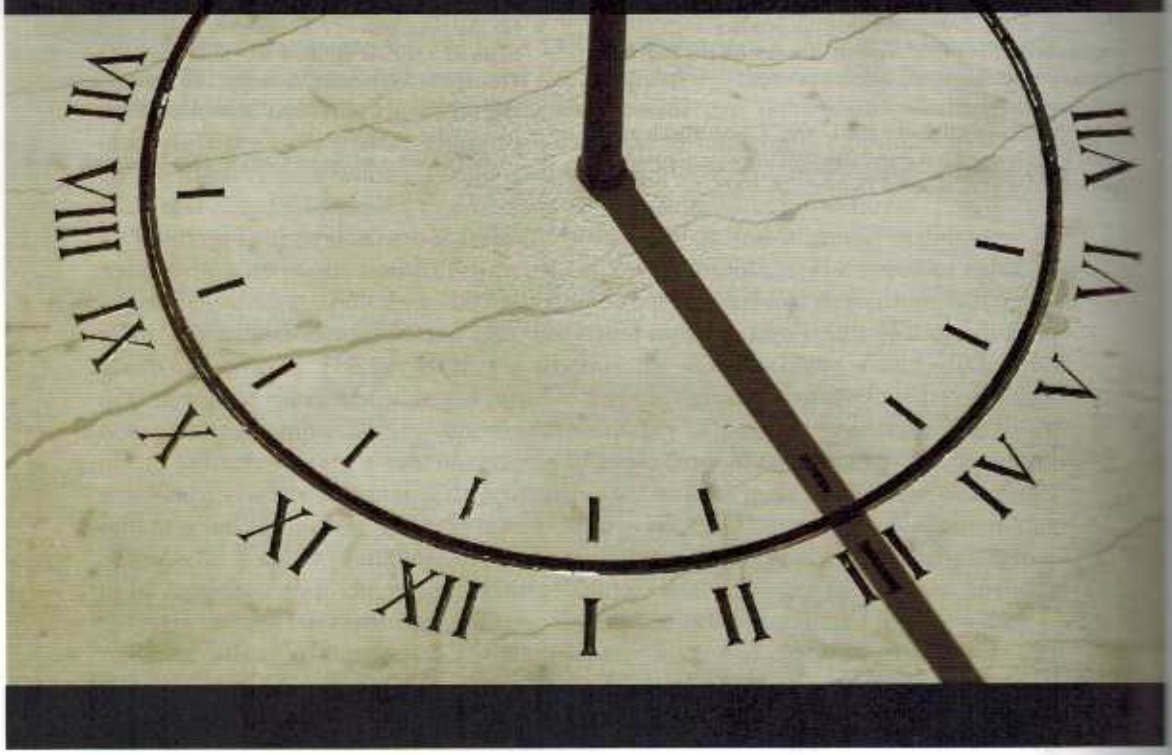
Case 4 Ford and the World Automobile Industry in 2009



Ford in Crisis

By June 2009, Ford Motor Company was the only remaining member of Detroit's "Big Three" to have escaped bankruptcy. Chrysler had filed for Chapter 11 protection on April 30; General Motors had followed on June 1. For Chief Financial Officer, Lewis Booth, the eight months since his appointment in November 2008 had involved unremitting pressure. The financial crisis that followed the collapse of Lehman Brothers in September 2008 had engulfed the entire U.S. automobile sector. By the time President Obama took office in January 2009, U.S. auto sales were half of those a year previously. This fall in demand was unprecedented in the industry's history. Ford reported a $14.7 billion loss for 2008; a result of which was the elimination of stockholders' equity.[1]

TABLE 4.1 Ford estimates of U.S. sales and its own financial needs

	Forecast U.S. auto sales (million units)			Ford's estimated additional financing requirement ($ billion)
	2009	2010	2011	
GDP decline of 3%; recession persists throughout 2009	11.0	12.5	14.0	9
More severe slump persisting into 2010	10.5	11.0	12.0	13

Source: Ford Motor Company, Business Plan Submitted to the Senate Banking Committee, December 2, 2008.

Booth's attention had, by June 2009, shifted from short-term survival to the longer term financial outlook for Ford. The evidence that Ford had submitted to the Senate Banking Committee in December 2008 had estimated the company's financing needs on the basis of "current-rates" and "worst-rates" growth scenarios (See Table 4.1). Since then the world economy had stabilized and some forecasters were predicting that the U.S. economy would begin growing again in 2010. For the world auto industry, government incentives for scrapping old cars and purchasing new, fuel-efficient models had done much to stabilize demand—especially in Europe. Ford's results for the first quarter of 2009 showed signs of improvement: despite a continuing fall in sales, its $1.4 billion loss for the quarter was much smaller than the loss in each of the previous two quarters.

As the short-term threat of insolvency receded, Booth turned increasingly to Ford's longer term financial outlook. In December 2008, Booth had forecast that Ford would break even in 2011. Ford's cost-reduction measures had already begun to bear fruit—it had started its restructuring long before GM and Chrysler. During 2009 it would see the benefits of its plant closures, its early switch to smaller, more fuel-efficient cars and the sale of its loss-making Jaguar, Land Rover and Aston Martin subsidiaries.

However, Booth recognized that Ford's return to profitability would depend not only on its own efforts, but also upon the state of the automobile industry in a post-recessionary world. While the short-term outlook of the industry improved over the later part of 2009, the long-term outlook became more alarming.

