.7	19.893	Yes	Yes
55	n.a.	VW	Slovakia	582	29%	6.6	1.421	Yes	Yes
88	n.a.	Daewoo Motor Polska	Poland	388	n.a.	10.4	6.936	Yes	Yes

Source: Business Central Europe, Annual Survey 1997/1998

2.3 Summary of Automotive industry in Eastern Europe

The output of CEEs countries plants has encountered a constant growth after the general slow down of 1993. Except for Tatra, Moskvitch, Dacia and AvtoVAZ (which are all state owned), production has improved in term of quantity and quality by the introduction of new models in the production line. DRI/PlanEco (table 4) forecasts a constant growth for the production in Eastern Europe meanwhile, the production in NAFTA and Western Europe is declining. Sales also have rung up a significant increase in all countries, but remain very sensitive to economic growth (see table 4). Segmentation sales vary significantly from country to country. As markets open and

incomes rise we should witness important changes in the segmentation that will begin to converge towards Western European levels. Hungary, Poland, the Czech Republic and Slovenia have segmentation patterns not too far from Western European levels. In Russia, Bulgaria, Romania and Slovakia, lower segments is oversized in relation to other categories.

Table - 3

	Global Car Production by Region (000s)										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
W. Europe	10,845.0	12,109.0	12,611.0	13,063.0	13,801.0	14,155.0	14,084.0	14,031.0	14,252.0	14,494.0	14,451.0
E. Europe	2,160.0	1,793.0	1,925.0	2,065.0	2,498.0	2,787.0	3,059.0	3,395.0	3,696.0	3,948.0	4,091.0
NAFTA	8,169.0	8,673.0	8,376.0	8,162.0	8,133.0	8,179.0	8,053.0	8,015.0	7,961.0	8,103.0	8,309.0
Asia	1,0645.0	10,222.0	10,455.0	11,097.0	11,900.0	11,112.0	11,500.0	11,578.0	11,774.0	11,866.0	12,111.0
Lat. America	1,385.0	1,587.0	1,528.0	1,728.0	2,045.0	1,926.0	2,103.0	2,307.0	2,496.0	2,686.0	2,872.0
Other	482.0	516.0	540.0	564.0	558.0	593.0	616.0	636.0	660.0	681.0	684.0
Total	33,680.0	34,900.0	35,435.0	36,679.0	38,935.0	38,752.0	39,413.0	39,961.0	40,839.0	41,777.0	42,517.0

Source: DRI World Car Forecast Report, May 1998

2.4 Links with national and international S&TS

As we stated in the first part, the automotive industry needs a very complex network organisation. As a consequence, when a manufacturer (a network leader) starts new operations in a foreign country, usually some of its suppliers follows him in the country. These enterprises set alliances, joint ventures and other type of co-operative agreements and act afterward as "network organisers" (Radosevic, 1997) while bringing and transferring most of their productive and R&D knowledge. The local sourcing helps in developing networks among domestic 2nd and 3rd tier suppliers. In order to take advantage of the lower costs on this market by finding potential suppliers, audits are done by the foreign manufacturers, usually by foreign 1st tier suppliers. These audits are made to install normalisation standards (ISO 9001, VDA 6.1, QS 9000), that foreign enterprises ask for. An audit targeting a specific normalisation, shows exactly what is needed to restructure in order to be able to produce world-class products. Thus the enterprise will be able to set up its financial needs in order to finance its investment.¹⁵ In the best case, they want

¹⁵ Then global suppliers like Lucas, Valeo, Delphi, Bosch, VDO Instrument make active searches of suppliers. Through audits, they are finding out the needs of domestic suppliers in tooling, training, founding and evaluating their R&D and management capabilities.

to find suppliers able to develop products, and in order to help them, they borrow them some tooling, give guarantee to banks if some loans are needed.

2.5 Future pattern of restructuring

As far as industrial co-operation and restructuring is concerned, two sets of countries appears. The first one, Central European countries, including the Czech Republic, Hungary, Poland, Slovenia and Slovakia. This set of countries have started their reforms earlier, attracting more FDI, are now more productive and the market structure is closer to the western pattern. They belong to the most advanced countries in transition (MAC). They are more able to engage co-operations with Western enterprises, in order to learn by co-operating on technical and managerial know-how issues. Western production networks, through those co-operations, give more responsibilities to their suppliers for quality and eventually for R&D tasks.

The second group of countries including Russia, the Former Soviet Union republics (Ukraine, Uzbekistan), Romania and Bulgaria. The main difference, is that from the beginning, there was no real privatisation done in those countries and the macro-economic environment still remain highly unstable. This has led to an unclear ownership structure and no deep restructuring has been achieved. Those countries received just few FDI, and kept a market structure a way far from Western Europe's. They can be classified in less advanced countries in transition (LAC).

The potential obstacles for the future development of the automotive industry in MAC is the uncertain strategic policy of the foreign 1st tier suppliers, in order to know if MAC are used as a temporary sourcing base before going in cheaper labour cost countries. This is especially true because of the agreement between EU and MAC to lower import taxes to 0% in 2002. The growth of living standards and incomes in CEEEs could be an advantage for sales but could be an obstacle to investment in productive plants if no higher productivity gains come to compensate the loss of labour costs advantages, are reached before the total opening of the borders.

