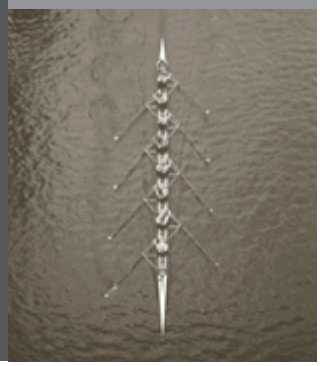
case 4

Ford and the World Automobile Industry in 2007



Ford in Crisis

By late November 2006, less than three months since arriving at Ford's Dearborn, Michigan, headquarters. CEO Alan Mulally was battling for the company's survival. The short-term challenge was financing Ford's cash drain – during the third quarter of 2006 the company had lost $5.2 billion. On November 27, Mulally and CFO Don Leclair had arranged an $18 billion debt financing package secured on Ford's North American assets. However, the bad news was unremitting. On the evening of November 30, Mulally received the November US sales figures. Ford had suffered a 10% fall in unit sales year-on-year with sharp declines in sales of pickup trucks and Jaguar cars. As a result, Ford slipped from no. 2 in market share behind General Motors (GM) to no. 4 behind DaimlerChrysler and Toyota.

Mulally was Ford's third CEO in four years. Jacques Nasser's attempt to transform Ford into a customer-focused, innovative, auto giant through a slew of acquisitions had ended in massive losses and a boardroom revolt. Chairman Bill Ford (great-grandson of founder Henry Ford) took over as CEO and reversed course. A "Revitalization Plan" involving the elimination of 35,000 jobs, annual cost reductions of $3 billion, and an accelerated program of new product launches was succeeded in January 2006 by a new turnaround plan: "The Way Forward." Despite job cuts, plant closures, and the reorganization of production, losses continued to grow throughout 2006. As confidence in Bill Ford's ability to execute a turnaround dissipated, the Board decided to appoint a CEO from outside the company.

With no prior experience of the auto industry (his prior career was with Boeing), Mulally was reluctant to chart a new strategic course for Ford. The company's most pressing problem, he surmised, was not lack of strategy, but was ineffective execution. Mulally perceived a lack of dialogue, inadequate cooperation, weak

accountability, excessive complexity, turf battles, and debilitating cross-functional conflict – especially between finance and engineering. Ford would need to move faster and more purposefully in addressing entrenched problems of excess capacity, inflexible work practices, slow new product development, and erratic decision making.

But how long did Ford have? With a cash outflow forecast at $4 billion during the final quarter of 2006 and with automotive operations reckoned to generate a negative cash flow of $21 billion during 2007–9, Ford's financial situation would remain precarious. In these circumstances, Ford's ability to survive over the medium term would depend critically on the state of the world auto industry. As he reviewed the financial performance of other automakers, Mulally realized that Ford's problems were not wholly of its own making: the entire industry had been earning minimal profits for years. During 2005, the world's 34 largest automotive companies earned an average net margin of 2.1%; 2006 profitability was unlikely to be significantly higher. If the overall levels of competition and profitability in the world auto industry were to be much the same during the next five years as they had been during the past five, the challenge of turnaround would be considerable. However, what most worried Mulally was the potential for the industry to suffer a further deterioration in profitability. Given the likelihood of a slowdown in the world economy during 2007 and 2008, there seemed little chance that the industry's overhang of excess capacity was likely to be resolved. In the meantime the industry was threatened by new pressures on profitability: new competitors from emerging market countries, the automakers' weakening control over their distribution systems, growing power of component suppliers, and increasing concenrn over the environmental impact of private motoring. It was certainly a very different industry environment from aerospace. In large passenger jets, Boeing faced just one competitor, Airbus. In autos, Ford was one of 12 major international players all battling for more market share.

The Market

Trends in Market Demand

During the 1880s, the first internal-combustion powered vehicles were produced in Europe – notably by Gottlieb Daimler and Karl Benz in Germany. By the turn of the century hundreds of small companies were producing automobiles both in Europe and in America. The subsequent 120 years saw the industry developing at different rates in different parts of the world. The US industry entered a period of rapid growth during 1910–28. Since the mid-1960s, the combined output of autos and trucks was broadly stable – despite cyclical fluctuations (see figure 4.1). In Europe and Japan too, total production has followed a fairly stable trend during the past two decades. The problem of market saturation was exacerbated by the tendency for cars to last longer (see table 4.1).

As a result, the automobile producers have looked increasingly to the newly industrializing countries for market opportunities. During the 1980s and 1990s countries such as Korea, Malaysia, Taiwan, Thailand, Turkey, Brazil, and Argentina offered the best growth prospects. As these markets became increasingly saturated, so China, India, and the former Soviet Union were seen as the "next wave" of attractive markets. With the opening of many of these countries to trade and direct investment, the world production of cars and trucks continued to grow (see figure 4.2).