Booth had taken comfort in the fact that Ford's stronger operational and financial performance would allow it to emerge as one of the survivors of the crisis while weaker competitors failed. A similar view was taken by Daimler Benz's CEO who predicted that 2009 would be a "Darwinian year" for the auto industry. Yet, by June 2009, there was little evidence of competitive selection:

> [I]nstead of natural selection, something else happened: governments around the world, from Canada and Brazil to Russia and South Korea, stepped in with prodigious amounts of cash to keep car plants open and assembly lines running.
>
> All told, automakers have benefited from well in excess of $100 billion of direct bail-out funds or indirect state aid, such as scrappage schemes, since global sales collapsed last October—in nominal terms, the biggest ever short-term intervention in manufacturing.
>
> All this money has preserved jobs in car making, still the linchpin of many industrial economies. But the money has also prevented a necessary shake-out in an industry that has long had too many producers. Consultants at PwC

estimate the industry has the capacity to build 86 million units this year, almost a record—and 31 million more than the 55 million vehicles that it will sell. "What appeared to be a unique opportunity to address the industry's biggest issue—excess capacity—has been missed," says Michael Tyndall, an analyst with Nomura. In Europe not a single plant has closed permanently, thanks to bail-outs.

"The shape of the industry looks all but the same, except that governments have tipped lots of money in and prevented Darwinian selection," says Max Warburton, analyst at Sanford Bernstein. "It has been a good reminder of what this industry is: a government-supported job creation scheme."

Long-term observers of the industry point out that it has never operated on the pure free-market principles. Governments have always intervened in hard times. The status of many carmakers as national champions is bolstered by dynastic family owners at about half the big producers, who often rank continuity and control above shareholder value. Both they and governments form a big obstacle to consolidation.[2]

The thought of an industry structure that was barely changed from that of the past decade was profoundly depressing to Booth: between 1990 and 2008 the world's five biggest auto makers (GM, Toyota, Ford, Daimler-Chrysler and Volkswagen) had earned on average net margin of 1.1%; their return on invested capital had been far below their cost of capital and together they had destroyed billions in shareholder value. However, even in the absence of consolidation among existing auto makers, it was clear that the structure of the industry was far from remaining static. The shifting of demand from the mature industrial nations to the growing markets of Asia, Eastern Europe and Latin America was accompanied by the emergence of new competitors from these same regions. At a more fundamental level, the combined forces of technology and environmental concerns were redirecting the industry's evolutionary path. Ford planned to introduce all-electric commercial vans in 2010 and all-electric automobiles in 2011.[3]

Development of the World Automobile Market[4]

The Evolution of 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 U.S. market saw its fastest rates of growth during 1910–28 and then after the Second World War. Since the mid-1960s, the combined output of autos and trucks was broadly stable—despite cyclical fluctuations (see Figure 4.1). Western Europe and Japan also experienced maturing of their markets with production peaking in 1989–90. In all the advanced industrial countries, the tendency for cars to last longer created a downward trend in the demand for motor vehicles well before the 2008 recession (see Figure 4.2).

As a result, the automobile producers looked increasingly to the newly industrializing countries for market opportunities. During the 1980s and 1990s,

FIGURE 4.1 U.S. motor vehicle production, 1900–2008

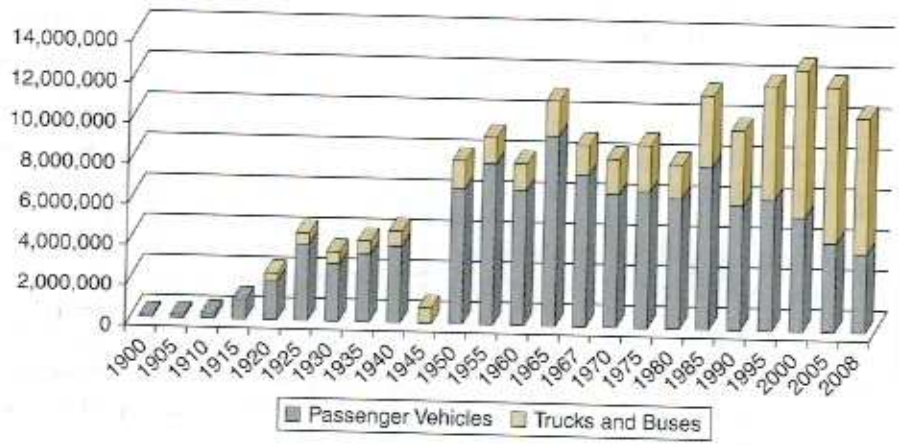
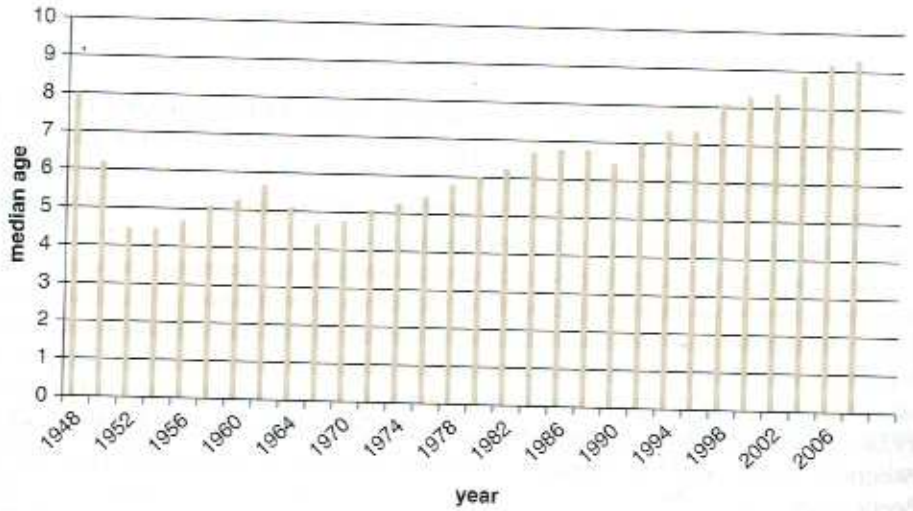


