

HYUNDAI MOTORS: MAJOR PLAYER IN GLOBAL AUTOMOBILE MANUFACTURING - LUCK OR DELIBERATE MOVES?

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In 1970, South Korea's GDP per capita was \$260 and Ghana's GDP per capita was \$250. Fast forward to fifty years later: South Korea's GDP per capita was \$32,000 and Ghana's GDP per capita was \$1,786. South Korea's approach to encourage participation in international trade turned the country into the world's eleventh largest economy. Ghana followed a policy of self-sufficiency discouraging imports and exports (Hill & Hult 2020).

Not only had Hyundai Motors benefitted from the policies of its country of origin, but like German and Japanese automobile manufactures after World War II, it benefitted from an environment with significant impact on the company's global competitiveness. Four attributes were present: a skilled labor pool, local demand conditions, related and supporting industries, and capable competitors. These attributes contributed to the eventual growth of Hyundai into a global competitor (Porter 1990).

Introduction

In 1967, Hyundai Motors was established (Chung 2001). Hyundai branded vehicles were manufactured by Hyundai Motor Company, which along with Kia formed the Hyundai Kia Automotive Group. Headquartered in Seoul, South Korea, Hyundai operated the world's largest integrated automobile manufacturing facility in Ulsan with the capability of producing 1.6 million units annually (Taylor III 2010). The company's global workforce included 75,000 employees. Hyundai Motor Company maintained manufacturing facilities in 10 countries, along with vehicle assembly plants owned by local companies in several countries. Hyundai vehicles were sold in 193 countries through 6,000 dealerships and showrooms. Hyundai, together with Kia, was the world's fifth-largest automaker. In 2012, Hyundai had global sales of over 4.4 million vehicles. Popular models included the Sonata and Elantra mid-sized sedans (Hyundai Global News 2013).

Hyundai had continued to improve the quality of its vehicles by improving performance and reliability. Emphasis was placed on design and engineering to achieve the desired results. This effort raised the overall profile of Hyundai relative to other vehicle manufacturers (Exhibit 1).

Exhibit 1. Ward's 2009 10 Best Engines Winner

Source: WARD'S, December 5, 2008, Ward's 2009 10 Best Engines Winners, WARD'S

The Winners for 2008 (Engine and Tested Vehicle):

- * Audi AG: 2.0L TFSI turbocharged DOHC I-4 (A4 Avant)
- * BMW AG: 3.0L turbocharged DOHC I-6 (135i Coupe)
- * BMW AG: 3.0L DOHC I-6 Turbodiesel (335d)
- * Chrysler LLC: 5.7L Hemi OHV V-8 (Dodge Ram/Challenger R/T)
- * Ford Motor Co.: 2.5L DOHC I-4 HEV (Escape Hybrid)
- * General Motors Corp.: 3.6L DOHC V-6 (Cadillac CTS)
- * Honda Motor Co. Ltd.: 3.5L SOHC V-6 (Accord Coupe)
- * Hyundai Motor Co. Ltd.: 4.6L DOHC V-8 (Genesis)
- * Toyota Motor Corp.: 3.5L DOHC V-6 (Lexus IS 350)
- * Volkswagen AG: 2.0L SOHC I-4 Turbodiesel (Jetta TDI)

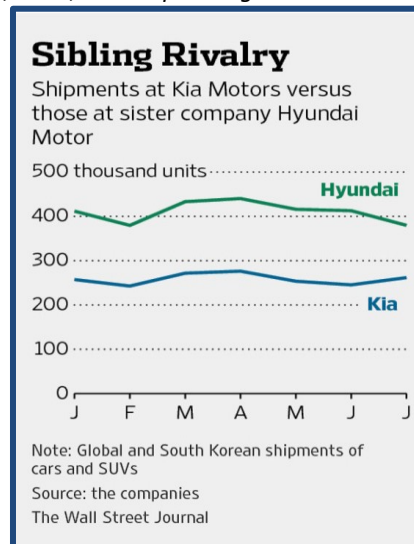
One analyst warned that Hyundai was putting too much pressure on suppliers to cut costs, which could undermine a push to greater quality. Hyundai also faced challenges from the rising value of the S. Korean won against the dollar. Hyundai still produced almost 50 per cent of its vehicles in South Korea and depended on local parts and steel, although only 18 per cent of its final sales were in Korea (Oliver 2011).

Hyundai had begun to emphasize styling; it adopted a new design approach called “*Fluidic Sculpture*.” The new design included the current-generation Sonata and the next *Genesis*, launched in 2015. It started competing with exclusive brands such as the *BMW 7-Series* and *Mercedes S-Class*, when it launched an American version of its *Equus* premium-luxury sedan in 2009 (Economist 2013).

There were a variety of reasons why the Koreans moved up market. For one thing, luxury vehicles provided significantly higher margins than did budget models, where there was more competition. There was also the issue of image (Exhibit 2). The original *Genesis* helped change the minds of buyers who had long dismissed the Hyundai brand (Economist 2013).

Exhibit 2. Hyundai and Kia Sales

Source: Nam, In-Soo, August 28, 2014, *Kia Keeps Being Overshadowed by Hyundai*. Wall Street Journal.



Genesis

Genesis Motor, LLC, was the luxury vehicle division of Hyundai Motor Company (CNET 2015). *Genesis* brand was announced as an independent division on November 4, 2015, with the *Genesis G90* launched on December 9, 2015 (Kim 2015). In 2015, Hyundai made *Genesis* a stand-alone brand (Yahoo! 2015).