FIGURE 4.1 US motor vehicle production, 1900–2005

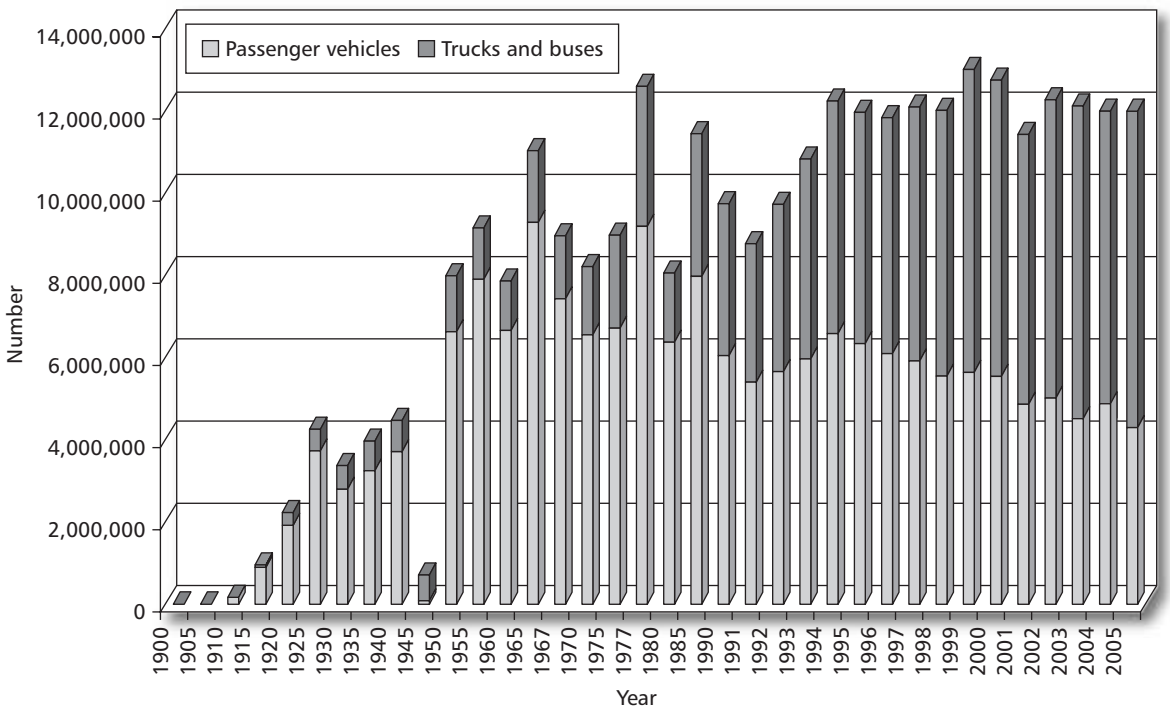


TABLE 4.1 Median age of passenger cars in the US (years)

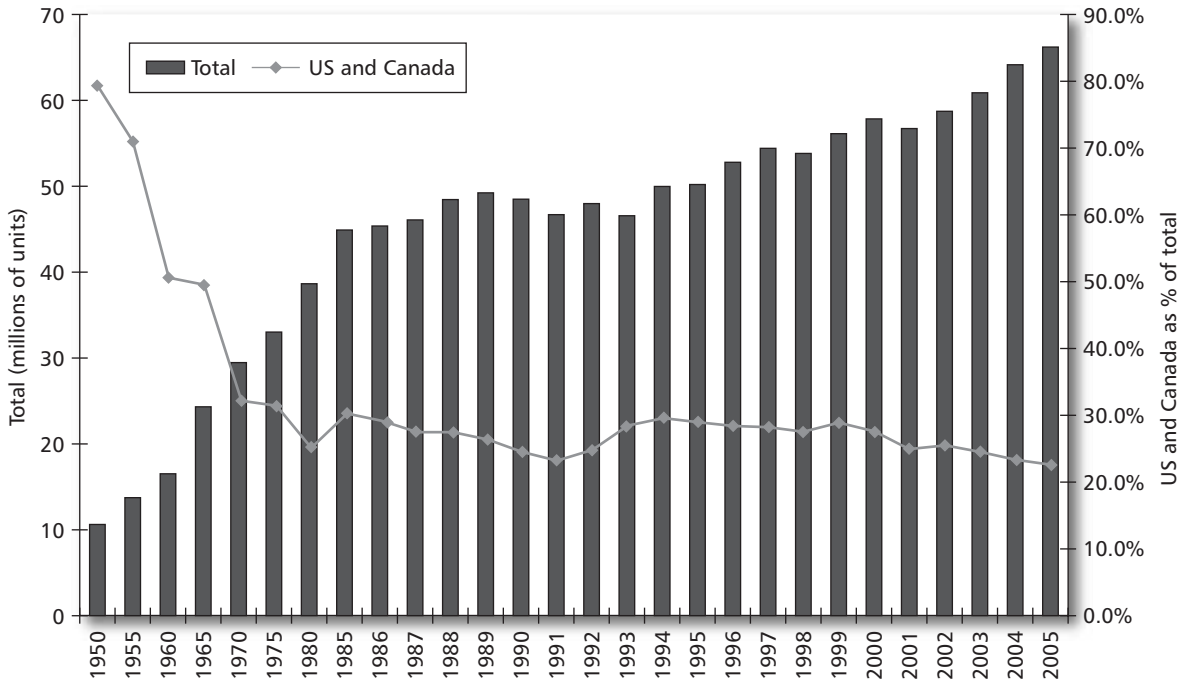
Year	Median age	Year	Median age
1941	4.9	1990	6.5
1948	8.0	1992	7.0
1952	4.5	1994	7.4
1958	5.1	1996	7.4
1962	5.7	1998	8.1
1968	4.7	2000	8.3
1972	5.1	2002	8.4
1976	5.5	2003	8.6
1980	6.0	2004	8.9
1984	6.7	2005	9.0
1988	6.8		

SOURCE: R. L. POLK & CO.

The Evolution of the Automobile

The early years of the industry were characterized by considerable uncertainty over the design and technology of the motorcar. Early "horseless carriages" were precisely that – they followed design features of existing horse-drawn carriages and buggies.