FIGURE 4.2 Median age of passenger cars in the U.S.



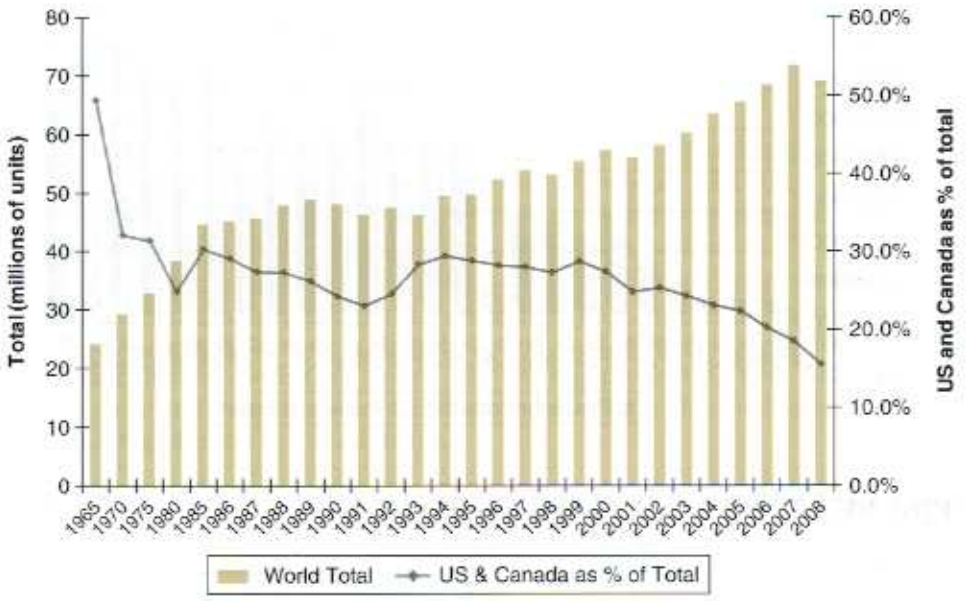
Source: R. L. Polk & Co.

newly industrializing countries such as Korea, Malaysia, Thailand, Turkey, and Argentina offered the best growth prospects. During 2000 to 2009, the BRIC countries (Brazil, Russia, India, and China) were the world's primary growth markets. As a result, the world production of cars and trucks continued to grow (see Figure 4.3).

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 4.3 World motor vehicle production, 1950–2008



Early motorcars demonstrated a bewildering variety of technologies. During the early years, the internal-combustion engine vied with the steam engine and eclectic motors. Internal combustion engines featured 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 technology and design features of the Model T set a standard for other manufacturers to imitate. Convergence of technologies and designs continued throughout the twentieth century. During the 1920s, all manufacturers adopted enclosed, all-steel bodies. The final decades of the twentieth century saw the elimination of most distinctively different designs: the VW Beetle with its rear, air-cooled engine, the Citroën 2-CV and its idiosyncratic braking and suspension system, Daf with its "Variomatic" transmission, and the two-stroke engines favored by some Soviet-bloc manufacturers. Engines became more similar: typically four cylinders arranged in line, with V-6 and V-8 configurations for larger cars. Front-wheel drive became standard on smaller cars; suspension, steering, braking systems and body shapes became more similar. Technological progress was incremental: innovations primarily involved new applications of electronics, new materials and new safety features. The main advances were multi-valve cylinders, traction control systems, all-wheel drive, electronic fuel injection, variable suspensions, intercooled turbos, satellite navigation systems, collision-avoidance radar and intelligent monitoring systems.

Despite less differentiation between manufacturers, new product segments have continued to appear. New vehicle types include a number of "crossovers" such as luxury SUVs and "mini-SUVs."

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 U.S., 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, distinctive national differences persist. For example, during 2000–8 light trucks (pickups and SUVs) outsold passenger cars in the U.S. In Japan, microcars, such as the Suzuki Cervo, have grabbed 35% of the total car market.

This trend toward design convergence and slowing of technological change was interrupted by one major technological development. In 1997 both Toyota and Audi introduced mass-production hybrid cars—almost 100 years after Ferdinand Porsche had developed the first hybrid car in which an internal combustion engine powered an electric motor. By 2009, hybrids accounted for 12% of the Japanese market and 3% of the U.S. market. Several major automobile manufacturers, including GM, Daimler, Mitsubishi, and Subaru, planned to launch all-electric cars in the latter part of 2009 through to 2010, once more revisiting the early years of the auto industry—in 1900, 28% of all automobiles produced in the U.S. were all electric.

