

Fiat Group Automobiles – An Arabian Phoenix in the International Auto Industry

Giuseppe Volpato – Università Ca' Foscari Venezia

1. Crises and reorganizations in the evolution of Fiat Auto

Fiat Group Automobiles¹, the group that controls automotive manufacturing activities within Gruppo Fiat SpA, has gone through many crises in more than a century of existence. The crisis that arose dramatically in 2002, albeit rooted in the previous decade, presents however some peculiar aspects. On the one hand it was certainly the most serious ever, since only the support by other Fiat group businesses and a team of banks have avoided that the “virtual bankruptcy” of Fiat Automobiles turned into an actual one. On the other hand, however, the crisis has been followed by a recovery that has astonished scholars and observers for the speed and character of the turnaround. We could define such recovery a “rebirth” from the ashes like the Arabian Phoenix, given the many elements of novelty and change from the past, that the management of Sergio Marchionne, CEO of Fiat Group, has achieved since 2004. To describe and to interpret the new strategic trajectory requires, considering its peculiarities, to outline the situation facing Fiat Automobiles in 2004, after a long stage of managerial and competitive involution².

In the second half of the 1980s Fiat Auto reached the end of the decade with brilliant results: both in terms of market performance, with a market share in 1989 equal to 12.30% in Western Europe and 57.18% in Italy, and in terms of profits that in 1989 totaled 28,424 billion lire, equal to € 14,679 million, corresponding to a Return On Sales (ROS) of 8.3%.

But the end of the 1980s also marked the exit of Fiat Auto CEO, Vittorio Ghidella, due to disagreements with Fiat Group CEO, Cesare Romiti. The wish of the latter not to name the new CEO of the auto group from among Ghidella's collaborators induced him to lead the group *ad interim*, without having the technical competences or the necessary commitment³. So a stage of slow renovation in models and process technologies began, just when both nationally and internationally new

¹ Fiat Auto, division of Fiat Group, in charge of Automobile activities with the brands: Fiat, Alfa Romeo, Lancia, Maserati, Abarth and Fiat Professional (Light Commercial Vehicles), became Fiat Group Automobiles February 1st, 2007. In general we use the name “Fiat Automobiles” even for time before the change or simply Fiat.

² In the years of strong economic development following World War II Fiat had undergone a stage featuring typical elements of the fordist model. For a description of the conceptual structure of this model see: Boyer and Freyssenet (2000). On the economic and industrial history of Fiat there is a large bibliography. Among the contributions we single out: Castronovo (1999), Camuffo and Volpato (1998), Volpato (2003, 2004). For a more comprehensive view of the recent evolution and its reorganization see: Volpato (2008).

³ A very interesting analysis, made by an insider, to understand the power struggles that took place in the management of Gruppo Fiat over those years can be found in Garuzzo (2006).

conditions were maturing. Conditions that would push Fiat Automobiles to a significant redefinition of its own strategies and of its positioning in the global competitive landscape.

2. The elements of change in the competitive scenario from 1990

In order to highlight the challenge involved in maintaining the competitiveness level that Fiat Auto achieved in the late 1980s throughout the following decade, it is important to underline that there were profound transformations both in domestic and international automotive demand, and in the reorganization of supply where pressures by Japanese manufacturers were growing stronger, and there were hints of future competitive aggressiveness by Korean brands. Among the elements of this new scenario the following should be mentioned.

a. The change in the Italian domestic demand: the big parachute that eased Fiat Automobiles' life in the alternating sequence of crisis and expansion is represented by domestic demand where the brands controlled by Fiat operated in a quasi-monopolistic position and, even 18 years after the Common European Market, it still had a market share over 60%. However it was easy to grasp the signs that such landscape was going to change. In fact, thanks to the growth in motorization that in Italy had reached particularly high levels after the mid-1980s, Italian automotive demand was gradually moving towards a "preference for variety" that led to grow the share of cars in niches where Fiat was hardly present.

b. The downward expansion of product lines both for volume and for specialist automakers. With the transition in all major markets of developed countries from the stage of first purchase to replacement demand, and the growth in multi-motorization⁴, a wide process of gradual segmentation of the market began, into smaller and smaller portions and niches, with the need to develop targeted offers for specific consumer clusters⁵. Volume automakers had begun to pay more attention to smaller car segments, previously believed to be less important⁶, since the second car purchased by a same family was often a city-car model. Such evolution also had a significant impact on the room for maneuvering for Fiat Auto that, pushed by a fiscal policy that penalised large engines⁷ had historically developed by focusing on smaller segments.

c. The emergence of Korean automakers in Europe. The manufacturing growth achieved in the 1980s by Korean brands was a clear signal of their interest to enter

⁴ Presence of two or more cars within the same family.

⁵ A good example of such policy is represented by Renault's choice in 1996 to manufacture 5 variants of the Mégane model on a single platform.

⁶ Among the most significant cases of such "trading-down" towards lower segments where Fiat was particularly present there are: the launch of Ford Fiesta in 1976, followed by Ka in 1996; the launch of Citroën Ax in 1986, the launch of Opel Corsa in 1982, the launch of Renault Twingo and Nissan Micra in 1992, and Volkswagen Lupo in 1998.

⁷ This type of politics, that sees car purchasing as a sign of wealth to be heavily taxed, arose since the dawn of the automotive industry, when probably it had a meaning, but then it survived indefinitely, both during fascism, and in the present stage. Hence came a preference of Italians for smaller cars, less affected by the fiscal regime. Volpato (1999).

the Triad markets. This clearly was true also for Italy, with the issue however that these new competitors would have started their race with models lying at the lower end of their range, that is segments that were in more direct competition with Fiat Automobiles' range, and they seemed oriented to practise quite aggressive price policies. The Korean company that played the role of forerunner in Italy was Hyundai that started imports in 1982. In 1993 Kia followed, then in 1994 Daewoo.

3. Fiat Automobiles' priority objectives for the 1990s

Already in the late 1980s it was evident that a stage of growing competition in Europe was emerging, mainly for brands operating in the lower end of the range, such as Fiat Automobiles, that luckily could rely on a particularly favorable end-of-decade, but that nonetheless had to carry out profound transformations if it was to maintain its chances for success⁸. In particular the necessary objectives were the following.

a. More balanced sales mix in the different markets. At the end of the 1980s the geographical distribution of Fiat sales was too dependent on the domestic and Western European markets, mainly after the exit from the US market in 1982. It was then necessary to adopt a new and strong policy of internationalization aimed at Newly Industrialized Countries (NICs) that were moving into a promising motorization process.

b. Clearer definition of brand positioning. The purchase of the Alfa Romeo brand, that took place in 1986, required an overall repositioning since in previous years the Lancia brand was progressing on two fronts, partly towards classic, comfortable and elegant cars with the larger models, partly towards sports cars, with smaller models, and in particular with the "Delta" model that was awarded many prizes in the world rally championships.

c. Gradual product upgrading. The fact that automotive activities were largely leaning towards smaller segments necessarily had to be correct. If up to that time the specialization on low end cars had allowed Fiat to fully exploit domestic demand (also thanks to lower salaries in Italy versus other European and US competitors), it was evident that this position would become much harder to maintain with the entry in the competitive arena of automakers having even lower salary levels: Eastern European countries, Latin America and Korea.

d. Overall quality enhancement. Another must for the Turin group was represented by the rationalization of manufacturing processes, both internally and externally, to elevate in a consistent and lasting way vehicle quality and reliability. Without an upgrading of the quality-reliability combination, also in smaller cars, the gradual erosion of market shares would have manifested to a worrying degree.

