

The Japanese Automotive Cluster



Microeconomics of Competitiveness

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Table of Contents

- 1 Country Analysis
 - 1.1 Country Background
 - 1.2 Economic Performance
 - 1.3 Macroeconomic Competitiveness
 - 1.3.1 MFPs
 - 1.3.2 SIPI
 - 1.4 Country Diamond Analysis
 - 1.4.1 CSR
 - 1.4.2 DC
 - 1.4.3 FC
 - 1.4.4 SRI
 - 1.5 Cluster Mapping
- 2 Japan Automotive Cluster
 - 2.1 Cluster History
 - 2.2 Cluster Profile
 - 2.3 IFCs
 - 2.4 Recent Trends
 - 2.5 Cluster Diamond
 - Cluster deep dives
 - 2.6 Competition
- 3 Recommendation
 - 3.1 Country recommendation
 - 3.2 Cluster recommendation

1. Country Analysis

1.1. Country Background

In B.C. 660, Japan was established by Amaterasu Omikami, the goddess of the sun. The country consists of four large islands – Honshu, Hokkaido, Shikoku, and Kyushu – and countless small islands in the Pacific Ocean near China, Korea, and Russia. (See **Figure 1** for the map of Japan.) The mountainous archipelago stretches 3,000 km north to south, and is on four tectonic plates, and 40 volcanoes are active and earthquakes occur 1,000 times a year. As of 2015, 127 million people live in only 27% of the land area, which makes large cities' population dense. 38 million people live in Tokyo-Yokohama (world's largest metropolitan) and 17 million live in Osaka-Kobe-Kyoto area (14th largest) (Demographia, 2014).

Figure 1 Map of Japan

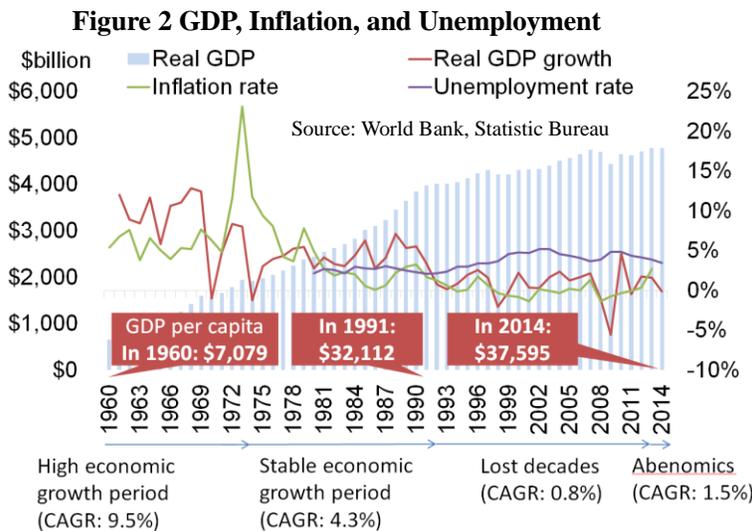


The country is not endowed much resources and only has marine sea resources, which necessitated Japan to become one of the largest sea-borne traders. After World War II, it developed large ports combined with huge scale factories and increased productivity in manufacturing sector.

1.2. Economic Performance (GDP, inflation, unemployment, Productivity)

During World War II, Japanese economy and infrastructure were devastated. However, a large number of working population created large demand from reconstruction, and high saving rate enabled companies to make large investment. From 1955 till 1973, the period called “high economic growth period”, real GDP growth was 9.2% CAGR. (See **Figure 2** for historical

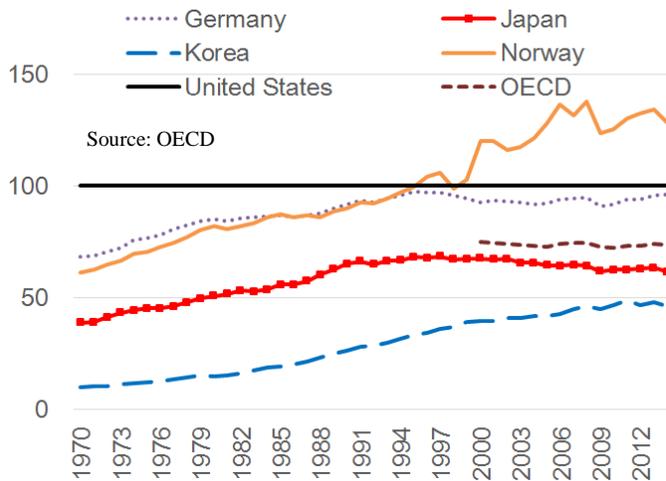
economic performance.) During this period, export sector including automotive grew faster than



GDP. After two oil shocks in 70's, Japanese economy entered the stable growth period. However, after the Plaza Accord in 1985, the government increased public spending and the Bank of Japan

(BOJ) lowered interest rate to cope with rapid appreciation of yen against dollar. That cause drastic increase of stock and real estate prices. On December 29th in 1989, Nikkei stock index price recorded 38,957 yen. Like other bubble economies, Japanese bubble also collapsed shortly. From 1991 till 2011, GDP growth was only 0.8% CAGR. After the lost two decades, the second Abe regime started in 2012 and “Abenomics” was launched. Three arrows - fiscal policy, monetary policy, and structural reforms – were supposed to revitalize the Japanese economy, but only expansionary monetary policy seemed have some effect. It is hard in the country to create expectation toward future inflation. Unemployment rate is mere 3.3% in 2014, much lower than other developed economy, but productivity is lower. It's only 62% of US and growth rate since 2001 is 1.1%, slightly lower than OECD average. (See **Figure 3** for productivity comparison.)

Figure 3 Productivity comparison (USA=100)



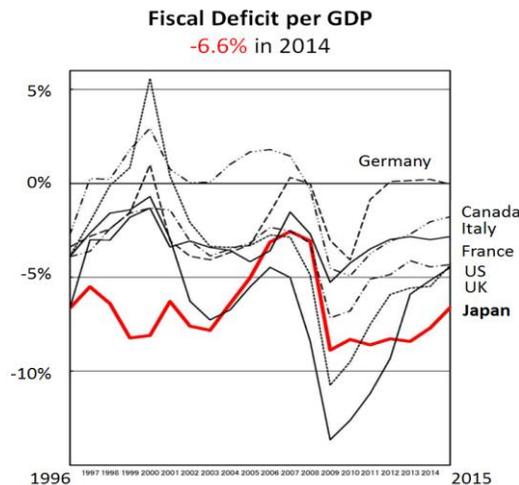
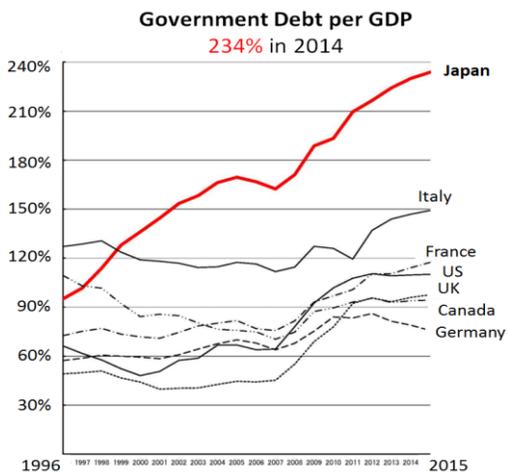
USA=100	2014
Norway	128.5
USA	100
Germany	96.1
G7	87.2
OECD	73.6
Japan	61.6
Korea	46.2

	% change from 2001-2014	GDP per capita	GDP per hour worked
Korea	3.5%	3.9%	
United States	0.9%	1.5%	
OECD - Total	1.0%	1.2%	
Japan	0.8%	1.1%	
Germany	1.1%	0.9%	
Norway	0.6%	0.3%	

1.3. Macroeconomic Competitiveness

1.3.1. MFPs

Figure 4 Government Debt and Deficit



Source: Ministry of Finance

Japanese macro situations are daunting. The

government debt has piled up to 234% of GDP, the highest

among in the world. Although only 9.8% of bond holders

are foreigners (Nikkei, 2015) and such bonds are issued at

JPY, the government won't be able to pay back the debt in

an orthodox way because Japan's fiscal deficit is -6.6% and

the debt will continue to increase. (See **Figure 4** for the

Government's Debt and Fiscal Deficit.) Since 2012, BOJ

has taken expansionary monetary policy and on January

29th 2016, it finally lowered the interest rate to negative.