The Evolution of Manufacturing Technology

At the beginning of the twentieth 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 1000 vehicles. When Henry Ford began production in 1903, he used a similar approach—even for early versions of his Model T. His vision of an affordable, mass-produced automobile depended on the development of more precise machine tools that would permit interchangeable parts. By 1913, he had overcome the technical challenges of his new system of production. Components were produced either in batches or continuously and 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.

"Fordism" was the first major revolution in process technology; Toyota's "lean production" was the second. The system was developed by Toyota in postwar Japan at a time when shortages of key materials encouraged extreme parsimony and avoidance of inventories and waste. 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 process technologies reduced the extent of scale economies in assembly. Optimal manufacturing efficiency once required giant assembly plants with outputs of at least 400 000 units a year. After 1990, most new assembly plants had capacities

of between 150 000 and 300 000 units per annum. Scale economies in components and subassemblies were much more important. The minimum efficient scale for an engine plant was around 1 million units annually.

New Product Development

Scale economies were far more important in new product development: huge development costs needed to be amortized over large numbers of vehicles.

Increasing design complexity, the application of electronics, and new safety and environmental standards caused the cost of developing new models to rise steeply. By the 1990s the cost of creating an entirely new, mass-production passenger car from drawing board to production line was in excess of $1.5 billion. Ford's Mondeo/Contour—its first entirely global model—launched in 1994 cost a total of $6 billion (including tooling costs).

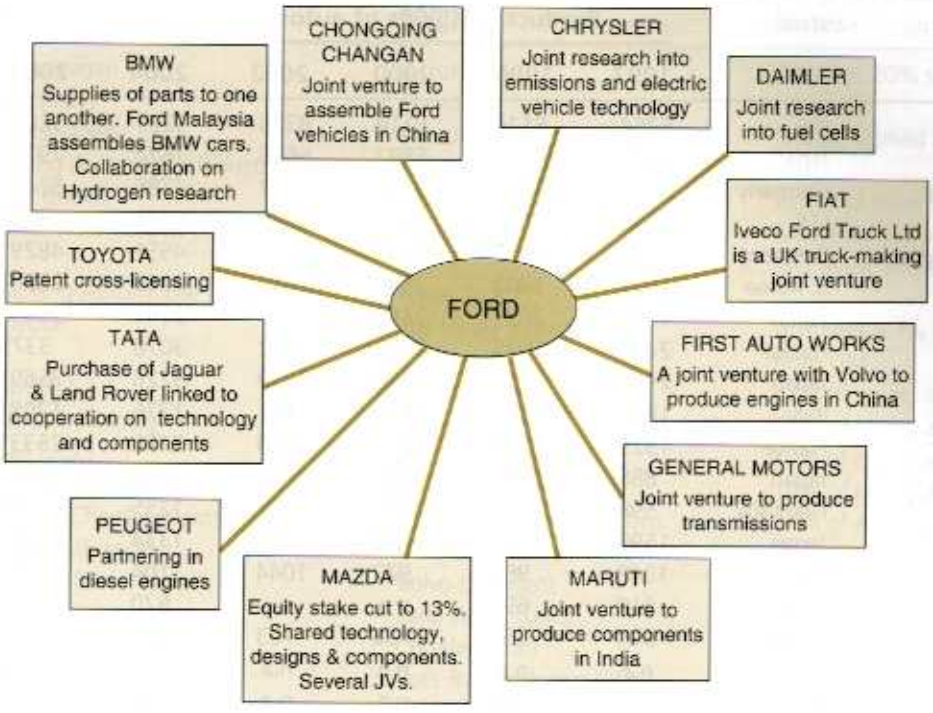
Smaller manufacturers could survive only by avoiding these massive product development costs. One way was to avoid new model changes. Prior to its acquisition by Ford, Jaguar's two models, the XJ6 and XJS, were almost two decades old. The tiny Morgan car company has made the same model since the late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

The cost of new product development has been the major driver of mergers and acquisitions in the industry. Economies from sharing development costs also encouraged increased collaboration and joint ventures. In 2009, the automobile industry was a global network of collaborative arrangements. These included joint-venture plants, technology alliances, component supply agreements and joint marketing agreements. In emerging market countries, most new auto plants were joint ventures between local and overseas companies. Figure 4.4 shows Ford's alliances with other automobile producers.

During the 1990s, new product development emerged as the critical organizational capability differentiating car manufacturers. Designing, developing and putting into production a completely new automobile was a hugely complex process involving every function of the firm, up to 3000 engineers, collaboration with several hundred suppliers and up to five years from drawing board to market launch. The team-based approach to new product development put in place by Toyota and Honda became models for all the major manufacturers. The result was a significant reduction in product development time.

Attempts to lower product development costs focused around three concepts. First, modular designs: the disaggregation of the vehicle into a number of separate subassemblies. Second, "virtual prototyping": the use of 3D computer graphics to design and test prototypes. Third, the development of shared platforms for multiple models. A "platform" comprised a vehicle's architecture including its floorpan, suspension system and layout of powertrain and major components. From 2000 to 2009 there was an important trend towards building multiple models on a single platform in order to exploit scale economies and to facilitate new product development. 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-6 and I-4 (four in-line cylinders). The I-4 engine has over 100 variations; it has an annual volume of 1.5 million and is built at three

FIGURE 4.4 Ford's alliances with other automakers



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."