2.6 Review of S&T policy in CEECs:

In *Poland*, the Task Force for Structural Policy set up in this country, suggests to base the R&D policies relying on the OECD countries experienced in this field. R&D units should be established within industrial holdings by transferring shares of R&D units to institutions of higher education and to industrial holdings. Other suggestions concern the creation of a Commission for special-purpose research projects, which would work with the State Scientific Research Committee (KBN). Other financial aids (tax relief on investments, public aids for exporters, credit guarantees for SMEs) should enter in the horizontal aids for SMEs.

In the *Czech Republic*, no innovation policy has been implemented, under Klaus' government period. Now the Research and Development Council of the Government of the Czech Republic is working on the adoption of industrial policies that would promote innovation in SMEs. Managers of domestic and foreign enterprises in the Czech Republic are quite pessimistic about possible help that could come from the State. Since the Velvet Revolution, the economic environment was very liberal and no work had been done to build a good environment allowing SMEs to develop.

In *Hungary*, government policies have been mainly targeted towards FDI by multinational car manufacturers in the early 1990s. It was partly due to these policies (including corporate tax exemption for the first 5 years and government help for establishing infrastructures) that Opel, Suzuki, Ford and Audi appeared as investors in Hungary between 1991 and 1993. Specific treatments for large FDI were latter abolished. Now the policy is toward general investment incentives regardless of their foreign or domestic origin. A new incentive is, however, a governmental subsidy to multinational firms which establish R & D centres in Hungary. The principle is that 25% of the cost would be supported by the government. Serious negotiations are under way in this respect with Audi (Havas, 1998).

In *Russia*, up to now, the car industry as the rest of the industry, as made few efforts to adjust even if co-operations agreement are being signed with Western manufacturers (Renault, GM, for instance). The main problem of this industry can be summarised in two points: the need to reorganise the car industry in order to upgrade the quality, introduce new brands of cars for a more sophisticated demand; it is also to the need recapitalise this industry which lacks capital to carry out its modernisation. As far as S&T is concerned, it falls under a more general analysis of

the role of an industrial policy in this country (Hare & Richet, 1997), which, up to now, is not yet the first concern of the Russian government (nor of the Ukrainian one).

In transforming economies, S&T policies could concentrate on several points: the training of qualified technicians and engineers the supply of technological knowledge to suppliers, often SMEs, of car assemblers in order to fill up the asymmetric gap affecting these small units. These companies are, up to now, under the minimal efficiency size; it is quiet difficult for them to have access to technologies allowing them to increase the quality of their production and so to compete more effectively as they generally lack financial resources to cope with the necessary investments required. In Russia, the barter system makes things worse as companies have to enter specific networks in which goods are exchanged against goods.

Interviewed managers of global firms located in MAC¹⁶, feel that some infrastructure works by governments are strongly needed, especially in the Czech Republic. First, SMEs are isolated because there are no efficient institutions that could help information to circulate. There are no technical training seminars, where new applied research techniques could be disclosed and transfered. No shared financing of research projects (like in Western countries) are set up to beneficiate SMEs. Car industries, in these countries, have not enough sales representation abroad. There quite a difference between the S&T policies on paper and the reality of small enterprises. Only the Hungarian policy seems to have had a tangible result. Russian and Polish policies remains a wishful intention.

While the production networks are developing and new investments are going in CEEEs countries, government have remained less interventionist.¹⁷ A strict application of regulations against the import of used Western cars, which do not match the minimal environmental regulations, would be better. Those used vehicles are taking market shares on the most competitive segment of CEE car manufacturers.

¹⁶ See list of visited enterprises, Annexe 3.

¹⁷ The Co-operation Agreements between EU and CEE countries set up a schedule to lower to 0% in 2002 the restrictions and taxes on built-up car imports. More and more disputes are happening between CEEEs countries and EU because of the non-respect of import tariffs due to the pressure of some foreign investors. A famous example is the importation of already build-up Korean cars, disassembled in Slovenia, shipped to Poland and re-exported in the EU by Daewoo. This Korean firm was avoiding the Polish and the European import duty this way.

3 Case Studies: The restructuring of Russia and the Czech Republic

These two case studies illustrate the difference between LAC and MAC, in terms of economic environment, enterprises restructuring and growth potential.

3.1- The Czech Republic:

The Czech Republic has attracted an important amount of the FDI inflows in CEEs shortly after the Velvet Revolution, 6 billion \$, in 1996 since 1989 (CzechInvest, 1998). The automotive industry, which has a century of history in this country, benefited of one quarter of all foreign investments.

3.1.1- The privatisation of Skoda a.a.s.: The integration in the VW international network.

