AUTOMOTIVE INDUSTRY ANALYSIS

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Executive Summary

Chosen industry:
This analysis focuses on the automotive industry, specifically, large-scale manufacturers of automobiles. The automotive industry is inherently interesting: it is massive, it is competitive, and it is expected to undergo major restructuring in the near future due to globalization and decreasing oil reserves. The analysis team members (we) feel qualified to perform this investigation due to our familiarity with the industry and our education—several of us have studied and worked on problems associated with automobile manufacturing and we are all mechanical engineering graduate students.

Analysis Methodology:
The report begins with a historical overview of the automotive industry. This is followed by an analysis of the industry's structural characteristics using Porter's 5 Forces Model as a framework, which provides an understanding of the automotive industry as a whole in its current state. Next, ten representative companies of varying sizes are analyzed and compared; the chosen companies and selection criteria follow. General Motors, Ford, and Toyota were chosen because they are the current market leaders. DaimlerChrysler, Nissan, Volkswagen, and Honda were chosen because of their status as stable international companies who have been in the automobile business for many years. Hyundai, Maruti Udyog, and Shanghai Automotive Industry Corp., based in Korea, India, and China, respectively, were chosen based on their growth potential and their status as relatively new to the industry.

These ten companies are analyzed in terms of their market position, their financial situation, and their management strategy. Where useful, specific statistics have been incorporated into the analysis including: market share, return on equity, return on sales, revenues, net expenses, net income, market value added, number of brands, number of models, debt rating, and debt ratio. The examination of the industry as a whole and of some of the major players in the industry provides a good framework within which insightful conclusions can be derived about the current state and future of the automotive industry.

Major Findings and Conclusions:
In the conclusions section, we identify and describe attributes of successful companies including: production efficiency, well-planned cost structures, manageable size, distributed management of brands, attention to underserved markets, focused strategy, and well-respected brands and products. We then move from specific company attributes to identifying key trends in the automotive industry as a whole including: international expansion, conglomeration in mature markets, distributed competition in new markets, increased environmental regulation, increased energy constraints, and increased operational efficiency. Using these trends, we predict where the industry is headed and how it will evolve to meet new challenges.

The report concludes with the recommendation section, which provides a prediction of the near-future success of each of the analyzed companies. The outlook is not great for any of the four well-established, Euro-American companies considered in this report: DaimlerChrysler, Ford, General Motors, and Volkswagen. Of these companies, we conclude that DaimlerChrysler seems to be holding up the best. The future looks much more promising for the four Asian companies with international market reach that were studied: Honda, Hyundai, Nissan, and Toyota. Toyota stands out as being best positioned for success in the near future, while Honda will most likely continue to be successful on a smaller scale. And although currently successful, it is much more difficult to predict the future success of Maruti Udyog and Shanghai Automotive Industrial Company. Both companies remain mainly focused on the Indian and Chinese markets, respectively, and thus lack the geographical diversity that smoothes the market performance of some of their larger competitors.

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1. Industry Overview

1.1. History

The evolution of the automotive industry has been influenced by various innovations in fuels, vehicle components, societal infrastructure, and manufacturing practices, as well as changes in markets, suppliers and business structures. Some historians cite examples as early as the year 1600 of sail-mounted carriages as the first vehicles to be propelled by something other than animals or humans. However, it is believed by most historians that the key starting point for the automobile was the development of the engine. The engine was developed as a result of discovering new energy carrying mediums, such as steam in the 1700s, and new fuels, such as gas and gasoline in the 1800s. Shortly after the invention of the 4-stroke internal combustion gasoline-fueled engine in 1876, the development of the first motor vehicles and establishment of first automotive firms in Europe and America occurred. See Figures 1 and 2 in Appendix A for a timeline of the automotive industry from 1895 to 2000.

During the 1890s and early 1900s, developments of other technologies, such as the steering wheel and floor-mounted accelerator, sped up the development of the automotive industry by making vehicles easier to use. Almost simultaneously, in America, the societal infrastructure that would provide fertile ground for the proliferation of automobiles was being set. Driver's licenses were issued, service stations were opened, and car sales with time payments were instituted. Famous vehicle models such as Ford's Model T were developed during these times and, by 1906, car designs began abandoning the carriage look and taking on a more "motorage" appearance.

Model T

Ford Assembly Line

During the 1910s, the development of technologies and societal infrastructure continued in addition to new manufacturing practices and business strategies. Traffic lights started appearing in the U.S. and thousands of road signs were posted by B. F. Goodrich on over 100,000 miles of U.S. roads. Henry Ford's famous assembly line was launched in 1913, which allowed vehicles to be mass produced and thus achieved economies of scale. Ford also introduced the concept of using interchangeable and standard parts to further enable the mass production process. Automakers also started to merge with other companies (e.g., GM acquired Chevrolet) and to expand to other markets (e.g., GM of Canada).

In the 1920s, the development of infrastructure, adoption of new manufacturing practices, and the merging of companies continued (e.g., Benz and Daimler, Chrysler and Dodge, Ford and Lincoln). In the U.S., the Bureau of Public Roads and the enactment of the Kahn-Wadsworth Bill helped facilitate road-building projects and develop a national road system. In manufacturing, mass production methods became better established, which led to the availability of a wide range of satisfactory cars to the public. While Ford had focused on a single model, GM adopted a new production strategy for providing greater product variety, which helped the company increase their market share by 20% and reduce Ford's by 24%.

In the 1930s, several new vehicle brands were developed (e.g., Ford Mercury, Lincoln Continental, Volkswagen) and trends in vehicle consumer preferences were established that differentiated the American and European market. In the U.S. market, consumers preferred luxurious and powerful cars, whereas in Europe consumers preferred smaller and low-priced cars. Also during this time, GM's product variety strategy continued to give them a competitive advantage over Ford, allowing GM to continue increasing their market share while Ford kept losing theirs.

In the 1940s, during World War II (WWII), automotive factories were used to make military vehicles and weapons, thus halting civilian vehicle production. After WWII, the economies of most European and some Asian-pacific countries, such as Japan, were decimated; this required the development of new production and business strategies such as those of Toyota, which began to develop what is now known as Just in Time (JIT) manufacturing. Most of the first models produced were similar to the pre-war designs since it took some time for the plants to revamp their operations to make new designs and models.

In the 1950s and 1960s, more technological innovations, such as fiberglass bodies and higher compression ratio fuels, allowed vehicle developers to appease the growing consumer interest for vehicle comfort, look, and feel. Car designs were highly influenced by emerging safety and environmental regulations. Vehicle speed limits and front seat belts became standard, in addition to other features such as heating and ventilation equipment.

The 1970s were marked by stricter environmental regulations and the oil embargo of the early 70s, which led to the development of low emission vehicle technologies, such as catalytic converters, and a 55-mph nationwide speed limit in the U.S. Foreign cars like the Japanese Honda Civic started appearing in the U.S. market. The Civic was marketed as a fuel efficient and low-emissions vehicle, which given the recent high oil prices and strict environmental regulations made it well-received. Despite the entrance of new competitors into the U.S. market, U.S. automakers underestimated the threat of foreign automakers to their market shares.

In the 1980s, the U.S. automotive industry began losing market share to the higher quality, affordable, and fuel efficient cars from Japanese automakers. In response to this market share loss, U.S. automakers began focusing on improving quality by adopting different Japanese manufacturing management philosophies, such as JIT. Although their adoption of JIT and other philosophies helped improve the quality of U.S. vehicles, it did not fully bridge the gap between the quality of U.S. and Japanese cars. This gap remained because U.S. automakers tried applying JIT techniques without a full understanding of the whole Japanese manufacturing system, while Japanese automakers had decades to develop, refine and master their JIT approach.

Another significant paradigm of the 1980s was the global nature of vehicle manufacturing. Automakers started assembling vehicles around the world. This trend was accelerated in the 1990s with the construction of overseas facilities and mergers between multinational automakers. This global expansion gave automakers a greater capacity to infiltrate new markets quickly and at lower costs. The increased product offerings in many markets led to consumers having a greater variety of vehicles from which to choose. To this new vehicle buffet was coupled the explosion of the internet, which made vehicle-related information readily accessible to consumers. Internet-informed and empowered consumers now wanted a vehicle that was “personalizable,” inexpensive, reliable, and quickly obtainable. Consumers desired vehicles that were less harmful to the environment, which led to the introduction of hybrid vehicles by Japanese automakers in the late 1990s.

In the current decade, the recent trend of increasing sophistication and empowerment of the consumer has led automakers to identify new and more specialized markets within saturated markets with diverse customer bases, such as that of the U.S. Another trend is to infiltrate new emerging markets such as Southeast Asia and Latin America, which has further motivated the establishment of production facilities overseas and the establishment of global alliances and commercial strategic partnerships with foreign automakers. Of these new markets, China appears to be the most promising.

1.2. Porter's Five Forces Analysis

Michael Porter identified five forces that influence an industry. These forces are: (1) degree of rivalry; (2) threat of substitutes; (3) barriers to entry; (4) buyer power; and (5) supplier power. For more on this framework proposed by Porter, please see Appendix C. Like other industries operating under free market, capitalistic systems, viewing the automotive industry through the lens of Porter's Five Forces can be helpful in understanding the forces at play.

Degree of Rivalry

Despite the high concentration ratios seen in the U.S. market (see Appendix D), which typically signify that a lesser degree of competition is seen in the industry, rivalry in the U.S. and the global automotive industry is intense. Clearly, the concentration ratios do not tell the whole story. The automotive industry in the U.S. is no longer the playground of the Big 3 (GM, Ford, and Daimler Chrysler); global companies compete in the U.S. market, while U.S. companies have globalized themselves. In the 1980s, the Japanese car makers Honda and Toyota entered a fairly disciplined U.S. market and have been very focused in growing their shares of the market. The great diversity of rivals in terms of cultures and associated philosophies has intensified rivalry in the industry. Market growth is slow in the established markets of the U.S. and Western Europe, and companies must fight fiercely to eke out gains or prevent losses in market share. However, growth is potentially huge in the rapidly industrializing nations of China and India; in these booming markets, companies could take advantage of the opportunities to reap handsome rewards. The degree of rivalry in the automotive industry is further heightened by high fixed costs associated with manufacturing cars and trucks and the low switching costs for consumers when buying different makes and models.

Threat of Substitutes

The threat of substitutes to the automotive industry is fairly mild. Numerous other forms of transportation are available, but none offer the utility, convenience, independence, and value afforded by automobiles. The switching costs associated with using a different mode of transportation, such as train, may be high in terms of personal time (i.e., independence), convenience, and utility (e.g., luggage capacity), but not necessarily monetarily (e.g., round trip train fare on MARTA would most likely be less expensive than the cost of fuel consumed on a similar round trip, daily parking, car insurance, and maintenance).
The exception to this statement occurs in the global urban areas with high population densities. In these areas, the substitutes available (e.g., walking, mass transit, bicycles, etc.) can be less costly than automobiles and thus alternative modes of transportation are often preferred.

Also, there are inherent underlying social and cultural attitudes that keep people from owning automobiles in some parts of the world. Many nations are not as spread out or as mobile as the U.S.; they are constrained either by geography, race, class, or religion and the need for personal transportation is not as great, yet. The American dream of "a car [or two] in every garage" is not what the rest of the world currently wants or needs. However, the marketing arms of the global automotive manufacturers are certainly working very hard to change this paradigm, and with unprecedented production volumes world wide, all signs indicate that they are succeeding. Most with the ability and means to own a vehicle, who live in a society with the necessary infrastructure (e.g., roads and fueling stations), will do so.