It is worth underlining that such program would not have taken place without a massive investment policy, so it would have been legitimate to wonder whether it was worth it. I do not hesitate to note that in the late 1980s the path hereby sketched entailed considerable risks for shareholders. However I believe that the available alternatives were just two: either to adopt a strong policy of commitment in the industry trying to activate at best the lines of such "slow but systematic" expansion (possibly also through cooperation agreements with other important automakers), or to exit the industry by selling the automotive brands and switching to other

⁸ For more details on this analysis see: Volpato and Zirpoli (2006).

industries. Once for all, there was a situation of *tertium non datur* – there is no alternative.

4. The 1990s decade – The years of inadequateness

4.1 Changes at the top

Unfortunately the changes that took place at the top of Fiat Automobiles in 1989 would turn out to be seriously inappropriate for the competitive challenge that was lying ahead, both because of some previous mistakes, and of the inadequateness of the “new” top management that, even when it moved in the direction required by the emerging competitive scenario, did so with delays and mistakes. The most relevant aspect is that, if strategic deficits were considerable, also the operational management was largely faulty. Cesare Romiti, CEO of Fiat Group, who in the end of 1988⁹ also became CEO of the Fiat Auto, was mainly anxious to reduce the weight of the automotive sector within the group in order to avoid a too “auto-centric” character that would subtract power from his management. This translated into a shift of profits generated by automotive into other sectors. In 1989 the investments dedicated to cars began falling below 50% of total investments by the Fiat Group, while those directed to “diversified” activities grew from 14.6% in 1988 to 24.7% in 1990, also due to new acquisitions in the insurance and distribution arenas.

The overall outcome was a considerable reduction in market shares both in Italy and in Western Europe that alarmed Gianni Agnelli and in December 1990 induced Romiti to leave the position of CEO of Fiat Auto to Paolo Cantarella, who was his assistant in the past.

Cantarella, in contrast to Romiti, was a “car guy” and initially gave the impression of being able to reinvigorate the automotive group through model renovation and to lead it towards a more adequate business model: more open internationally and structured into a wider range of segments. In 1993 there was the important success of the launch of the “Punto” model, that replaced the “Uno”, followed by a promising Fiat range expansion with the “Coupé” and “Barchetta” models, and “Spider” and “Coupé” for Alfa Romeo, adding to models traditionally offered by Fiat Automobiles in midsize cars⁹. However, probably due also to the workload following the period of inertia in product launches between 1989 and 1992, not all models were up to the task, mainly on the quality standpoint. For the above-mentioned niche models there were relevant reliability issues, while other cars were inadequate on the design side, such as the new Lancia “Delta” (1993), incapable of replacing the previous model. Similar troubles affected the Alfa Romeo “145” and “146” models, and total sales for this brand in 1994 were at half the levels achieved in 1990.

4.2 The deficits in the range/product plan

The decision by Paolo Cantarella in the mid 1990s to change the business model of Fiat Automobiles towards a “volume and variety” approach could not be

⁹ Models: Bravo and Marea for Fiat, models “145” and “146” for Alfa Romeo and renewal of “Delta” model for Lancia, but lacking the renewal of “Croma” model for Fiat.

maintained with the quite unsatisfactory results achieved during the following years, where once again the design stage was deficient. Cantarella tried to change course with the launch of the “Stilo” model in 2001, but results were once again unsatisfactory, and the continuous worsening in the image of the three major Fiat brands (Fiat, Alfa Romeo and Lancia) had repercussions onto the whole range with significant losses in market share both in Italy (below 35% share in 2001) and in Europe (below 10%).

The modest level of such results becomes even more evident if one considers that at the same time Fiat Automobiles exerted great pressure to support sales and to limit market share erosion. This drove the rise in the practice of cars being directly registered by dealers (or Fiat’s wholly-owned dealerships), then sold into the market with very high rebates as “zero-km used cars”. The Turin-based company at the same time was considerably increasing its direct sales with high rebates to rental companies and other business customers. It was a disastrous policy both for dealers and for the automaker itself. Due to this, the achieved results, albeit lower than targets, were met through sales drugged by rebates that were largely greater than the competition¹⁰. The fact that even in 2001, year when total registrations in Italy peaked, Fiat Automobiles had an operational loss of € 549 million, suggests the magnitude of the costs borne to support sales, basically by selling below cost¹¹.

4.3 The internationalization strategy

With respect to the internationalization process, the 1990s were a time of strong commitment for Fiat Automobiles, unfortunately partially affected by many causes: a chain of unfavorable events and some mistakes. The internationalization envisioned by Avvocato Agnelli came into reality in the mid 1990s with the “178 Project”. It consisted in a family of cars starting from the same platform, to be manufactured in a range of countries, but in a highly standardized way, in order to exploit significant scale and learning economies both for plant construction and in manufacturing, with the possibility to transfer parts between the different manufacturing locations. The globalization of the car was aimed at new-motorization countries such as Brazil, Argentina, Poland, Russia, Turkey, India and China. The objective was to reach a combined volume of about one million cars in 2003, to be manufactured in about a dozen countries¹². The idea made sense even if it would have emerged that even inside these markets the differences in customer preferences were significant. After a first encouraging stage in Latin America the international financial crisis of 1998 led to a slowdown in the project¹³. However, even if the results were partly affected by the negative context, serious mistakes were undoubtedly made both on the program planned for India, with the development of a plant that was then never utilized and with an excessive degree of product standardization that was inadequate for that market, and in Russia and China with delays and quite unsatisfactory results.

4.4 The reduction of internal competences and resources and the state of crisis

¹⁰ Total costs of these rebates were estimated by Giancarlo Boschetti, late CEO of Fiat Auto, at about 23.7% of turnover, plus the costs of warranty work at about 7.3%. Boschetti (2002).

¹¹ Volpato (2004b).

¹² Volpato (2000).

¹³ Balcet and Enrietti (2002).

The gradual worsening of the crisis of Fiat Automobiles began already in 1997 to trigger a vicious circle in which the deficit arising from operations led on the one hand towards greater debt and on the other hand towards a reduction in internal resources in terms of employees, investments, R&D expenses.