The restructuring of the automotive industry in the Czech Republic started with the setting up of the joint venture between VW and Skoda after the Czech government decided to disassemble the KAP motor branch in the early 80's, resulting in distinct companies: Liaz, Tatra, Avia, Karosa, Jawa and AZNP (Skoda). Skoda a.a.s. was created by the Volkswagen joint venture in 1991.¹⁸ Volkswagen holds 70% of the shares and the Czech Agency for Property holds 30%. VW took over the very specific car production plant and left the previous Skoda's suppliers which were integrated in the AZNP, but has kept business links with them.

The first effect of this joint venture is that VW's suppliers began to be involved with this new venture. Domestic suppliers have been forced to co-operate, often to merge with foreign suppliers - also forced to locate in the Czech Republic near the assembly line, in order to lower cost through economies of scale, to upward quality, delivery standards required by the new owner.

¹⁸ The initial investment project was DM9.5m (\$6.27m) with a production capacity of 390.000 units, even though the investment was reduced and kept at DM3.7m (\$2.44m) until the year 2000.

This was an opportunity for these companies to upgrade their efficiency and the quality of their production, and also, to joint the global VW sourcing network.¹⁹

3.1.2- Market segments analysis and network restructuring:

Sales and production are in constant growth and are predicted to stabilised at a very high level around year 2001 (see tables 5 and 6).

Downwards competition axis: Sales in the Czech Republic are concentrated on two segments: the average-low segment: small and functional low-priced cars and the average-high segment, with a lower price than its Western competitors on this segment. The most important characteristic of this market for Skoda is to have a functional and robust car with the lowest price as possible. With the opening of borders, almost all European car companies are selling on the Czech market. Opel, Fiat and Ford are the main competitors of Skoda/VW, they compete by buying market shares sometimes at discounted prices.

Upwards competition axis: In the Czech Republic, competition on human resources is developed because there is not much labour mobility and not enough good young technicians. So Skoda has to pay its workers more than the average salary and had to hire some guest workers from Poland. The new channel of technology transfer is now, in most cases, based on co-operation with foreign companies. Audits to obtain quality certifications which is a necessary conditions to develop business relations with Skoda and VW, is often the first step of a technical co-operation. Within a co-operation with a foreign company, domestic suppliers could benefit of investments in machinery and know how. With the current over-capacity, about only 10% of the companies

Table - 5

Car Production by Model in the Czech Republic (000s):										
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2008
Favorit/For man	3.805	0	0	0	0	0	0	0	0	0
Felicia	189.333	238.958	296.715	290.000	260.000	0	0	0	0	0
Felicia B	0	0	0	0	45.000	320.000	320.000	330.000	320.000	330.000
Octavia	0	1.168	60.690	110.000	125.000	130.000	120.000	110.000	130.000	160.000
Model W8	0	0	0	0	0	10000	60000	60000	50000	60000
Total Skoda	193.138	240.126	357.405	400.000	430.000	460.000	500.000	500.000	500.000	550.000

¹⁹ To save on logistical costs, six suppliers (including Rockwell, Gumotex, Siemens/Sommer Alibert and Johnson Controls) are now fully integrated and are producing on Skoda's site in Mlada Bolelav.

%Chg	26.8%	24.3%	48.8%	11.9%	7.5%	7.0%	8.7%	0.0%	0.0%	4.8%
Tatra	48	70	23	10	10	10	10	10	10	10
Total	193.186	240.196	357.428	400.010	430.010	460.010	500.010	500.010	500.010	550.010
%Chg	26.8%	24.3%	48.8%	11.9%	7.5%	7.0%	8.7%	0.0%	0.0%	

Source: Standard&Poor's DRI/PlanEcon, April 1998

Table - 6

	Domestic Car Sales in the Czech Republic (000s):									
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2008
Skoda	67.598	82.734	96.680	94.733	101.06	116.50	125.08	126.36	131.21	117.00
%market share	60.3%	53.4%	55.8%	52.3%	52.3%	54.2%	53.1%	53.5%	53.5%	42.7%
Tatra	50	69	23	10	10	10	10	10	10	10
Other	46	21	10	10	10	10	10	10	10	10
Total	67.694	82.824	96.713	94.753	101.08	116.52	125.10	126.38	131.23	117.02
%share	29.6%	28.4%	31.3%	37.8%	41.6%	46.6%	49.5%	50.9%	51.4%	42.4%
New regs					8	0	3	6	2	0
%chg.	15.1%	22.4%	16.8%	-2.0%	6.7%	15.3%	7.4%	1.0%	3.8%	

Source: Standard&Poor's DRI/PlanEcon, April 1998

will survive, because the component industry is getting more and more global, and main 1st tier suppliers are becoming bigger. Skoda has founded a design centre which works in co-operation with some Czech technical schools. The whole Skoda R&D Department has 800 employees.²⁰

3.1.3 - How can domestic suppliers benefit from foreign network: The Case of PAL Praha a.s.