Barriers to Entry

The barriers to enter the automotive industry are substantial. For a new company, the startup capital required to establish manufacturing capacity to achieve minimum efficient scale is prohibitive. An automotive manufacturing facility is quite specialized and in the event of failure could not be easily re-tooled. Although the barriers to new companies are substantial, established companies are entering new markets through strategic partnerships or through buying out or merging with other companies. In fact, the barriers to entry for new (or different) markets may be quite low; in the 1980s, U.S. companies

practically invited Japanese makers into the U.S. by failing to offer quality vehicles in the lower price markets. All of the large automotive companies have globalized and entered foreign markets with varying degrees of success.

In the newer, undeveloped markets of Asia, Africa, and South America, the barriers to entry similarly exist. However, a domestic start up, with local knowledge and expertise, has the potential to compete in its home market against the global firms who are not yet well established there. Such an operation, if successful, would surely be snatched up by one of the global giants and incorporated into its fold.

Buyer and Supplier Power
In the relationship between the automotive industry and its suppliers, the power axis is substantially tipped in the industry's favor. The automotive industry is comprised of powerful buyers who are generally able to dictate their terms to their suppliers. There are specific characteristics that make members of the automotive industry powerful buyers: (1) there is not a grand proliferation of companies manufacturing automotives, and the four largest automotive companies in the U.S. have roughly 90% of the value of shipments and value added in the U.S. (see Appendix D); (2) automotive parts (e.g., oil filters, mufflers, belts, etc.) are standardized commodities and these parts are only used on automobiles; and (3) backward integration can and does occur, as seen in summer 2005 when Ford purchased struggling parts maker Visteon.

In the relationship between the automotive industry and its ultimate consumers, purchasers of finished vehicles, the power axis is tipped in the consumers' favor. Consumers wield the greatest power in this relationship due to the fairly standardized nature of the automotive commodity (a vehicle) and the low switching costs associated with selecting from among competing brands. However, the automotive industry remains marginally powerful due to the large customer to producer ratio.

The automotive industry is a dynamic place. With the forces above at play, and with history as a guide, it is safe to say that the automotive industry will continue to change, evolve, and adapt.

2. Analysis

In this section we investigate ten major companies in the automotive industry to gather a better understanding of the automotive industry's dynamics on a company-by-company basis. For insight into the relative revenues and net incomes for 2004 for each of the companies analyzed, please see Figures 3 and 4 in Appendix A. Additional financial information for each of the companies may also be found in Appendix B.

2.1. DaimlerChrysler

DaimlerChrysler (DCX) was formed in 1998 in a merger of two of the automotive industry's oldest and most prestigious manufacturers: Daimler-Benz AG and the Chrysler Corporation. This so-called "merger of equals" was the culmination of a long complicated family history that in some sense follows the history of the automobile itself. Because of this prestigious history, DaimlerChrysler enjoys a strong reputation on both sides of the Atlantic.

Today, DaimlerChrysler employs a total of 384,723 people in 17 countries. Their products are sold in over 200 countries. DaimlerChrysler is the fourth largest vehicle producer in the world in terms of units sold behind GM, Ford, and Toyota. In 2004, DaimlerChrysler sold 4,000,700 passenger vehicles and 712,200 commercial vehicles. The company is structured into three main automotive groups: the Mercedes Car Group, the Chrysler Group, and the Commercial Vehicles Division. These groups are parents to a total of 12 different brands, including Mercedes-Benz, Dodge, Chrysler, Jeep, the luxury car

Maybach, and the compact environmentally friendly smart car. In all, DaimlerChrysler produces approximately 126 vehicle models.

DaimlerChrysler has been marginally successful in the United States where the Chrysler Group has recently been the strongest of Detroit's Big 3. In fact, during the third-quarter of 2005, Chrysler was the only Big 3 company to earn a profit ($379 million for the quarter). This came in spite of a 21% drop in third-quarter earnings by DaimlerChrysler worldwide due to increasing taxes. However, during this same period, DaimlerChrysler increased operating profit by 38%. Analysts have attributed this odd result to increasing demand for Chrysler and Mercedes products. This increased demand is evidenced in the U.S. market where the Chrysler Group produces four of the 20 top selling passenger vehicle models: the Dodge Ram, the Dodge Caravan, the Jeep Grand Cherokee, and the Jeep Liberty. As a result of this improved third-quarter performance, Chrysler's U.S. market share has risen to 13.3%. More broadly, the popularity of DaimlerChrysler models can be seen in the steady rise in revenue over the past three years (see Figure 5 in Appendix A). From 2002 to 2004, revenue has increased 22.6% from $157 billion to $192 billion.

Because demand for DaimlerChrysler products has remained relatively stable in the face of increasing oil prices, their future looks relatively bright. Growth in demand for passenger vehicles is expected to further slow in North America, Western Europe, and Japan. Therefore, DaimlerChrysler's future depends upon successful marketing in emerging markets across the globe.

2.2. Ford

Ford Motor Company (F) was founded in 1903 by automotive and industrial pioneer Henry Ford in Dearborn, Michigan. Being first to implement a moving assembly line for automotive manufacturing, Ford was able to more efficiently mass produce their products than their competitors. In 1908 the Model T was introduced and went on to sell over 15 million vehicles, firmly establishing Ford as the major player in the early automotive industry with 50% market share by the 1920s. The company went public in 1956 and since then has grown to be a significant presence in the global automotive market.

The Ford Motor Company product portfolio includes cars, trucks, and SUVs from the following brands: Ford, Lincoln, Mercury, Mazda, Aston-Martin, Jaguar, Volvo, and Land Rover. In addition to its core automotive business, Ford has a finance division, a parts and service division, and they also currently own Hertz Corporation, the largest car rental business in the world. Relative to other massive automotive manufacturers in 2003, Ford was number two domestically and globally (behind GM), in terms of number of vehicles sold.

Ford's outlook is challenging. In the 3rd quarter of 2005, Ford posted a pre-tax profit loss of over $1.3 billion in their Automotive operations, with a $1.1 billion loss in North America. The current losses for 2005 are due to a number of reasons: (1) rising costs of commodities, namely steel and energy, have increased manufacturing costs considerably; (2) ongoing and rising health care costs, particularly 'legacy' benefits paid to retirees and their families; (3) bailing out major parts supplier Visteon from bankruptcy; and (4) vehicle sales lagging by 81,000 units compared to the same point in 2004, in spite of unprecedented "Employee Pricing" sales offered during summer 2005. Sales are especially lagging in the profitable SUV and truck markets where demand is dropping due to escalating gasoline prices. This loss is disappointing given the positive trend seen in net income for the past two years (see Figure 6 in Appendix A). The negative net income seen in 2002 was due to the costly safety recall of defective Firestone tires used on numerous Ford and Mercury trucks and SUVs.

Ford's poor performance in 2005 and dark outlook were reflected in the downgrading of their credit ratings by both Standard & Poor and Moody's to "junk" status in late spring 2005 - from BBB- to BB+

and Baa3 to Ba1, respectively. The volatility of Ford's stock, in terms of its Beta rating, is in the neighborhood of 1.6 which indicates that investing in their stock has fairly high risk. In the face of poor performance and negative trends, significant steps must be taken in the near future to ensure the long term viability of Ford Motor Company.

Elements of company-wide restructuring have been announced and implementation begun. Part of the restructuring involves reducing personnel, mostly from white-collar positions. In more long term restructuring, the company needs to shed over-capacity in manufacturing. Shedding over-capacity involves closing down and consolidating manufacturing facilities. These closures are prevented by agreements made with the United Auto Workers (UAW) through 2007. A key element in Ford's success is its relationship with the UAW and ability to get concessions from the union. Concessions over healthcare costs, which cost upwards of $2000 per new vehicle sold, and plant consolidations are required for Ford to be leaner, more efficient, and more cost-effective in its business.

In addition to organizational restructuring being vital to the future success of Ford, the company realizes the need to reestablish their market share, particularly in the U.S. domestic market. They have begun attempts to do this with the introduction of many new vehicles to freshen and invigorate their product line. Ford has announced plans to increase its hybrid vehicle production tenfold to 250,000 per year by 2010. This could be viewed as an attempt to position itself as the domestic leader in the rapidly growing hybrid market in the U.S.

If the organizational restructuring comes off well and new product offerings are a hit with consumers Ford stands a good chance to see another 100 years as an industry leader.

2.3. General Motors

After its organization in 1908, General Motors (GM) proceeded to acquire seven companies by the end of 1909. Today, the company's brand names include many of the beginning acquisitions including Buick, Cadillac, Chevrolet, GMC, Oldsmobile, and Pontiac, as well as newer acquisitions and creations including Holden, Hummer, Opel, Saab, Saturn, and Vauxhall. GM is the largest automobile manufacturer in the world, selling nearly nine million cars in 2004, which equated to a 14.5% global market share.

As of the end of 2004, GM reduced its projected earnings for 2005 by over 50% from previous projections, which reflects its low expectations for the company in the near future. Investors have also lost faith in the future of GM; the current stock price is selling at a fraction of the book value. GM's debt has been steadily downgraded and stood at BBB- as of the end of 2004 according to Standard & Poor's ratings.

According to their Letter to Stockholders, GM's main problems consist of "global overcapacity … falling prices … rapidly escalating healthcare costs … unstable fuel prices … [and] increasing competition." The effects of these troubles can be seen quantitatively through the ratios provided in Table 1 of Appendix A. GM's debt ratio illustrates that their overall debt nearly equals their assets; their current ratio shows that they have more liabilities than assets in the upcoming year; and the return on sales and equity are very low in comparison to industry standards. Each of the five ratios places GM among the worst three out of the ten sampled companies. While these ratios in no way provide a complete measure of a company, they do illustrate that GM is currently struggling to keep up with its competitors.

GM's main problem is their failure to remain cost-competitive in the global market. To address this, GM has reworked deals with both American and European unions which will reduce its cost of labor. To increase revenues, GM is focusing on increasing market share in growing countries such as India and

China. They are also offering more hybrids to increase their fuel efficient offerings, which is a fast growing market in America and has been one of the main ways that foreign manufacturers have increased their market share in GM's primary markets.

It will take some time for GM to become profitable again. In the first three quarters of 2005, GM has seen losses continue to grow well past $1 Billion and their credit rating has been reduced to junk status. However, GM still has the largest market share in the world and the capability to become successful again. If GM can reign in escalating costs and offer cost-competitive products, the automobile giant will be in position to once again assert its dominance of the market.

2.4. Honda

Honda Motor Co. (HMC) was established by Soichiro Honda in 1946. It originally began producing motorcycles in the mid 20th century and began manufacturing automobiles (the Honda Civic) in 1972. After the original Civic's inception, Honda produced many variants of this highly successful vehicle, such as the four-door sedan, wagons, hatchback, coupe, and more recently the hybrid. Honda currently has two automotive brands (Honda and Acura) and it produces over 20 other vehicle models, such as the Accord, Element, Insight, Odyssey Minivan, Pilot SUV, and Ridgeline Truck, in addition to producing motorcycles and power products.

Since Honda began producing automobiles it has been a leader in producing fuel efficient and low emissions vehicles. In 1977 and 1983, Civic models ranked first in U.S. fuel-economy tests. Honda has also introduced hybrid vehicles such as the Insight, Civic, and Accord, in 1999, 2002, and 2004, respectively, with the 2006 Insight being the most fuel efficient car of 2006.