FIGURE 4.2 World motor vehicle production (cars and trucks), 1950–2005



Early motorcars demonstrated a bewildering variety of technologies. During the early years, the internal-combustion engine vied with the steam engine. Among internal-combustion engines there was a wide variety of cylinder configurations. Transmission systems, steering systems, and brakes all displayed a remarkable variety of technologies and designs.

Over the years technologies and designs tended to converge as competition relegated many once-promising designs to the scrapheap of history. The Ford Model T represented the first "dominant design" in automobiles – the technologies and design features of the Model T set a standard for other manufacturers to imitate. Convergence of technologies and designs was the dominant trend of the next 90 years. During the 1920s, all manufacturers adopted enclosed, all-steel bodies. During the last few decades of the 20th century most models with distinctively different designs disappeared: the VW Beetle with its rear, air-cooled engine, the Citroen 2-CV and its idiosyncratic braking and suspension system, Daf with its "Variomatic" transmission, and the distinctive models made by Eastern European manufacturers. Engines became more similar: typically 4 cylinders arranged in-line, with V-6 and V-8 configurations for larger cars. Front-wheel drive and anti-lock disk brakes became standard on smaller cars; suspension and steering systems became more similar; body shapes became increasingly alike. Although the automobile continued to evolve, technological progress was incremental: innovations primarily involved new applications of electronics and new safety features. A 1950 Mercedes had about 10 meters of wiring. A 1995 SL 500 with full options had 3,000 meters of wiring and 48 different microcomputers. In terms of automotive engineering the main advances were multi-valve

cylinders, traction control systems, all-wheel drive, electronic fuel injection, variable suspensions, and intercooled turbos. The quest for fuel economy resulted in the substitution of lighter materials (aluminum, plastics, ceramics, and composites) for iron and steel. Continuing advances in the application of electronics include satellite navigation systems, communications technology (telematics), emergency signaling, collision-avoidance radar, and intelligent monitoring systems.

While designs and technologies have converged, the range of vehicle types has increased. New vehicle types include passenger vans ("people carriers"), sport utility vehicles (SUVs), micro cars, and a variety of cars that combine features of different product segments ("crossovers" such as luxury SUVs and "mini-SUVs" built on automobile platforms). However, within individual product segments, different manufacturers' vehicles have tended to become more similar.

Convergence also occurred across countries. The same market segments tended to emerge in different countries. The major differences between countries were in the *sizes* of the various segments. Thus, in the US, the "mid-size" family sedan was the largest segment, with the Honda Accord, and Toyota Camry the leading models. In Europe and Asia, small family cars ("subcompacts") formed the largest market segment. Yet for all the emphasis by manufacturers on global models, national markets are characterized more by their differences then by their similarities. For example, in 2006 in the US, light trucks (pickups and SUVs) outsold passenger cars. In Japan, minicars, such as the Suzuki Cervo have grabbed 35% of the total car market.

The Evolution of Manufacturing Technology

At the beginning of the 20th century, car manufacture, like carriage-making, was a craft industry. Cars were built to order according to individual customers' preferences and specifications. In Europe and North America there were hundreds of companies producing cars, few with annual production exceeding 1,000 vehicles. When Henry Ford began production in 1903, he used a similar approach. Even with fairly long runs of a single model (the first version of the Model T, for example), each car was individually built. The development of more precise machine tools permitted interchangeable parts, which ushered in mass production: batch or continuous production of components which were then assembled on moving assembly lines by semi-skilled workers. The productivity gains were enormous. In 1912 it took 23 man-hours to assemble a Model T; just 14 months later it took only four. The resulting fall in the price of cars opened up a new era of popular motoring.

If "Fordism" was the first major revolution in process technology, then Toyota's "lean production" was the second. The system was developed by Toyota in post-war Japan at a time when shortages of key materials encouraged extreme parsimony and a need to avoid inventories and waste through defects. Key elements of the system were statistical process control, just-in-time scheduling, quality circles, teamwork, and flexible production (more than one model manufactured on a single production line). Central to the new manufacturing was the transition from static concepts of efficiency optimization towards continuous improvement to which every employee contributed. During the 1980s and 1990s all the world's car manufacturers redesigned their manufacturing processes to incorporate aspects of Toyota's lean production.

New manufacturing methods required heavy investments by the companies in both capital equipment and training. However, the essence of the Toyota system was not new manufacturing "hardware" in the form of robotics and computer-integrated

manufacturing systems. The critical elements were the "software" – new employee skills, new methods of shop-floor organization, redefined roles for managers, and new relationships with suppliers.

Flexible manufacturing technology together with modular designs reduced the extent of scale economies in assembly since different models could be manufactured within the same plant. It was once believed that efficiency required giant assembly plants with outputs of at least 400,000 units a year. During the past decade, most new plants had output capacities of between 150,000 and 300,000 units. Scale economies in components and subassemblies were much more important. Minimum efficient scale for an engine plant is around 1 million units annually.

New Product Development

The critical scale economy in automaking is the ability to amortize the huge costs of new product development over a large enough number of vehicles.

The cost of developing new models has risen steeply as a result of increasing design complexity, the application of electronics, and new safety and environmental standards. By the late 1980s the cost of creating an entirely new, mass-production passenger car from drawing board to production line was about $1.25 billion. By the early 1990s, costs had escalated substantially above this level (see table 4.2).

Smaller manufacturers could survive only by avoiding these massive product development costs. One way was to avoid new model changes. Prior to its acquisition by Ford, Jaguar's two models, the XJ6 and XJS, were almost two decades old. The tiny Morgan car company has made the same model since the late 1930s. The alternative was to license designs from larger manufacturers. Thus, Tofas of Turkey built Fiat-designed cars, Proton of Malaysia built Mitsubishi-designed cars, and Maruti of India produced Suzuki-designed cars.