Hyundai's marketing emphasized a lower price compared with luxury vehicles made by BMW, Lexus, and others. *Genesis* had a good start (Exhibit 3). The industry was impressed. *Genesis* was named North American Car of the Year, overcoming a crowded field that included the *Audi A4*, *Jaguar XF* and *Cadillac CTS-V* (Economist 2009).

Exhibit 3. Top 8 Hyundai and Genesis Production by Country, 2021

Source: Hyundai Motor Company, October 4, 2020, Sales Performance

Rank	Country	Vehicle production
1	 <u>South Korea</u>	1,646,888
2	 <u>India</u>	635,413
3	 <u>China</u>	360,565
4	 <u>United States</u>	288,967
5	 <u>Czech Republic</u>	275,620
6	 <u>Russia</u>	235,157
7	 <u>Brazil</u>	188,349
8	 <u>Turkey</u>	161,500

Hyundai's Image

In 1998, Hyundai started to overhaul its image to establish itself as a world-class brand. Hyundai Motor Group invested heavily in the quality, design, and manufacturing. It added a 10-year or 100,000-mile warranty to cars sold in the United States and launched an aggressive marketing campaign. Hyundai consistently ranked among world's top-valued brands (Exhibit 4).

Exhibit 4. 2017 Automotive Top 10 Brands (Interbrand)

Source: *Hyundainews.com*, September 26, 2017

Rank, Company / Brand Value (\$bn)	
1.	Toyota / 50.3
2.	Mercedes-Benz / 47.8
3.	BMW / 41.5
4.	Honda / 22.7
5.	Ford / 13.6
6.	Hyundai Motor / 13.2
7.	Audi / 12.0
8.	Nissan / 11.5
9.	Volkswagen / 11.5
10.	Porsche / 10.1

Changing Manufacturing

Hyundai had reduced its dependence upon direct labor by raising levels of automation and information technology in the production process. Even though Hyundai had been anxious about building a U.S. plant, the outcome was a success. Hyundai's production model was easily transferable to other countries; because it depended less on production workers than did the Japanese model, it was easier to transfer. To recruit and train American workers was relatively easy for Hyundai, because its production model did not require high skill levels nor active participation (Hyung 2010).

Hyundai's U.S. transplant surpassed the performance of the original plants in South Korea within two years, because it benefitted from the flexibility of automated production facilities and a labor market in Alabama that did not have militant unions. Hyundai had been rapidly increasing overseas production not only in European countries, such as Slovakia and the Czech Republic, but also in developing countries, such as Brazil and Russia. (Hyung 2010).

Hyundai Localization Strategy

Hyundai Motors offered tailored models to meet local needs in markets such as Russia and India (Jung-a 2012). Hyundai's *Solaris* compact car and its *Eon* economy car sold more than 10,000 units per month in Russia and India each. The *Solaris* was Hyundai's strategic model targeted at the Russian market, with many specialized features that suited the long and bitterly cold Russian winter, road conditions, and driving habits. The car became the best-selling imported car in Russia. Hyundai was the second-largest imported carmaker with an 8.9 per cent market share of the Russian market (Jung-a 2012).

In India, Hyundai was the second-biggest seller of cars with a 20 per cent market share as it produced cars at two plants to meet the special needs of Indian drivers. Its entry-level *Eon* model became the country's best-selling car. Hyundai had slashed the price of the car, which was built on a completely new platform made for the Indian market. While Hyundai cut prices, it was also offering design and interior fixtures aimed at attracting customers (Jung-a 2012). Localization became ever more important for the carmaker to achieve its goals as it sought to make up for stalled sales growth in advanced markets with strong sales in emerging markets that still boasted relatively upbeat economic prospects (Jung-a 2012).

Hyundai Enters the United States

Hyundai entered the United States in 1986. It focused on first-time car buyers who were unable to afford value-equipped cars. Hyundai responded with its *Excel* subcompact model. Sales were 168,882 vehicles, an industry record for an import car distributor in its first year. Hyundai sales continued to soar, reaching a record of 263,610 units (Hyundai Motor Company 2020).

Initially, the *Excel* was popular, but its faults became apparent as cost-cutting measures caused reliability to suffer. With an increasingly poor reputation for quality, sales plummeted. In

response, Hyundai began investing heavily in the quality, design, manufacturing, and long-term research of its vehicles. The company added free maintenance for the first 2 years or 24,000 miles for all its new cars sold, starting with the 1992 model year. It also added a 10-year or 100,000-mile powertrain warranty (known as the *Hyundai Advantage*) to its vehicles sold in the United States (Hyundai Motor Company 2012).

By 2004, sales had dramatically increased, and the reputation of Hyundai cars improved (Hyundai Motor Company 2012). In 2004, Hyundai tied with Honda for initial brand quality in a survey/study from J.D. Power and Associates. Hyundai was ranked second in the industry, behind Toyota, for initial vehicle quality. Hyundai continued this tradition as it placed third overall in J.D. Power's 2006 Initial Quality Survey, behind Porsche and Lexus (AutoWeek Magazine 2006). Hyundai completed a new manufacturing facility in Montgomery, Alabama in 2004 at a cost of \$1.7 billion. Production started in May 2005. It employed more than 3,000 workers in 2012 (Hyundai Motor Company 2012).

The last time the Hyundai Motor Group opened a new plant in the U.S. was in 2009. Hyundai and Kia had the goal to be among the U.S.'s top three EV providers by 2026 (Felton 2022).