Currently, Honda ranks sixth in sales within the automotive industry. They have overseas plants in over 12 countries including the U.K., Italy, Brazil, Taiwan, Indonesia, Malaysia, Thailand, Nigeria, U.S., and Canada. Honda has been increasing their production capacity worldwide in response to their steady growth in total sales over the last few years. From 2002 to 2003, Honda increased sales by 95,000 units, and from 2003 to 2004, sales increased by 259,000 units. With this growth in sales Honda has seen a commensurate increase in its revenues (see Figure 7 in Appendix A). In China, they saw approximately a 50% increase in sales from the fiscal years of 2003 to 2004, and they expect sales to keep increasing.

In the future, Honda has stated that they will keep improving the fuel efficiency of all their vehicles. They will continue to expand their production capacity in Asia, due to the expected increases in demand in those regions. In the U.S., they plan on launching new models targeted to younger people to create a new base of loyal customers. Given Honda's past record on delivering high quality and fuel efficient vehicles, their strong position in the current market, their strategic direction for the next few years, and the rising costs of fuel worldwide, it is evident that Honda will have a strong presence in the automotive market in the future.

2.5. Hyundai

Hyundai Motor Co. (HMC) was established in Korea in 1967. The company's first model (Cotina) was released, in cooperation with Ford Motor Company, in 1968. In 1998, Hyundai acquired a 51% stake in Kia, but has since reduced its share to 37%. In 2004, Hyundai was South Korea's largest car maker and the world's seventh largest car maker selling 2.3 million units. Hyundai currently offers about a dozen cars and minivans, as well as trucks, buses, and other commercial vehicles. Some popular entries in their product lineup include the Accent, Sonata, Tucson, Elantra, Santa Fe, and Tiburon, which all earned the title "Best Bet" in Jack Gillis' *The Car Book 2005*.

Hyundai's outlook is on the upswing. Hyundai's parent company, Hyundai Motor Group, began investing heavily in the quality, design, manufacturing, and long-term research of its vehicles starting in 1998. This investment paid off in 2004 when Hyundai tied with Honda for initial brand quality in a survey from J.D. Power and Associates. Hyundai's increase in both quality (named "Best Value Car Award Winner" – Smart Money magazine 2005) and safety (received "Automotive Excellence in Safety Award" – Popular Mechanics 2005) along with its low prices will allow it to continue to grab new market share. Reflecting this trend of low prices and increased market share, in 2004 Hyundai reported a dramatic increase in annual revenues to 50.7 billion dollars and only a small gain in net income to 1.78 billion dollars (see Figure 8 in Appendix A).

Hyundai's growth is fueled by increasing international sales. From January-September 2005, sales in Russia increased 100% and sales in the U.S. increased 10% year-on-year. To meet this new demand, Hyundai has been investing in manufacturing plants in North America, India, China, Turkey and research and development centers in North America, Japan and Europe. In June 2004, Hyundai opened its first plant in the U.S. In 2006, Hyundai plans to start construction on a new production plant in Europe.

Counteracting these positive international sales trends, Hyundai has recently run into trouble in its domestic (Korean) plants. In August 2005, the production of 25,683 vehicles was delayed due to a strike by the company's unionized workers. Later that week, Kia's workers joined the strike causing Kia to delay the production of 21,273 vehicles. The economic effects of these strikes have yet to be reported. If Hyundai can overcome these recent strikes, the company's future outlook is promising.

2.6. Maruti Udyog

A license and Joint Venture agreement was signed between the government of India and Suzuki Motor Company (SMC) in Oct. 1982 to launch Maruti Udyog Limited (MUL). Today, MUL offers 11 models, including the Maruti 800, Omni, premium small car Zen, international brands Alto and WagonR, off-roader Gypsy, mid size Esteem, luxury car Baleno, MPV, Versa, Swift, and Luxury SUV the Grand Vitara XL7.

MUL's dominant position in the Indian car market and its ability to satisfy its customers have made it the success it is today (see Figure 9 in Appendix A). MUL has been the leader in the Indian car market for two decades. Today, MUL holds about 50% of the total Indian market. For a record sixth year in a row, MUL was ranked highest in customer satisfaction, according to the J.D. Power Asia Pacific 2005 India Customer Satisfaction Index Study. In 2004, Business World ranked MUL among the country's five most respected companies and the country's most respected automobile company.

As the dominant player in the Indian automobile market, MUL is focusing on entering new markets in India to increase market share. MUL recently added service businesses including sale and purchase of pre-owned cars, lease and fleet management service for corporate clients, Maruti Insurance and Maruti Finance. In April, MUL made large investments in a new plant that will produce diesel engines. Once this plant is operational, MUL plans to increase its role in the diesel segment of the market, which now accounts for about one-fifth of the total passenger car market in India.

Competition has become fierce in some Indian market segments, especially entry level compact cars. MUL's major competitor in this market, Hyundai Motor Company, is aggressively expanding its sales and network across India. MUL has reduced the price of the Maruti 800 three times this year to keep this model cheaper than those offered by Hyundai. Even with the planed expansion to new Indian markets, MUL's future success will depend greatly on how well it can compete with its new international competitors.

2.7. Nissan

Nissan Motor Co., Ltd. (NSANY), was established in 1933 in Japan, but its roots go back to 1914 when the first Datsun automobile was produced. Nissan first appeared on American shores in 1958 when a Datsun sedan was released on the U.S. market. Nissan furthered its influence on the American market in 1960 when Nissan Motor Corporation, U.S.A. was established in Gardena, California. In 1989, Nissan founded Infiniti, the luxury division of Nissan North America, Inc. The most recent major corporate event, however, came in 1999 with the formation of the Renault-Nissan alliance. While Renault, a French corporation, and Nissan remain independent corporations, "both companies share a single joint strategy of profitable growth and a community of interests." More specifically, as a result of the alliance, Renault holds a 44% stake in Nissan, while Nissan owns a 15% stake in Renault. Excluding Renault, Nissan supports two major brands – Nissan and Infiniti, and produces a total of 18 different vehicle models. Nissan's stated mission is "investment in the future."

Nissan has experienced a substantial recovery over the past six years. Carlos Ghosn became CEO of Nissan in 1999 after leading both Renault and Michelin U.S. through economic turnarounds. Before Ghosn's arrival, Nissan had experienced seven years of losses. After posting a -$6.456 billion net income in 2000, Nissan has steadily recovered under Ghosn's leadership such that in 2004 they earned $4.882 billion in net income. Since 2002, revenue has increased approximately 50% (see Figure 10 in Appendix A). Sales have risen 22% over that same period. In 2004, Nissan was able to sell 3,388,000 automobiles. Nissan, including all consolidated subsidiaries, currently employs 123,748 workers in 18 countries on 4 continents.

Nissan's market share in the U.S. stands at around 6% as of 2004 while, in Japan, Nissan holds 19.3% of the market as of 2005. Along with Toyota, Nissan has recently become one of the most successful Japanese automobile companies in the U.S. The Infiniti brand has regularly been the recipient of industry awards. In 2005, the Infiniti G35 won the Automotive Lease Guide's (ALG) Residual Value Award given to the vehicle expected to retain the highest percentage of its original value. Also, the G35 was a recipient of Car and Driver's 10 Best Award. In 2004, AutoWeek named the G35 "America's Best Coupe". Two other models, the Q45 and the M, have been given the Insurance Institute for Highway Safety's (IIHS) highest possible safety rating of "Best Pick."

Nissan is not optimistic about the sales outlook in the U.S. or Chinese markets. Ghosn recently predicted that growth in the U.S. market is at the beginning of the end, and that the sales "bonanza" in China is a thing of the past. In the face of an industry-wide decrease in growth, Nissan's outlook is not outstanding. However, good management and a strong global presence will serve Nissan well as the competition moves to emerging markets.

2.8. Shanghai AIC

The Shanghai Automotive Industrial Company (SAIC) Group, representative of the numerous up-and-coming auto manufacturers in Asia, is a government controlled firm that produces passenger cars, tractors, motorcycles, trucks, buses, and automotive parts. SAIC was established in the 1960s, but only started to make a significant impact in the automotive market upon entering into a joint venture with Volkswagen in 1984 to manufacture Santana sedans. In 1997, SAIC expanded further by creating a second major joint venture, this time with General Motors. With approximately 50 plants in the Shanghai area and over 40 joint ventures with global automotive companies, SAIC is now the largest automotive manufacturer in China. SAIC is not publicly traded, but has one subsidiary, an auto parts manufacturer titled Shanghai Automotive Co., Ltd, listed on the Shanghai Stock Exchange.

Although SAIC's origins were small, the joint partnerships with Volkswagen and GM served as a way for SAIC to jumpstart their enterprise in terms of capital, expertise, and designs. By 2000, SAIC's production

capacity had reached 400,000 vehicles and accounted for 45 percent of China's car market. In 2003, SAIC produced over 600,000 cars just in the joint ventures with VW and GM, a dramatic increase of 57% from 2002. That catapulted SAIC onto FORTUNE's list of the world's 500 largest companies at number 461, with revenues in 2003 of US$11.8B and profits of US$689M.

However, SAIC has ambitious intents to go beyond the opportunities afforded by these joint ventures. SAIC plans to develop its own brands and to have them on the market as early as 2007, with goals of producing 2 million cars in 2010 and 3 million in 2020. Doing so would make SAIC one of the six largest automotive manufacturers worldwide. To achieve this semi-independence, SAIC has put great emphasis on research and development. Among other things, it acquired intellectual property rights for the Rover 25 and 75 before MG Rover's collapse and last year purchased Ssangyong, a South Korean maker of sport utility vehicles. This purchase makes SAIC the first Chinese automaker to have a controlling interest in a foreign carmaker, helping achieve two other goals: expanding beyond China to enter the global automotive market and getting ahead of its two main local competitors, Dongfeng Motor and First Auto Works. As a goal for its world market, SAIC aims to hit export revenues of US$5B in 2010.

Despite these ambitious goals, the recent past has been fairly tumultuous for SAIC, just as it has been for the entire global automotive market. 2003 was an amazingly prosperous year for SAIC, with production of passenger cars leaping to 612, 216 from only 390,508 in 2002 and with an accompanying 37% increase in revenues. But sales slowed in 2004, with revenues gaining only 3%. And in the first four months of 2005, SAIC saw earnings drop by 74%. Yet obviously the market potential in China is huge – as of last year, there were 940 vehicles for every 1,000 drivers in the U.S., 502 in Japan, and only 8 in China. But because of this high market potential and relatively low barriers to entry, competition is fierce and oversupply a distinct possibility. In addition, attempts by the Chinese government to curb spending by making financing more difficult have reduced sales rates significantly.

To be successful, SAIC will need to adapt itself to the markets it intends to penetrate: in China, it will need to transition from the traditional Chinese automotive market which featured lavish passenger cars targeted at government and business officials to the future market of compact sedans and other smaller, cheaper cars targeted at the growing middle class. For international markets, it will need to address challenges related to branding, R&D, design, and marketing, which established international manufacturers have had years to work out. SAIC will also experience some growing pains – it will have to tiptoe through issues of knowledge transfer and intellectual property as it attempts to simultaneously produce Volkswagens, GM cars, and vehicles under its own brand. And SAIC will have to follow through on current plans to list in an upcoming international IPO. If SAIC can endure these challenges, it has immense potential both in China and worldwide.