The most evident indicator of the outsourcing of activities in Fiat Automobiles is represented by the share of personnel costs in the income statement. The reduction in employee levels had started already after Ghidella's exit. From the peak recorded by the whole of automotive activities in 1989 with 134,270 employees, numbers fell to 114,386 in 1995 and to 74,292 in 2000. A comparison between the share of personnel costs in turnover of Fiat Automobiles compared to the Renault and PSA groups, in the automotive fields, clearly shows the dramatic move to forms of outsourcing carried out by Fiat¹⁴. In 1995 the share of personnel costs in sales was 14.44% for Fiat, already lower than Renault (18.74%), but in 2000 the share fell to 9.07% for Fiat versus 14.98% for Renault and 13.44% for PSA. A highly relevant aspect is that outsourcing involved not only component manufacturing and sub-group assembly activities, but also design and coordination activities of suppliers' work¹⁵. Between 1991 and 2000 the parts within Fiat's own area of responsibility decreased from 76% to 28%¹⁶. This evolution, which began in the early 1990s, and apparently eased in the mid-1990s for a short period of time, came back in 1998 and started to accelerate at the beginning of 2000: Fiat's market share, notwithstanding the policy of strong rebates and direct sales to rental companies, continued to fall causing a reduction in sales and a collapse in operational results: a loss of €549 million in 2001, and a loss of €1,343 million in 2002.

The crisis situation manifested in December 2001 with a shocking declaration of a €4 billion overall loss for Fiat Group of which 2.7 due to Fiat Automobiles. In the year 2003 Gianni Agnelli died and his brother Umberto took his place, the latter dying in May 2004. The automobile firm then faced a stage of continuous changes in governance that did not facilitate the recovery. The turnaround took place only in 2004 with Luca Cordero di Montezemolo becoming Chairman of the whole Fiat Group, and Sergio Marchionne becoming CEO, the latter becoming also CEO of Fiat Automobiles in February 2005 to manage the recovery of this sector more directly.

5. The reorganization operated by Sergio Marchionne

5.1 Shaking up Fiat Automobiles management

The steps taken by Sergio Marchionne to lead Fiat Group (and in particular Fiat Automobiles) out of the tunnel are many. Some are initiatives with short-term outcomes that have already generated significant effects, while others will produce their effects over the medium to long term. Overall, these initiatives constitute a dense web that cannot be summarized without some simplifications that however do not affect the picture. The priority initiative is the most delicate and certainly relates to the replacement of some Fiat Automobiles' figures located in high-level decision-making posts. The marked crisis of Fiat and the disappearance of key figures such as

¹⁴ On the organizational forms of model development in Fiat Auto: Calabrese (1997).

¹⁵ On the development during the 1990s of simultaneous activities of concentration in the number of supplier firms and upgrading and greater delegation to those confirmed: Enrietti and Lanzetti (2002).

¹⁶ Volpato (2004b).

Gianni Agnelli in January 2003 and Umberto Agnelli in May 2004 had triggered many rounds of changes at the top of the group that, as often happens in these cases, considerably slowed down the initiative of managers and cadres in the face of ever-changing scenarios without clear guidelines. Moreover, the tradition of the Turin-based company with respect to management turnover had always featured a preference for internal solutions, and this translated into modest changes in ideas, managerial styles and approaches.

Marchionne profoundly impacted on this too bureaucratic and routine-oriented structure with initiatives that can be defined as *management by stress*, based on hard work and strong commitment. On the one hand, he demanded clear commitment from his direct reports on objectives and times, while on the other hand he made room for young managers, more oriented to fight for their ideas and willing to work hard to carry out more with less resources than their predecessors had available. Moreover, Marchionne did not bring along with him a staff when he became CEO of Fiat. He relied on his own capability to choose the right people, inside the company if they seemed fit, but also outside and abroad if he identified the person he needed. If one looks at the number of employees in Fiat Automobiles one can see that their number decreased dramatically under Marchionne's management, but he showed great leadership abilities dedicating himself to extremely hard working schedules and asking all Fiat Automobiles personnel to do the same, applying a very high personal drive in achieving objectives. Besides, Marchionne had begun already in spring 2004 a wide process of assessment of capabilities of individual managers evaluating both their leadership abilities and their achieved performance. In little more than a year the whole of Fiat Automobiles managers directly reporting to him underwent a profound transformation. In mid 2006, 40% of the 27 first-level top managers were foreign. This would have been unthinkable just a few years before.

5.2 *The international cooperation agreements*

In the field of international agreements Sergio Marchionne initially had to untie the knot represented by the agreement with General Motors defined in 2000. Such agreement did generate positive outcomes, but it entailed a put option by which Fiat could have asked General Motors to purchase Fiat Automobiles. This possibility was a true Damocles' sword hanging over General Motors since the auto activities of Fiat in 2003 were on the verge of bankruptcy and the American company was itself facing an acute crisis that the absorption of the Italian company would have worsened. This put option was a true time bomb and negatively affected at the roots the opportunities for cooperation between the two automakers, who had in place a shared structure for component purchasing and for the development of shared platforms, with the outcome of also preventing other international agreements that Marchionne was interested to develop¹⁷. Marchionne acted well, managing to cancel the agreement, through the price of €1.55 million to be paid by GM. Right after this he moved on to finalize a set of agreements¹⁸:

¹⁷ On organizational aspects of the Fiat-GM agreement and on the outcome of such cooperation see: Camuffo and Volpato (2002), Enrietti and Barichello (2006).

¹⁸ During the 24 months following its entry as CEO of Fiat Spa, Sergio Marchionne has sealed 13 international agreements, of which 10 involving Fiat Auto.

- with the Indian group Tata for a wide-ranging cooperation, including shared manufacturing of some models in India and in Argentina, but also joint development of models, component design and manufacturing, joint marketing and distribution in India, through Tata networks;
- with Ford to use the new city-car platform designed for the new Fiat 500 also for the Ford Ka model, to be manufactured in the Thichy plant in Poland;
- with Severstal Auto to assemble in Russia the Palio and Albea models manufactured in kits at the Turkish Tofas plant, owned by the joint-venture between Fiat and the Koc group;
- with Chery to strengthen vehicle manufacturing in China.

The new dynamism on internationalization has been supported by the comeback in the major markets where Fiat Automobiles is involved. Latin America has been first, where Fiat operates with the new mega Betim plant in the Brazilian state of Minas Gerais. With the recovery in automobile demand that took place in the area the Betim plant is manufacturing at full capacity and has moved to a third shift in final assembly by employing new personnel, with a daily production of 2,500 vehicles. Fiat Auto do Brasil (FIASA) significantly contributes to the economic comeback of the group. Other growth areas are Turkey and Poland, where the manufacturing of the 178 project models (Palio, Siena, Palio Weekend, etc.), adequately renovated, was augmented by new models. The “Linea” models stands out among others, a three-volume car developed on the Grande Punto platform in the Turkish Tofas plant and launched in mid 2007 with an initial production of 60,000 units, but with the objective to reach 280,000 units through manufacturing also in Brazil, Russia, India and China.