Hyundai in China

Hyundai Motor Company (HMC) established a joint venture company with Beijing Automotive to build a car plant in China. HMC spent USD \$250 million to build a 50-50 joint venture factory for passenger cars, to be called Beijing-Hyundai Motor Company in China. Production began with Hyundai's *EF Sonata* model and in due course the *Elantra XD* was added. Hyundai Motors and Beijing Automotive expected the Chinese auto market to expand dramatically following China's entry into the World Trade Organization (Hyundainews.com 2002).

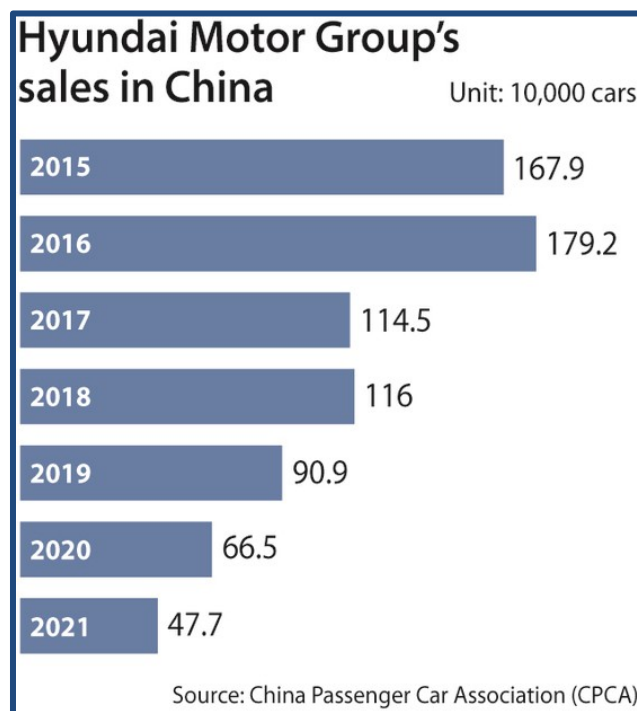
Hyundai Motors and Beijing Automotive operated five plants in China (Business Korea 2019).

In October 2010, Hyundai signed an agreement with Sichuan Nanjun Automobile to set up a commercial vehicle joint venture, Sichuan Hyundai Motor Co. Ltd (ChinaAutoWeb.com 2010). Hyundai Motor Group achieved record-breaking sales in the United States and Europe while floundering in China. Its average monthly sales were 39,700 units, less than a third of its average in 2016 (Exhibit 6). Its market share in China was 2.7 percent, 12th among carmakers. In 2011 it had 6 percent of the market, and it was No. 3 (Korea Joongang Daily 2022).

Hyundai's decline started in 2017 when South Korea decided to deploy the U.S.-led Terminal High Altitude Area Defense (Thaad) antimissile system despite very clear and strong objections from Beijing. China reacted with unabashed economic retaliations against S. Korea and its companies. It encouraged a boycott of Korean products, ranging from cosmetics to cars. Hyundai Motor Group sold 1.8 million units in 2016 and fell by 36 percent the next year (Exhibit 5). Except for a slight rebound in 2018, sales never recovered (Korea Joongang Daily 2022).

Exhibit 5. Hyundai Motor Group's Sales in China

Source: Korea Joongang Daily, January 20, 2022, Hyundai Motor tries U-turn in China strategy



Hyundai has been looking for a strategy to win back Chinese customers (Korea Joongang Daily 2022). After years of weak sales, Hyundai reorganized its Chinese operations in 2019 and suspended plants and production of compact models to enhance profitability. The shrinking sales in China were in contrast to its solid performance in the United States and Europe with its premium brand *Genesis* and its competitive SUV models (Korea Bizwire 2021).

Hyundai vowed to take steps to shift focus from affordable models tailored to the Chinese market to new, luxury models and zero-emission vehicles. It planned to launch more than 20 electric models in China by 2030, up from the current eight, to pit itself against *Tesla* and other established automakers that were speeding up their EV adoption (Korea Bizwire 2021). To tap into the growing high-end Chinese market, Hyundai debuted its luxury brand *Genesis* and prepared to launch the flagship *G80* sedan and *GV80 SUV*. The automotive group pinned high hopes on zero-emission vehicles, as Beijing vowed to phase out the internal combustion engine vehicles by 2035 (Korea Bizwire 2021).

In addition to EVs, Hyundai made inroads into the market for fuel cell electric vehicles (FCEVs) running on hydrogen in China, as the Chinese government aims to provide 1 million hydrogen-powered vehicles by 2035. Hyundai planned to build its first overseas hydrogen fuel-cell systems plant in China to start production in 2023 (Korea Bizwire 2021).

The reasons for Hyundai and Kia's sluggish performance in China were complex. Many critics had pointed out that Hyundai had failed to keep up with rapidly changing Chinese consumers' tastes. (Hyun-bin 2022).

Hyundai in Japan

Hyundai announced on February 9, 2022, that it was re-entering the Japanese market after an absence of more than 12 years. Like many foreign automakers, Hyundai had struggled with

Japan's high retail costs which it was unable to offset with sales volume due in part to consumer "preferences" for local brands. (Just Auto 2022).

This time around, Hyundai had a radically new strategy. It sold its vehicles online exclusively. This reduced its retail costs dramatically. It was banking on the rising popularity of e-commerce in Japan to grow its presence in the market. *Tesla* already employed a similar strategy. Hyundai used public events and venues such as shopping malls to carry out promotional activities and to help establish customer relationships. It also teamed up with local car-sharing company Anyca to sell its vehicles (Just Auto 2022).