2.9. Toyota

Toyota was established as a public company in Japan in 1937. It entered the U.S. market in 1957, but only became successful with the introductions of the Corona in 1965 and the Corolla in 1968. By 1970, Toyota was the world's fourth-largest carmaker and by 1975 had displaced Volkswagen as the U.S.'s #1 auto importer. Toyota began auto production in the U.S. in 1984 through a joint venture with GM, and launched the successful Lexus line in the U.S. in 1989. Since then, Toyota has continued to grow steadily, becoming the third largest global automotive manufacturer as of 2003, with sales last year of 7.4 million vehicles. Unlike many other large auto manufacturers, Toyota carries only 4 brands: Toyota, Hino, Scion, and Lexus; it also has a majority interest in Daihatsu. Known for their quality and reliability, Toyota cars and light trucks such as the Camry (Best-selling passenger car in America, 2004), Corolla, Lexus LS330, Prius (Motor Trend's Car of the Year, 2004), Tundra (Motor Trend's Truck of the

Year, 2000), Tacoma (Motor Trend's Truck of the Year, 2005), 4Runner, and Lexus RX300 (Motor Trend's SUV of the Year, 1999) have been extremely successful both in the U.S. and abroad.

In the last few years, Toyota has been able to ride out the automotive storm, continuing to post impressive results despite the troubles that other companies have seen. In 2003, net income jumped almost 55%, reaching US$10.8B. And in 2004, both revenue and net profit increased slightly (see Figure 11 in Appendix A). Currently, Toyota holds a 6% profit margin, dramatically higher than any of the Big 3.

Toyota's success is based largely on its forward-thinking, innovative management style and its rigorous standards of quality. The Toyota Production System is a much-studied strategy of design and manufacturing which emphasizes streamlining and elimination of waste – giving rise to the "just-in-time" and "lean" manufacturing movements – and continuous error-checking and improvement. In addition, Toyota has repeatedly been ahead of the trend in investing in new technologies. Instead of focusing on reducing labor costs, Toyota has increasingly automated their production facilities. And with the release of the Prius in 1997, Toyota introduced the first mainstream hybrid vehicle, cashing in on the demand for fuel economy and reduced environmental impact. Like the Prius, the Scion line successfully identified and addressed a new consumer sector, a plan that Toyota will continue to follow. These strategies combine to give Toyota a significant sustainable competitive advantage.

The results of all this are clear: in 2005, Toyota won a record-breaking 10 segment awards in J.D. Power and Associates Initial Quality Study, with Lexus carrying top honors for five years straight. And while 75% of Toyota's current market is in Japan and North America, it aims to reach markets in 140 countries and regions in the future. With new assembly facilities in Thailand, Indonesia, South Africa and Argentina, Toyota has more than 60 manufacturing facilities in 26 countries. This allows production in geographic proximity to Toyota's future target markets like Asia and South America. With expansion underway, operations going well, innovative infrastructure and mindset, and well-targeted high quality products, Toyota is excellently positioned for future growth and success.

2.10. Volkswagen

The Volkswagen Automotive Group was formed in Germany in 1937 based on Ferdinand Porsche's concept for a "*volkswagen*," which literally means a "people's car." Today, Volkswagen AG is the largest European car manufacturer. The company is divided into three main groups: the Volkswagen Group, which includes the brands Volkswagen, Škoda, Bentley and Bugatti; the Audi Group, which includes Audi, SEAT, and Lamborghini; and the Commercial Vehicles Group. Together, these groups comprised 11.5% of the 2004 global automobile market.

While Volkswagen's revenues have remained relatively constant, by 2004 its net profit after taxes had fallen to less than one-third of the 2002 level due to increasing costs. See Figure 12 in Appendix A for Volkswagen's recent net profit history. Although sales in its largest markets of Western Europe and South America have remained constant or strengthened over the past year, sales outside of those markets have dropped. The majority of the losses stem from poor performance within the Volkswagen group and within the North American market. This has resulted in Volkswagen's global market share falling 0.6% to 11.5%.

As profits and market share are currently at their lowest values in the past five years, Volkswagen has reason to be concerned about the future of the company. Its returns on sales and equity have fallen to 0.8% and 3.0%, respectively. Both rates are worst among the ten companies considered in this report and are approximately half of the next worst ratios. While Volkswagen has blamed an "unfavorable exchange rate" and "weakness in the most important markets" for the latest downturn, the larger problem stems from Volkswagen being unable to provide the best "people's car" since its competitors are providing

similar quality at a reduced price. With this in mind, Volkswagen has begun a restructuring process aimed at making the company and its manufacturing capabilities more conducive to change. It also engaged in a cost-cutting campaign in 2005 including lay-offs and reworking of union deals. While these cuts will provide immediate relief, Volkswagen must find a way to provide a more cost-efficient car to become competitive in the long term.

Volkswagen is also attempting to regain its prominence in the Chinese market. After being the first company to pursue that market, Volkswagen held a large share of the government and taxi sectors, which provided a consistent source of income. Due to weakening political ties and loss of market share to newer competition, Volkswagen has made an effort to strengthen joint ventures with Chinese manufacturers Shanghai Automotive Industry Corp. and First Automotive Works. If Volkswagen AG is to reverse its recent decline, the current restructuring must be successful in cutting costs and winning back some of the market share lost. If the North American sector can regain profitability and the rapidly growing Chinese market turns back to Volkswagen, the company will grow in the future.

3. Conclusions

Taken as a whole, the individual company analyses in the preceding section lead to several general conclusions about the automotive industry. It is apparent that today's successful companies share many common business strategies and visions. The entire industry is following several clear trends that will guide the evolution of the automotive industry in the near future. A discussion of these attributes and trends follows.

3.1. Attributes of Successful Companies

Today's successful automobile companies possess at least some of the following attributes: production efficiency, well-planned cost structures, manageable size, distributed management of brands, attention to underserved markets, focused strategy, and well-respected brands and products. In this section, we will address each of these attributes individually.

Production efficiency has played a significant role in making Toyota the most successful of today's automobile manufacturers. Toyota has continually sought to improve efficiency through a number of innovative operational strategies such as the JIT paradigm and the Total Quality Management (TQM) view of design and production. In addition to innovative business strategies, Toyota has moved towards fully automated production facilities, resulting in both decreased labor costs as well as faster production times.

It is interesting to note that the automotive industry's most productive companies in terms of revenue are also some of its least profitable (see Figures 3 and 4 in Appendix A). This can be attributed to the lack of *well-planned cost structures* within the industry's largest producers. High costs can partly be attributed to inefficient production and distribution practices, but increasing health care costs are also a significant drain on the Big 3. In general, the companies without strong labor unions have more flexible cost structures in addition to having lower overall labor costs.

Manageable size is obviously not an attribute of today's struggling auto manufacturers. GM and Ford lead the market in terms of vehicle production (15 million units and 8 million units in 2004, respectively), but in 2004, they ran two of the lowest operating margins in the industry (both under 2%). This is partly due to poor management and partly due to inertia—it is much more difficult for sweeping changes to filter through the atrophied bureaucracy of an older, well-established organization than through the relatively younger, more flexible foreign companies.

Distributed management of brands seems to positively influence the prestige and marketing success of large, conglomerate corporations. This is especially relevant in today's mature markets where numerous older brand names have repeatedly joined forces under consolidated central managements. For example, the Chrysler Group is better able to manage and market Dodge products in the U.S. from Detroit than DaimlerChrysler central management would be able to do from Stuttgart; local management better understands both the customer and the brand.

In addition to targeting market segments by locale, identification of and focused *attention to underserved markets* have helped smaller producers wedge their way into a larger market share. Honda, for example, is not able to compete with Mercedes in the high-end luxury sedan market due to Mercedes' brand name and prestige. Honda is not able to compete with Ford or GM in the pickup truck market because of their consumers' loyalty. However, recognizing these limitations, Honda has instead focused their efforts on producing reliable, relatively inexpensive sedans. Today, there are also two clear examples of the effectiveness of identifying and exploiting niche markets. Companies such as Toyota and Honda have established an upper hand on the Big 3 manufacturers by being the first to develop hybrid vehicles. Customizable products such as Toyota's Scion line or DaimlerChrysler's Smart Car similarly appear to be indicative of an emerging market niche.

Focused strategy seems to be an essential principle of management in all industries, but its demonstration is especially apparent in the automotive industry. While management at Toyota has been radical in their commitment to production efficiency, larger producers such as GM and Ford have been left behind with their attempts at moderation. JIT management, for example, cannot be successful when done halfway. Toyota's strategy which focuses on responsiveness and consumer needs has proven successful, whereas companies such as GM and Ford who have not invested as heavily in either one have been considerably less successful.

Finally, since automobiles are expensive long-term consumer investments, it is necessary that automotive companies produce *well-respected brands and products*. Brand loyalty takes time to build, but it can be done as evidenced by the successes of Toyota, Honda, and Nissan in the U.S. market. These companies were virtually non-existent in the U.S. before the 1980s, whereas now their products are ubiquitous on U.S. highways. DaimlerChrysler attributes much of their relatively consistent performance to the fact that they have established a tradition of quality brands such as Dodge and Mercedes and have thus achieved sustained customer satisfaction.

3.2. General Trends in Direction and Evolution

Aside from specific company attributes, it is also possible to identify some general trends in the automotive industry. Studying these trends helps predict where the industry is headed and how it will evolve to meet new challenges. These trends will be useful in identifying which companies will likely be successful and how they will achieve success. In what follows, we will address the following trends individually: international expansion, conglomeration in mature markets, distributed competition in new markets, increased environmental regulation, increased energy constraints, and increased operational efficiency.

International expansion has the potential to be the most lucrative growth sector in the automotive industry. In the U.S., there are 765 cars per 1000 people; in Japan, 543; and in the United Kingdom, 426. In contrast, Brazil has 81, Indonesia 21, India 12; and China only 10; these unsaturated markets provide potential for phenomenal growth. In the past several years, China has been the focus of this international expansion. In 2003, 4.44 million cars were sold in China, up from 2.1 million in 2001. However, it appears as though growth in the Chinese auto market has currently slowed considerably. Whereas growth was at 34% in 2003, the growth expectation for 2005 is down to 12% – still considerably higher than

Detroit. It remains to be seen whether this growth will spread to South America, Africa, India, and other emerging markets. It is also uncertain as to whether these markets will be captured by local companies, by one or several of the large, multinational automotive corporations, or by joint ventures between the two.

Conglomeration in mature markets and distributed competition in new markets is a remarkable but obvious trend in the automotive industry in recent years. The 1990s saw a spate of mergers among American, European, and Japanese automotive companies. Since 1989, Ford has bought Jaguar, Aston Martin, Land Rover, and Volvo; Daimler-Benz AG and the Chrysler Corporation merged in 1998; and Nissan and Renault formed a strategic alliance in 1999. GM and Volkswagen have also taken over a number of other smaller companies. Comparatively, emerging markets such as China and India have seen a somewhat contrary trend. China, for example, has over 120 companies that make passenger cars. This results in *distributed competition in new markets*, with the large international firms competing not only with each other but also with the numerous smaller, local companies. This diversity in the young markets parallels the early years of the American automotive corporate landscape; it is likely that the trend towards conglomeration seen in mature markets will spread to the emerging international markets over time.