The Industry

The Manufacturers

The major automobile manufacturers are shown in Table 4.2. The ranks of the leading producers were dominated by U.S., Japanese, and European companies; outside of 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 U.S. than within it; Honda produces more Accords in the U.S. 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 4.3). The financial problems of Japanese and Korean auto companies during the late 1990s accelerated this process. As a result, U.S. and European carmakers acquired significant proportions of the Japanese and Korean auto industries. The financial crisis of 2008–9 resulted in little consolidation: Fiat's acquisition of Chrysler was the only major merger. In fact, the

TABLE 4.2 The world's leading auto manufacturers

		Production ('000s of autos and commercial vehicles)						
		1992	1996	2000	2002	2004	2005	2007
GM	U.S.	6764	8176	8114	8326	9221	9200*	9350
Toyota	Japan	4249	4794	5897	6626	7674	7974*	8534
Volkswagen	Germany	3286	3977	5106	5017	4785	5243*	6268
Ford	U.S.	5742	6611	7206	6729	6721	6818*	6248
DaimlerChrysler	Germany	2782	4082	4666	4456	4551	4829*	4635
Hyundai[a]	S. Korea	874	1402	2488	2642	2283	2534*	3987
Honda	Japan	1762	2021	2469	2988	3141	3391*	3912
Peugeot	France	2437	1975	2879	3262	3078	3375	3457
Nissan	Japan	2963	2712	2698	2719	3226	3569*	3431
Fiat	Italy	1800	2545	2639	2191	1776	1708*	2679
Renault[b]	France	1929	1755	2515	2329	2490	2533*	2669
Suzuki	Japan	888	1387	1434	1704	2392	2630	2596
BMW	Germany	598	641	835	1091	1255	1328*	1542
Mitsubishi	Japan	1599	1452	1613	1821	1334	1381	1412
Mazda	Japan	1248	984	972	1044	1104	1149*	1287
Daihatsu	Japan	610	691	n.a.	n.a.	870	909	856
AvtoVAZ	Russia	674	562	756	703	727	732	736
FAW	China	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	691
Tata	India	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	588
Fuji (Subaru)	Japan	648	525	581	542	555	571	585
Isuzu	Japan	473	462	572	437	578	642	532

n.a. = not available.

* Sales data.

[a] Including Kia.

[b] Including Dacia and Samsung.

Source: Ward's Automotive Yearbook

main outcome was further fragmentation (e.g. GM's attempts to sell its Saab and Opel subsidiaries). In the meantime, a number of domestically focused manufacturers—especially from China and India—were building a global presence.

Outsourcing and the Role of Suppliers

Henry Ford's system of mass production was supported by heavy backward integration. At Ford's giant River Rouge plant, iron ore entered at one end, Model T's emerged at the other. Ford even owned rubber plantations in the Amazon basin. The trend of the past 30 years has been towards increasing outsourcing of materials, components, and services in order to achieve lower costs and increased flexibility. 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. The Japanese model of close,

TABLE 4.3 Mergers and acquisitions among automobile manufacturers, 1986–2009

Year	Acquirer	Target	Notes
2009	Volkswagen	Suzuki	Acquires 20% stake
2009	Fiat (Italy)	Chrysler	
2009	Volkswagen	Porsche	Merger agreed
2009	Beijing Automotive Industry Corp.	Fujian Motor; Changfeng Motor	
2008	Tata (India)	Jaguar Cars, Land Rover (U.K.)	Acquired from Ford
2008	SAIC Motor Group (China)	Nanjing Automobile	SAIC now owns both MG and Rover brands
2005	Nanjing Automobile (China)	Rover (U.K.)	
2005	Toyota	Fuji Heavy Industries	Acquired 8.7% stake from GM
2002	GM (U.S.)	Daewoo (South Korea)	42% of equity acquired
2000	Renault (France)	Samsung Motors (South Korea)	70% of equity acquired
2000	GM (U.S.)	Fiat (Italy)	20% of equity acquired
2000	DaimlerChrysler (Germany)	Hyundai (South Korea)	10% of equity acquired
2000	DaimlerChrysler (Germany)	Mitsubishi Motors (Japan)	34% of equity acquired
1999	Renault (France)	Nissan (Japan)	38.6% of equity acquired
1999	Ford (U.S.)	Volvo (Sweden)	Acquires car business only
1999	Ford (U.S.)	Land Rover (U.K.)	Acquired from BMW
1998	Daimler Benz (Germany)	Chrysler (U.S.)	Biggest auto merger ever
1998	VW (Germany)	Rolls Royce Motors (U.K.)	Acquired from Vickers plc
1998	Hyundai (South Korea)	Kia (S. Korea)	
1998	Daewoo (South Korea)	Ssangyong Motor (South Korea)	
1998	Daewoo (South Korea)	Samsung Motor (South Korea)	
1997	Proton (Malaysia)	Lotus (U.K.)	
1997	BMW (Germany)	Rover (U.K.)	
1996	Daewoo (South Korea)	FSO (Poland)	
1996	Daewoo (South Korea)	FS Lublin (Poland)	
1995	Fiat (Italy)	FSM (Poland)	
1995	Ford (U.S.)	Mazda (Japan)	
1994	Daewoo (S. Korea)	Oltcit/Rodae (Romania)	
1991	VW (Germany)	Skoda (Czech Republic)	
1990	GM (U.S.)	Saab-Scandia (Sweden)	50% of equity acquired
1990	Ford (U.S.)	Jaguar (U.K.)	
1987	Ford (U.S.)	Aston Martin (U.K.)	
1987	Chrysler (U.S.)	Lamborghini (Italy)	
1986	VW (Germany)	Seat (Spain)	