The automaker, through its local subsidiary Hyundai Mobility Japan, focused exclusively on electric vehicles (EVs). This segment had been undersupplied in Japan, with the government yet to provide significant sales incentives to EV buyers (Just Auto 2022).

Hyundai in Russia

In the 2000s, automakers expected Russia to become a major automotive market and hub to boost business in international markets, including Europe. But instability in the country and a stagnant economy, among other factors, led the market to peak at only 2.96-million-unit sales in 2008 (Wayland 2022).

New U.S. sanctions and Moscow's invasion of the Ukraine had a wide-ranging impact on the already constrained automotive global supply chain, but only a few automakers have notable exposure in Russia (Wayland 2022). France-based Renault Group, which has a controlling stake in Russian automaker AvtoVAZ, accounted for 39.5% of the country's vehicle production, followed by Hyundai Group at 27.2%. Volkswagen had a 12.2% share, according to research firm IHS Markit, while Toyota Motor followed at 5.5%. Others were in low single digits (Wayland 2022).

Hyundai Motor Group sales in Russia plunged by 68% to 11,245 units in March from 35,389 units a year earlier. The group suspended operations at its assembly plant in St Petersburg after component supplies were disrupted by Russia's war with Ukraine (Wayland 2022).

Hyundai in India

Hyundai made its first international foreign direct investment in 1996, when Hyundai Motor India Limited (HMIL) was established in India with a production plant in Irungattukottai near Chennai, India (Business.mapsofindia.com 2010).

Once Hyundai entered the Indian market, things changed. Hyundai started focusing on quality, customer care and service. It talked about its technology like multi-point fuel injection (MPFI) which emitted lower emissions and met Euro norms (Telang and Souvik 2016). The Korean giant gained immense popularity in Indian market, making it the second-largest automobile manufacturer in India, within a few months of its inception (Yadav 2021). Hyundai tapped the premium sedan segment with its Hyundai *Sonata*. It managed to attract attention due to its resemblance to *Jaguar* models. In addition, *Sonata Gold* was one of the most luxurious cars on sale in India at the time of its launch. The company has held many firsts in the Indian market, such as the *Kona Electric* being the first zero-emission SUV. Hyundai Motor Co. and its auto-parts suppliers invested as much as \$1.47 billion in India for construction of its second car-manufacturing plant and an engine and transmission facility (Choudhury 2006). Hyundai invested \$911 million, while the auto parts makers invested the remaining \$562 million. The new factory doubled Hyundai's car-manufacturing capacity in India to 600,000 units when it opened in October 2007 (Choudhury 2006).

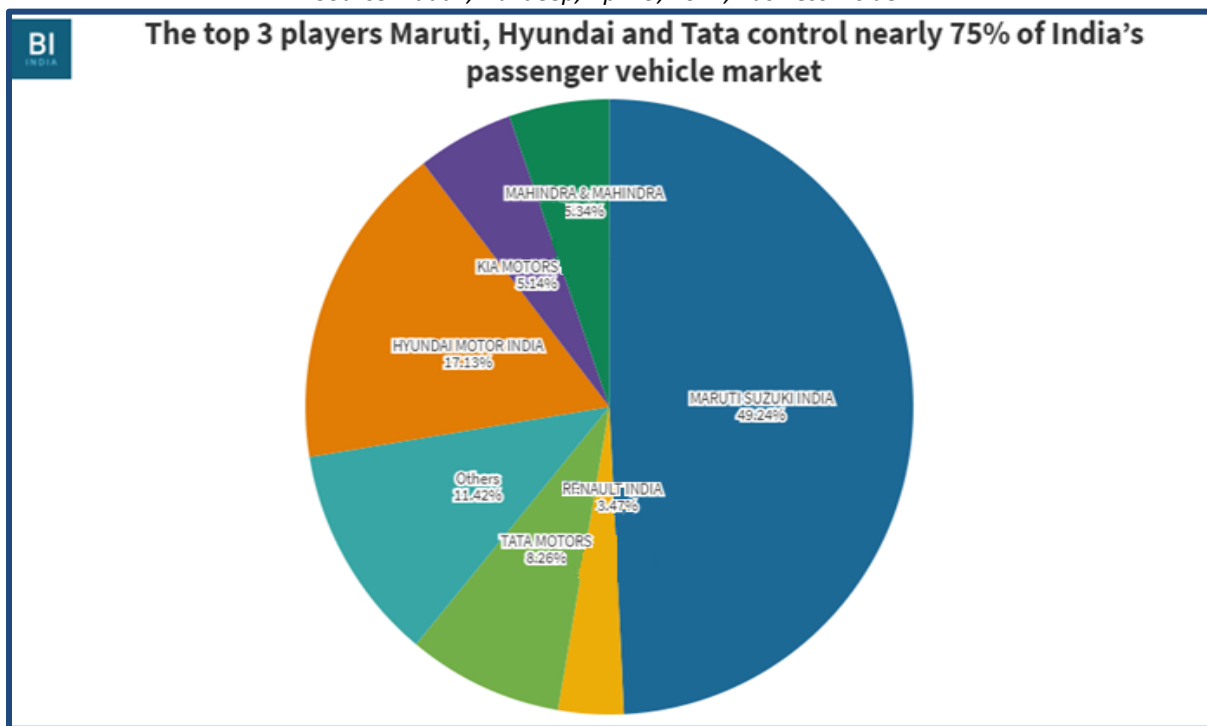
Hyundai entered India because it was the world's fifth-largest automobile market, a step toward becoming a leading global car manufacturer. India continued to be one of the world's most promising markets since an increasing number of families could afford cars as incomes rose. The Indian market remained attractive due to its healthy growth rates (Kala 2017).