5.3 Range renovation and sparkling communication

Clearly the central initiative in Marchionne’s turnaround has been the refreshing of the range of models and of the brands offered. The new CEO could in part benefit from the work of some of his predecessors who had correctly started the renewal of some important models. The most evident case is that of the new Panda launched in 2004. This small car, manufactured in Poland, gained the “Car of the Year” award. It has a significant value for money ratio, and an undisputed quality. The recovery of the image and quality of the product has started right from this well engineered model that also allows interesting profit margins both for the automaker and for the distribution network. This model was followed with significant results for the new Croma in the third quarter of 2005 followed in 2006 by: the Grande Punto, the Alfa Romeo 159, the Alfa Romeo Brera and in 2007 by Bravo, Linea and the 500. On the whole Fiat Group has scheduled the launch of 23 new models and 16 major facelifts between 2007 and 2010.

The strengths of the present range are mainly Panda and Grande Punto with ambitious volume plans that have however been exceeded, bearing in mind that manufacturing of the previous Punto is still running at about 100,000 units per year. Among the models wholly developed under Marchionne’s management there are two that are particularly important, namely Bravo and 500. The first model is in the “C” segment, the most important in Europe, with models such as Volkswagen Golf, Opel Astra, Peugeot 307. It is thus a very important model for the comeback of Fiat Automobiles both for its contribution to profits, and for the consolidation of the company image, where in the past the firm suffered the failure of a model like the

“Stilo”. Marchionne has decided to start with quite a cautious policy, declaring for Bravo a target of 120,000 cars per year, that the whole specialized press has judged too prudent. A significant part of the favorable reaction among customers for the new product range of Fiat Automobiles comes from a considerable enhancement in quality of product engineering, that generated both higher perceived quality and higher satisfaction, and lower development and manufacturing costs. On this front there is wide agreement that the new managers chosen by Marchionne are doing a good job, notwithstanding the need to control costs, through better co-ordination with suppliers.

If one looks at the future program of new model launches for the three brands, it is not the number of scheduled launches that surprises (albeit the innovative effort will be undoubtedly heavy), but rather the level of care adopted in preparing the launch and the new way in which the company communicates with customers. For example the launch of the new 500 marked quite a break from the past. This model is a modern reinterpretation of the old car launched in 1957 and manufactured in 3.7 million units; the new one is already a media icon. For the new 500, Fiat Automobiles activated many months before launch (1st July 2007) a website to allow potential customers to express their views on many aspects of the car: a new and involving way to establish direct contact with customers and to exploit their suggestions. This kind of initiatives managed to gain not just interest from the public, but also a lot of goodwill towards the specific product and the overall Fiat range in general. Only three months after launch the orders recorded for the 500 have reached the whole target for 2007 and led to an increase in production capacity in the Tychy Polish plant, that by end 2008 is due to manufacture 530,000 vehicles between Panda, 500 and Ka. Also the communication adopted for the Lancia brand has been refreshed and, while still short of new models (in particular the new Delta HPE that will be launched in 2008), managed to grow sales both for the Ypsilon and Musa model, both in Italy and abroad. A modern marketing strategy and an effective communication represent a key step in the group’s turnaround, but this has been accompanied by a range of innovations in other areas.

5.4 Turning Fiat Automobiles toward the Customer

On the Customer Care front there was also a marked acceleration in change. Fiat Automobiles did not have a solid tradition in this area due to the chronic tendency of the Turin company to subdue marketing policies to manufacturing and design needs, so that the relationship with customers had to be fundamentally turned upside down. The beginning was the establishment of a new Customer Care position assigned to a manager from Iveco who reports directly to Marchionne. This move marked a dramatic change of perspective from the past and has made room for a multiplicity of initiatives with high value for the end customer. Among the most significant elements of novelty there are the establishment of a call center, directly managed by Fiat Group, that all European consumers can access through a single toll-free number, capable of managing inbound calls in 9 different languages. The importance and the innovative nature of the call center consists in its capability to track customer needs from the time of the order throughout its delivery, monitoring the behavior of all the different subjects involved in supporting the consumers in trouble. Through this initiative the average lead time required for trouble shooting has decreased from 23 days in the middle of 2006 to 7.5 days by the middle of 2007.

Another relevant aspect on the commercial standpoint is the renewal of the website of the auto brands in order to interact actively with interested potential

customers. The customers showing interest in the products when surfing the website of one of the three brands are then contacted by the Customer Experience Management group set up by the Customer Care system, and passed on to the distribution network, especially when new models are launched. The leads generated by this initiative are constantly growing and already contribute to 3% of sales for the distribution network. Such initiative is also relevant for the high level of commitment among dealers: this adds positive effects both on customer satisfaction and on the network capability of attracting new customers. According to data elaborated by the Customer Service team, the closing ratio of leads generated by the manufacturer has increased from 25% to 31% with a marked increase in the share of sales recorded locally by dealers, and an increase in customer satisfaction indices.

Another important element of this new strategy of attention towards the customer lies in the strengthening of the after-sales care service, which during the crisis years went through a dramatic fall of confidence. Nowadays the after-sales care service is managed in an integrated way with the ambitious objective of eliminating car-off-the-road situations due to the lack of spare parts. The development of 14 parts distribution centers in Europe is envisioned, to ensure twice-daily delivery of parts to the service network.

6. Doing more with less

6.1 Choosing routes that differ from the competition

As will be shown later, the objectives of the company relaunch set in 2004 by Marchionne have been achieved on time; however it is appropriate to note that the comeback has been favourably influenced by some factors that could change in the future. One of these is the current Italian governmental policy of incentives towards the scrapping of obsolete cars (Euro “0” and Euro “1”) that supports automobile demand in the domestic market. The second point is the stage of slowdown in market penetration in Europe for the two direct competitors of the Fiat brands, that is the Peugeot-Citroen and Renault groups. This means that over the next years one can expect a considerable increase in investments by these two groups, as well as by other manufacturers, particularly Volkswagen. As a consequence the chance for Fiat to consolidate the comeback recorded in these recent years is related to the possibility to develop something “special”, that is initiatives capable of eliminating the competitive gap that has been accumulated during the decade preceding the turnaround strategy implemented by Marchionne. On the basis of interviews carried out with the management I think it is justified to define the new strategy as an effort aiming at “achieving more with less”. As Marchionne has repeatedly declared, Fiat Automobiles cannot limit itself to imitating competitors, but it must pursue innovative routes and anticipate competitors’ moves. This implies a philosophy based on doing more with less. Such an approach can be found over a wide range of company activities. In part the capability to manufacture improving quality and reducing costs at the same time derives from the policy of agreements such as for the “Sedici” model, an off-road vehicle manufactured by Suzuki and customized for Fiat, or for the platform sharing for the Panda and 500 model in Fiat with the Ka model in Ford, both assembled in the same manufacturing line. But there are also quite innovative examples. For example the new Bravo model has been developed through a focused carryover based upon the previous “Stilo” model. The body has been completely revised, while the mechanical part has been only fine-tuned with a dramatic saving in investments. It was Marchionne himself who during the

presentation of the new model to the press underlined that the investment required for the new model amounted just to €350 million, versus investment levels that are much higher for the competition, with the effect of a dramatic reduction in the break-even point, to the advantage of profitability. In the case of the Bravo the manufacturer will start to make a profit starting from an annual production volume of 75,000 units, and this marks a true record.