The cost of new product development has been the major reason for the wave of mergers and acquisitions in the industry. Economies from sharing development costs also encouraged increased collaboration and joint ventures: Renault and Peugeot established joint engine manufacturing: GM established collaborations with Suzuki, Daewoo, Toyota, and Fiat to build cars and share platforms and components. In China and India most new auto plants were joint ventures between local and overseas companies.

During the 1990s, new product development emerged as the critical organizational capability differentiating car manufacturers. Designing, developing, and putting into

TABLE 4.2 New car development costs during the 1990s and 2000s

Ford Mondeo/Contour (1994)	$6 billion
GM Saturn (1990)	$5 billion
Ford Taurus (1996 model)	$2.8 billion
Ford Escort (1997 model)	$2 billion
Chrysler Neon	$1.3 billion
Renault Clio (1999 model)	$1.3 billion
Honda Accord (1997 model)	$0.6 billion
BMW Mini (2001)	$0.5 billion
Rolls Royce Phantom (2003 model)	$0.3 billion

SOURCE: ASSEMBLED FROM VARIOUS NEWSPAPER REPORTS.

production a completely new automobile was a hugely complex process involving every function of the firm, up to 3,000 engineers, close collaboration with several hundred suppliers, and up to five years from drawing board to market launch. To reduce product development time, most automakers modeled their new product development process on those of Toyota and Honda, which had pioneered the use of cross-functional development teams. Attempts to lower product development costs focused around modular designs and "virtual prototyping" – the use of 3D computer graphics to design and test prototypes. However, pressure for increased fuel efficiency and more environmentally friendly vehicles seemed likely to put increasing upward pressure on product development budgets.

The Industry

The Manufacturers

The major automobile manufacturers are shown in table 4.3. The ranks of the leading producers were dominated by US, Japanese, and European companies: outside of

TABLE 4.3 The world's leading auto manufacturers

		Production ('000s of autos and commercial vehicles)					
		1992	1996	2000	2002	2004	2005
GM	US	6,764	8,176	8,114	8,326	9,221	9,200*
Toyota	Japan	4,249	4,794	5,897	6,626	7,674	7,974*
Ford	US	5,742	6,611	7,206	6,729	6,721	6,818*
Volkswagen[+]	Germany	3,286	3,977	5,106	5,017	4,785	5,243*
DaimlerChrysler	Germany	2,782	4,082	4,666	4,456	4,551	4,829*
Nissan	Japan	2,963	2,712	2,698	2,719	3,226	3,569*
Honda	Japan	1,762	2,021	2,469	2,988	3,141	3,391*
Peugeot	France	2,437	1,975	2,879	3,262	3,078	3,375
Hyundai	S. Korea	874	1,402	2,488	2,642	2,283	2,534*
Renault	France	1,929	1,755	2,515	2,329	2,490	2,533*
Suzuki	Japan	888	1,387	1,434	1,704	2,018	2,200
Fiat	Italy	1,800	2,545	2,639	2,191	1,776	1,708*
Mitsubishi	Japan	1,599	1,452	1,613	1,821	1,334	1,381
BMW	Germany	598	641	835	1,091	1,255	1,328*
Mazda	Japan	1,248	984	972	1,044	1,104	1,149*
Daihatsu	Japan	610	691	n.a.	n.a.	870	909
AutoVAZ	Russia	674	562	756	703	727	732
Fuji (Subaru)	Japan	648	525	581	542	555	571
Isuzu	Japan	473	462	572	437	578	642
Koc	Turkey	n.a.	n.a.	n.a.	n.a.	337	442
Maruti	India	n.a.	n.a.	n.a.	n.a.	384	430

n.a. = not available.

* Sales data.

SOURCES: *WARD'S AUTOMOTIVE YEARBOOK*; COMPANY ANNUAL REPORTS.

TABLE 4.4 Mergers and acquisitions among automobile manufacturers, 1986–2002

Year	Acquirer	Target	Notes
2005	Nanjing Automobile	Rover (UK)	
2005	Toyota	Fuji Heavy Industries	Acquires 8.7% stake from GM
2002	GM (US)	Daewoo (S. Korea)	42% of equity acquired
2000	Renault (France)	Samsung Motors (S. Korea)	70% of equity acquired
2000	GM (US)	Fiat (Italy)	20% of equity acquired
2000	DaimlerChrysler (Germ.)	Hyundai (S. Korea)	10% of equity acquired
2000	DaimlerChrysler (Germ.)	Mitsubishi Motors (Japan)	34% of equity acquired
1999	Renault (France)	Nissan (Japan)	38.6% of equity acquired
1999	Ford (US)	Volvo (Sweden)	Car business acquired from Volvo
1999	Ford (US)	Land Rover (UK)	Acquired from BMW
1998	Daimler Benz (Germany)	Chrysler (US)	
1998	VW (Germany)	Rolls Royce Motors (UK)	
1998	Hyundai (S. Korea)	Kia (S. Korea)	
1998	Daewoo (S. Korea)	Ssangyong Motor (S. Korea)	
1998	Daewoo (S. Korea)	Samsung Motor (S. Korea)	
1997	Proton (Malaysia)	Lotus (UK)	
1997	BMW (Germany)	Rover (UK)	
1996	Daewoo (S. Korea)	FSO (Poland)	
1996	Daewoo (S. Korea)	FS Lublin (Poland)	
1995	Fiat (Italy)	FSM (Poland)	
1995	Ford (US)	Mazda (Japan)	
1994	Daewoo (S. Korea)	Oltcit/Rodae (Romania)	
1991	VW (Germany)	Skoda (Czech Republic)	
1990	GM (US)	Saab-Scandia (Sweden)	50% of equity acquired
1990	Ford (US)	Jaguar (UK)	
1987	Ford (US)	Aston Martin (UK)	
1987	Chrysler (US)	Lamborghini (Italy)	
1986	VW (Germany)	Seat (Spain)	