Source: newspaper reports.

collaborative long-run relationships with their "first-tier" suppliers has displaced the U.S. model of contract-based, arm's-length relationships. United States' and European automakers now have long-term relationships with a far smaller number of 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

TABLE 4.4 Revenues and profitability of the biggest automotive component suppliers

	Revenues ($ billion)			ROA (%)
	1994	2000	2008	2008
Robert Bosch (Germany)	19.6	29.1	58.5	1.7
Denso Corp. (Japan)	11	18.2	40.3	6.7
Johnson Controls (U.S.)	7.1	17.2	35.9	0.6
Aisin Seiki (Japan)	7.3	8.9	27.1	4.4
Magna International (Canada)	–	10.5	23.7	0.1
Delphi Automotive (U.S.)	–	29.1	18.1	n.a.
Eaton (U.S.)	4.4	8.3	15.4	6.6
Lear Corp (U.S.)	3.1	14.1	13.6	(1.0)
Valeo SA (France)	3.8	8.9	11.4	(3.2)
Visteon (U.S.)	–	19.5	9.5	1.2
Dana (U.S.)	5.5	12.7	8.7	n.a.

n.a. = not available.

Source: Company financial statements, Forbes.

equipment—they have also grown in size and global reach. Bosch, Denso, Johnson Controls and Delphi are almost as big as some of the larger automobile companies (see Table 4.4).

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.* Outsourcing has grown from individual components to major subassemblies (such as engines and steering systems) to complete cars as has been noted above. In addition, auto firms have developed original equipment manufacturer supply arrangements amongst themselves: Chery of China and Hyundai each produce cars for Chrysler, which are sold under the Dodge badge in North America.
- *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 U.S.
- *Collaboration.* Ford's alliances (see Figure 4.4) are typical of the joint technology and product development among automobile companies intended to share costs.

Despite constant efforts at lowering costs, the major automakers were unable to achieve the unit costs of upstart producers in China, India, and other low labor cost countries. Tata Motors' launch of its Nano model in 2009 underlined the challenges faced by the global majors. The Nano was a four-seater, 623cc city car, which achieves almost 70 miles per gallon of gasoline. However, what gained the attention of all the world's automakers was its price: at 115 000 rupees ($2420) it was the world's cheapest new car.

Excess Capacity

The greatest structural problem of the industry was excess capacity. Ever since the early 1980s, the growth of production capacity had outstripped the growth in the demand for cars. Import restrictions had exacerbated the problem. During the 1980s and early 1990s, North American production capacity grew substantially as a result of Japanese companies building greenfield "transplants." The opportunities presented by the growth of private motoring in Eastern Europe, Asia and Latin America during the 1990s resulted in a rush by all the world's leading automakers to build new plants in these countries. Further big additions to world production capacity resulted from the expansion of the Korean car industry during 1992–7. Even where demand was growing fastest—such as China, where sales grew annually by almost 50% between 2002 and 2008—growth of capacity outstripped growth in demand. At the beginning of 2009, CSM Worldwide estimated global excess capacity at 34 million units (see Table 4.5).

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 U.S., PSA in Slovakia, and at least a dozen other new plants in China and India.

Internationalization

Accessing growing markets, exploiting scale economies in purchasing, technology, and new product development were the main drivers of international

TABLE 4.5 Automobile production capacity, January 2009

	Production capacity (millions of units per year)	Production (millions of units per year)	Excess capacity (millions of units per year)
North America	17.3	10.1	7.2
South America	5.5	3.7	1.8
Europe	27.3	17.8	9.5
Middle East and Africa	2.5	1.7	0.8
Japan and Korea	17.3	13.9	3.4
South Asia	8.3	4.7	3.6

Source: CSM Worldwide.

expansion. Although Ford and General Motors began international expansion back in the 1920s, until the 1970s the world auto industry was made up of fairly separate national markets where each national market was dominated by indigenous producers. Each of the larger national markets was supplied primarily by domestic production and manufacturers tended to be market leaders. Internationalization has meant that, while there are now far fewer automakers in the world as a whole, concentration has declined in most national markets. For example, in 1970 the "Big Three" (GM, Ford, and Chrysler) held close to 85% of the U.S. market, VW and Daimler Benz dominated the market in Germany, as did Fiat in Italy, British Leyland (later Rover) in the U.K., Seat in Spain, and Renault, Peugeot, and Citroën 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).

The rise of new markets and the quest for low production costs has resulted in major shifts in global distribution of production (see Tables 4.7 and 4.8). Between

TABLE 4.6 Automobile market shares in individual countries (%)

	1988	2006		1988	2006
U.S.			**U.K.**		
GM	36.3	23.5	Ford	26.3	18.5
Ford	21.7	16.7	GM (Vauxhall)	13.7	12.7
DaimlerChrysler	11.3	10.8	Peugeot	8.7	10.0
Toyota	6.9	13.9	VW	n.a.	12.9
Honda	6.2	8.8	BMW/Rover	15.0	4.6
France			**Japan**		
Renault	29.1	24.8	Toyota	43.9	40.4
Peugeot	34.2	28.2	Nissan	23.2	14.0
VW	9.2	11.6	Honda	10.8	12.2
Ford	7.1	6.0	Suzuki	n.a.	12.1
Italy			**Korea**		
Fiat	59.9	28.5	Hyundai	55.9	50.0
VW	11.7	10.8	Kia	25.0	23.3
Ford	3.7	7.8	Daewoo	19.1	10.0
Peugeot	n.a.	9.6			
Renault	7.1	6.4			
Germany					
VW/Audi	28.3	27.8			
GM (Opel)	16.1	9.7			
Ford	10.1	8.0			
Mercedes	9.2	11.3			

n.a. = not available.