These policies are called 3D Monetary Easing, consisting

of quantitative easing (increase monetary base), qualitative easing (increase risk asset purchase), and negative interest rate (on additional BOJ reserves). These monetary policies are meant to depreciate Japanese yen against other currencies, particularly for USD, in order to increase profit and stock price of export-oriented companies such as Toyota. Also this easing is essentially debt monetization, and therefore the monetary base and BOJ's balance sheet have been expanding rapidly. (See **Figure 5** for monetary base, inflation rate, and interest rate and **Figure 6** for comparison of central banks' balance sheets.)

1.3.2. Social Infrastructure and Political Institutions

Figure 5 BOJ Easing and Inflation Rate

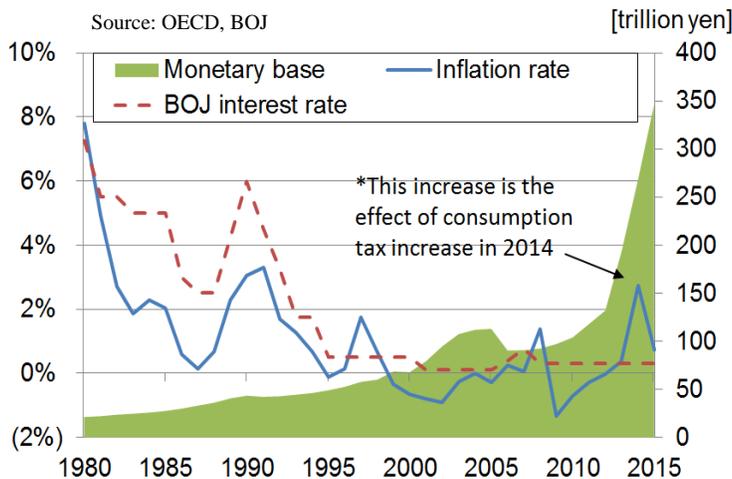
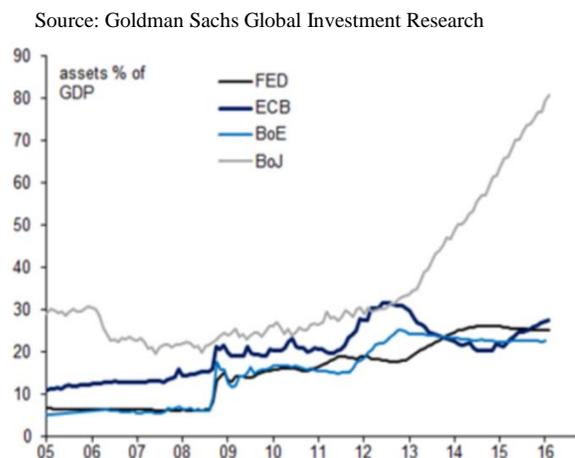


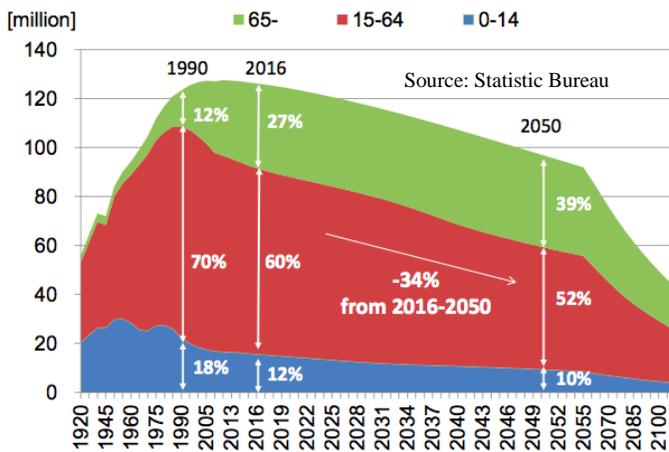
Figure 6 Balance Sheets of Central Banks



Overall, Japan has advantages in human development, political institutions, and rule of law, though it faces distinctive challenges such as ageing population and frequent change of political leadership. Japan has the third-highest primary education enrollment rate (100%), which is also of high quality (ranked 10th by World Economic Forum, 2014). Great primary education

prepares the young population to better achievement in secondary education, as well as skilled and specialized labor force in the future. Moreover, the country also has the second longest life expectancy in the world in 2014 (2nd in 2014), with its average life expectancy of 83 years old (World Economic Forum, 2014). However, the ever-ageing population in Japan not only reduces productivity and creativity, but also increases burden of social welfare. (See **Figure 7** for Japan's population composition.) From 2016 to 2050, it is predicted that Japan's total population will shrink from over 127 million to around 95 million and that its working population will decreased by 34% to 50 million. In 2050, 52% of the total population will be working while 39% of the total population will be elderly people.

Figure 7 Japan's Population Composition (1920-2100)



Japan has stable political environment that provides a peaceful foundation for economic and social activities. After Prime Minister Koizumi, Japan has frequent change of political leadership, with six prime ministers in

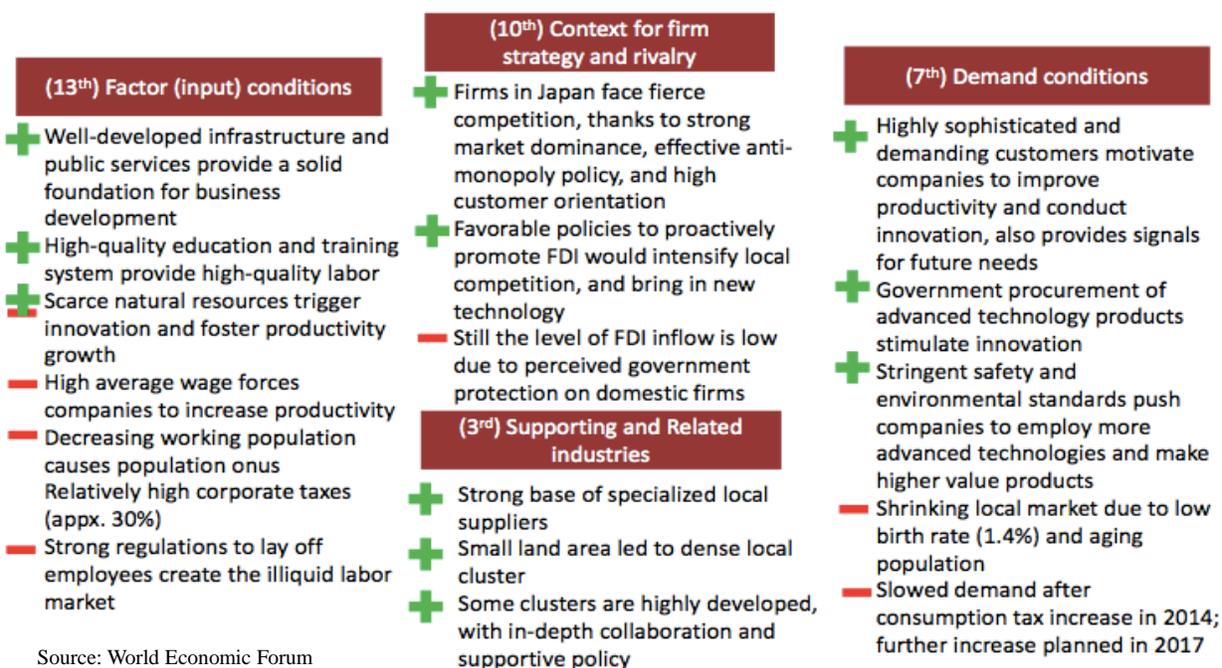
about 6 years, which led to inconsistency and discontinuity of policy making and implementation, and impeded the country's recovery progress. However, after PM Abe took his 2nd regime in 2012, he strengthened his support base in the Liberal Democratic Party and has been in the PM position