Since then, Hyundai has maintained the second-largest share of the pie in India after *Maruti Suzuki*. Hyundai held a 17% market share as of January 2021 in India. It was also the largest car exporter in the country. Hyundai - through its Indian subsidiary - exported to more than 88 countries across Africa, Middle East, Latin America, Australia and the Asia-Pacific (Exhibit 6).

In December 2020, Hyundai recorded its highest production output in a single month of 71,000 units. The company had been strengthening its portfolio in India with the addition of new hatchbacks and SUVs such as *Grand i10 Nios*, *Creta*, *i20*, which posted strong sales volumes (Yadav 2021).

Exhibit 6. Top Players in the Indian Automobile Market

Source: Yadav, Navdeep, April 9, 2021, *Business Insider*



Hyundai in Europe

Hyundai Motor decided to build a €1bn (\$1.2bn) plant in the Czech Republic to accelerate the Korean carmaker's push into Europe. The move underscored Hyundai's ambitions to join the top ranks of global automakers by diversifying its production bases to overseas markets. It also demonstrated the attractiveness of central and eastern Europe as a production location, with *Kia*, Hyundai's low-price affiliate, already building a factory in Slovakia (Jung-a & Krosnar 2006).

The Czech Republic plant would have an annual production capacity of 300,000 units. Hyundai expected the new plant to help reduce production costs, foreign exchange risks, and avoid any trade disputes with Europe. It was estimated that Czech labor costs were just one-tenth of those in South Korea. Hyundai was suffering from a rapid increase in wages because of frequent industrial action. Partial strikes by its militant labor union cost Hyundai Won 591bn (\$566m) in lost production this year (Jung-a & Krosnar 2006).

Hyundai and its affiliate Kia Motors grew sales rapidly in Europe, their second-largest overseas market after the U.S. It planned to develop a new model, suitable for its European buyers, at the Czech plant. Central Europe had emerged as a key driving force in the world's automotive sector (Jung-a & Krosnar 2006).

The Korean brands attributed their buoyantly counter cyclical businesses to lean business models and desirable new cars such as the Hyundai *i30 hatchback* and *Kia Sportage crossover* vehicle that matched the preferences of potential customers (Reed 2012).

Hyundai Scandals

Corruption? In 2006, the South Korean government initiated an investigation of Chung Mong Koo's practices as head of Hyundai. The government suspected him of corruption. On April 28, 2006, Chung was arrested and charged for embezzlement of 100 billion South Korean won (USD \$106 million) (Sang-hun 2006). As a result, Hyundai Vice Chairman and CEO, Kim Dong-jin, replaced him as head of the company.

Unfair competition? South Korean regulators began procedures in September 2006 to determine whether Hyundai Motors had violated competition rules by allegedly attempting to pressure parts suppliers to cut prices. The Korean Fair-Trade Commission (FTC) had been studying allegations that the country's largest carmaker attempted to unfairly pass the burden of higher raw material prices and the stronger local currency onto its business partners using its strong bargaining power (Jung-a 2006). FTC officials conducted onsite investigations into Hyundai and its parts suppliers in November and February (Jung-a 2006).

To ease such criticism, Hyundai pledged to pay its 1,800 suppliers in cash for the rest of 2022 at a cost of about Won 3,300 bn and to provide Won 2,600 bn in funding for the suppliers' research and development activities over the next four years. Securing support from the parts suppliers was crucial for Hyundai to fulfill its ambition to become one of the world's top five automakers (Jung-a 2006). Prosecutors investigated allegations that Hyundai created "*slush funds*" to lobby politicians for business favors, and that Mr. Chung tried to transfer management control to his son by illegal means (Jung-a 2006).

Overstated Fuel Economy? In 2014, the company was issued \$350 million in penalties by the U.S. government. It agreed to pay \$395 million in 2013 to resolve claims from vehicles owners, and agreed to pay \$41.2 million to cover the "*investigative costs*" of 33 U.S. state Attorneys General (Shepardson 2016).

Hyundai and Kia agreed to settle claims that they had overstated fuel economy statistics for almost 1.2m vehicles sold in the U.S. for a record \$300 million (Guthrie 2014). This was the largest civil penalty in the history of the U.S, Clean Air Act; Hyundai also forfeited greenhouse gas emission credits with an estimated value of more than \$200 million (Guthrie 2014).

Vehicle Recalls? South Korean prosecutors raided the headquarters of Hyundai Motors to look into the way the South Korean automaker handled vehicle recalls over engine defects (Jung-a 2019). The raid came after a South Korean civic group filed a complaint in 2017 that the company had delayed recalls despite being aware of the engine defects. That year, Hyundai undertook massive recalls in South Korea and the U.S. but denied any wrongdoing. Seoul's transport ministry asked state prosecutors to look into the case amid allegations that Hyundai tried to conceal engine defects. The ministry ordered a recall of 238,000 vehicles in the country in May 2017. The carmaker was also under investigation by U.S. safety regulators over the recall of nearly 1.7 million vehicles for engine defects (Jung-a 2019).