Two general trends that almost certainly will not change are *increased environmental regulation* and *increased energy constraints*. While the U.S. government is considerably more lax than its EU counterparts, the trends definitely point towards tighter emissions controls in all developed markets and, ultimately, in today's emerging markets such as China and India. Besides governmental regulation, auto manufacturers are becoming increasingly affected by a perceived increase in fuel costs. A recent study by the United States Geological Survey (USGS) has predicted that crude oil production will peak sometime between 2026 and 2047, which means that energy constraints will play an increasingly important role in the automotive industry. This fact has many automotive companies developing hybrid drivetrains and looking for alternative energy sources to power their vehicles in the near future.

As in many sectors, *increasing operational efficiency* of automotive design, production, and distribution is becoming one of the most important factors in establishing a competitive advantage. Movement towards "real-time" enterprise is increasing, with cycle times becoming shorter and shorter. Table 2 of Appendix A shows, for example, the average amount of time that each company spends fabricating a single vehicle. In almost all cases, this time has been reduced since last year. These increasingly short turnarounds result in reduced customer lead-time and increased efficiency and productivity for the manufacturer. Emphasis on JIT production and digital information management along with flexible manufacturing lines and supply chains will reduce over-capacity production and will eventually allow customized automobiles to be fabricated and delivered within days or weeks.

4. Recommendations

Given these general industry trends and the attributes related to corporate success, the previous analyses of individual companies can be compared and evaluated for future success. In this section, we present our recommendations as to which companies will become leaders in the automotive industry over the next five years.

Four well-established, Euro-American companies were considered in this report: DaimlerChrysler, Ford, General Motors, and Volkswagen. Of these, *DaimlerChrysler* seems to be holding up best. Its revenues have steadily increased over recent years and demand for its vehicles has also been on the rise. It is also focusing on expanding into emerging markets worldwide. These positive aspects suggest that DaimlerChrysler is in a good position for future success. *Volkswagen*, on the other hand, will have a rough time over the next few years. Achievement of its stated goal of creating the 'people's car' is being

prevented by other companies offering similar quality at a lower price. Even worse off are *Ford* and *General Motors*, which will struggle with the negative repercussions of their age and size. Legacy systems, aging workforces, and outdated corporate, production, and distribution structures will prevent them from achieving significant success in the next few years.

Honda, Hyundai, Nissan, and Toyota are four Asian companies with international market reach. Of these companies, *Toyota* stands out positioned on an excellent trajectory for the near future. As a relatively young company, it has been able to create efficient development and production practices as it grows, thus reducing costs and increasing productivity and profitability. A focus on innovation and forward thinking has brought Toyota into the lead in areas such as hybrid technology and automation of manufacturing facilities. Because of the high design and manufacturing standards within Toyota, its vehicles are synonymous with quality and its brand image is highly regarded worldwide. Toyota has taken the risk of leading the automotive industry into uncharted waters and, as a result, will be rewarded with dramatic success. *Honda*, while not as revolutionary or trend-setting as Toyota, has presented steady, reliable growth. Attention to defining new markets and tailoring of product lines with an eye to market segment demands and environmental restrictions have Honda well on the way to continued success in the near future. Honda exemplifies the concept that big is not necessarily better; it remains more profitable than any of the Big 3 while posting revenues less than half those of the Detroit companies. *Nissan* and *Hyundai*, while not enjoying the stability of Toyota or Honda, will most likely post acceptable performance in the coming years. Nissan's product quality and history is comparable to the other Asian companies, but it has suffered from a tumultuous past. Nissan's new management has recorded excellent improvements, but will need to implement new strategies in order to raise it to the next level. Hyundai has been on an upswing and is actively pursuing international expansion, which should allow it to take advantage of new and growing markets.

Maruti Udyog and *Shanghai Automotive Industrial Company* both remain in a somewhat precarious situation due to their focus on only the Indian and Chinese markets, respectively. As larger international companies begin to enter those markets, fierce competition will put increasing pressure on these local companies. Changes in those markets, such as the recent downturn in China's sales, could be disastrous for these companies, which lack geographical diversification. If they can survive, there is much opportunity for growth—although it will probably take more than five years before they can achieve this expansion and stabilization.

Whether or not the future plays out according to these recommendations will depend on factors both internal and external to each company. Management decisions will define how the companies are positioned within the industry and how they pursue new opportunities; fluctuations in emerging markets, global economic trends, and changing customer demand will challenge companies to respond in new ways. Regardless, many of the companies will face major turning points in their corporate existence over the next five years; the near future will almost surely be a defining period for the automotive industry.