for 3 years and 4 months until today. This enabled the government to consistently push “Abenomics” policies. Finally, Japan has succeeded in creating and maintaining advanced legal environment. It has high judicial independence, high transparency of government policy-making, low favoritism in decisions of government officials, and reliability of police service, which all contribute to creating an institutional foundation for achieving prosperity.

1.4. Country Diamond Analysis

Overall Japan has advantage in microeconomic competitiveness. Its business environment rank improved to 12th in 2015 (Institute for Strategy and Competitiveness, 2015). Improved demand conditions, factor conditions, context for strategy and rivalry, and capital market infrastructure are the major driving forces. (See **Figure 8** for Japan’s national diamond analysis.)

Figure 8 Japan’s National Diamond Analysis

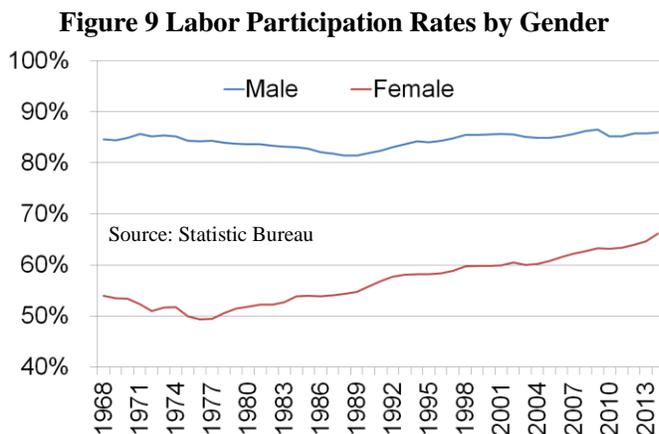


Source: World Economic Forum

1.4.1. Factor Conditions

Scarce natural resource is one distinctive characteristic of Japan's factor conditions. However, Japan has successfully leveraged this disadvantage as a pressure to promote innovation and foster productivity growth. It educates and trains high-quality and highly-productive labor; it also has developed efficient infrastructure and public services. On the other hand, Japan still faces a few challenges. In terms of the labor market, the increasing number of ageing population and decreasing number of working population present a huge threat of labor shortage in the near future. Strict regulation regarding lay off employees (ranked 133rd by World Economic Forum, 2014) leads to illiquid labor market. Because of the illiquidity, females face challenges to go back to workplaces after having kids and many have become housewives. As a result, female labor participation rate was only 66% in 2014, although it has been increasing, whereas male's was 86%.

(See **Figure 9** for labor participation rates of male/ female.)

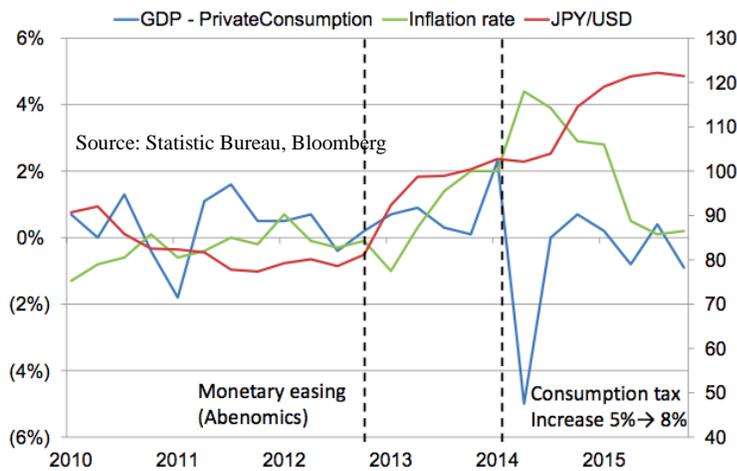


Moreover, corporations face burdens of high tax rate, which is as high as 50% of total profits (World Economic Forum, 2014) and high labor cost, limiting financial resources for innovation.

1.4.2. Demand Conditions

Japan has the most sophisticated and demanding customers (1st) that motivate companies to improve productivity and conduct innovation that could serve consumer needs. Domestic demand would also serve as signals to improve companies' global strategy. In order to stimulate companies to conduct innovation, Japanese government utilizes procurement of products of advanced technology. Moreover, since Japan has stringent safety and environment standards, companies are motivated to always employ advanced technologies and produce value-added products. However, Japan's demand conditions are not without challenges. Due to decreasing population and increasing percentage of the elderly described in the Factor Conditions session, the total size of Japan's domestic market is shrinking. In terms of regulation, current tax policy does

Figure 10 Consumption in GDP, inflation and exchange rate



not provide incentive to increase private consumption. Also consumption tax increase hit demand in 2014. (See **Figure 10** for Private consumption in GDP and inflation rate.)

1.4.3. Supporting and Related Industries

Business sophistication is one engine of Japan's prosperity. It has best condition of both local supplier quantity (ranked 1st by World Economic Forum, 2014) and local supplier quality (ranked 1st by World Economic Forum, 2014). It also has the best value chain breadth and production process sophistication, which benefit a comprehensive and systemic development. Moreover, Japan also has many well-developed clusters, such as the automobile cluster.

1.4.4. Context for Firm Strategy and Rivalry

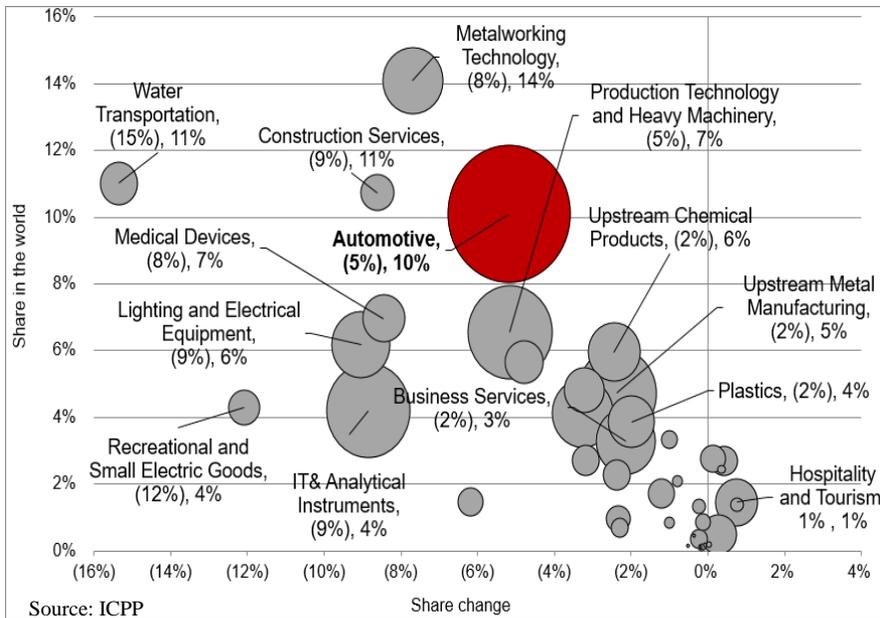
Japan has the world's most fierce local competition (ranked 1st by World Economic Forum, 2014) in part thanks to its market orientation (ranked 2nd by World Economic Forum, 2014), effective anti-trust monopoly policy (ranked 4th by World Economic Forum, 2014), and customer orientation (ranked 1st by World Economic Forum, 2014).