PAL Praha a.s. has resulted from the privatisation of PAL a.s. company which has integrated fifteen other suppliers. The privatisation has been achieved in 1995. During the transformation process, PAL Praha has been integrated in the PAL a.s. company and has started to adjust the market economy environment. At first PAL Praha had a joint venture with VDO Instrument

²⁰ The Prague Technical School makes research contracts for companies. The UVMV, a private research institute, is conducting researches and doing testing. As there is still an important problem concerning the lack of communication between Czech enterprises, networking is still poor as the level of innovation. In order to promote efficient innovation programs among Czech enterprises, the Research & Development Council of the Czech Government has decided to set a Centre of Excellence Program. To integrate this program, enterprises have to submit a co-operative research program, together with a research centre and an institutional scientific centre (for example,

(VDO-Frankfurt) and produced under licences. Since August 1996, the capital is 100% Czech and the co-operation with VDO in finish.

A set of restructuring measures has been implemented: restructuring of their production process and management by adopting the management structure of the ISO 9001; rationalisation program concerning employees. Only 50% of the total amount of labour force is remaining, compared to the level of 1989.

The turnover is increasing year after year and exports too. The company exports to North America and Western Europe 68% of its production²¹. It is expanding abroad, always with a majority of Czech capital. They are the first Czech system supplier for the whole VW group.²²

With foreign licence they upgraded their production quality, keeping on investing in product development. They have up-graded their equipment (tooling machines, computer equipment, with software of computer assisted design (CAD). Eighty employees work in the R&D centre. 40% of those employees are technicians with high educated background. They had developed some co-operation with technical universities as Brno Technical University. They hire some professors and researchers (freelance) as external employees for consulting.

3.1.4- Potential role of S&T policy

Problems that arise from the current situation in the Czech Republic are the following:

- shortage on the labour market: there are not enough good technicians and not enough workers to sustain the demand of the industry.
- no efficient structure (i-e. technological forum) that gives the possibility for enterprises to exchange information on new technologies development.

one of the centres of the Academy of science). Some projects will be financed, partly by the Czech government and partly by the PHARE program.]

²¹ PAL Praha has foreign representations in 5 different countries: Bielorusia, Germany, Great Britain, Canada, Spain.

²² To be able to set business with international partners they need quality certifications. Now they have ISO 9001, QS 9000, Rate A- VW, and soon ISO 9000 and ISO14000.

- for local suppliers, there are still governance problems inherited from the vouchers privatisation, overstaffing, need of technicians, shortage of financial devices to invest in order to reach a certain degree of quality and increase productivity.

Some domestic companies have been able to adjust. On the other hand, due to weak corporate governance or to inflexible behaviour, some companies have shut down or have had their production task downgraded by Skoda, passing from design and production to assembling parts.

The important gap between enterprises that had close co-operations with foreign firms and the other that remains on the old markets, shows that a S&T-policy is strongly needed if they want the spill over effect to be efficient. There is no innovation policy in the Czech Republic t presently. The only link between enterprises and the S&T system is the Centre of Excellence program managed by the Research and Development Council of the Government of the Czech Republic.²³

All other links that exist between S&TS and enterprises are based on individual initiatives. Universities seem to be the research organ the most effective in applied research. The current University chart gives the opportunity for Technical Schools Departments (Prague Technical School has one Department on the Automotive Industry) to develop co-operations with industrial corporations and to keep the profits to reinvest it in different laboratory devices.

3.2 Russia

3.2.1 Point of departure: Mass privatisations scheme after the collapse of the USSR

The car industry in the USSR was a vital part of the military-industrial complex and by its huge production was a symbol of the power of communist industrial planification. Every car and truck producer was attached to a branch ministry and they had to produce the number of units, planned

²³ This agency is working on the design and setting up of an innovation policy for the Czech industry. The Centre of Excellence Program is concerned with the founding of a co-operative research between enterprises, universities and the Academy of sciences. It could be in some ways useful, but it appears to remain too theoretical and each program is not yet co-ordinated with the others. This program is entering this year into its second version that will be more directed towards the industry than was the first one.

without having to sell it. Only the quantity of output mattered. After the collapse of the USSR in 1991, the Russian car industry remained one of the industrial champions of the Russian economy although it lost its traditional CIS countries' markets. Under the shock therapy prescriptions, the mass privatisation plan was launched.

Contrary to the economic choices made by Hungarian, Czech and Polish governments, no privatisation, at least in some strategic sectors, was done with the help of foreign capital. Mass privatisations have led to the ownership concentration between the hands of former managers, employees collectives and in the Government's hands up to the round of privatisation. Economic instability and uncertain legislative environment did not help to favour a real privatisation programme. Three major car firms, AvtoVAZ, Moskvitch and UAZ are still under the Russian State or regional administrations control and GAZ is held under employees collective control. Common features to all manufacturers in Russia have slowed the restructuration process in this country:

- Accumulated debts and soft monetary constraint have stimulated the barter trade: Keeping inertia in their economic behaviour, car manufacturers still haven't yet adjusted to the new environment. The management restructuring has not yet taken place in the organisational structure of these enterprises. Debts have accumulated in all companies, partially soaked up by the State many times, by bankruptcy suits rejected because of the State interventions or by high inflation rates.

- Overstaffing and the ownership of social structures : The number of employees is still very high in comparison to Western standards, and in most of car enterprises, no diminution of employment after the privatisation has taken place. Finally these enterprises have not changed their work organisation.