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APPENDIX A: Exhibits

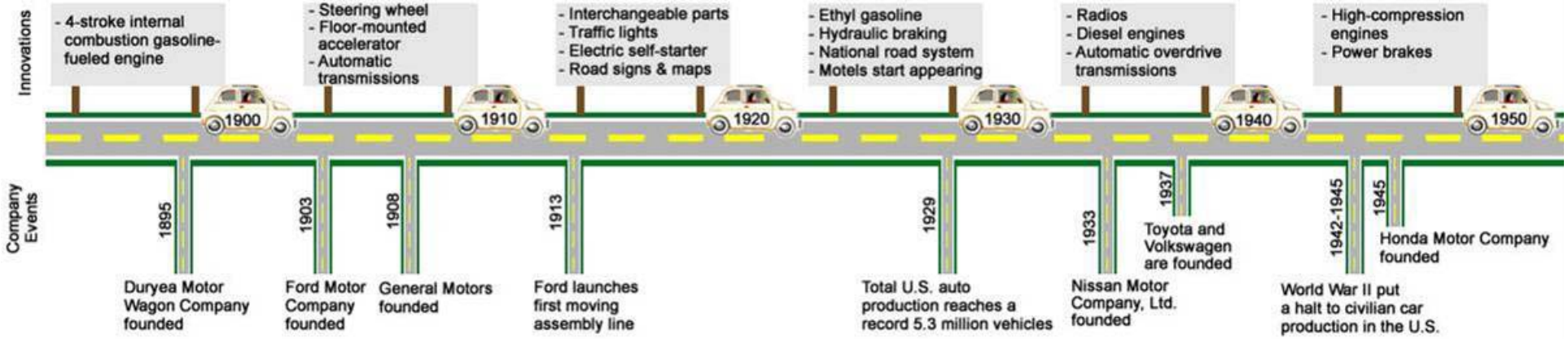


Figure 1 Automotive Industry Timeline from 1895 - 1950

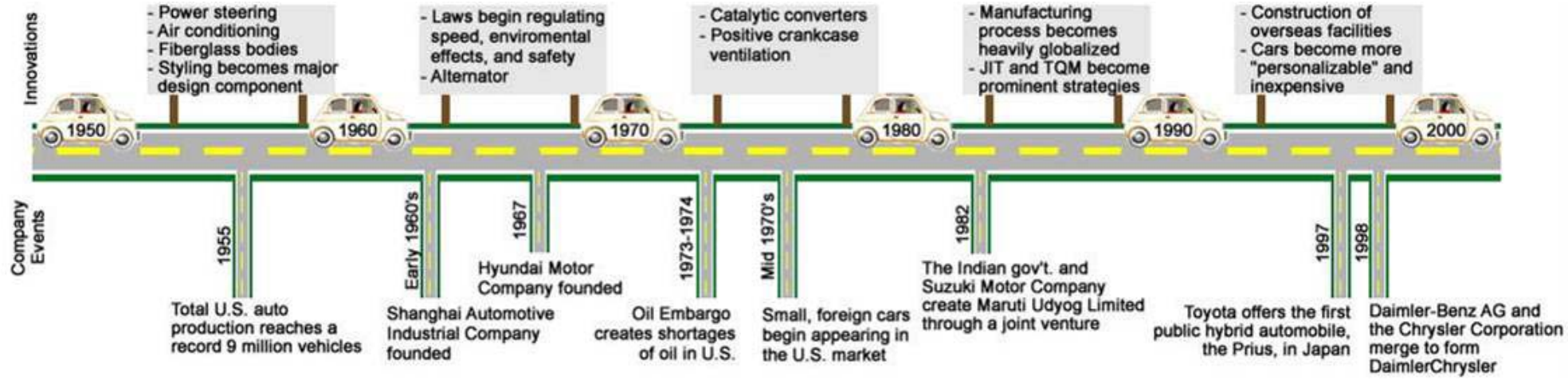


Figure 2 Automotive Industry Timeline from 1950 - 2000

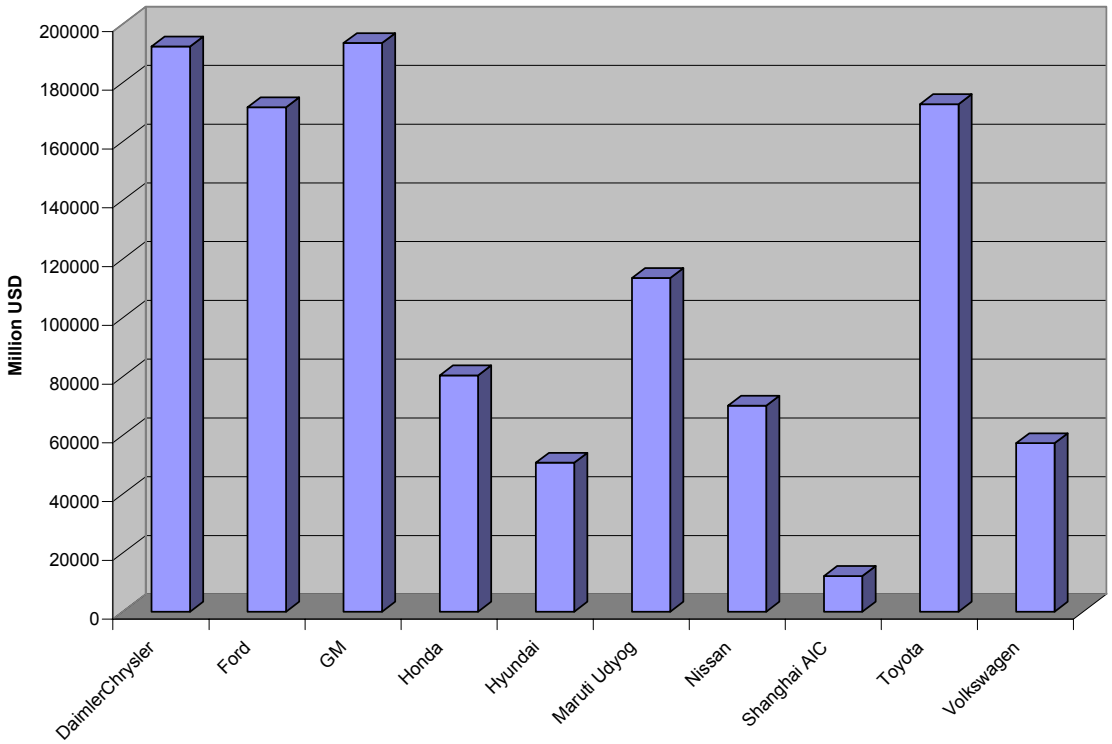


Figure 3 Revenues 2004

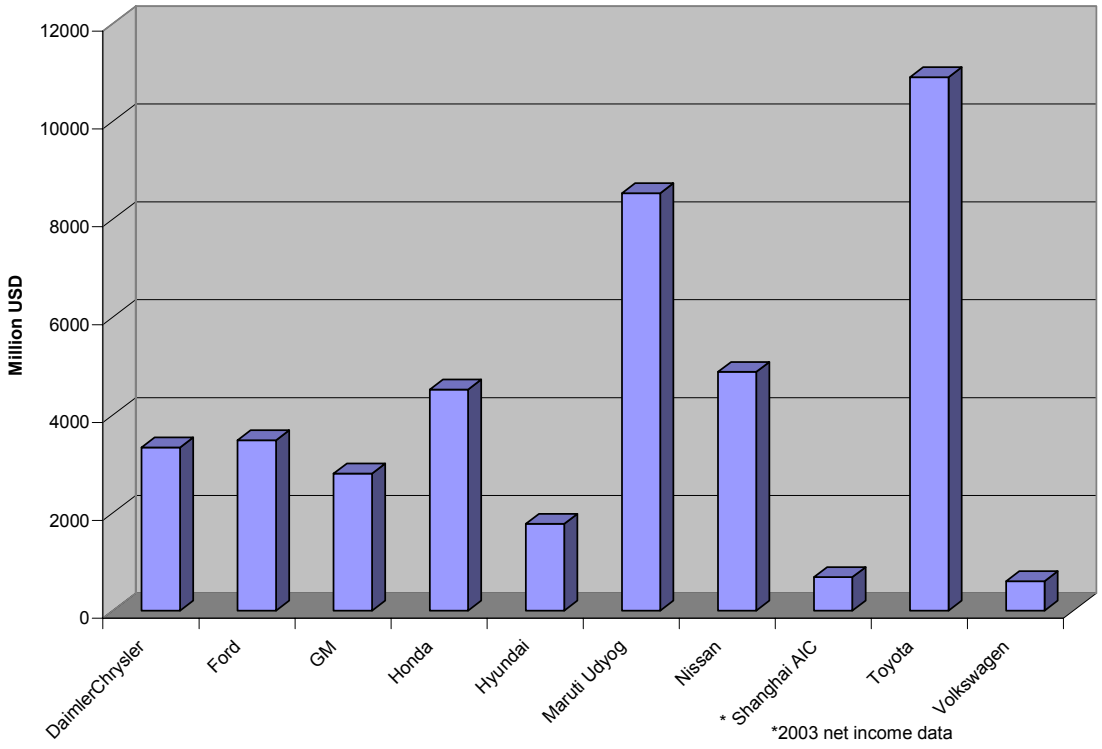


Figure 4 Net Incomes 2004

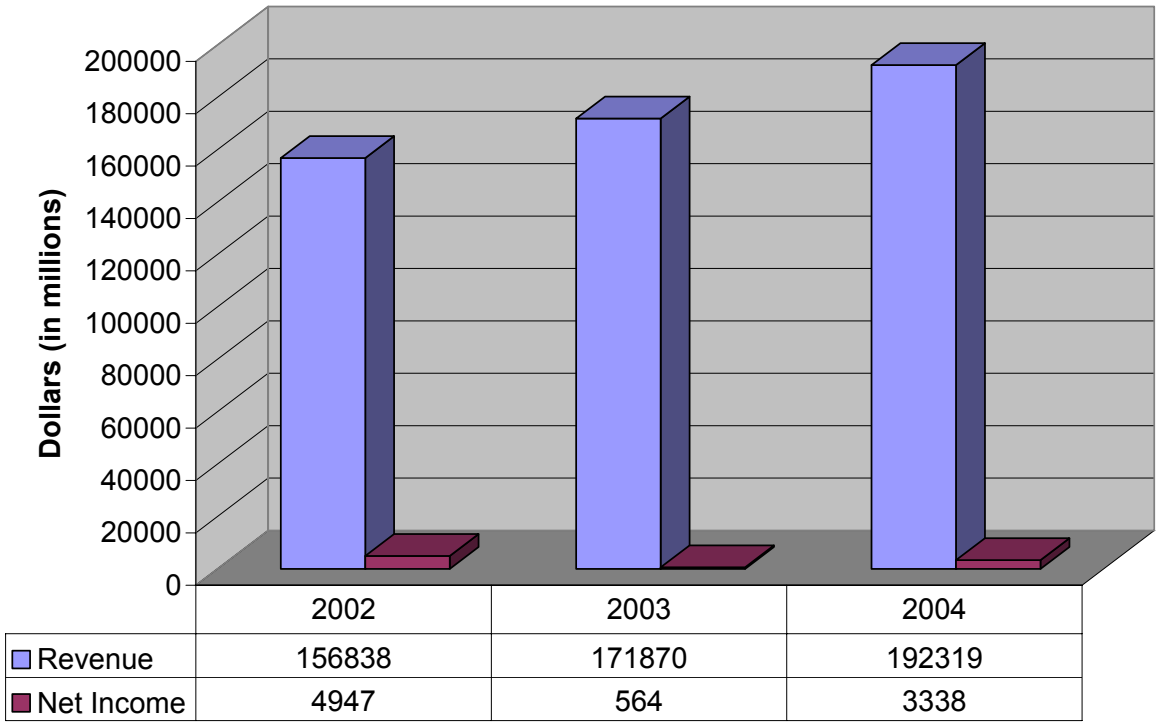


Figure 5 Daimler Chrysler Revenue and Net Income 2002 – 2004

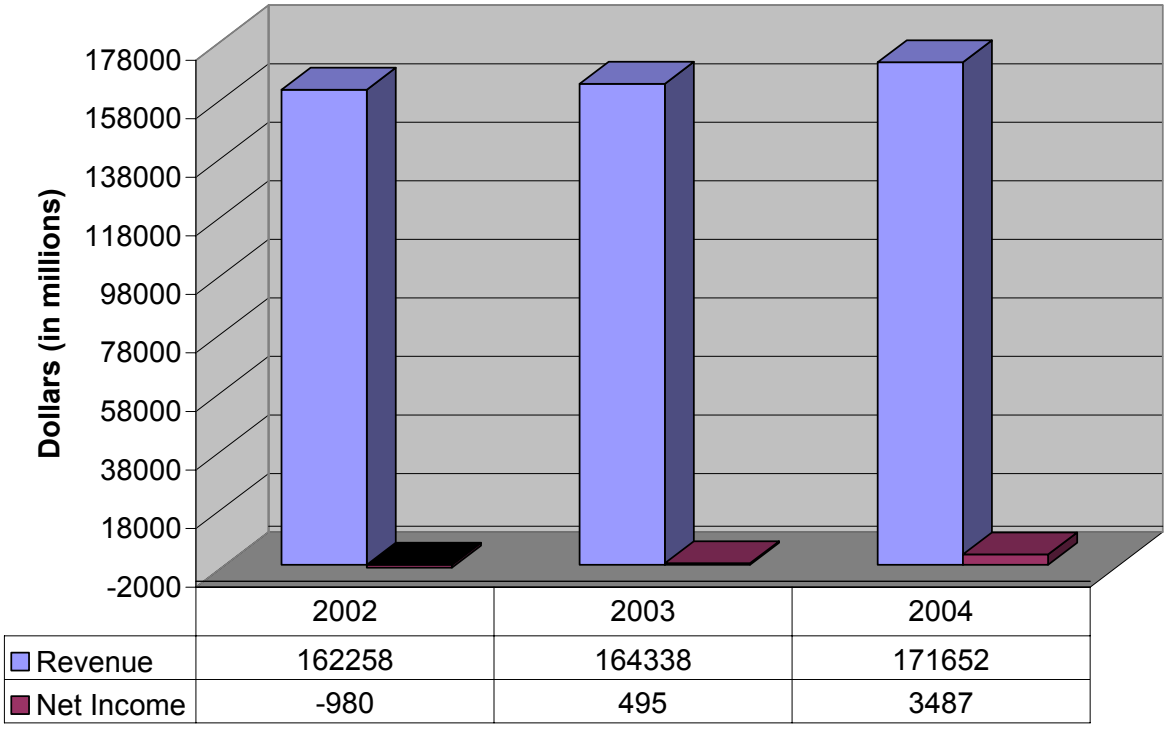
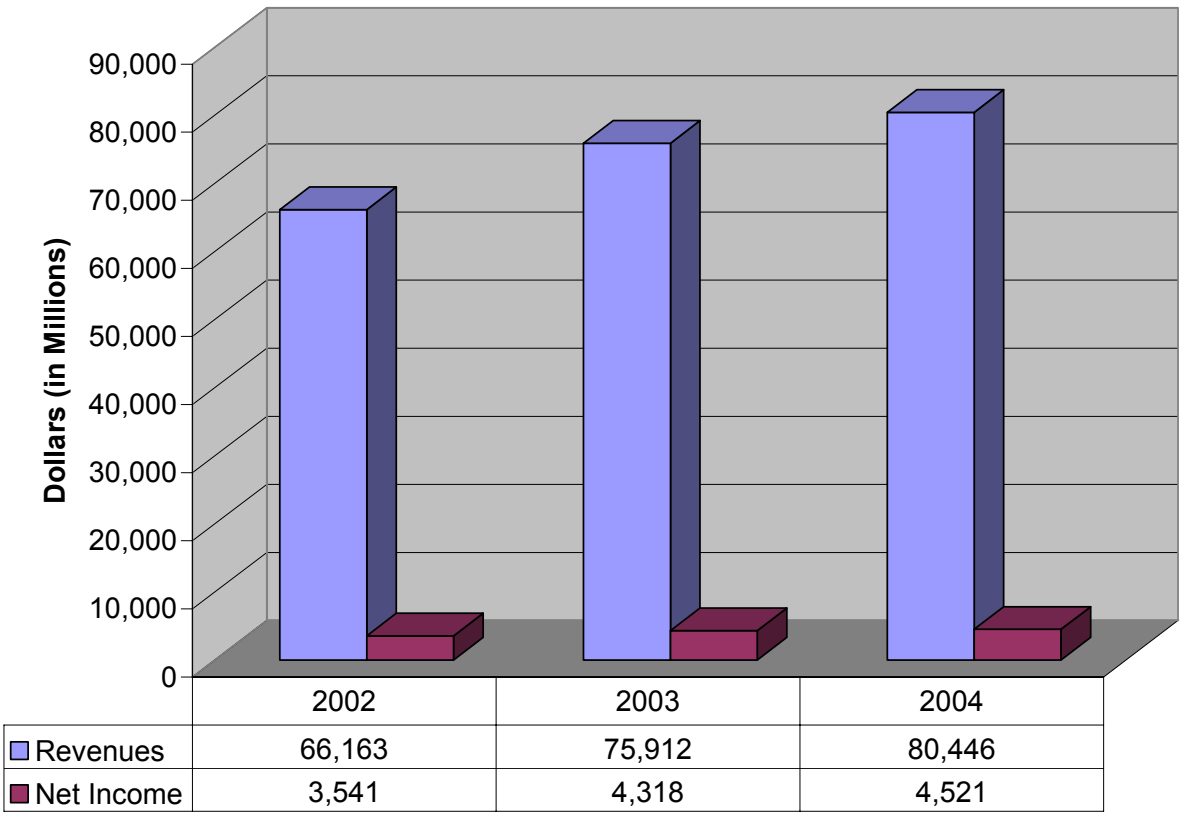
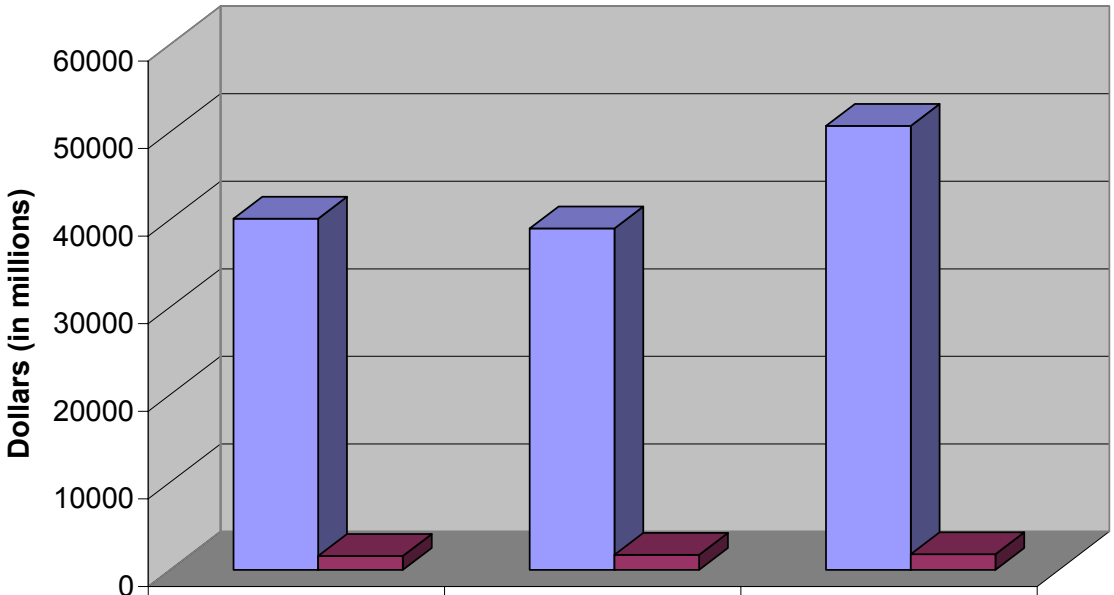