Despite the intense local competition, foreign companies and domestic small businesses are prevented from success. Prior to 2014, foreign companies were discouraged to set up operations in Japan due to long customs, long days to start businesses, lots of procedures, etc. At the end of 2013, Ministry Economy, Trade, and Industry of Japan (METI) established a series of act and laws that aim to create the world's most business-friendly environment in Japan. It also highlighted that Japan's External Trade Organization (JETRO) will provide comprehensive support for foreign companies to increase FDI (METI, 2013).

1.5. Cluster Mapping

Since 2000, shares of key industries as % of world export have decreased. (See **Figure 11** for the export portfolio by cluster.) Though automotive cluster's export still contributes 20% of

Figure 11 Japanese Export Portfolio by Cluster



Japanese export and 10% of the world's market share, the share has decreased by 5%. However, the main reason of the export decrease is not decline in the market share, but rather production shift to foreign

manufacturing plants. The main reasons of production shift to foreign countries are: (1) cheaper wages than Japanese labors, (2) geographical proximity to countries where demand is growing unlike in Japan, and (3) some countries have entry-barriers such as tariffs and local production is required. As a result, although the manufacturing output at foreign plants increased from 35% to 45% since 2004, the global share of Japanese autos remained around 30%. (See **Figure 12** for the market share of automotive industry and **Figure 13** for the manufacturing output abroad.)

Figure 12 Japanese Auto's Market Share in the

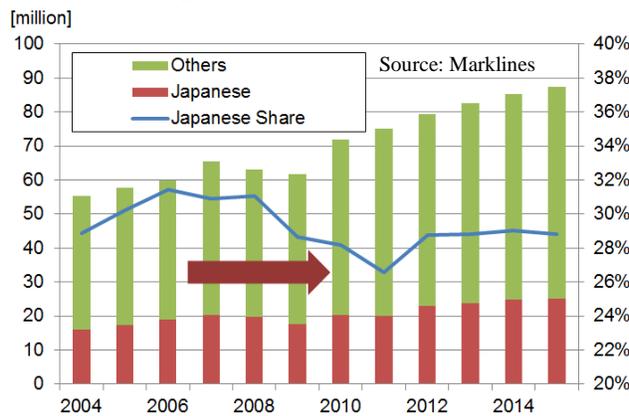
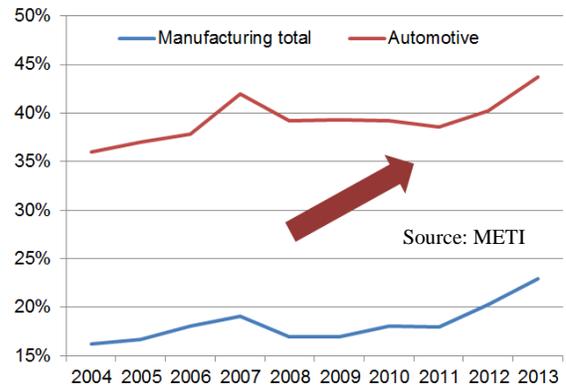


Figure 13 Japanese Offshore Manufacturing



2. Japan Automotive Cluster

2.1 Cluster History

The rise of Japanese automotive cluster was mostly unexpected throughout most of 20th century, before hitting several turning points along with the help of favorable macro and micro conditions that made Japan the largest automotive producer by 1990.

Starting off during the period between WWI and WWII (1914-1945), Japan's heavy militarization due to its major role in WWII laid the foundation for a strong transport industry. Thanks to the Meiji Restoration that made Japan to be the first industrialized country in Asia, conglomerates like Toyota and Nissan were already producing industrial goods before WWII. The government then chose these two firms to produce military and industrial trucks by imitating Western models for the war effort. It was advantageous to have such strong government intervention and only having 2 players in the beginning because there was no automotive industry yet, and this setup allowed resources to be channeled effectively to the right users. After WWII,

many conditions allowed the automotive industry to grow rapidly. First, Japan was the 5th most populous country in the world so it benefited from a large domestic market. Second, the economy experienced strong growth due to reconstruction and support from the US. Lastly, the government started to provide public loans to private businesses and also restricted car imports. The most important factor in this period that enabled success later was the anti-monopoly environment that allowed the automotive industry to have around 7-8 players instead of only 1-2 national winners, allowing intense rivalry. Interestingly, the government also didn't want more than 7-8 players to cause resources wasting, and actually came to that number by weeding out smaller players through mergers. Though all of these conditions seem to lead to successful development of the cluster, problems with the product itself and lagging technology prevented Japanese cars from gaining much attention. Japanese cars in this era were known for lower horsepower, cheap quality, and having engine overheating problems. Fortunately, key turning points occurred in the following decades to reverse this situation.

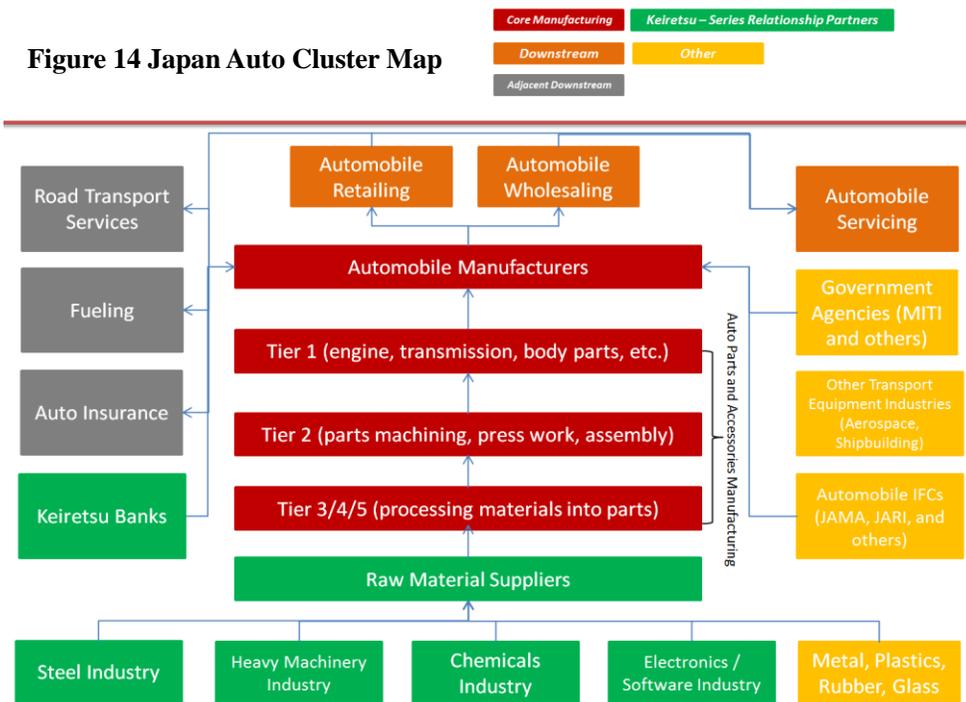
The 1970s oil crisis allowed Japanese cars to take a foothold in the global auto landscape. By this decade, engineering issues were decreasing as a result of automakers' strong culture of "kaizen" to improve on past mistakes. Contrary to Western cars that emphasized powerful engines, large bodies, and heavy build, Japanese cars leaned more towards lighter materials, smaller bodies, and less powerful engines. This was because Japan was a smaller country with a much denser

population, meaning cars were mostly driven in crowded urban conditions. As oil prices went skyrocketing while the Yen depreciated in this decade, these characteristics actually became strong value propositions for buyers of cars and increased global demand for Japanese cars.