- Inefficient governance and management structures: It is hard to see a clear strategic pattern in the Russian car enterprises behaviour, even though all declarations on restructuring programmes by directors or government representatives. Politicians always try to protect employment and to maintain their control enterprises. This behaviour is nevertheless harmful to the stability of the management for long term successes.

Without any achieved privatisation programme, leading to a new governance system and a clear division between ownership and control, it is difficult to see how some parts of the former industrial structure in this sector could be efficiently integrated into the new international production network.

3.2.2 Russian car producers and market analysis

Overall exportations of Russian car producers declined by 50% since 1995, and are forecasted to decline (DRI/PlanEco, 1998 and EIU, 1998) due to the forced reorientation strategy of AvtoVAZ to sell on its domestic market instead of exportating because the fact that some models do not fit western regulations concerning the emission level and the security. Russian domestic car manufacturers dominate the domestic car market with 88% of total new car production in 1997 (see table 7). Parallel imports are very frequent but this grey market is not taken in consideration in statistics. Sales on market segments in Russia are more concentrated on the low and lower-medium segments on which the main competition axes are prices. There is a growing demand of cars for the emerging middle class but domestic enterprises cannot fill up this segment.

3.2.3 The role of existing networks on restructuring and innovation:

The Russian automotive enterprises belong to the Survival network type (Huber and Wörgötter, 1998), which is involved in a process of "rent-extraction" in order to keep their power in the enterprise and over regional politics. Car enterprises concentration over different regions like Togliatti for AvtoVAZ, Nizhny Novgorod for GAZ, Samara, or even Moscow's industrial suburbs and their control on the labour market and in extension to the rest of the economics of these regions, give those enterprises a very important bargaining power with regional authorities. No structures of communication seem to be created, like Associations of entrepreneurs, local Chamber of Commerce, local business press, and enterprises remain isolated from each other and from the rest of the country's industry because of their closed regional networks.

Table - 7

	Production by manufacturers in Russia									
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2008
AvtoVAZ	609213	680965	741207	729436	757293	755434	767000	789100	786000	815000

AZLK/Moskvitch	40.600	2930	20607	21500	7500	0	0	0	0	0
Daewoo	0	4062	13225	18800	22900	28725	40200	50300	49000	63000
GAZ	118673	124284	124339	127000	129540	132000	110000	115000	117000	12900
IzhMASH	12774	9149	5544	3000	0	0	0	0	0	0
UAZ	44.880	33.701	51411	45000	55000	65000	65000	65000	70000	80000
YelAZ/GM	0	19	1100	8000	22500	59500	88000	99200	110000	206000
KamAZ/SeAZ	12.139	12606	26799	40000	42500	47500	57500	67500	80000	105000
Kia	0	0	1000	5000	10000	15000	20000	25000	28000	35000
Skoda	0	0	0	0	0	2000	9000	16000	23000	75500
Fiat	0	0	0	350	15000	40000	60000	85000	125000	190000
Ford	0	0	0	0	0	2500	7500	22500	28000	115000
Renault	0	0	0	1100	4000	10000	18000	27000	41000	134000
Other	0	0	0	0	5000	10000	20000	30000	40000	513000
Total	838.279	867.716	985.232	999.186	1.071.233	1.168.000	1.262.000	1.391000	149000	200000
% change	5.1	3.5	13.5	1.3	6.3	6.7	7.0	10.2	7.3	

Source: Standard & Poor's DRI/PlanEco, East European Automotive Industry Forecast Update, April 1998

3.2.4 GAZ - The restructuring of production in the turmoil of a weak governance structure

GAZ (Gorky Avtomobila Zavod)²⁴ is the second largest car producer in Russia and has the title of most successful Russian car company. Even if this company released 111m\$ of profits in 1997, it remains among the 20 largest tax debtors of the country, owing 492.4bn rubbles in 1996 to the Russian government and to the Nizhny Novgorov regional government. Production has been stabilised for the last 2 years at the level of 127.000 cars (see table 7). The company is working at full capacities. GAZ do not export any of its models outside of CIS countries

²⁴ GAZ was founded in 1930 with the help of Ford Motor Corporation. It was privatised in February 1993 through the mass privatisation method.

The ownership is held for the major part by a collective of employees (73.36%) after comes institutions shareholder the Avtobank (10.12%), GAZinvest (8.5%) and Menatep bank (8.02%). This enterprise has 89 000 employees (106.000 in 1995) and produces 13% of the domestic cars and light trucks output. 20000 employees used to work in social infrastructures in 1995. 33000 employees were producing components in 1995. It owns 1000 apartment blocs (Buck, 1996). The main plant is situated in the city of Nizhny Novgorov (formerly Gorky), and other plants are located in the region.

The enterprise structure doesn't have a really efficient governance system. It is a typical surviving network from the ancient system. Buck and al. (1996) mention that GAZ management and employees have interest in securing their jobs.²⁵

GAZ appears to be the most sensitive Russian car manufacturer to product development. The Volga model has been upgraded without losing any production volume (DRI/PlanEco, 1998). Now GAZ is in the process of replacing the Volga with a new car by the end of 1999. This project will be financed partly by the EBRD.