Figure 6 Ford Revenue and Net Income 2002 – 2004



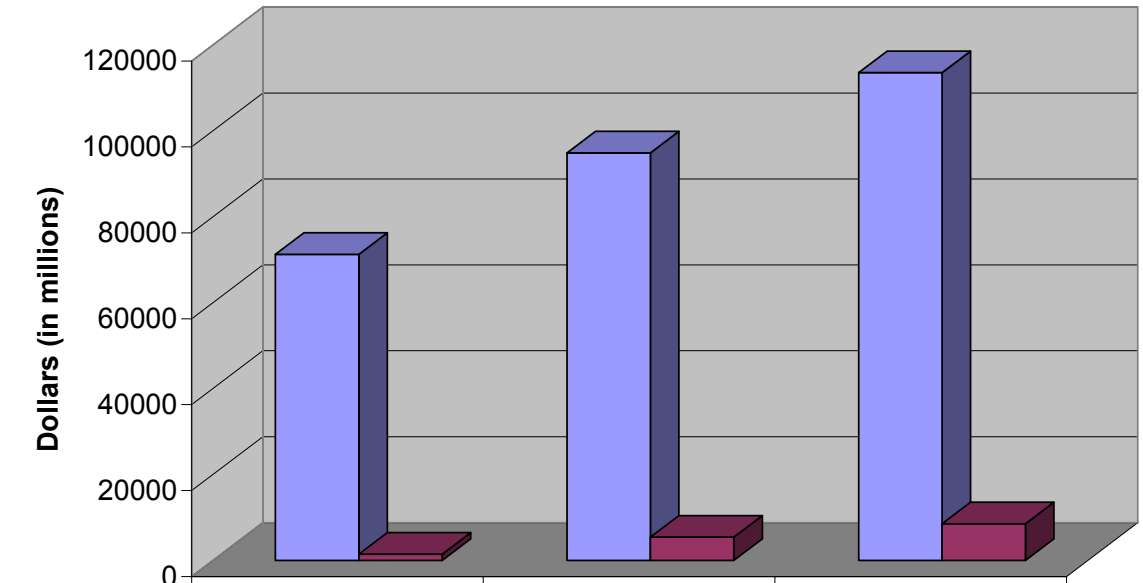
	2002	2003	2004
Revenues	66,163	75,912	80,446
Net Income	3,541	4,318	4,521

Figure 7 Honda Revenue and Net Income 2002 – 2004



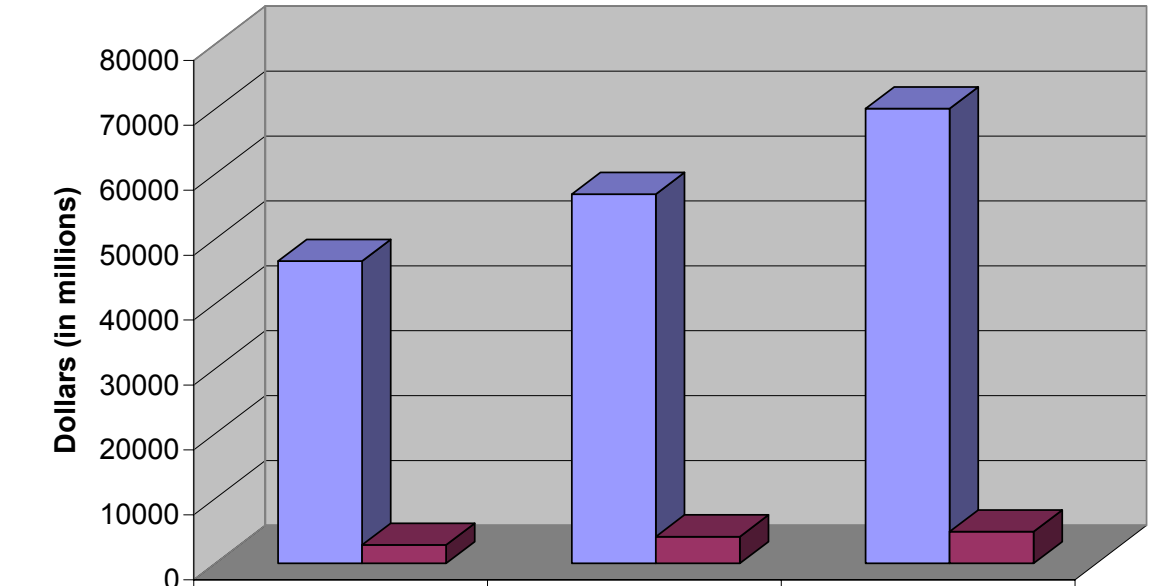
	2002	2003	2004
Revenue	40110.5	38994.5	50695.2
Net Income	1582.4	1713	1778.5

Figure 8 Hyundai Revenue and Net Income 2002 – 2004



	2002	2003	2004
Revenue	71265	94866	113538
Net Income	1464	5421	8536

Figure 9 Maruti Udyog Revenue and Net Income 2002 – 2004



	2002	2003	2004
Revenue	46588.3	56904.9	70087
Net Income	2849	4132.9	4881.7

Figure 10 Nissan Revenue and Net Income 2002 – 2004

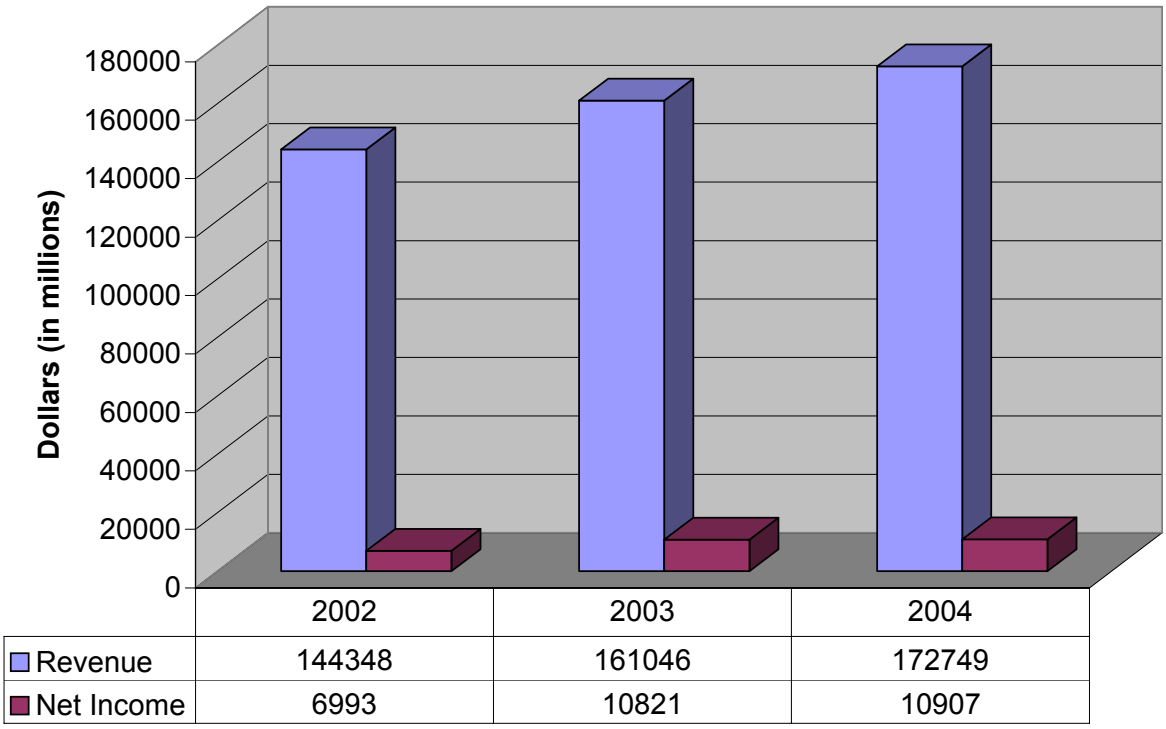


Figure 11 Toyota Revenue and Net Income 2002 – 2004

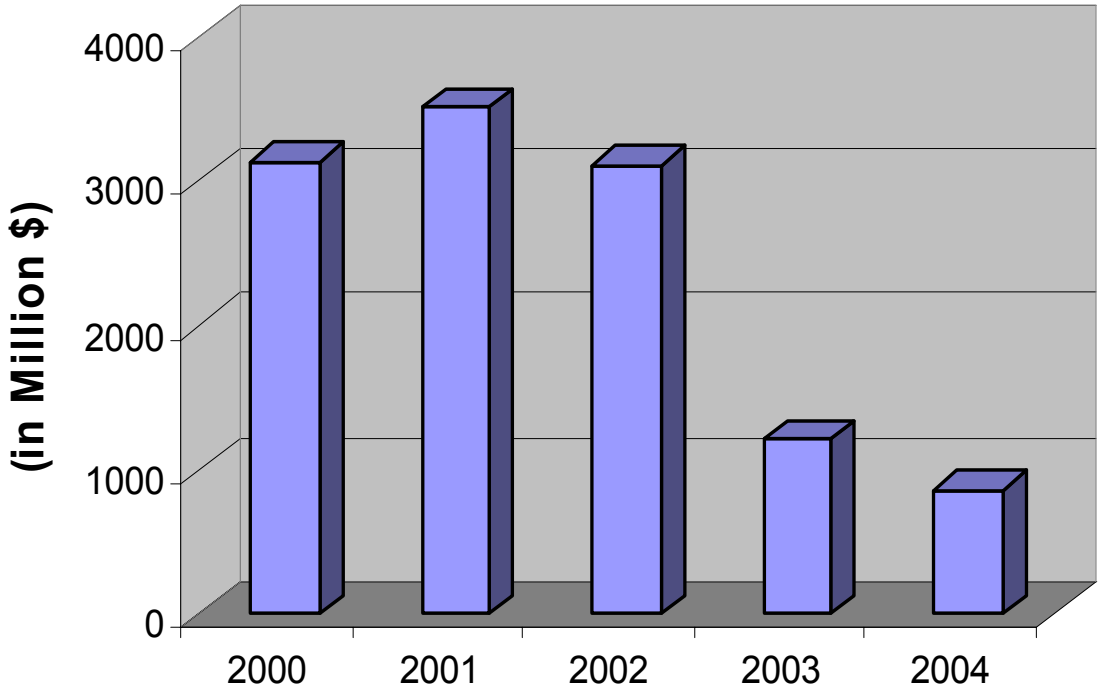


Figure 12 Volkswagen AG Net Income 2000 - 2004

Table 1 GM Ratios

	GM	*Average*	*Median*
Debt Ratio	0.942	0.696	0.725
Current Ratio	0.856	1.103	1.104
Asset Turnover	0.403	0.872	0.844
Return on Sales	0.014	0.040	0.035
Return on Equity	0.101	0.136	0.123