This new value proposition became the selling point for Japanese cars in the US, where OEMs took on separate marketing strategies from Japan to focus on conveying impressions of reliability, fuel efficiency, and value to the largest auto market in the world. As OEMs became more export driven, many countries also demanded Japan to relax its import restrictions on foreign cars. The government agreed to do so but only lifted controls when Japanese OEMs reached nearly 100% market share, effectively making it difficult for foreign OEMs to sell well in Japan. From 1980s onward, Japanese OEMs also realized that they no longer needed to imitate Western models and started to do more indigenous innovation on product configuration to fit Japanese consumers' demands. Thanks to Japan's very sophisticated consumer base and strong environmental regulations, OEMs started to make cars that were of high quality, safety, and had high environmental standards, sometimes surpassing global regulations. These factors enabled Japan by 1990 to become the world's largest automotive producer, shipping 9.7 million units.

2.2 Cluster Profile

The automotive cluster is the industry that makes all passenger and commercial vehicles and motorcycles in Japan, sold through domestic retail or wholesale and exports. The core of the Japanese automotive cluster is comprised of OEMs (in total 14 of them) who are supplied by auto parts manufacturers broken down from tier 1 to 5. (See **Figure 14** for Japan Auto Cluster Map.)



The strength of this cluster is characterized by dense local clusters with a very strong base of specialized local suppliers, the keiretsu relationship between suppliers and OEMs (covered in a later

section), and very highly developed and quality raw material suppliers in steel, heavy machinery, chemicals, and electronics industries. An example of dense local clusters is Toyota in the Aichi region with all of its tier-1 keiretsu suppliers like Denso and Toyota Industries being in proximity. This not only increases ease of cooperation and minimizes costs, but also makes it more effective for the entire region to execute focused developments and policies specifically for promoting the

auto industry. The strength of raw materials industries (chemicals, electronics, etc.) is also critical because automobiles rely on diverse inputs that need to match the highest quality and safety standards. Japan's early industrialization and focus on craftsmanship and advanced technology put it in a great starting point to have the suitable raw materials to make automobiles, which is something other auto clusters in developing countries today lack. On a broader level, Japan already had strong manufacturers of transport equipment, such as aircraft engines, bullet trains, and ships, had high quality roads, and had very developed insurance and banking sectors to support auto buyers. The result of these factors is an auto cluster of US\$136 billion value, 10.5 million units produced, and 5.5 million employees (8.7% of workforce) in 2015.

2.3 IFCs

Developing the automotive cluster was a priority item on the government's list in the 1960s. Not only did the Ministry of International Trade and Industry (MITI) help consolidate the industry into just 7-8 players and also called for foreign car import restrictions, many IFCs were set up to standardize product configuration, improve production technology, and lobby for trade policies. Some examples of such IFCs include JAMA (Japan Automobile Manufacturer's Association), which consists of 14 auto producers in Japan and is the main IFC for manufacturing technology, and JARI (Japan Automobile Research Institute), which conducts research on next-generation vehicles and develops pioneering projects. There are also IFCs in the downstream

of the value chain like Japan Automobile Importers Association and Japan Automobile Dealers Association to deal with pricing, tax, and legal regulations. In total, there are more than a dozen IFCs spanning across manufacturing, education/research, downstream, and regulations aspects of the industry. Even though these IFCs played a big role when the cluster was just starting, particularly in standardizing product specifications, they don't have much presence today as the cluster becomes more mature. Today, the auto OEMs themselves take on the research and development and also do a better job than the IFCs at policy lobbying. As the global auto industry is on the verge of entering into an era of hybrid electric vehicles and new assisted driving technologies, Japan's auto cluster could benefit from more collaboration with IFCs to concentrate resources and talent on developing technologies that are more likely to be adopted.

2.4 Recent Trends

By 1990, the Japanese auto cluster has become the world's largest, before hitting a slowdown due to Japan's stagnant economy and also auto production shifting to outside of Japan. Despite lower production today, Japan is still the #1 country in the world auto market by brand origin, with significant strength in Japan itself, US, and Southeast Asia. (See **Figure 15** for production volume of Japanese autos and **Figure 16** for comparison with other countries'.)

Figure 15: Japan Auto Production Volume

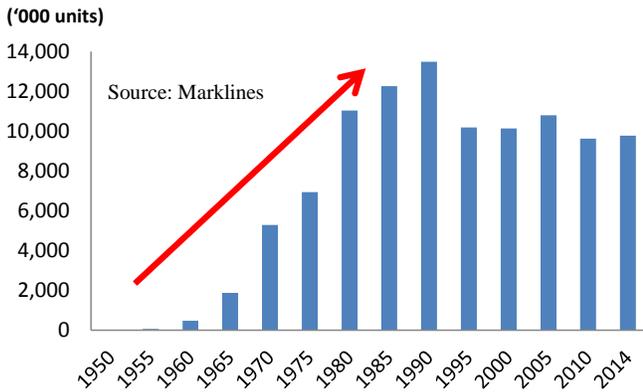
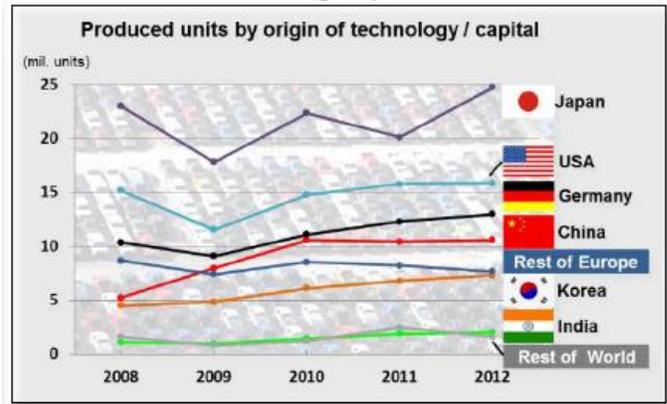