6.2 *Time-to-market, Platforms & Standardization*

Some important aspects of doing more for less are: a) the reduction in the time-to-market (TTM) of new products; b) the implementation of a strategy based in platform sharing; c) the standardization of modules. The Grande Punto already marked a good performance with 20 months of TTM. With Bravo the TTM was reduced to 18 months, that represents the best performance in Fiat Automobiles and one of the best in the world. The new standard will be achieved with the launch of the Alfa Romeo Junior which is targeted with a TTM of 15 months. These results have been achieved through an intelligent implementation of carryover from the most advanced components already optimized in previous models, and through relevant technological innovations. Among these, an important contribution came from the introduction of a system of *Digital Mock-Up* (DMU) that during the development stage for a new model avoids physical mock-ups¹⁹ that require long lead times and much higher costs²⁰. All this has translated into a higher quality level. It is not by chance that the new Bravo was the first Fiat model to be sold with a 5-year warranty.

Fiat Automobiles can regain much competitiveness in manufacturing costs through the strengthening of the platform sharing policy where its direct competitors (such as Peugeot-Citroen, Renault and Volkswagen) are enjoying some advantage. According to this program the number of architectures, equal to 19 in 2006, will be reduced to 6 in 2012. Already in 2010 the number of models based on a single architecture will increase from 1.7 to 3.7 and the number of vehicles manufactured per architecture will increase from 150,000 to 450,000 units. Finally, a wide process of standardization of modules that constitute the vehicle sub-systems is in place. If for example one considers the HVAC module (Heating, Ventilation and Air Conditioning) the product development managers have programmed a standardization that will allow to move from the 18 modules used in 2005 to 5 modules in 2012, with significant cost savings, higher quality and reliability.

World Class Manufacturing

A particularly important contribution to the company's performance will have to be achieved through an improvement in output quality in manufacturing and final assembly plants. To this respect, Fiat Automobiles is carrying out a wide program of training initiatives at the various levels of each plant, and of definition of procedures aimed at eliminating any form of waste and activity that does not add value for the end customer. This wide program, named Fiat Group Automobiles Production System (FAPS) is inspired by the Toyota Production System in its most advanced form, and will allow to achieve the excellence standards entailed in the certification

¹⁹ To illustrate the economies generated by the digital mock-up we could consider that the first physical mock-up of a new model costs between 500,000 and 1 million euros.

²⁰ Besides, all new models sold by Fiat Auto in Europe gained the 5 stars EuroNcap.

system of World Class Manufacturing (WCM). This is a structured set of methods and tools applied throughout the company, involving all employees in order to promote a radical improvement in production system performance, to ensure that the product is delivered to the customer in the required lead time and with the required quality levels, also eliminating non-value adding activities and any other type of loss or waste of human resources, equipment, materials and energy. This is carried out by involving the people at all levels in problem solving activities, providing focused training to line personnel so that they know and implement a wide range of organizational tools²¹ aimed at quality enhancement and waste elimination. The program is naturally based upon the greater possible involvement of operational personnel, expected to come up with suggestions and innovative solutions. These organizational tools per se are quite well known, but their integral application represents a great challenge particularly for the large personnel training effort that their implementation requires. Clearly the system must also be monitored through a set of Key Performance Indicators (KPI) capable of recording the quality levels of work teams, that in Fiat are named Elementary Technological Units (UTEs) in the most complex areas (stamping, welding, painting and final assembly) and in the whole of the plant. The importance of such program clearly emerges from the trend recorded in some KPIs. For example on the personnel involvement side, improvement proposals in the Polish Tychy plant have increased from 0.5 suggestions per employee per year in early 2006, to 4 suggestions per employee per year in late 2006, with an implementation rate of these suggestions of 50%. In the Melfi plant between end 2005 and end 2006 the first time quality for electric defects has improved by 50% with significant savings in rework activities, and in the same plant total personnel hourly productivity has recorded in 2006 a greater than 12% increase.

7. Trends in performances

7.1. Market share recovery

The launch of new models, helped also by the growth in registrations in the Italian market during recent years, and a strengthening of the government incentives in early 2007 for the scrapping of non-catalytic cars, has generated a significant recovery in market share for the brands of the Fiat Automobiles. The low point for all three brands was recorded in 2003 in Italy, while in Europe as a whole the fall continued until 2005. However some signs of recovery started to show up, mainly for the Fiat brand, whose weight is much higher than the other two, in the second half of 2004. Then the comeback accelerated in the second half of 2005, with the arrival of the Grande Punto. The year 2006 has confirmed the recovery for the brands, and in 2007 this has consolidated further (Exhibit no.1 and no.2).

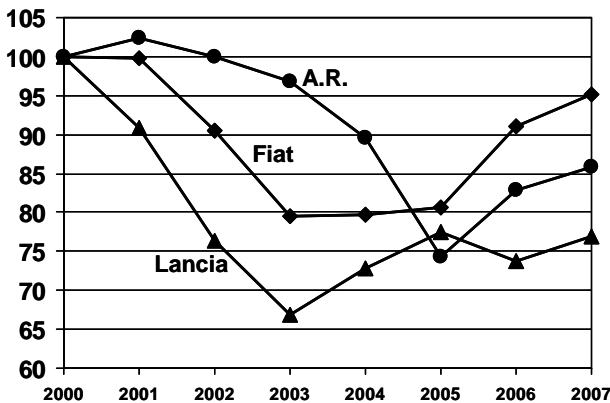
7.2. Financial performances

If one looks at the recovery of Fiat Automobiles by considering economic and financial indicators then the magnitude of the turnaround appears much higher than the market shares in Italy and in Europe would suggest. The reasons are twofold. On the one hand the fast comeback from the huge losses recorded in 2002 with net losses

²¹ Among the most known tools implemented in an integrated approach by the Fiat Group Automobiles Production System there are the Kanban, Failure Mode and Effects Analysis (FMEA), Poka Yoke, Six Sigma, etc. See: Massone (2007).