Table 2 Average Vehicle Production Time

Company	*Hours per vehicle, 2005*	*Change from 2004*
Toyota	27.90	–5.5%
Nissan	29.43	+4.8%
Honda	32.02	–0.2%
General Motors	34.33	–2.5%
Chrysler Group	35.85	–4.2%
Ford	36.98	–4.2%

APPENDIX B: Selected Financial Information

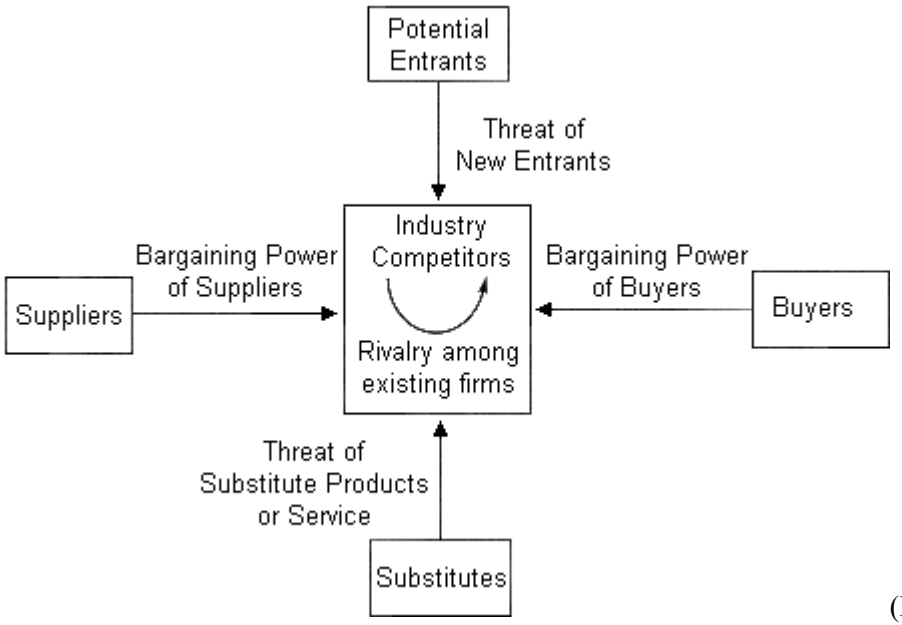
Company	*DaimlerChrysler*	*Ford*	*GM*	*Honda*	*Hyundai*	*Maruti Udyog*	*Nissan*	*Shanghai AIC*	*Toyota*	*Volkswagen*
Sales or Revenues 2002	156838	162258	177867	66163	40111	71265	46588	8609	144348	51779
Sales or Revenues 2003	171870	164338	185837	75912	38995	94866	56905	11765	161046	54588
Sales or Revenues 2004	192319	171652	193517	80446	50695	113538	70087	12100	172749	57330
Net Income after Taxes 2002	4947	-980	1736	3541	1582	1464	2849		6993	1245
Net Income after Taxes 2003	564	495	3822	4318	1713	5421	4133	689	10821	761
Net Income after Taxes 2004	3338	3487	2805	4521	1779	8536	4882		10907	607
Total Liabilities 2004	201926	275732	451877	56057	39369	16080	55055	6349	137677	36710
Total Assets 2004	247334	292654	479603	86647	55723	64044	74150	12923	226604	49422
Total Current Assets 2004	142294	44703	91213	37281	20575	29720	35537	763	87905	22442
Total Current Liabilities 2004	102274	55027	106577	34861	25511	12188	29269	4963	76611	15780
Total Equity 2004	45408	16922	27726	30590	16354	47964	19094	6574	88927	12712
Debt Ratio	0.816	0.942	0.942	0.647	0.707	0.251	0.742	0.491	0.608	0.743
Current Ratio	1.391	0.812	0.856	1.069	0.806	2.438	1.214	0.154	1.147	1.422
Asset Turnover	0.778	0.587	0.403	0.928	0.910	1.773	0.945	0.936	0.762	1.160
Return on Sales	0.017	0.020	0.014	0.056	0.035	0.075	0.070		0.063	0.011
Return on Equity	0.074	0.206	0.101	0.148	0.109	0.178	0.256		0.123	0.048

Sales, Revenues, Net Income after Taxes, Assets, Liabilities, and Equity are reported in millions of USD.

	Average	*Median*	*Max*	*Company*	*Min*	*Company*	*Spread*
Sales or Revenues 2002	92583	68714	177867	GM	8609	Shanghai AIC	169258
Sales or Revenues 2003	101612	85389	185837	GM	11765	Shanghai AIC	174072
Sales or Revenues 2004	111443	96992	193517	GM	12100	Shanghai AIC	181417
Net Income after Taxes 2002	2597	1736	6993	Toyota	-980	Ford	7973
Net Income after Taxes 2003	3274	2768	10821	Toyota	495	Ford	10326
Net Income after Taxes 2004	4540	3487	10907	Toyota	607	Volkswagen	10300
Total Liabilities 2004	127683	55556	451877	GM	6349	Shanghai AIC	445528
Total Assets 2004	158910	80398	479603	GM	12923	Shanghai AIC	466680
Total Current Assets 2004	51243	36409	142294	DaimlerChrysler	763	Shanghai AIC	141531
Total Current Liabilities 2004	46306	32065	106577	GM	4963	Shanghai AIC	101614
Total Equity 2004	31227	23410	88927	Toyota	6574	Shanghai AIC	82353
Debt Ratio	0.689	0.725	0.942	GM	0.251	Maruti Udyog	0.691
Current Ratio	1.131	1.108	2.438	Maruti Udyog	0.154	Shanghai AIC	2.285
Asset Turnover	0.918	0.919	1.773	Maruti Udyog	0.403	GM	1.369
Return on Sales	0.040	0.035	0.075	Maruti Udyog	0.011	Volkswagen	0.065
Return on Equity	0.138	0.123	0.256	Nissan	0.048	Volkswagen	0.208

Sales, Revenues, Net Income after Taxes, Assets, Liabilities, and Equity are reported in millions of USD.

APPENDIX C: Porter's Five Forces



(Michael Porter)

Taken from http://www.valuebasedmanagement.net/methods_porter_five_forces.html; accessed November 8, 2005

More information on Porter's 5 Forces may be found in the course notes or at http://www.quickmba.com/strategy/porter.shtml

APPENDIX D: Concentration Ratios in US Auto Industry

Table 3 Summary of Concentration Ratios

Automobile and Light Duty Motor Vehicle Mfg	Number of Largest Companies			
	4	8	20	50
% of value of shipments accounted for by the -	88.3	97.5	99.7	99.9
% of value added accounted for by the -	92.8	98.1	99.6	99.9

NACIS code	Industry group and industry	Companies[1]	Value of shipments[2] ($1000)	Percent of value of shipments accounted for by the–				Herfindahl-Herschmann index for 50 largest companies[3]
				4 largest companies	8 largest companies	20 largest companies	50 largest companies	
3361	Motor vehicle mfg	325	220 052 857	82.4	91.8	98.8	99.7	2 505.8
33611	Automobile & light duty motor vehicle mfg	253	205 543 825	88.3	97.5	99.7	99.9	2 862.8
336111	Automobile mfg	173	95 365 667	79.5	96.3	99.5	99.9	2 349.7
336112	Light truck & utility vehicle mfg	84	110 178 158	99.3	99.9	99.9	99.9	D

Figure 13 Share of Value of Shipments Accounted for by the 4, 8, 20, and 50 Largest Companies: 1997

Explanation of the determining of VALUE OF SHIPMENTS
This item covers the received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all miscellaneous receipts, such as receipts for contract work performed for others, installation and repair, sales of scrap, and sales of products bought and sold without further processing. Included are all items made by or for the establishments from material owned by it, whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In the case of multiunit companies, the manufacturer was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value, including not only the direct cost of production but also a reasonable proportion of ‘‘all other costs’’ (including company overhead) and profit.

In addition to the value for NAICS [North American Industry Classification System] where changes are significant, it will not be possible to define products; aggregates of the following categories of miscellaneous receipts are reported as part of a total establishment’s value of product shipments:

1. Reported contract work - Receipts for work or services that a plant performed for others on their materials.
2. Value of resales - Sales of products brought and sold without further manufacture, processing, or assembly.
3. Other miscellaneous receipts - Such as repair work, installation, sales of scrap, etc.

Industry primary product value of shipments represents one of the three components of value of shipments. These components are:

1. Primary products value of shipments.
2. Secondary product value of shipments.
3. Total miscellaneous receipts.

Primary product shipments are used in the calculations of industry specialization ratio and industry coverage ratio.

NACIS code	Industry group and industry	Companies[1]	Value added by manufacture ($1000)	Percent of value added accounted for by the[2]–				Herfindahl-Herschmann index for 50 largest companies[3]
				4 largest companies	8 largest companies	20 largest companies	50 largest companies	
3361	Motor vehicle mfg	325	72 574 976	87.3	93.8	98.8	99.7	D
33611	Automobile & light duty motor vehicle mfg	253	68 314 274	92.8	98.1	99.6	99.9	D
336111	Automobile mfg	173	28 937 270	87.4	97.0	99.4	99.9	2 725.0
336112	Light truck & utility vehicle mfg	84	39 377 004	99.5	99.9	99.9	99.9	D

Figure 14 Share of Value Added Accounted for by the 4, 8, 20, and 50 Largest Companies: 1997

Explanation of the determining of VALUE ADDED

This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments (products manufactured plus receipts for services rendered). The result of this calculation is adjusted by the addition of value added by merchandising operations (i.e., the difference between the sales value and the cost of merchandise sold without further manufacture, processing, or assembly) plus the net change in finished goods and work-in-process between the beginning and end-of-year inventories.

For those industries where value of production is collected instead of value of shipments, value added is adjusted only for the change in work-in-process inventories between the beginning and end of year. For those industries where value of work done is collected, the value added does not include an adjustment for the change in finished goods or work-in-process inventories.

"Value added" avoids the duplication in the figure for value of shipments that results from the use of products of some establishments as materials by others. Value added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

Taken from "Concentration Ratios in Manufacturing". 1997 Economic Census *Manufacturing* Subject Series. U.S. Department of Commerce. Economics and Statistics Administration. US Census Bureau. Issued June 2001.

Accessible from http://www.census.gov/prod/ec97/m31s-cr.pdf