To conclude, we can say that the main talent of GAZ was to have been able to attract financing from diversified sources without doing any structural restructuring.²⁶ Because of the power of employees in the control of the firm, it will be difficult to restructure the work organisation and to reduce costs linked to the level of overstaffing. Even through this inefficient governance, the company was able to respond quickly to market demand with the production of the Gazelle and, to some extent, co-operate with foreign enterprises; GAZ builds engines, under a production licence of the Austrian Steyr-Daimler-Puch. The JV with Fiat could be an opportunity to gain some technical knowledge and with the production of Fiat badged car, to earn more profits and to get free from the barter trade.²⁷

3.2.5 Prospects for setting a S&T policy

In February 1998, the Russian Government adopted an investment promotion policy for the automotive sector, trying to stimulate the local component manufacturers' demand. The Russian market remains very protective with three different types of taxes²⁸ which increase the selling price of imported models. The OECD (1994) proposal for a Science, Technology and Innovation

²⁵ This attitude is reflected in the inner-rule regarding the transfer and sell of shares. There is a limited internal possibility to transfer shares. This is not a real privatisation, as the possibility to transfer shares is not granted to owners. (Buck, 1996). Outside investors owned only 26% of the shares.

²⁶ The EBRD allowed two loans, one of 20m\$, 65m\$, a loan of 15m\$ is expected from the Avtobank and the Russian government has granted GAZ for a five years tax credit

²⁷ The project of a joint venture with Fiat. Fiat and GAZ will hold both 40 % of the shares, and the remaining part will be held by the EBRD. GAZ will assemble 2000 Fiat models a year, from kits, and a new facility will be build in 1999. The JV wishes to attract European and American component manufacturers.

²⁸ the Customs duty 30%, Value Added Tax 20% and 5% Excise Tax

Policy for encouraging communication between research institutes and enterprises and to finance co-ordination bodies to do so, still had no effect.

The effects of foreign investments on Russian car enterprises (manufacturers and suppliers) through a co-operation with foreign enterprises could be salutary downstream and upstream with suppliers and for marketing . Foreign enterprises could be a stimulant for research with a potential demand for research institutes by creating links. And last but not least, a very needed capital investment will be brought by these foreign enterprises.

3.2.6 Barriers to restructuring and prospect for S&T policies

Political willingness and commitment of the Russian government is a real issue as it has to exercise its corporate governance on management, on the one hand, and as a State institution, to build up a better economic and industrial environment. Restructuring of car enterprises, undertaken to match profitability rapidly, will have negative and damaging effects on employment on a regional scale. But there is no alternative ways for them to face world competition. Up to now, maintaining employment seems the main goal of management and local supervisors. In 1998 summer financial crisis in Russia will probably slow the pace of inflow of foreign direct investment in the country. Stabilisation policies will be favoured and their microeconomic impact will be delayed.

4- Perspectives and conclusions:

In this chapter, we have focused on the transformation of the car industry in transition economies. This transformation process is taking place while the world car industry is restructuring and expanding into the global economy through direct investment, strategic alliances, and mergers. FDI conducted by Western companies plays an important role and are a substitute (generally more efficient) than national industrial policies conducted by government which are lacking competence and money in this field (Hare and Richet, 1997).

- Conclusive remarks:

The current situation shows a two speeds course in CEEEs countries:

- In Central Europe, during the privatisation, enterprises were disintegrated by selling the units separately to suppliers and concentrating on core business. CEEEs' car enterprises are still more integrated than the western's ones, because they cannot yet rely on the market to supply everything.
- CIS countries, despite the production growth, are stuck with long term heavy problems to solve. The ownership structure of the four main Russian firms and the weak financial system cannot allow efficient corporate governance to take place. These enterprises are still highly vertically integrated and are making business in an incomplete monetary economy. The level of employment didn't change very much since the privatisation took place, and manufacturers still produce almost all components. Some strategic alliances with Western car manufacturers should help at restructure and develop new products.

Even if almost each CEEEs have lost its national champions - with the major exception of Russia - , the example of the UK car industry shows that a car industry dominated by foreign owners (99% of output is made by foreign companies) can be a growing sector with the existence of a very competitive environment and the lead of the Japanese transplants companies able to transfer their industrial ²⁹.

- Filling the gap: the role of public policies

The S&T system in CEEEs countries has a particular nature compared to dominant models in Western market economies (Freeman, 1987, Nelson, 1993). If the scientific level of education

²⁹ Today car production in the UK has overcome Italy and the sector is competing with Spain to become the third carmaker in Europe. British managers (in co-operation with suppliers) have been able to develop their skill in the new greenfield plants and to draw from and apply some essential lessons from the Japanese experience:

- develop an export-led strategy: 3/4 of the production is exported,
- consistent quality,
- improving cost base,
- ability to transfer *kaizen* to suppliers by sending teams of quality and manufacturing experts in suppliers' plants,

and research has been high, the technology dimension of these policies is more disputable as in this kind of system, there were few, if not at all, incentive for firms to develop new product, to innovate. This has been the main failure of the socialist system, and probably, one of the main reasons explaining its collapse because to its intrinsic inability to answer to the complexity of the industrial organisation.