these countries only Hyundai of Korea was among the leading manufacturers. All the major manufacturers are multinational: both GM and Ford produce more cars outside the US than within it; Honda produces more Accords in the US than in Japan. As a result some countries – notably Canada, Spain, and the UK – are significant auto producing countries without having any significant domestic auto companies. Over the past two decades the industry has consolidated through mergers and acquisitions (see table 4.4). The financial problems of Japanese and Korean auto companies during the late 1990s accelerated this process. As a result, US and European carmakers acquired significant proportions of the Japanese and Korean auto industries. At the same time, a number of small producers continued to survive, especially in protected markets. Trade liberalization represented a threat to these companies. China's accession to the

World Trade Organization meant that several Chinese automakers were attempting to build an international presence.

Outsourcing and the Role of Suppliers

Henry Ford's system of mass production was supported by heavy backward integration. In Ford's giant River Rouge plant, iron ore entered at one end, Model Ts emerged at the other. Ford even owned rubber plantations in the Amazon basin. The trend of the past 20 years has been towards increasing outsourcing of materials, components, and subassemblies. This has been led primarily by the desire for lower costs and increased flexibility. Again, leadership came from the Japanese: Toyota and Nissan have traditionally been much more reliant on their supplier networks than their US or European counterparts. At the end of the 1990s GM and Ford both spun off their component manufacturing businesses as separate companies: Delphi and Visteon, respectively.

Relationships with suppliers also changed. In contrast to the US model of arm's-length relationships and written contracts, the Japanese manufacturers developed close, collaborative long-run relationships with their "first-tier" suppliers. During the 1990s, the Japanese model of close collaboration and extensive technical interchange with a smaller number of leading suppliers became the model for the entire global auto industry – all the world's manufacturers outsourced more manufacturing and technology development while greatly reducing the number of their suppliers.

As the leading component suppliers have gained increasing responsibility for technological development – especially in sophisticated subassemblies such as transmissions, braking systems, and electrical and electronic equipment – they have also grown in size and global reach. Bosch, Johnson Controls, Denso, and Delphi were almost as big as some of the larger automobile companies (see table 4.5).

TABLE 4.5 Revenues and profitability of the biggest automotive component suppliers

	Revenues ($ billion)			ROE (%)
	1994	2000	2005	2005
Robert Bosch (Germany)	19.6	29.1	49.1	12.0
Denso Corp. (Japan)	11	18.2	29.0	9.4
Johnson Controls (US)	7.1	17.2	27.5	14.4
Delphi Automotive (US)*	–	29.1	26.9	–38.4
Magna International (Canada)	–	10.5	22.8	9.9
Lear Corp (US)	3.1	14.1	17.1	6.3
Aisin Seiki (Japan)	7.3	8.9	17	8.5
Visteon (US)	–	19.5	17	**
Valeo SA (France)	3.8	8.9	11.8	8.1
Eaton (US)	4.4	8.3	11.1	21.9
Dana (US)*	5.5	12.7	8.6	–294.5

* Currently operating under Chapter 11 of US Bankruptcy Code.

** Not meaningful: company has negative shareholders' equity.

SOURCES: COMPANIES' FINANCIAL STATEMENTS.

The Quest for Cost Reduction

Increasing competition in the industry has intensified the quest for cost reduction among automobile manufacturers. Cost-reduction measures have included:

- *Worldwide outsourcing*. The tendency for increased outsourcing of components has been noted above. In addition, auto firms have developed original equipment manufacturer (OEM) supply arrangements amongst themselves: Daewoo supplies several of GM's models; GM supplies components to Fiat; Mitsubishi and Chrysler supply engines for the BMW Mini.
- *Just-in-time scheduling*, which has radically reduced levels of inventory and work-in-progress.
- *Shifting manufacturing to lower-cost locations*: VW's North American production is based in Mexico and it moved production from Germany to the Czech Republic, Spain, and Hungary; Japanese companies have moved more and more production to lower-cost locations in Southeast Asia; Mercedes and BMW developed greenfield plants in the deep south of the US.
- *Automation*. In high-cost locations (North America, Western Europe, and Japan), increased automation has reduced labor input.

Different companies have faced different cost issues. While European manufacturers were constrained by rigid working conditions, restrictions on layoffs, and generous benefits, US companies were hit by increased provisions for pensions and healthcare.

The quest for economies of scale and scope in relation to product development meant that companies sought to spread rising development costs over larger production and sales volumes. This resulted in the standardization of designs and components across the different models of each manufacturer. In 2003, Ford launched a global manufacturing program aimed at: ". . . realizing efficiencies in manufacturing, engineering and product costs for new vehicles by sharing vehicle platforms and components among various models and the re-use of those platforms and components from one generation of a vehicle model to the next."

For example, Ford's C1 platform is used for the Ford Focus, the Mazda 3, the Ford C-max, and the Volvo S40 and G50. In engines, Ford moved to three engine families: V-8/V-10, V-8, and I-4 (four in-line cylinders). The I-4 engine has over 100 variations, an annual volume of 1.5 million, and is built at three different plants – one in North America, one in Europe, and one in Japan. *Automotive News* explained: "The idea is to share systems in areas that customers can't see and feel, and differentiate the brands in areas they can."