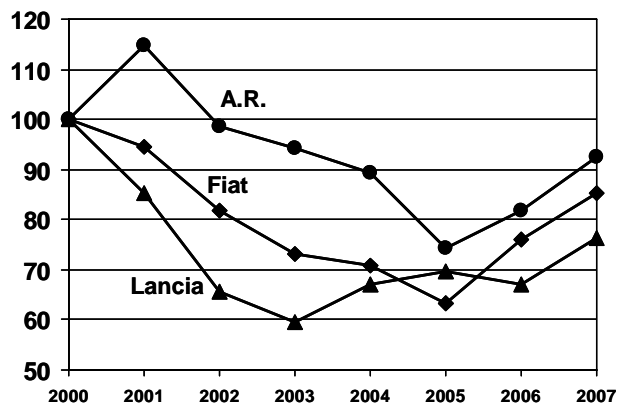
equal to € 2,739 million, benefitted from the contribution of profits gained internationally, and mainly in Brazil. After the crisis at the end of the 1990s the Brazilian market showed strong growth trend and Fiat Automobiles, which fights head-to-head for first place with the Volkswagen Group, could benefit from this situation through the development of models and variants? consistent with that market²². In particular Fiat has introduced very early the flex-fuel system, internally developed by Magneti Marelli. On the other hand the return to profitability was obtained in accordance with the capability of the group to reduce as fast as possible the debt levels, and improve the ranking among international rating agencies.

Exhibit no.1 – Fiat Makes’ Market Share in Italy (2000 = 100)



Fonte: ANFIA

Exhibit no.2 – Fiat Makes’ Market Share in W.Europe (2000 = 100)



Fonte: ACEA

If one looks at the main indicators one can see that Sergio Marchionne has maintained the previous policy of employee reduction and of control of R&D and fixed capital expenditures (see Statistical Appendix). The difference lies in the fact that he could act so that the reduction in resources could be compensated by greater leadership abilities among his managers and by a stronger commitment by all employees. In such way the number of Fiat Automobiles employees remains at minimal levels and the increase in the number of high-level professionals (managers and engineers) has been offset by a reduction in the number of low-skill profiles, with a further reduction of the share of employee costs in total turnover²³. Also on the investment front, where approval procedures require fast lead times and significant payback rates, the maximum was extracted from available resources through carryover actions from previous models.

In November 2006 Sergio Marchionne and some of his staff met financial analysts in Turin. Detailed information was given both on achieved results, and on the most significant objectives to be reached before 2010. Among these there is that of manufacturing and sales of cars and of commercial vehicles derived from cars.

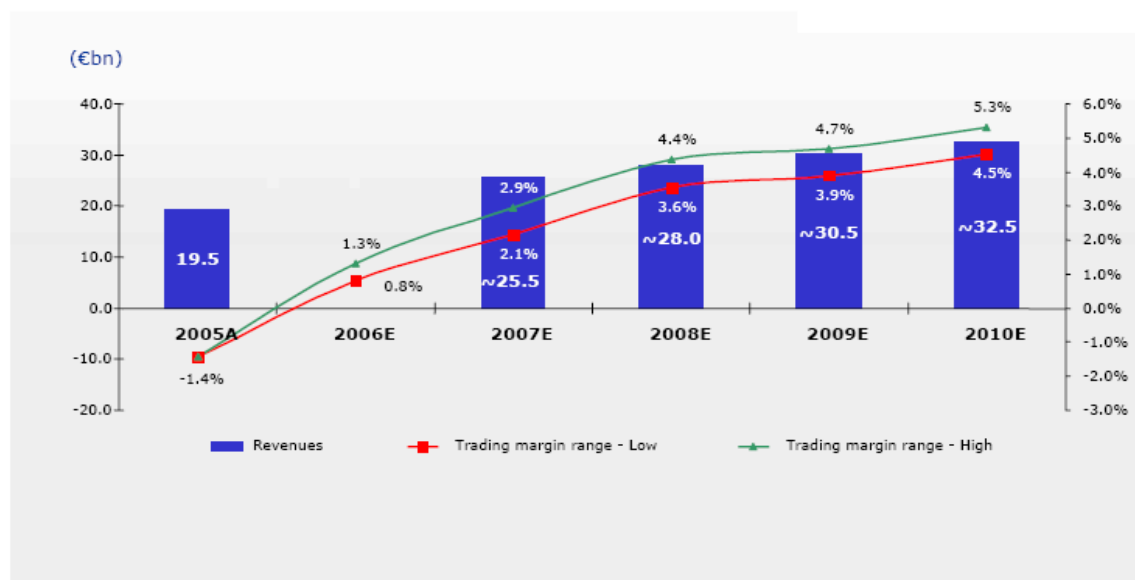
²² In city-cars Fiat do Brasil produces the “Mille”, “Palio” and “Idea” models. The “Idea” was awarded “Carro do Ano” (car of the year) in 2006.

²³ At the end of 2006, the employees were 44,691 and the share was 4.82% for Gruppo Fiat Auto. The same data were respectively 125,827 and 14.08% for Renault Automobile and 139,500 and 13.79% for PSA Automobile.

According to the CEO of the Fiat Automobiles sales in 2010 should reach a level of 2.8 million units for the brands falling within the consolidated group (Fiat, Fiat Professional, Alfa Romeo, Lancia, Maserati and Abarth) and of 3.5 million including also production developed in joint-venture (mainly in Turkey). Such growth, clearly ambitious, would require also a very high increase in the registrations for the Alfa Romeo and Lancia brands that in the 2007-2010 stage should mark a 87.5% and 150% increase respectively (compared to 2006 sales levels).

On the economic and financial front Fiat Automobiles targets are set by 2010 (Exhibit no.3) to sales of about €32.5 billion, versus the €23.7 billion recorded in 2006, and a Trading Margin on sales growing from the range 0.8-1.3% on sales in 2006, to the estimated range 4.5-5.3% in 2010.

Exhibit no.3 – Fiat Auto Financial Targets



Source: Fiat Auto, November 2006

For the time being the most up-to-date results available relate to the first 9 months of 2007. They indicate that the objectives stated in the company turnaround plan have been met and indeed exceeded, both in terms of vehicle sales and in terms of financial results. During the first 9 months of 2007 vehicle deliveries have grown by 13.8% vs. 2006, for a total of 1.66 million units and revenues of €19.6 billion. During the same time frame the trading profit of Fiat Automobiles has grown from €374 million to €570 million with a trading margin at the end of the period of 2.91%. In other words Fiat Automobiles has achieved at the end of the third quarter the highest value within the range assumed by Sergio Marchionne for the end of 2007, as shown in Exhibit 3.