In the automotive sector, innovation mainly comes from in-house and co-operative researches with related enterprises; it relies also on the supply of education services.

One of the most important tasks of a technological policy could only be concentrated on two points:

- helping firms, especially SMEs to have access to information about processes, innovations, markets, in order to reduce the asymmetry between big enterprises and subcontractors at least for new entrants.
- look at and up date the curriculum of technical schools supplying the qualified workforce.

Up to now, with differences, the car industry in CEEEs, has been integrated into major world car manufacturers networks either to supply the global market, either to develop new markets opportunities in CEEEs economies. For some carmakers, Daewoo, for instance, this strategy is also a spring board to conquer other markets in the region. The first mover strategy, in some countries, as in Poland, has attracted followers which are trying to take market shares either through direct investment, merger or through selling strategies (establishing retail networks).

In concentrating on core businesses, as in the West, car makers have given room to the expansion of sub-contracting units; they also have set new standards for quality, for delivery, and also for efficiency: sub-contractors have been obliged or are obliged to develop their business in order to match the minimum efficiency size to supply assembly lines.

S&T policies towards the car industry are at a crossroads for different reasons. First, in the new political environment, there is no real thought on what should be a S&T policy as most

government have followed more or less liberal policies on the one hand and lack of financial resources to implement such policies. Secondly, the former S&T system is almost worn at now.

Nevertheless S&T policies generally take place upstream (level of national R&D expenses, higher education system and, more generally, human capital policies). The real problem, in this sector, as long as governments don't focus on a strategy of developing 'national champions', S&T policies have to concentrate on how to help small and medium size enterprises working for this sector to be able to get access and to appropriate the technology they need to answer the demand from car assemblers. It is on these segments of the production that domestic companies should concentrate as the main business is between the hands of foreign carmakers. The situation is quite different in Russia where the unbundling of big car companies is not yet on the agenda. In house technology should still remain important even if some spin off could take place in the near future. The future of the car industry in CEEEs and in Russia, fundamentally, is linked to the macro-stabilisation and to economic growth: more income to distribute to the population will stimulate the demand for cars.

Annexe 1 -

Figure A - Motives for investing in CEEEs

Domestic Market Access	VW in the Czech Republic with limited room left to other car makers: Daewoo which has absorbed Avia and Hyundai which has launched a joint-venture with Skoda-Plzen. Exporters (Renault, Citroen) are buying market shares. Control of a narrow market, Suzuki in Hungary, Daewoo in Romania
Regional Market Access	Different car makers in Poland: supply of a large and growing local demand: Fiat, GM, Daewoo, WV-Skoda VW-Skoda, from the Czech Republic to Poland (mainly to bypass heavy import duties), to Belarus, Russia. VW in Slovakia to assemble cars for the local and regional markets (Hungary, Austria, Ukraine) GM-Opel in Hungary (mainly Western markets) Daewoo, building a regional base with investments in Romania, Poland, Ukraine, Hungary, the Czech Republic
Global Market Access	Audi in Hungary, VW-Skoda in the Czech Republic, Fiat in Poland, Renault in Slovenia (after the collapse of Former Yugoslavia) produce, assemble and re-export
Building up an European base	Daewoo in Romania and in Poland as a way to take a stake in Europe; other Asian car makers (Japan) have already an industrial base in Europe
Cost, technology and Human resources	All countries, especially in the Northern part (Hungary, the Czech Republic, Slovakia, Poland)

Annexe 2 -

Figure B - Car producers by Regions and Strategic Alliances worldwide

<i>Producers by Regions:</i>	<i>Strategic Alliances lines³⁰:</i>
<p>NAFTA</p> <p>GM Ford Chrysler</p>	<p>The "GM line":</p> <p>GM (including Chevrolet, Oldsmobile, Buick, Pontiac etc.); Toyota (and its subsidiary Daihatsu), Suzuki, Isuzu (35% owned by GM); Daewoo (50% owned by GM before 1992); Opel and Vauxhall (100% GM subsidiaries), SAAB (50% owned by GM),</p>
<p>European Union</p> <p>VW Fiat PSA Renault BMW-Rover Volvo Mercedes-Benz GM-Opel Ford-Europe Saab Jaguar</p>	<p>The "Ford line":</p> <p>Ford (including Lincoln, Mercury etc.); Mazda; Kia; Volkswagen-Audi-SEAT-Skoda, Fiat-Lancia-Alfa Romeo, Renault-Peugeot-Citroen, BMW (directly linked to Ford), Rover (partially owned by BMW), Jaguar (owned by Ford).</p>
<p>Asia</p> <p>Honda Toyota Mitsubishi Daewoo Hyunday Kia Suzuki Mazda</p>	<p>The "Chrysler line":</p> <p>Chrysler (including Jeep, Dodge, Plymouth, Neon etc.); Mitsubishi; Hyundai (through Mitsubishi); Volvo (joint R&D and production with Mitsubishi in the Netherlands); Daimler-Benz</p>