Figure 16: Global Auto Units by Brand Origin

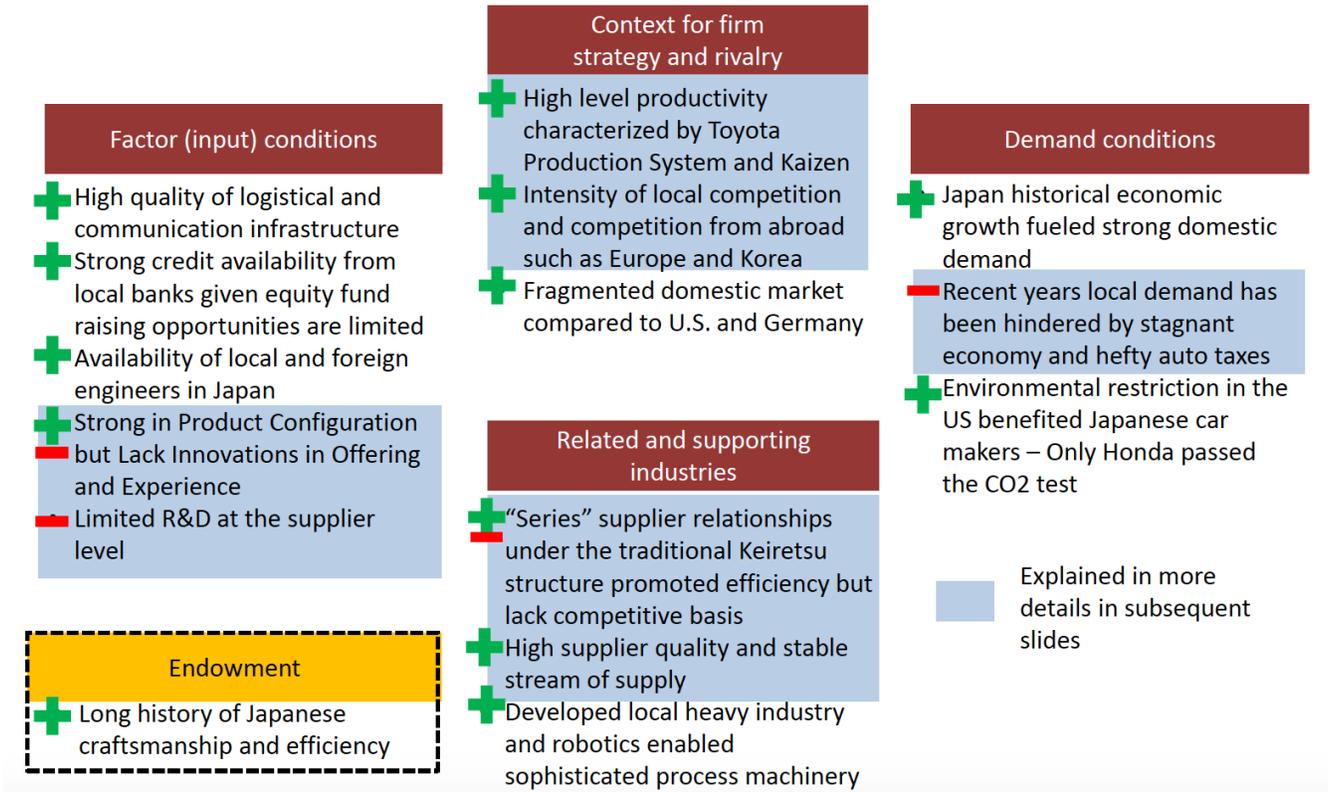


Going forward, Japan faces a number of issues other than flat growth. First, emerging markets will become the largest markets, but Japanese cars have not been popular in those markets other than Southeast Asia. Emerging markets are also likely to practice protectionist policies on auto production, limiting the success of Japanese cars. Second, Japanese cars have become synonymous with value and reliability only, and not necessarily performance and driving experience. Lastly, as hybrid electric vehicles continue to gain importance, competition from German and American incumbents will intensify. As of now, Japanese HEVs dominate about 50% of all worldwide HEVs, so OEMs should ensure that their successful strategies thus far can be sustainable.

2.5 Japan Automotive Cluster Business Environment

Japan automotive cluster business environment has been largely positive and has aided the fast growth of the cluster in the past decades. (See **Figure 17** for the Cluster Diamond Analysis.)

Figure 17 Cluster Diamond Analysis

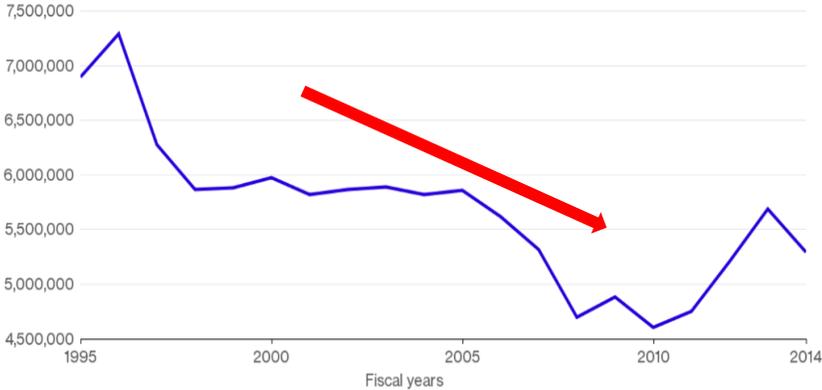


The cluster was endowed with a long history of Japanese craftsmanship and efficiency, characteristics that are as well observable in other clusters in Japan. Building on the endowment, the cluster also enjoyed a series of strong factor conditions such as strong pipeline of local engineering talents, high quality of logistical and communication infrastructures and strong credit availability from domestic banks to the auto manufacturers, especially during the earlier time when Japanese equity market was relatively less developed.

The Japanese automotive market is more fragmented (7-8 key players) compared to markets such as Korea and Europe. In Japan, competition from local manufacturers as well as from

foreign manufacturers is fierce, pushing firms to compete on level of productivity and to produce even more efficiently through implementation of the accoladed Toyota Production System (TPS) and emphasize of Kaizen. Additionally, a sophisticated local heavy industry and robotics made advanced process machinery at reach. The same emphasis on efficiency and low price was also passed on to the car parts suppliers, where we see high quality and the ability to provide stable stream of supply, enabled by a Japanese specific supplier structure – “Keiretsu”. On the backdrop of a strong demand fueled by historical economy growth, the Japanese automotive cluster excelled. Nonetheless, examining today’s competitive landscape, Japanese car manufacturers are losing

Figure 18 Japan Total Vehicle Sales 1995-2014



Source: JAMA report 2015

ground. Domestic vehicle sales have been shrinking during the last two decades. (See **Figure 18** for the total vehicle sales in Japan.) Recent local demand has been hindered by

Japan’s stagnant economy and hefty auto taxes.

More importantly, factors that had contributed to the success of Japan auto cluster such as production efficiency enabled by TPS and “Keiretsu” supplier structure have now become the factors that limit innovative growth and R&D in the cluster.

The next part of the paper will deep dive into the cluster diamond, focusing on specific features of the Japan automotive cluster and how these features have created both strengths and weaknesses reflected in the cluster's evolution.

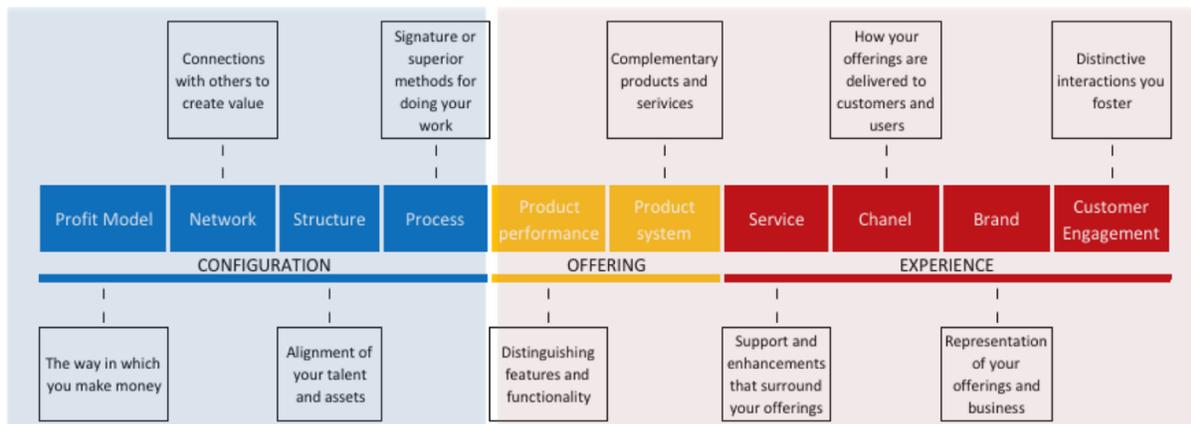
2.5.1 Toyota Production System

Toyota Production System (TPS) was developed mainly by two Toyota engineers from 1948 to 1975, to help Toyota achieve lean manufacturing. Today, this production system has been widely adopted by a large number of global manufacturers operating in other industries. The system emphasizes on exactness, sequencing, timing and outcome and can be broken down to four main components: Just-in-time production, Kaizen, Jidoka and Kanban. *Just-in-time (JIT)* production aims to achieve the most efficient resource allocation by producing the right parts and materials at desired quantities at the time when they are needed. Production is *pulled* by customer demand. *Kaizen* represents continuous improvement to perfect the precisely-defined production system. *Jidoka* means “automation with a human touch”, and it is a critical component of achieving JIT. Problems are reported and resolved immediately when they occur. *Kanban card* is also essential to JIT and lean production. When input materials and parts are depleted, signals are sent to suppliers via Kanban, creating a demand-driven supply system with the aid of visual management.