Excess Capacity

A major problem for the industry was the tendency for the growth of production capacity to outstrip the growth in the demand for cars. During the 1980s and early 1990s, Japanese companies were major investors in new capacity with a number of greenfield "transplants" in North America and Europe. During the 1990s all the world's major car companies responded to the quest for globalization with new plants (many of them joint ventures) in the growth markets of Southeast Asia, China, India, South America, and Eastern Europe. During 1992–7, the Korean car companies were

especially aggressive investors in new capacity. It was particularly worrying that, even in the markets where demand was growing fastest (such as China, where sales grew annually by almost 50% between 2002 and 2006), growth of production capacity outstripped growth in demand. The resulting overhang of excess capacity was a key factor exacerbating intense competition in the industry. During 2006, capacity utilization in the US auto and light truck industry was 70.4%. The average during 1972–2005 was 78.0%.

Looking ahead, it appeared as though capacity reductions by Ford, GM and a few other companies would be more than offset by the new plants that would begin production during 2007–9. These included three new Toyota plants (one in India, two in China), two new Honda plants in North America, Hyundai plants in the Czech Republic and US, PSA in Slovakia, and at least a dozen other new plants in China and India.

Internationalization

The driving force behind capacity expansion was internationalization. Although multinational growth extends back to the 1920s (when Ford and General Motors established their European subsidiaries), until the 1970s the world auto industry was made up of fairly separate national markets. Each of the larger national markets was supplied primarily by domestic production, and indigenous manufacturers tended to be market leaders. For example, in 1970 the Big Three (GM, Ford, and Chrysler) held close to 85% of the US market, VW and Daimler Benz dominated the market in Germany, as did Fiat in Italy, British Leyland (later Rover) in the UK, Seat in Spain, and Renault, Peugeot, and Citroen in France. Internationalization meant that all the world's leading manufacturers were competing in most of the countries of the world. As a result, the market dominance of local firms was undermined (see table 4.6).

Internationalization required establishing distributors and dealership networks in overseas countries; it also entailed building manufacturing plants – especially when import restrictions made it difficult to serve the overseas market from the home base. US and European quotas on Japanese automobile imports encouraged the Japanese automakers to build plants in these regions. Table 4.7 shows some of the North American auto plants established by overseas (mainly Japanese) companies. Similarly, to serve the booming Chinese market, all the leading Western and Japanese automakers established local production (mostly joint ventures).

Different companies pursued different internationalization strategies:

- Toyota and Honda had expanded throughout the world by establishing wholly owned greenfield plants.
- Ford, which had initially internationalized by creating wholly owned subsidiaries throughout the world, extended its global reach during 1987–99 by acquiring Mazda, Jaguar, Aston Martin, Land Rover, and Volvo.
- GM established a network of alliances and minority equity stakes: notably with Fiat, Suzuki, Saab, and Daewoo.
- DaimlerChrysler was created through a transatlantic merger in 1998, and established a position in Asia by acquiring equity in Mitsubishi Motors and Hyundai.

TABLE 4.6 Automobile market shares in individual countries (%)

	1988	1994	2000	2005
Japan				
Toyota	43.9	33.7	28.5	40.4
Nissan	23.2	18.0	11.8	15.0
Honda	10.8	8.5	16.2	12.3
Suzuki	n.a.	n.a.	10.0	12.1
Korea*				
Hyundai	55.9	46.5	50.3	50.0
Kia	25.0	26.5	19.7	23.3
Daewoo	19.1	16.0	24.8	10.0
Australia				
Toyota	15.3	19.0	16.8	21.9
GM-Holden	20.9	21.3	22.0	17.8
Ford	28.1	24.4	15.9	13.8
France				
Renault	29.1	30.0	28.2	25.8
Peugeot	34.2	31.1	30.9	30.6
VW	9.2	8.0	11.2	11.0
Ford	7.1	8.1	6.2	6.0
Italy				
Fiat	59.9	46.0	35.5	30.1
VW	11.7	10.4	11.8	10.3
Ford	3.7	9.6	8.8	8.8
Peugeot	n.a.	n.a.	7.6	9.7
Renault	7.1	7.0	7.0	6.4
UK				
Ford	26.3	22.2	20.7	19.5
GM	13.7	16.9	14.2	14.7
Peugeot	8.7	12.1	12.3	10.0
VW	n.a.	n.a.	11.1	12.7
BMW/Rover	15.0	12.8	7.7	6.6
Germany				
VW/Audi	28.3	20.9	27.8	29.8
GM	16.1	16.5	12.5	10.7
Ford	10.1	9.9	7.6	8.6
Mercedes	9.2	8.2	12.8	13.3
Japanese	15.2	12.5	10.8	11.0
US				
GM	36.3	34.3	28.6	25.5
Ford	21.7	22.6	19.1	17.7
Daimler Chrysler	11.3	9.8	10.5	12.6
Toyota	6.9	8.5	11.0	13.4
Honda	6.2	8.5	10.0	8.7

* Domestic producers only (excludes imports).