Sources: Japan Automobile Manufacturers Association; Korean Automobile Manufacturers Association; A. K. Binder (ed.), Ward's Automotive Yearbook, 2009, Wards Communications, Southfield MI, 2009.

TABLE 4.7 World motor vehicle production by countries and regions (percentage of world total)

	1960	1989	1994	2000	2005	2008
U.S.	52.0	23.8	24.5	22.2	20.0	18.6
Western Europe	38.0	31.7	31.2	29.9	28.4	20.7
Central and E. Europe	2.0	4.8	4.3	4.6	5.4	9.5
Japan	1.0	18.2	21.2	17.7	17.0	16.7
Korea	–	1.8	4.6	5.0	5.3	5.5
Other	7.0	19.7	14.4	20.6	24.0	29.0
Total units (millions)	12.8	49.5	50.0	57.4	66.8	69.4

Source: A. K. Binder (ed.), Ward's Automotive Yearbook, 2009, Wards Communications, Southfield MI, 2009.

1990 and 2008, China, Korea, Brazil and India established themselves among the world's leading motor-vehicle producers as a result of rapidly growing domestic markets and low production costs. Nevertheless, the continued leadership of Germany, Japan and the U.S., despite their high costs, pointed to the power of agglomeration effects in maintaining the competitiveness of long-established production centers.

TABLE 4.8 Top-15 automobile-producing countries, 2008 (thousands of cars; excludes trucks)

	1987	1990	1995	2000	2005	2008
Japan	7891	9948	7664	8363	9017	9916
China	n.a.	n.a.	356	620	3118	6341
Germany	4604	4805	4360	5132	5350	5532
U.S.	7099	6077	6338	5542	4321	3777
Brazil	789	663	1312	1348	2009	2561
Korea	793	987	1893	1881	2195	2436
France	3052	3295	3051	2883	3113	2144
Spain	1403	1679	1959	2445	2098	2014
India	n.a.	n.a.	n.a.	541	999	1507
Russia*	1329	1260	834	967	1288	1469
U.K.	1143	1296	1532	1641	1596	1448
Mexico	266	346	710	1130	846	1217
Canada	810	1072	1339	1551	1356	1195
Poland	301	256	260	533	527	840
Italy	1701	1874	1422	1442	726	659

*U.S.S.R. in 1987 and 1990.

Sources: Japan Automobile Manufacturers Association; Korean Automobile Manufacturers Association; A. K. Binder (ed.), Ward's Automotive Yearbook, 2009, Wards Communications, Southfield MI, 2009.

TABLE 4.9 Hourly compensation for motor vehicle workers (U.S.$ per hour, including benefits)

	1975	1984	1994	1998	2002	2004	2006
Germany	7.89	11.92	34.74	34.65	32.20	44.05	45.93
U.S.	9.55	19.02	27.00	27.21	32.35	33.95	35.12
U.K.	4.12	7.44	15.99	20.07	21.11	29.40	29.95
France	5.10	8.20	18.81	18.50	18.73	26.34	29.41
Japan	3.56	7.90	25.91	22.55	24.22	27.38	27.84
Spain	-	5.35	15.37	15.34	15.11	21.55	24.18
Korea	0.45	1.74	7.81	7.31	12.22	15.82	19.04
Italy	5.16	8.00	16.29	16.44	15.67	21.74	18.62
Mexico	2.94	2.55	2.99	2.21	3.68	3.50	3.73

Source: U.S. Department of Labor, Bureau of Labor Statistics.

The Outlook

As he revisited his financial forecasts for the next planning period, Booth realized that Ford's ability to generate profit would depend not just upon the recovery of demand in the world automobile market but also upon how competition would affect the kinds of profit margin that the industry would be earning over the next four years. What would happen in terms of mergers, capacity rationalization, and entry by emerging market manufacturers into world markets would clearly have a major impact on the overall margins that the industry would earn. As of June 2009, there was little evidence that the structural changes anticipated by many industry insiders were materializing. In particular, there was no evidence that recession and scale economies were pushing the industry towards radical consolidation. Despite the widely held belief that the minimum efficient scale for a full-line automobile producer was five million units annually, some of the industry's most successful companies— such as BMW, Suzuki, SAIC, and Tata Motor—had output far below this threshold. Meanwhile, General Motors and Ford with output well in excess of five million units annually were struggling for survival.

Booth also recognized that, despite the appearance of the industry becoming ossified by government support for existing carmakers, there was also the potential for radical change. The combination of environmental concerns and technological change might lead to a number of different scenarios. With global warming accelerating, government regulation and consumer preferences seemed likely to accelerate the shift from large to small cars and hasten the obsolescence of the internal combustion engine. The transition to electric vehicles would offer opportunities for a range of new entrants into the industry—particularly those companies with well-developed capabilities in electrical engineering. Environmental concerns—particularly rising urban congestion—might also result in a dramatic decline in private transportation in favor of public transportation, or possibly private motoring based upon short-term rental rather than car ownership.