8. The other objectives under Marchionne's lead

Facing the expanding presence across all segments by premium brands as already mentioned, the equally strong current expansion of Korean brands, and the entry of Chinese and Indian brands, the achievement of Fiat Automobiles' objectives

implies the need for Fiat to reposition its offering upwards for all three brands, but especially for Lancia and Alfa Romeo that were given extremely ambitious targets. Unless it is possible to command a premium price for a significant share of domestic production it will become harder and harder to maintain manufacturing operations in Italy. Besides, it must be reaffirmed that the success of this program does not depend just on the initiatives promoted by Marchionne, who undoubtedly proved to be able to lead the group with great determination, but also on competitors' actions. On this front it is not hard to see that all major automakers are very committed to heavy programs of investment and model range renovation, with growing R&D expenses. For example the Audi division in the Volkswagen Group has announced in 2006 the launch for the 2007-2011 period of an investment program for €8.4 billion to expand its range to 40 models. It is similarly evident that the recovery of Fiat market share in the European markets could benefit from the current difficulties troubling two of its most direct competitors such as Renault and PSA. However it is known that the two French groups are in turn developing massive recovery plans. For example Carlos Ghosn, CEO of Renault has announced in March 2007 the launch of 26 novelties over the next three years (novelties include "new models" and "silhouettes") and Christian Streiff, new CEO of PSA has announced an objective of 5 million vehicles sold by 2015, and 29 new models in Europe between 2007 and 2010, including renovation of existing models and range extension.

For these reasons the upgrading of the Fiat brands looks a tough route that will have to be followed gradually, without leaps. For example the launch of the new Lancia model Thesis in 2001 represents a mistake not to be repeated. It is evident that it would have been much better to invest in an overdue?? renewal of the Lybra model, whose late introduction had compromised its success, rather than to propose a model such as the Thesis, inadequate to play the too ambitious role it had been given. To develop in a gradual and fine-tuned but systematic way,, the strategy of upgrading requires not just industrial agreements, as those recently signed with Ford and with the Indian company Tata, that in reality are focusing on cost reduction and investment sharing, but also a strong commitment to research and development aimed at product innovation, being clear now that in the most advanced markets only innovation is capable of allowing the acquisition of a premium price. Fiat has demonstrated, mainly in the design of diesel engines, the necessary innovative capabilities, but the issue is to widen these capabilities. Over recent years, as already said, Fiat Automobiles has been required to reduce the scope of its own research and development initiative, acquiring more innovation than in the past through outsourcing. This approach, useful besides being required by the search for a fast economic and financial equilibrium, must however be replaced with a stage of image upgrading by a greater emphasis on internal innovation. It is all too clear that to rely on the marketplace to acquire innovations will not enable Fiat to overtake its competitors.

Currently the innovation expenses are still too limited (less than half than the main competitors), but if the R&D spending were to double, as it should, the share on the cost per manufactured unit would increase eroding margins. Facing this dilemma, the most reasonable solution would be to carry out, besides industrial agreements, also a financial agreement to source the additional resources necessary to fight competition simultaneously on two fronts: greater product innovation (mainly aimed towards medium-high segments) and volume growth investing in networks abroad. In the years of the crisis Fiat Automobiles followed a policy of dramatic reduction in its distribution networks, both in Italy and abroad. In part this

choice was conditioned by the need to concentrate sales on a smaller number of dealers in order to support their profitability that was worsened by the loss of competitiveness of the product on the quality standpoint, and by very costly sales support policies (fleet sales, zero-km used cars, etc.).

Fiat must then manage to obtain greater financial resources towards:

- a) The development of new models. In the 2007-2010 Product Plan, disclosed in November 2006, 23 new models and 16 model upgrades are foreseen. It is undoubtedly a considerable effort, but the fact that it does not include either the substitution of the Lancia Lybra (the new HPE model aims at a completely different customer segment) or the launch of an SUV for the Alfa Romeo brand, represents two weaknesses that should be overcome.
- b) The development of more powerful engines, but at the same time more fuel efficient and with lower CO₂ emissions.
- c) The expansion of distribution networks, mainly for the Alfa Romeo and Lancia brands that are under-represented in Europe. In the meeting with financial analysts in November 2006 the manager in charge of dealer development has announced that the total number of dealers in Europe (4,400 in 2006) will increase to 4,800 in 2010. It is a step forward, but that appears still small versus the needs for a complete consolidation of the company over the long term. It is not by chance that network sizes for its major competitors are much larger, starting from Renault²⁴ and PSA.
- d) The strengthening of marketing policies abroad, where the number of Fiat vehicles in circulation is much smaller than in Italy and therefore does not provide the same level of visibility to the new offering of the Turin company.

Marchionne's management has been capable of carrying out miracles with a very limited set of resources, particularly thanks to the "doing more with less" philosophy that is working very well, but over the medium to long term it seems necessary to move toward forms of growth that are supported mainly by a broadening of investments and innovation initiatives.

References

- Balcet G., Enrietti A. (2002), "The Impact of Focused Globalisation in the Italian Automotive Industry", *Journal of Interdisciplinary Economics*, 13 (1-3).
- Boschetti G. (2002), "Interview", in *Professional – Periodico di informazione manageriale del gruppo Fiat*, n.12.
- Boyer R., Freyssenet M. (2002), *The Productive Models – The Conditions of Profitability*, Palgrave-Macmillan, Houndmills, Hampshire.
- Calabrese G. (1997), *Fare auto – La comunicazione e la cooperazione nel processo di sviluppo prodotto*, F. Angeli, Milano.
- Camuffo A., Volpato G. (1998), *Making Manufacturing Lean in the Italian Automobile Industry – The Trajectory of Fiat*, in Freyssenet M., Mair A., Shimizu K., Volpato G., (eds.), *One Best Way? – Trajectories and Industrial Models of the World's Automobile Producers*, Oxford University Press, Oxford.

²⁴ Renault declares a network of 9,764 Point of Sales in Europe as sum of Direct Dealerships, Independent Dealers and Agents (2006 Annual Report).

- Camuffo A., Volpato G. (2002), "Partnering in the Global Auto Industry: the Fiat-GM Strategic Alliance", in *International Journal of Automotive Technology and Management*, 2 (3-4), pp.335-352.
- Castronovo V (1999), *Fiat 1899-1999: Un secolo di storia italiana*, Rizzoli, Milano.
- Garuzzo G. (2006), *Fiat – I segreti di un'epoca*, Fazi Editore, Roma.
- Enrietti A., Barichello F. (2006), *Fiat-GM Powertrain: chi ha guadagnato dall'alleanza?*, in AA.VV., *Annali di Storia dell'impresa*, n.17, Marsilio Editore, Venezia.
- Massone L. (2007), *Methods and Tools for the Fiat Auto Production System*, Fiat Group Automobiles, Turin.
- Volpato G. (2000), *La filière automobile italienne vers la globalization*, in Dupuy G., Bost F., (eds.), *L'automobile et son monde*, Éditions de l'Aube, La Tour d'Aigues.
- Volpato G. (2002), "Una crisi che viene da lontano – Il marketing strategico di Fiat Auto", in *Economia e politica industriale*, 29, n.116, pag. 63-86.
- Volpato G. (2003), *Fiat Auto: From "Forced" Internationalization Towards Intentional Globalization*, in Freyssenet M., Shimizu K., Volpato G., (eds.), *Globalization or Regionalization of the European Car Industry?*, Palgrave-Macmillan, Houndsmills, Hampshire.
- Volpato G. (2004), *Fiat Auto – Crisi e riorganizzazioni strategiche di un'impresa simbolo*, Isedi, Torino.
- Volpato G. (2008), *Fiat Auto – Un'araba fenice nell'industria automobilistica internazionale*, Il Mulino, Bologna, forthcoming.
- Volpato G., Zirpoli F. (2006), "Fiat Auto: crisis and resurrection? A critical analysis", in *Finanza, Marketing, Produzione*, 24 (4), pp.106-122.