³⁰ Török (1997)

Annexe 3-

List of visited enterprises and institutions

Poland		Czech Republic	
<i>Enterprises</i>		<i>Enterprises</i>	
Daewoo-FSO Motor Spolka Z o.o.	Car manufacturer	Avia, a.s.	Truck manufacturer
Zasada Group	Car assembling, Car business holding	automobilova a.s.	Car Manufacturer
Valeo	Component supplier	a.s.	Component supplier
Thermique Moteur		Autobrzdy spol. s.r.o.	Component supplier
Volkswagen Poznan	Car assembling	Tatra a.s	Car and truck manufacturer
Pol-Mot Holding S.A.	Holding group in car related business	spol, sr.o.	Custom car manufacturer
Fomar Roulunds SA	Component supplier	PAL Praha a.s.	Component supplier
Delphi Automotive	Component supplier	Gumokov a.s.	Component supplier
		Motor Jikov a.s.	Component supplier
		CZ Strakonice a.s.	Component supplier
		Karsit s.r.o.	Component supplier
		Avia Karoseria Brno a.s.	Truck component supplier
		Temac a.s.	Component supplier
		Peguform Bohemia a.s.	Component supplier
Pimot	Research and testing institute	UVMV s.r.o.	Research and testing institute
		Motor Vehicle Research Institute Ltd.	
<i>Institutions</i>		<i>Institutions</i>	
Ministry of Economy Dept of Industrial Policy		AIE CR - Association of Innovation Entrepreneurship CR	
KBN - State Committee for Scientific Research Dept of Int'l Co-operation and European Integration		Czech Technical University in Prague Faculty of Mechanical Engineering	
Technology Agency Proinnovation Program's Policy and Implementation Department		Automotive Industry Association	
		Research and Development Council on the Government of the Czech Republic	

Annexe - 4

	R&D Score 1994 - 1996								
	1997 R&D Spending	% chg	Sales	R&D % Sales	Cost of fund (COF)	R&D as % COF	1996 £000	1995 £000	1994 £000
Engineering, vehicules	23,303,024	4	560,135	4.2	14,456,546	161.2	22,462,018	19,023,319	16,716,249
General Motors, USA	4,983,591	-8	101158	4.9	4699769	106	5409019	5097788	4276042
Ford Motor, USA	3,845,266	-7	93368	4.1	1706576	225.3	4145497	3955877	3168834
Toyota Motor, Japan	2,106,995	16	57232	3.7	546862	385.2	1818292	-----	-----
Daimler-Benz, Germany	1,914,146	2	41930	4.6	519858	368.2	1885753	1791448	1757647
Volkswagen, Germany	1487240	10	38278	3.9	1100220	135.2	1352037	1149231	946426
Honda Motor, Japan	1173841	14	24741	4.7	192365	610.2	1031018	948896	882573
Chrysler, USA	1033183	6	34634	3	1265954	81.6	972408	863012	791905
Renault, France	913068	-1	21004	4.3	353114	258.6	921857	798505	778603
Fiat, Italy	751445	5	26626	2.8	830818	90.4	718101	662757	772071
Denso, Japan	710153	16	7596	9.3	73891	961.1	611395	556239	521649
Volvo, Sweden	663261	5	14065	4.7	379619	174.7	633541	558322	352656
Peugeot, France	615548	3	17444	3.5	322103	191.1	597363	593625	692630
TRW, USA	613225	81	6583	9.3	138568	442.5	337912	256473	250395
Caterpillar, USA	320895	29	11502	2.8	348851	92	249180	227908	189012
Eaton, USA	245533	51	4596	5.3	132491	185.3	162271	137960	129452
AlliedSignal, USA	212106	1	8795	2.4	298408	71.1	209675	214537	193266
Valeo, France	207203	18	3432	6	27075	765.3	174976	152043	133657
Yamaha Motor, Japan	203233	18	3978	5.1	76761	264.8	172270	167339	-----
MAN, Germany	197735	2	7218	2.7	120683	163.8	193679	181511	189285
LucasVarity, UK	159000	49	4681	3.4	127000	125.2	106800	108400	105700
Fuji Heavy Industries, Japan	158505	47	5717	2.8	71311	222.3	107929	86965	92724
Cummins Engine, USA	158016	11	3419	4.6	43151	366.2	142822	139784	144463
Northrop Grumman, USA	154978	55	4905	3.2	215753	71.8	99672	73538	589521
Textron, USA	134922	20	6408	2.1	541510	24.9	112435	110004	113650
Hyundai Motor, South Korea	125206	33	4120	3	42435	295.1	93834	-----	-----
Pirelli, Italy	122033	13	3872	3.2	142403	85.7	108282	104157	98657
GKN, UK	93000	-1	2834	3.3	139000	66.9	94000	87000	76000

Source: Financial Time, June 25, 1998.

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