Insider Trading? In another scandal, Hyundai shares rose more than 20% after it confirmed early-stage discussions with Apple in January but subsequently fell back after the group said on February 8, 2021 that it was no longer in talks with the U.S. tech giant. South Korea's financial regulators were examining allegations that Hyundai Motor executives traded on inside information about the company's talks with Apple on developing an autonomous electric car, according to people with knowledge of the situation (Financial Times 2021). After Hyundai announced the initial discussions, 12 Hyundai executives sold about 3,400 shares, worth about Won 833m (\$753,000), according to Reuters calculations. The probe came at a critical time for Hyundai, which had been trying to build a presence in the autonomous vehicle market through tie-ups with foreign companies (Financial Times 2021).

Engines on Fire? Hyundai Motors asked the owners of nearly 500,000 vehicles in the U.S. to park their vehicles outside because of malfunctions causing engine compartments to catch on fire. The auto maker recalled the vehicles and warned that malfunctions in their anti-lock brake

systems could cause an electrical short, increasing the risk of a fire when driving a car or when it is parked (Calfas 2022). The recall affected about 357,830 vehicles in the U.S. and a further 67,355 in Canada. Kia Motors America's recalled 126,747 vehicles. Dealers inspected and replaced the anti-lock brake system's multi-fuse to solve the issue without any charge to owners (Calfas 2022).

Research and Development

Hyundai had invested in research and development centers South Korea, Germany, Japan and India to improve quality. Additionally, a center in California developed designs for the United States (Worldwide.hyundai.com 2013). Hyundai established the Hyundai Design Center in Fountain Valley, California in 1990. The center moved to a new \$30 million facility in Irvine, California in 2003. The facility also housed Hyundai America Technical Center, Inc, (HATC) a subsidiary responsible for all engineering activities in the U.S. for Hyundai. HATC moved to a new 200,000-square-foot (19,000 m²), \$117 million headquarters in Superior Township, Michigan in 2005 (Worldwide.hyundai.com 2013).

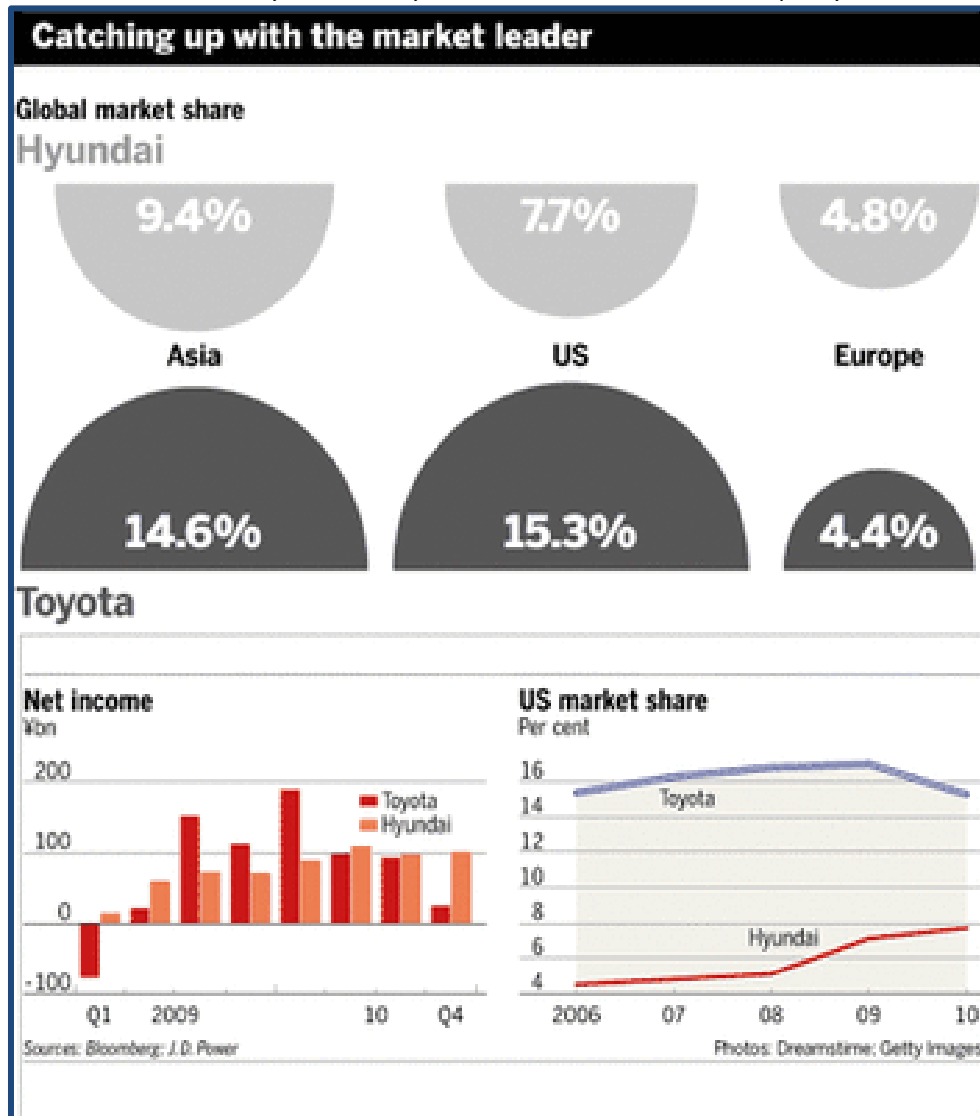
Russia's technology company Yandex signed a deal with Hyundai Motor Group to develop self-driving car technologies, as the two scramble to make up ground on global rivals (Foy and Jung-a 2019). The race to build fully autonomous cars forced many traditional carmaker to team up with tech groups to share expertise and develop joint platforms. Many analysts saw this technology as the most critical issue that shaped the future of the car industry (Foy and Jung-a 2019). Yandex was looking to develop a self-driving control system that could be marketed to other vehicle manufacturers, taxi companies and car-sharing providers (Foy & Jung-a 2019).