SOURCES: *JAPAN AUTOMOBILE MANUFACTURERS ASSOCIATION; KOREAN AUTOMOBILE ASSOCIATION; WARD'S AUTOMOTIVE YEARBOOK.*

TABLE 4.7 Japanese and European "transplants" in North America

Company	Parent(s)	Location	Production of cars and lt. trucks 2005
Honda of America	Honda	E. Liberty and Marysville, OH	939,868
Toyota USA	Toyota	Georgetown, KY	879,097
NUMMI	Toyota and GM	Fremont, CA	417,369
CAMI Automotive	Suzuki and GM	Ontario	189,997
Toyota Canada	Toyota	Ontario	305,996
Honda of Canada	Honda	Ontario	385,491
Diamond-Star Motors	Mitsubishi/Chrysler	Normal, IL	87,594
Subaru-Isuzu Auto	Fuji and Isuzu	Lafayette, IN	118,991
Nissan Motor USA	Nissan	Sryrna, TN and Canton, MS	836,011
BMW	BMW	Spartanburg, NC	124,816
AutoAlliance International	Mazda/Ford	Flat Rock, MI	272,632
Hyundai Motor America	Hyundai	Montgomery, AL	122,000
Volkswagen	Volkswagen	Puebla, Mexico	301,390

SOURCE: *WARD'S AUTOMOTIVE YEARBOOK.*

- Volkswagen made a series of acquisitions in Europe (Seat, Skoda, and Rolls Royce) and had focused heavily on investing in manufacturing capacity outside the advanced industrial countries, notably in Eastern Europe. Latin America, and China.

Nevertheless, not all companies built global presence. Renault had effectively merged with Nissan and Samsung Motors, but lacked any presence in North America, while Fiat and Peugeot were essentially European manufacturers.

Industry Location

The shift in demand to the emerging market countries and the automakers' quest for lower production costs has resulted in the geographical distribution of production in recent decades. The major growth areas of the past decade have been Asia (notably Korea, China, and India) and central and eastern Europe. Nevertheless, compared with other manufacturing industries (textiles, consumer electronics) the shifts have been moderate. The three major manufacturing regions – western Europe, North America, and Japan – still account for close to three-quarters of world production. Tables 4.8 and 4.9 show production by different regions and countries in recent years.

While the newer locations have the advantages of lower labor costs, which were often a fraction of those in the older industrialized countries (see table 4.10), with the exception of Korea, none of the new auto-manufacturing countries has emerged as a major world center for motor vehicle production. The ability of the established auto-manufacturing countries to sustain their leadership points to the importance of local agglomeration factors driving competitiveness in the auto industry.

TABLE 4.8 World motor vehicle production by countries and regions (% of world total)

	1960	1989	1994	2000	2005
United States	52.0	23.8	24.5	22.2	20.0
Western Europe	38.0	31.7	31.2	29.9	28.4
Central and E. Europe	2.0	4.8	4.3	4.6	5.4
Japan	1.0	18.2	21.2	17.7	17.0
Korea	–	1.8	4.6	5.0	5.3
Other	7.0	19.7	14.4	20.6	24.0
Total units (millions)	12.8	49.5	50.0	57.4	60.5

Products for E. Europe and USSR included in "Other" for 1991 and 1992.

SOURCES: AAMA, *AUTOMOTIVE NEWS.*

TABLE 4.9 Automobile production by country (thousands; excludes trucks)

	1987	1990	1995	2000	2005
US	7,099	6,077	6,338	5,542	4,321
Canada	810	1,072	1,339	1,551	1,356
Mexico	266	346	710	1,130	846
Total N. America	*8,176*	*7,496*	*8,387*	*8,223*	*6,523*
Germany	4,604	4,805	4,360	5,132	5,350
France	3,052	3,295	3,051	2,883	3,113
Italy	1,701	1,874	1,422	1,442	726
UK	1,143	1,296	1,532	1,641	1,596
Spain	1,403	1,679	1,959	2,445	2,098
Sweden	432	336	390	260	289
Total W. Europe	*13,471*	*13,672*	*14,350*	*14,853*	*14,550*
Japan	7,891	9,948	7,664	8,363	9,017
Korea	793	987	1,893	1,881	2,195
Australia	225	361	284	324	320
China	n.a.	n.a.	356	620	3,118
India	n.a.	n.a.	n.a.	541	999
Taiwan	175	277	271	265	324
Former USSR	1,329	1,260	834	967	2,554
Poland	301	256	260	533	527
Brazil	789	663	1,312	1,348	2,009

SOURCES: JAPAN AUTOMOBILE MANUFACTURERS ASSOCIATION; KOREAN AUTOMOBILE MANUFACTURERS ASSOCIATION; *WARD'S AUTOMOTIVE YEARBOOK.*

Market Segments and Market Positioning

As already noted, despite the globalization of the leading automakers, the world market by 2004 was still composed of many national markets due to differences in national regulations and customer preferences, differences in affluence and infrastructure, trade restrictions, and the need for each manufacturer to build a dealership

TABLE 4.10 Hourly compensation for motor vehicle workers (US$ per hour, including benefits)

	1975	1984	1994	1998	2002	2004
US	9.55	19.02	27.00	27.21	32.35	33.95
Mexico	2.94	2.55	2.99	2.21	3.68	3.50
Japan	3.56	7.90	25.91	22.55	24.22	27.38
Korea	0.45	1.74	7.81	7.31	12.22	15.82
Taiwan	0.64	2.09	6.93	6.87	7.05	7.50
France	5.10	8.20	18.81	18.50	18.73	26.34
Germany	7.89	11.92	34.74	34.65	32.20	44.05
Italy	5.16	8.00	16.29	16.44	15.67	21.74
Spain	–	5.35	15.37	15.34	15.11	21.55
UK	4.12	7.44	15.99	20.07	21.11	29.40

SOURCE: US DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS.

network in each market it served. The world market was also segmented by types of product. At the top end of the market were "luxury cars" distinguished primarily by their price. There were also specific types of vehicle: sports cars, sport utility vehicles (SUVs), small passenger vans ("minivans"), and pickup trucks. Although industry statistics distinguish between automobiles and trucks – the latter being for commercial use – in practice, the distinction was less clear. In the US small pickup trucks were a popular alternative to automobiles; SUVs were also classed as trucks.