Combining all these elements, TPS supports Japanese car manufacturers' business model of low margins and high volume. The system reduces mistakes and waste because it is perfected overtime by front line workers performing the same actions repetitively. Kaizen and the culture of alignment create advantages in quality, cost and reliability; however, a system like this can be very risk averse. Any potential mistakes associated with innovation could erode the margin meaningfully. This speaks to a phenomenon we see in today's automotive industry, that is, Japanese car manufacturers are strong in product configuration but lack innovations in product offering and brand experience.

2.5.2 Research and Development in Japanese Car Manufacturing

Figure 19 Types of Innovation



Source: Keely, Walters, Pikkell, Quinn, Ten Types of Innovation: The Discipline of Building Breakthroughs (2013)

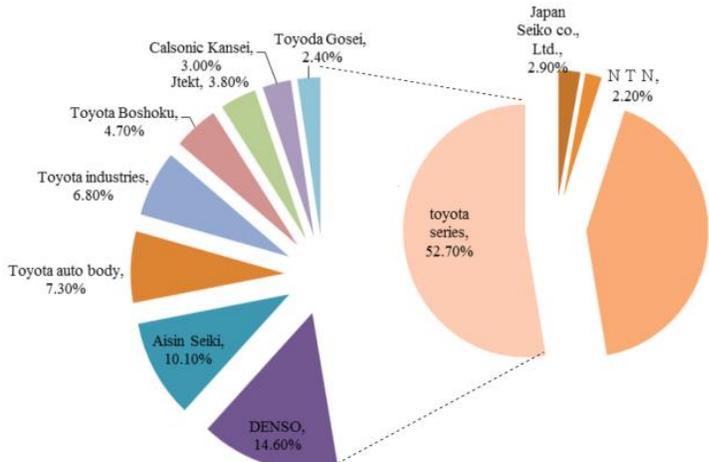
Innovation in car manufacturing can occur in three different areas – configuration, offering and experience. Japanese manufacturers are particularly strong at product configuration. (See **Figure 19** for types of innovation.) Typically, in a Japanese plant, a group of cross-functional

teams are assembled, to not only shorten the configuration process, but to also minimize any error which could occur in the process by leveraging high degree of alignment. On the other hand, European makers have not been able to compete with Japanese OEMs on this front because their production follows a sequential method, where initial product development time is prolonged. However, in terms of product offering (such as distinguishing features and functionality, and complementary services) and brand experience, European OEMs have noticeable competitive advantage. They compete on higher margin products with a great degree of customization availabilities, and they continuously invest R&D to enhance their competitive edge in these two spectrums, something the Japanese TPS not designed to do.

2.5.3 Keiretsu Supplier Relationship

Keiretsu represents a supplier – OEM relationship that is unique to Japan. Under the

Figure 20 Exclusive Keiretsu System in 2010



Source: HE and BAI , Japanese Automobile Industry Development and Experience

Keiretsu structure, suppliers are only allowed to serve exclusive to one OEM, who most of the time owns significant shares in suppliers directly or indirectly to the extent that they can exert material influence on the

suppliers. 8 of the top 10 ranked car parts supplier by sales in Japan in 2010 were exclusive suppliers to Toyota. (See **Figure 20** for the share of Japanese automotive parts suppliers.)

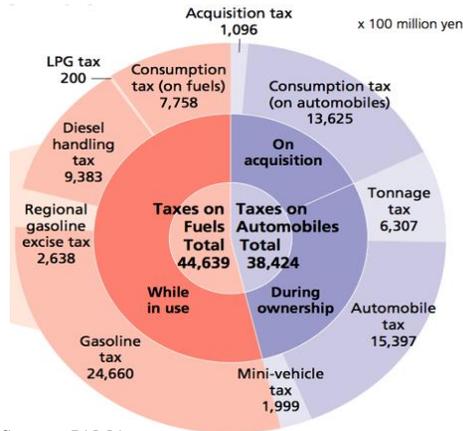
Almost all of the R&Ds are performed at the OEM level, after which production specifications are provided to suppliers. This contrasts with European car OEMs who spread R&D across the entire vertical value chain, leveraging on the specialized strength and economies of scale of a particular vertical. Most of the Japanese car parts suppliers are not innovative nor allowed to compete on a global basis, thus unable to charge competitive pricing. By not being able to compete globally, Japanese suppliers also missed the opportunities to stay closer on the innovation frontier, and learn from their European and American rivals on the most cutting-edge technologies.

In recent years, we have seen some changes towards a more liberalized Keiretsu. For instance, Japanese car OEMs started to source more integrated systems from suppliers as opposed to individual part. This has given more freedom to suppliers and has incentivized them to engage in more R&D. We have also seen the number of suppliers in Toyota's supplier association decreased from 200 in 1991 to 180 in 2011(Aoki and Lennerfors,2013). However, the modern Keiretsu relationship is still largely trust based – contract terms are still ambiguous, and OEMs often rely on the suppliers to go an extra mile.

2.5.4 Japan's Automobile-Related Taxes

One additional cluster factor which hindered domestic car demand, is the long history of

Figure 21 Taxes on Fuel and Automobile



Source: JAMA report

hefty automotive taxes. Japan recorded a total of automobile-related taxes of 8.3 trillion yen (USD 74.9 billion), which contributed to 8.7% of the projected 2015 total government tax revenue. (See

Figure 21 for total taxes related to autos in Japan.)

Since Japan's first five-year road improvement plan in

1954, there has been a steady increase in both the number of automobile related taxes and the absolute rates associated with each tax items. An average Japanese car owner is taxed twice higher than an owner in Germany and 5 times higher than a car owner in the US. (JAMA, 2015).

2.5 Competition

Today, Japan Auto cluster faces intense competition from international auto clusters such as South Korea, China, Germany and America. It is worth noting that South Korea, which is located in the same region as Japan, posts greater threat to Japan by competing on similar value propositions. South Korea, in contrast to Japan has a stronger and growing domestic demand due to favorable demographic trends. The proportion of people in the main car-buying age group of 15-64 will remain high, at over 70% of the country's population. South Korea also focused on

producing efficiently at low cost. The average price point of Korean car is lower than that of Japanese car. While historically South Korean cars such as Kia and Hyundai were perceived to have lower quality, the theme has become the most heavily emphasized by Korean OEMs in today's term. In addition, the country is also reputable of making bold investments in the innovation of ecofriendly cars. The South Korean government has offered offers tax incentives accordingly to promote next-gen autos. However, Korea car OEMs are still in early stages of commercialization of this segment, compared to a more developed segment in Japan.