Hyundai Motors needed its rivals to buy its hydrogen fuel cell system to spur global adoption of the technology and help it reach commercial scale as it became the latest group to overhaul its business model to survive rapid changes in the auto sector. The world's fifth-biggest carmaker by sales intended to spend \$6.7 bn over 10 years to develop the technology, which it hoped

would prove more popular than electric in replacing petrol and diesel vehicles (White & Jung 2019).

Exhibit 7. Hyundai Move to Quality

Source: Oliver, Christian, May 19, 2011, Hyundai accelerates in its move to quality, Financial Times.



Hyundai had poured billions of dollars into electric vehicles, and it was going further: it sold its whole fuel cell system, which converted stored hydrogen into electricity to power the vehicles’ motors, rather than licensing its technology (White & Jung 2019).

The strategy seemed right - but the key was how much interest global carmakers showed in the hydrogen technology, and whether the related infrastructure would be built up in time. Critics pointed to the high cost and weak early sales for the first commercial hydrogen models (White & Jung 2019).

Hyundai's move upmarket in the past few years exposed it to fierce competition. It was late to understand the shift towards SUVs in Europe, America, and most recently China. Its *Genesis* brand had lagged in the highest-margin premium segment. Half of its production capacity in China was idle. Rising labor costs at home, where it produced 40% of output, cramped Hyundai's ability to compete on price (Economist 2019).

Mr. Cho, the firm's chief strategist, wanted to spend more on future technologies such as hydrogen fuel cells and loosely defined "*integrated mobility*" (car-sharing, autonomous vehicles and the like). Hyundai channeled only 3% of sales to research and development, compared with 6% at Volkswagen or Toyota's 4%, according to Bloomberg (Economist 2019). Hyundai and Ineos (the chemical company) struck a deal that could lead to the Korean carmaker buying hydrogen from the Ineos. In exchange, Ineos would purchase Hyundai's fuel cell technology for its audacious entry into the car industry, with its debut vehicle the *Grenadier*, an off roader based on the original *Land Rover Defender* (Campbell 2020).

The shift from gasoline engines to batteries and hydrogen power forced carmakers to set up new supply chains. For carmakers who planned to roll out hydrogen models, including Hyundai, Toyota and General Motors, securing a supply of the fuel for their models was key to generating interest in the nascent technology (Campbell 2020).

Hyundai already had several hydrogen cars on the market, including the *Nexo* sport utility vehicle, although sales have been tiny. The company wanted to produce 700,000 hydrogen fuel cell units by 2030. Installing hydrogen stations was more expensive than battery charging

points, because of the need to keep the fuel at the right conditions, while producing it through a carbon-intensive process, which also undermined its green credentials (Campbell 2020).

Hyundai Motors planned to introduce its own electric car platform and battery charging systems, as it sought to gain a stronger toehold in vehicles powered by clean energies. Hyundai and Kia said the EV platform would help cut costs and expand the brands' EV line-ups. The automotive would unveil 23 new EV models over the next five years as it aimed to sell 1 million EVs a year (Jung-a 2020). The company said the EV platform would also help it cut the number of required components by 60 per cent and increase the driving range of vehicles by more than 20 per cent to about 500 km on a single charge. EVs made on the new platform would be able to charge up to 80 per cent capacity in 18 minutes (Jung-a 2020).

Carmakers around the world have invested billions of dollars improving their battery technology to improve safety and cut EV prices (Jung-a 2020). In June 2021, Hyundai Motor Group completed its acquisition of a controlling interest in the robotics firm, Boston Dynamics. Hyundai now had an 80% share of the company (CAR Magazine 2021).

Hyundai had almost 6 per cent of the world's electric vehicle market with plans to triple output of EVs to 560,000 by 2025 (Wall Street Journal 2021). Hyundai already sold battery-powered vehicles, but it hedged its low-carbon bets by developing hydrogen ones as well. Hyundai developed its own self-driving technology platform and had invested in more than 20 companies over the past five years, including a \$4 bn joint venture with Dublin-based Aptiv. Hyundai planned to become the world's first automaker to power all its commercial vehicle models with fuel cell systems by 2028 as it sought to popularize hydrogen vehicles by cutting the cost of the technology (Jung-a 2021).

Hyundai Plans

Amid growing competition among car makers to position themselves for a low-carbon future, Hyundai Motor Group announced that it planned to invest a total of \$16.5 billion over eight years to expand its production of electric vehicles in its home market. The plan was part of the auto group's target to capture 12% of the global EV market, as it planned to sell 3.23 million EVs a year worldwide (Jennings 2022).

Hyundai separately planned to build \$5.5 billion electric vehicle and battery manufacturing facilities in the U.S. state of Georgia, part of a broader \$10 billion investment in the giant American automotive market aimed at taking a lead over competitors. The factories had plans to start producing commercially in the first half of 2025 with annual capacity of 300,000 units. Hyundai Motor Group said EV sales reached 76,801 units in the first quarter of 2022, 73% higher than the same period in the previous year. The group said it anticipated making vehicles with performance and value that went *"beyond the competition."*

Hyundai took the spot at the first-ever *'Best Cars of the Year' 2021/2022 Awards*. The *Hyundai IONIQ 5* and *Kia EV6* were chosen as joint world champions, beating new models from established premium brands including Audi and Porsche (Automotiveworld.com 2022). The joint world champions were singled out for quality, innovation, design and state-of-the-art tech by a judging panel that featured global industry leaders from across the automotive spectrum.