Statistical Appendix

Year	Production			Workforce ¹			Turnover ²		Net Income ²		Investments ²		R&D ²	
	Worldwide	Domestic	Production abroad	World Fiat Group	World Fiat Auto Group	Italy Automobile Branch	World Fiat Group	World Fiat Auto Group	World Fiat Group	World Fiat Auto Group	World Fiat Group	World Fiat Auto Group	World Fiat Group	World Fiat Auto Group
1990	2.162.900	1.949.600	213.300	303.238	133.431	116.274	29.546	14.293	1611	468	2.175	1.032	1.162	551
1991	1.963.500	1.719.500	244.000	287.957	128.925	111.168	29.174	14.206	817	83	2.160	1.115	1.291	701
1992	1.829.800	1.546.400	283.400	284.102	125.378	104.289	30.526	14.175	285	-281	3.061	2.027	1.343	688
1993	1.786.600	1.164.600	622.000	261.021	120.338	95.627	28.176	12.937	-921	-858	3.439	2.616	1.160	594
1994	2.201.100	1.413.600	787.500	248.179	119.618	84.698	34.005	17.148	522	53	2.351	1.589	996	482
1995	2.235.000	1.531.100	703.900	237.426	114.386	77.704	39.092	20.190	1109	301	2.919	1.700	562	493
1996	2.336.200	1.430.500	905.700	238.135	116.144	75.518	40.244	21.950	1225	-100	2.746	1.677	1.129	502
1997	2.786.000	1.658.846	1.127.154	242.322	118.109	72.894	46.257	26.202	1248	384	2.398	1.341	1.166	535
1998	2.467.000	1.494.467	972.533	220.549	93.514	65.009	45.769	24.859	621	-151	2.418	1.373	1.160	608
1999	2.414.000	1.499.258	914.742	221.319	82.553	55.778	48.122	24.101	353	-261	2.709	1.464	1.406	711
2000	2.437.000	1.488.116	948.884	223.953	74.292	49.350	57.555	25.361	664	-304	3.236	1.412	1.725	776
2001	2.193.000	1.323.212	869.788	198.764	55.174	36.715	58.006	24.440	-445	-1418	3.438	1.331	1.817	870
2002	1.954.000	1.185.788	768.212	186.492	49.544	32.786	55.649	22.147	-3948	-2739	2.771	1.115	1.748	861
2003	1.875.000	1.080.915	794.085	162.237	44.563	28.413	47.271	20.010	-1900	-2038	2.011	1.100	1.747	939
2004	1.881.000	913.358	967.642	161.066	45.121	28.543	45.637	20.539	-1579	-2019	2915	1.792	1.791	952
2005	1.847.747	826.704	1.021.043	173.695	46.099	29.136	46.544	21.275	1420	-1191	3.520	1.582	1.558	665
2006	2.113.165	996.809	1.116.356	172.012	44.691	28.720	51.832	25.577	1151	363	4.312	2.163	1.598	675

1. Staff members are as 31 December of the year concerned

2. In million of €

The new automobile world at the XXIth century start Wrong forecasts and unexpected changes

edited by
Michel Freyssenet

Palgrave-Macmillan – Houndmills, Basingstoke, Hampshire RG21 6XS

Foreword

1. Introduction: ten years after, what had we learnt? - **Michel Freyssenet**
2. Change of the world and changes of automotive industry - **Michel Freyssenet**
3. Strategies of internationalisation of automobile firms in the new century: a new Leap Forward? - **Bruno Jetin**

Part One: Divergent Trajectories of Japanese and Korean carmakers

4. Sigh of Toyota as the new world No.1 carmaker - **Koichi Shimizu**
5. Honda: Balancing a shrinking domestic market with global growth - **Philippe Byosiere**
6. Nissan 1995-2007: crisis and revival - **Merieke Stevens, Takahiro Fujimoto**
7. Is 'the known disease' cured? The overview of Mitsubishi Motors' troubles and recovery Efforts - **Shinya Orihashi**
8. Mazda Motor Corporation: finding its identity under Ford's big shadow - **Arturo Daniel Heller**
9. Hyundai: is it possible to realize the dream of becoming a top 5 global automaker by 2010? - **Myeong-Kee Chung**

Part Two: The Resistible Decline of the “Big Three”

10. General Motors in an age of corporate restructuring - **Richard Senter, Jr. and Walter McManus**
11. Ford: losing its way ? - **Glenn Mercer**
12. Can Chrysler survive its re-invention? - **Bruce Belzowski**

Part Three: The Resistance of the Main European Car Producers

13. The Volkswagen trajectory over the last decade - **Ulrich Jürgens**
14. Renault : Globalization and some doubts - **Michel Freyssenet**
15. PSA: the limits of one-off cooperation with others carmakers to increase economies of Scale - **Michel Freyssenet**
16. Fiat Automobiles: An Arabian Phoenix in the International Auto Industry - **Giuseppe Volpato**
17. From the marriage in heaven to the divorce on earth. The DaimlerChrysler trajectory from the merger to the split - **Holm-Detlev Köhler**
18. Driving with engineers' professionalism and family values. The BMW trajectory from a regional carmaker to a global premium player - **Ludger Pries**
19. A Break from the past: Volvo and its malcontents' - **Matthias Holweg and Frits K. Pijl**

20. Management, labour and the fall of Rover: the closure of the last British owned automotive company - **Paul Stewart**

Part Four: Newcomers and global suppliers

21. Made in China: joint-ventures and domestic newcomers - **Hua Wang**

22. The Indian automotive scene: a look at the passenger car market since economic liberalisation in 1991-92 - **Vazir Fatehi**

23. Maruti-Suzuki's trajectory: From a national champion to a Japanese owned subsidiary. - **Florian Becker-Ritterspach**

24. Avtovaz in the period of post-soviet transformation. Lessons of the 1990s and current position - **Serguei Zhuravlev**

25. Winners and losers in the auto parts industry: the trajectories of the main First Tier Suppliers during the last decade - **Vincent Frigant**

26. Conclusion: The challenge of the sustainable development for the automobile industry and its current productive models - **Freysenet Michel**

Appendix: Presentation of GERPISA international network Index