Booth was particularly cognizant of the industry's propensity to retain outmoded assumptions concerning the automobile market and its economic drivers—indeed, this was a primary reason why the Detroit "Big Three" were in such a dire predicament. These deeply entrenched assumptions included: the belief that scale economies were the primary drivers of competitiveness, that there was no viable alternative to the internal combustion engine, that efficiency required offering a full range of models, that big cars were more profitable than small cars, and that consumers always preferred more—in terms of size and accessories—to less. Recent events had confounded many of these assumptions. Conventional notions about the attractiveness of different product segments appeared to be breaking down: some of the most popular—and profitable—new product launches had been small cars: the BMW Mini and Fiat Cinquecento in particular. The global success of the Toyota Prius and Honda Insight pointed to environmental awareness among consumers even in the absence of government inducements. New approaches to product development—including virtual prototyping, modular design and collaborative design and development—have the potential to overturn conventional relationships between scale and competitiveness. The efficiency-based logic of mass production is also being challenged by new developments in flexible manufacturing and increased opportunities for customization. Part of the appeal of the BMW Mini and Fiat Cinquecento has been their vast potential for customization.

Appendix

TABLE 4.10 Company sales ($ billion)

	1980–4[a]	1985–9[a]	1990–4[a]	1995–9[a]	2000-4[a]	2005	2006	2007	2008
GM	68	110	128	169	186	193	207	181	149
Ford	42	77	96	149	166	177	160	172	146
Chrysler	13	28	39	58	–	–	n.a.	60	n.a.
Daimler[b]	12	34	59	71	166	177	200	146	135
Toyota	18	42	82	107	125	173	179	203	265
VW	16	28	48	64	96	113	138	160	160
Honda	8	18	35	50	62	80	84	94	121
Fiat	18	27	42	50	59	55	68.4	86.1	83.7
Nissan	16	26	51	57	58	81	89	109	91
Peugeot	13	19	28	35	58	67		89	77
Renault	15	31	31	37	44	47	55	60	53
BMW	5	10	21	34	45	55	65	82	
Mitsubishi	12	14	25	32	27	20	41	43	61
Hyundai Motor	n.a.	n.a.	n.a.	18	38	58	68	74	
Mazda	n.a.	12	21	18	19	25	25	28	35

[a] Annual average.

[b] Daimler Chrysler 2000–6.

n.a. = not available.

Source: Company financial statements; Hoovers.

TABLE 4.11 Company profitability (return on equity, %)

	1980–4[a]	1985–9[a]	1990–4[a]	1995–9[a]	2000–4	2005	2006	2007	2008
GM[b]	11.4	11.8	3.2	27.5	11.7	n.c.	n.c.	n.c.	n.c.
Ford	0.4	21.8	5.9	35.4	(7.7)	18.8	n.c.	(48.2)	n.c.
Chrysler	66.5	20.8	2.0	24.5	–	–	n.a.	n.a.	n.a.
Daimler	24.3	18.3	6.9	22.1	7.7	8.0	9.5	13.1	5.5
Toyota	12.6	10.6	6.1	6.8	10.1	13.6	12.6	12.9	(5.0)
VW	1.6	6.3	(0.4)	11.1	6.8	4.7	7.3	13.0	13.4
Honda	18.1	11.8	5.3	15.1	13.2	11.9	11.3	11.1	1.3
Fiat	10.9	18.7	6.8	7.6	(24.2)	3.5	16.0	28.3	23.3
Nissan	10.3	4.7	3.6	(0.1)	29.3	17.2	13.0	13.7	(8.9)
Peugeot	(15.2)	36.7	12.5	3.0	13.4	n.a.	n.a.	5.8	(3.8)
Renault	(152.4)	51.1	9.1	11.0	14.7	17.6	14.2	12.7	3.2
BMW	14.8	10.4	9.7	(4.0)	15.4	13.2	14.5	11.8	12.7
Mitsubishi	10.0	7.9	4.8	(5.3)	(113.3)	(131.7)	3.7	11.2	(25.7)
Hyundai Motor	n.a.	n.a.	n.a.	4.4	10.6	n.a.	10.7	12.5	11.0
Mazda	n.a.	4.8	5.0	6.3	(34.2)	17.1	4.9	12.0	15.8

[a] Annual average.

[b] GM made a net loss of $2billion in 2006, $39 billion in 2007 and $31 bn. in 2008.

n.a. = not available.

n.c. = not calculable (shareholders' equity negative).

Source: Company financial statements; Hoovers.

Notes

1 Ford's stockholders' equity was negative $17.3 billion at the end of 2008.

2 "U.S. Car Industry: Back on the Road," *Financial Times*, June 17, 2009.

3 Ford Motor Company, Business Plan Submitted to the Senate Banking Committee, December 2, 2008, p. 16.

4 Note that different statistical authorities apply different definitions of "automobile." The basic distinction is between automobiles (or "passenger cars") used to transport people and commercial vehicles ("trucks") used to transport goods. The problem is that, in the U.S., sport-utility vehicles and pick-up trucks used primarily for personal transportation are classed as light trucks. Ideally we would like to define the automobile industry as comprising automobiles and light trucks (vans, pick-up trucks, SUVs, passenger vans), i.e. excluding heavy trucks and large buses. However, most of the statistics we use aggregate automobiles and all commercial vehicles.