Hyundai and Kia finished 2022 as one of the world's top five makers of EVs. The duo sold around 200,000 EVs – still well behind market leader Tesla, and also behind Volkswagen (Wilmot 2022).

Much of the Hyundai-Kia's success was due to excellent products at competitive prices available from investments made years ago. The *Hyundai Ioniq 5* and *Kia EV6* were both well-rated family cars with starting U.S. sticker prices around \$41,000. (Wilmot 2022).

Hydrogen fuel cell cars, an alternative solution for battery-electric cars, had left everyone skeptical since the early beginning due to a variety of issues. Price of the car, overall energy efficiency, and lack of refueling infrastructure had been the three major issues. However, hydrogen fuel cell achieved new record level sales of 3,341 in 2022 (Exhibit 8), up 257% from the previous year (Lane 2022).

The growth in 2021 was associated mostly with the push from Toyota and Hyundai. The number of open retail hydrogen stations in California reached 48, just 5 more than in 2021. 12 new stations were under construction. Viability of fuel cell vehicles remained doubtful; with the tremendous progress of mainstream electric vehicles, was the race already be over?

Exhibit 8. 2021 U.S. Hydrogen Vehicle Sales

Source: Lane. Mark, February 5, 2022, US: Hydrogen Fuel Cell Car Sales Rebounded In 2021, *insideeevs.com*.

2021 US Hydrogen Vehicle Sales
(Mirai and NEXO sales as reported by the manufacturers):
Toyota Mirai - 2,629 (up 427% from 499)
Hyundai NEXO - 430 (up 107% from 208)
Other models - 282 (up 23% from 230)
Total: about 3,341 (up 257%, from 937)

Hyundai had experienced some up and down years, as can be seen in its financial statements. Nonetheless, it appeared to have a bright future. Its assets have grown continuously over the past four years from 1.4 percent to 11.8 percent (Exhibit 9). Profits had grown from \$1.645 billion to \$5.693 billion over the same period (Exhibit 10).

Exhibit 9. Hyundai Motors Financials

Source: Hyundai.com, 2021

Balance Sheet

(Unit: billion KRW)

Classification	2021	2020	2019	2018
Assets	233,946	209,344	194,512	180,656
Current assets	88,565	83,686	76,083	73,008
Non-current assets	145,381	125,658	118,429	107,648
Total liability	151,331	133,003	118,146	106,760
Debt	107,793	91,407	81,372	73,296
Shareholders' equity	82,616	76,341	76,366	73,896
Total asset growth	11.8%	7.6%	7.7%	1.4%

* Consolidated Financial Statements (K-IFRS)

Income Statement

(Unit: billion KRW)

Classification	2021	2020	2019	2018
Sales Revenue	117,611	103,998	105,746	96,813
Operating income	6,679	2,395	3,606	2,422
Income before income tax	7,960	2,093	4,164	2,530
Profit for the year	5,693	1,925	3,186	1,645
Sales growth	13.1%	-1.7%	9.2%	0.5%
Profit growth	195.8%	-39.6%	93.7%	-63.8%

* Consolidated Financial Statements (K-IFRS)

Financial Ratios

(Unit: %, KRW)

Classification	2021	2020	2019	2018
Liability to equity	183.2%	174.2%	154.7%	144.5%
Debt to equity	130.5%	119.7%	106.6%	99.2%
Return on sales	4.8%	1.9%	3.0%	1.7%
Basic EPS	18,979	5,454	11,310	5,632

* Consolidated Financial Statements (K-IFRS)

Exhibit 10. Kia Motors Financials

Source: Kia.com, 2021

Balance Sheet

(Unit: KRW Million)

	2021	2020	2019	2018	2017
Total Assets	66,849,997	60,490,443	55,344,798	51,786,605	52,294,438
· Current Assets	29,205,483	26,093,382	21,555,416	19,711,791	21,642,079
· Non-current Assets	37,644,514	34,397,061	33,789,382	32,074,814	30,652,359
Total Liabilities	31,937,441	30,598,771	26,366,660	24,543,141	25,433,261
Debt	9,343,877	10,166,716	6,465,157	6,681,798	8,749,833
· Short term	4,415,620	5,267,994	2,490,221	2,271,638	3,855,133
· Long term	4,928,257	4,898,722	3,974,936	4,410,160	4,894,700
Total Equity	34,912,556	29,891,672	28,978,138	27,243,464	26,861,177

* Consolidated Financial Statements (K-IFRS)

Income Statement

(Unit: KRW Million)

	2021	2020	2019	2018	2017
Revenue	69,862,366	59,168,096	58,145,959	54,169,813	53,535,680
Gross Profit	12,925,201	9,945,532	9,379,389	7,992,530	8,916,984
Operating Profit	5,065,685	2,066,457	2,009,680	1,157,475	662,226
Recurring Profit	6,393,781	1,841,358	2,531,104	1,468,644	1,140,053
Net Profit	4,760,311	1,487,585	1,826,659	1,155,943	968,018

* Consolidated Financial Statements (K-IFRS)

Financial Ratio

(Unit: KRW Won)

	2021	2020	2019	2018	2017
Liabilities to Equity Ratio	91.5	102.4	91.0	90.1	94.7
Debt to Equity Ratio	26.8	34.0	22.3	24.5	32.6
EPS (KRW Won)	11,874	3,710	4,556	2,883	2,414

* Consolidated Financial Statements (K-IFRS)



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