Margins varied considerably between product segments. The profitability of the US automakers during 1995–2004 was primarily the result of strong domestic demand for SUVs and pickup trucks – segments where they met limited competition. The luxury car segment, too, was traditionally associated with high margins. By contrast, small and medium-sized family cars have typically lost money. However, mobility barriers between segments tend to be low. Modular product designs and common platforms and components have facilitated the entry of the major manufacturers into specialty segments. As the pressure of competition has increased across all market segments, manufacturers have sought differentiation advantage through introducing models that combine design features from different segments ("crossover" vehicles).

Vertical segmentation was also an issue for the industry. Profitability varied across the different stages of the auto industry's value chain. The prevailing wisdom was that downstream activities offered better profit potential than manufacturing activities – certainly financial services (mainly customer and dealer credit) were far more profitable than vehicle manufacturing. It was this logic that had encouraged the auto companies to outsource and spin off most of their production of components.

The Outlook

As Alan Mulally reviewed projections by his corporate economics and strategy team for worldwide auto sales over the next three years, he wondered if favorable demand growth would provide much support for the industry's profit levels. Most of the

growth would come from emerging market countries. Here the world's leading manufacturers were racing to set up new plants. In the mature markets of North America, Europe, and Japan, fuel costs and environmental factors complicated the picture. Despite concerns over the imminent "death of the automobile," Ford's projections suggested that high gasoline prices and concern over emissions were more likely to boost demand as motorists switched to hybrid, diesel, and more fuel-efficient autos. Mulally's main concern was the possibility that buyers would "trade down" to smaller, more economical cars in preference to the SUVs and luxury cars that had long supported Ford's profits.

Similar uncertainties clouded the likely evolution of industry structure. During the 1990s, most observers had assumed that scale economies would cause continuing consolidation of the industry to the point where only six major full-line car companies would survive. Certainly the industry had consolidated during the past decade: however, not only were some of the medium-sized carmakers stable and profitable (BMW, Renault, Peugeot), but several of the emerging-market newcomers were expanding internationally (e.g. Tata Motor and Maruti of India, Koc of Turkey, and Shanghai Auto).

Appendix
The World's Major Automobile Producers, Sales, and Profitability 1980–2003

TABLE 4.A1 Company sales ($ billion)

	1980–4*	1985–9*	1990–4*	1995–9*	2000	2001	2002	2003	2004	2005
GM	68	110	128	169	185	177	187	186	194	193
Ford	42	77	96	149	170	162	163	164	172	177
DaimlerChrysler	–	–	–	147	152	136	157	172	192	177
Chrysler	13	28	39	58	–	–	–	–	–	–
Daimler Benz	12	34	59	71	–	–	–	–	–	–
Toyota	18	42	82	107	121	106	107	129	164	173
VW	16	28	48	64	79	78	91	109	121	113
Honda	8	18	35	50	58	52	55	67	76	80
Fiat	18	27	42	50	53	58	55	61	67	55
Nissan	16	26	51	57	55	49	47	57	80	81
Peugeot	13	19	28	35	41	46	57	68	78	67
Renault	15	31	31	37	37	32	38	47	53	47
BMW	5	10	21	34	33	34	44	52	60	55
Mitsubishi	12	14	25	32	30	26	24	32	24	20
Hyundai Motor	n.a.	n.a.	n.a.	18	29	30	40	39	51	58
Mazda	n.a.	12	21	18	16	16	16	20	28	25

* Annual average.

SOURCES: COMPANY FINANCIAL STATEMENTS.

TABLE 4.A2 Company profitability (return on equity, %)

	1980–4	1985–9	1990–4	1995–9	2000	2001	2002	2003	2004	2005
GM	11.4	11.8	3.2	27.5	14.8	3.0	25.6	15.1	13.1	n.a.
Ford	0.4	21.8	5.9	35.4	18.6	–70.0	–17.5	4.2	26.3	18.8
DaimlerChrysler	–	–	–	15.9	18.3	–1.7	13.5	1.3	7.0	8.0
Chrysler	66.5	20.8	2.0	24.5	–	–	–	–	–	–
Daimler Benz	24.3	18.3	6.9	22.1	–	–	–	–	–	–
Toyota	12.6	10.6	6.1	6.8	7.5	9.5	7.7	10.5	15.2	13.6
VW	1.6	6.3	–0.4	11.1	12.1	10.5	–	4.4	3.0	4.7
Honda	18.1	11.8	5.3	15.1	11.8	10.6	14.0	16.1	13.5	11.9
Fiat	10.9	18.7	6.8	7.6	4.9	5.0	–3.7	–51.3	–75.9	3.5
Nissan	10.3	4.7	3.6	–0.1	39.2	36.4	23.0	27.2	20.8	17.2
Peugeot	–15.2	36.7	12.5	3.0	13.8	15.3	14.6	12.1	11.3	n.a.
Renault	–152.4	51.1	9.1	11.0	11.0	10.1	16.4	17.6	18.3	17.6
BMW	14.8	10.4	9.7	–4.0	20.6	17.3	14.5	11.8	12.7	13.2
Mitsubishi	10.0	7.9	4.8	–5.3	–123.2	n.a.	3.9	12.5	–470.0	–131.7
Hyundai Motor	n.a.	n.a.	n.a.	4.4	8.9	10.0	10.7	12.5	11.0	n.a.
Mazda	n.a.	4.8	5.0	6.3	–110.7	–93.2	4.9	12.0	15.8	17.1

SOURCE: *COMPANY FINANCIAL STATEMENTS.*