German cars compete on different spectrums. They set the benchmark for premium cars through new models of OEMs such as BMW and Mercedes Benz, while Lexus is the only successful upmarket brand created by Toyota in Japan. Germany has the strongest value proposition in supplier-OEM relations because most suppliers are independent and are free to innovate, and also that German products today are still associated with high quality, reliability, durability, efficiency, and safety, more than other clusters. In Germany, support from the government for environmentally friendly cars is limited, but German carmakers have more advanced technologies and are heavily involved in the EV market, with recent notable launches by Daimler (the E-Smart), BMW (the i3 and i8 models) and Volkswagen (the E-Up). However, pricing of German eco-friendly cars is likely to be targeted towards high-end markets.

3. Recommendation for the Japanese Government and Automotive Cluster

	Problems Identified	Recommendations	Who	Seq.
MFP	Government debt and fiscal deficit	Reform the national health insurance system to reduce expanding healthcare cost	Gov.	9
SIPI	Strict labor laws	Ease firing to improve liquidity of labor market	Gov.	7
FC	Decreasing working population	Ease the regulation on immigrant workers	Gov.	8
	Low productivity	Reduce working hours to pursue efficiency	Corp.	4
	Low level of R&D at the supplier level	Manufacturers such as Toyota and Nissan should gradually shift R&D responsibilities to competitive suppliers, exploring Joint Design Manufacturing Model and realize the financial incentives by leveraging supplier's expertise	Corp.	5
	Scarce natural resources	Develop renewables/ deep sea mineral& energy resources/ urban mining (recycling)	Gov. Corp.	6 8
DC	Hefty automobile-related taxes is a major force hindering domestic auto sales	Provide incentives and tax subsidies on cars with next-gen features (e.g. ecofriendly/ autopilot)	Gov.	2
	Shrinking demand because of aging population	Extend the planned consumption tax increase	Gov.	1
		Invest in infrastructures of new types of vehicles (e.g. EV/FCV charging stations)	Gov.	4
		Ease the regulation about immigrant workers	Gov.	8
Rivalry	Little FDI by overseas corporations	Stop giving domestic companies favor in M&A	Gov.	3
		Deregulate driverless cars in big cities to increase foreign tech companies' entrance and innovation.	Gov.	5
SRI	The traditional "Keiretsu" supply system has improved yet supplier and buyer relationship are still largely based on intangible factors; contract ambiguity still exists	Keiretsu should be disbanded overtime to allow individual suppliers to compete on their own merit in a global market, hence enhancing their own competitiveness	Corp.	7
Co. Ops/ STRAT	Products starting to lose competitiveness on performance and experience	Deploy more brand building initiatives to increase global recognition and increase consumers' WTP	Corp.	1
	TPS promotes accuracy and efficiency, but may erode creativeness in the process	Pursue cross-border collaboration opportunities with other foreign OEMs	Corp.	2
		Focus R&D on next-generation autos	Corp.	3
		Auto companies transform to a more globalized organizational culture	Corp.	6

3.1 National Level

Below is a detailed list of problems and recommendations on actions to be taken by Japanese governments and Corporations.

We consider policies below especially important and urgent:

(1) Delay the planned consumption tax increase to support demand condition.

Although Abenomics temporally increased the domestic consumption, consumption tax increase to 8% in 2014 killed personal consumption and GDP growth has slowed down. The government needs to postpone the planned increase to 10% in 2017 to keep the demand.

(2) Introduce tax incentives for automotive

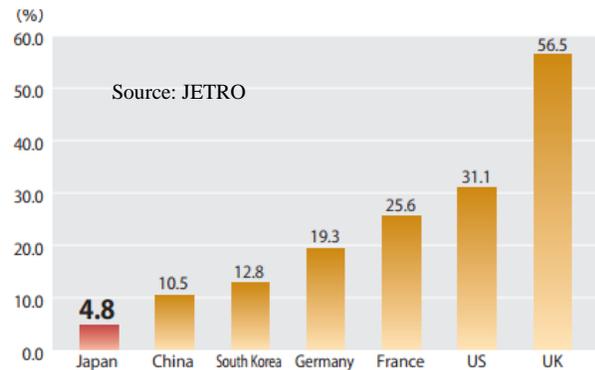
Even though the country's high level of personal income makes cars still affordable for the Japanese despite heavy tax environment, introducing tax discount or tax subsidies will still substantially stimulate consumption. Furthermore, to promote a shift to more ecofriendly cars and cars with next-gen features, the government can offer tax incentives for new-car buyers, as well as discounts on parking fees and expressway tolls.

(3) Attracting more FDI by providing a level playing field

Historically, M&A by foreign companies were strictly controlled, however, since 2001, the government has eliminated the barriers for foreign firms to enter Japan to increase FDI. As of

2016, restrictions remain only industries related to national security (e.g. aerospace/telecommunication etc) and automotive cluster has no legal barriers to entry for foreign companies. However, foreign

Figure 23 Inward FDI's ratio in nominal GDP



companies still have perception that they are not given equal opportunities and treatments government when it comes to a large-cap M&A in Japan. As a result, accumulated inward FDI is only 4.8% of nominal GDP. (See **Figure 23** for comparison of inward FDI to GDP.)

(4) Invest in infrastructures for new vehicle types

Government should support the investment in infrastructures of EV/PHEV/FCV. The government sets the target share of such new vehicle types in the domestic market as follows: EV&PHEV: 15-20% by 2020 and 20-30% by 2030/ FCV: 1% by 2020 and 3% by 2030. But customers won't buy such vehicles unless infrastructures such as charging stations are in place. Investments by private companies should be subsidized to promote more R&D by OEMs.

(5) Deregulate driverless cars in big cities and increase foreign tech companies' R&D

The government succeeded in increasing R&D in the biotech cluster by deregulating clinical study of drugs in limited area around Osaka. The analogy can be applied to the automotive

cluster. The government should deregulate driverless cars around Tokyo area before Tokyo Olympic held in 2020. That will attract FDI from tech companies abroad such as Google and Apple to enhance their reliability of auto-pilot driving. The policy will also increase productivity in long run if driverless cars spreads in the country.

(6) Ease the regulation on immigrant workers to increase demand and labor supply

In long term, this is the only way to increase the total number of working population. On April 19th, the government announced it will make the process of accepting permanent residency of high-skilled foreign labors the shortest in the world. Given the heterogeneity of the population, it is extremely difficult to accept unlimited number of immigrant workers, but gradually the government should start to accept more number of simple migrant labors.

3.2 Cluster Level

(1) Enhance Branding and Create Global Organizations

In today's world, producing cheaply at high volume can no longer be an auto manufacture's sustainable competitive advantage like decades ago. Today the Japanese auto manufacturers need innovation and organizational flexibility to move up the value curve and remain long-term competitiveness in the industry. The long run value proposition for Japanese car OEMs should be "Advanced manufacturer of Next-Gen Autos". Japanese car OEMs need to

deploy more brand building initiatives to increase customers' WTP, and should gradually transform to a more globalized (and flat) organizational culture to encourage efficient decision making and to attract talent. With resources spread globally, it becomes important for Japanese automotive manufacturers to pursue cross-border collaboration opportunities with other foreign OEMs on global sourcing strategy, while also utilizing comparative low-cost labor advantage of those companies' operations in regions like Southeast Asia.

(2) Gradually Disband Keiretsu and vertically delegate R&D responsibilities

The supplier – OEM relationship should be further liberalized beyond the “modern Keiretsu structure”, and eventually Keiretsu should be disbanded to allow individual suppliers to compete on their own merit in a global market, hence enhancing their own competitiveness. A starting point would be pursuing a Joint Design Manufacturing Model, which has been extensively utilized in the tech manufacturing. In a typically JDM model, R&Ds are conducted collaboratively, leveraging supplier's expertise and economics of scale. IPs can be individually or jointly owned, with all details specified in the JDM contract. In addition, developing cooperative arrangements with other foreign major assemblers and parts makers will be critical to developing the necessary capabilities to compete globally.

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