8

The Japanese Automotive Industry Since 2000: Causes and Impacts of Growth Disparities

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Introduction

At the outset of the twenty-first century, the automotive industry of Japan is among the most competitive and mature ones, along with those of Germany and Korea. The seven main Japanese carmakers taken together (Toyota, Nissan, Honda, Suzuki, Mazda, Daihatsu, and Subaru)[1] have yearly domestic production and sales, exports, and overseas production volumes of 10, 5, 5, and 14 million vehicles, respectively. Despite being celebrated in the late 1980s as the industrial model to be followed, the Japanese automotive industry has significantly evolved in its productive organization, employment relations, and inter-firm relations since the mid-1990s. The financial crisis at the beginning of that decade, the regionalization of the Asian automotive industries, the profitability of new energy vehicles, changing consumer behaviours and industrial policies, and the growth of emerging industries (especially that of China) have modified its sources of profits.

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Though in the 1990s several specialists emphasized the peculiarities of Japan's big corporations (once called the J-firm), the Japanese automotive industry started to display a trend of diversification in the carmakers' organizations. While Toyota and Honda went through this rough period without ties with foreign capital, Nissan, Mazda,[2] and Suzuki merged with foreign firms, Daihatsu and Subaru moved closer to the Toyota Group, and, more recently, Mitsubishi has merged with the Renault-Nissan Alliance. Hence, the structure of the industry has evolved towards higher concentration at the top of the supply chain and worsening working conditions at its bottom.

This chapter describes and analyses the causes and nature of these restructuring processes and explores their impacts on the competitiveness of the domestic industry and market, as well as on labour relations. How has the Japanese automotive industry kept a high level of competitiveness? What are the effects of this trend on the overall domestic industry? The second section presents the peculiarities of the Japanese auto industry, inherited from the 1960s–1970s. The third section is dedicated to exploring the diverging trajectories of Japanese carmakers, while the last two sections investigate their impacts on the Japanese supply chain, labour relations, and innovation trajectories. The final section concludes this chapter.

Structural and Historical Legacy

The success of Japanese carmakers is often ascribed to their manufacturing capabilities, which were described as *lean production* in the late 1980s. The basic ideas of the lean system are expressed by its two core pillars. The first is just-in-time manufacturing, which stresses the delivery of necessary products at the necessary time. The second is "autonomation" (*Jidoka*), which goes beyond the automation of work processes and introduces higher flexibility, with machines automatically stopping whenever a defect is detected.[3] Based on these organizational capabilities, Japanese carmakers were able to compete with their Western rivals, especially US firms, thanks to cheaper vehicles and higher quality standards (Shimokawa 2010).

Though one cannot deny that most Japanese carmakers and mega-suppliers heavily rely on manufacturing capabilities, this specificity alone does not explain their success. Without the commitment of workers, suppliers, and dealers, their productive organization would not have been able to develop harmoniously. For instance, under the umbrella of Toyota, until the mid-1990s, the Toyota Production System (TPS) involved two main cost management tools (*target costing* or value engineering and *kaizen costing*), which entailed the strong participation of suppliers and workers from the early stages of R&D until the first few months of final assembly. Moreover, labour and inter-firm relations were rooted in specific monetary incentives through the redistribution of productivity gains to the working units and in the suppliers' ability to continuously improve their working standards. In the pre-War period and during the 1950s, production focused mainly on trucks and vehicles for the army. At the beginning of the 1960s, there was almost no domestic market for passenger cars.[4] Thus, the industry grew from the 1960s onwards, following three development stages and triggering the establishment of a huge number of final assemblers and suppliers.

From the 1960s to the beginning of the 1970s, strong government intervention, growing stabilization of employment relations, domestic demand-led growth, and shortage of production and financial capabilities characterized the industry. While in 1960 production and sales volumes of passenger cars were extremely low (no more than 300,000 units), in 1970 they reached around 5.3 and 4 million units, respectively (taking passenger cars, commercial vehicles, trucks, and buses into account). Vehicle exports started to grow in 1966–1967. At that time, passenger cars accounted for roughly 60% of sales. This extremely rapid growth in domestic sales, coupled with a lack of financial and manufacturing resources, explains why most carmakers had to outsource not only the production of parts but also the final assembly of vehicles (Shioji and Nakayama 2016).[5] As for the suppliers, they came together in suppliers associations (*kyoryokukai*) in order to both improve their manufacturing capabilities (Heim 2013) and stimulate competition through the generalization of the multi-supplier production delegation system. After a long decade of harsh labour conflicts in the 1950s (Cusumano 1985), most of the firms reached agreements with their workers to create the basis for the

enterprise union system. This system was rooted in negotiations at the firm level, while sectorial negotiations and agreements were denied to the labour unions, and high wages for blue and white collars were seen as compensation.

This development of the Japanese automotive industry enabled Japanese carmakers to compete with Western firms until the early 1990s. Throughout this period (high growth and export-led regime from the 1970s to the beginning of the 1990s), production, sales, and exports volumes increased steadily and continuously to reach their historical peaks of more than 13 million production units and 8 million sales units in 1990, and around 7 million exports units in 1985. The growth regime thus changed in nature, since it was mostly driven by exports.[6] The two oil crises of the 1970s gave an advantage in the US and Western Europe to more fuel-efficient cars, a segment in which Japanese carmakers had acquired a competitive edge. However, Japanese cars were mainly exported to the US[7] due to the difficulties faced by American carmakers in producing small cars and to the American distribution system, which gave Japanese carmakers greater market access to the US than to Europe (Jullien 2008).[8] In order to counterbalance this commercial deficit, in the 1980s the American government decided to attract foreign direct investments (FDI) from Japan, and most Japanese carmakers that had already developed in Asia in the 1960s saw their American production volumes and sales boom, accounting for roughly 1 million units in 1990. As a result, in the early 1990s, Japanese carmakers were already well established in several parts of the world, with worldwide production volumes exceeding export volumes from Japan. Yet, there were signs of a possible slowdown in market expansion, which most decision-makers did not however take into account.

The third development stage, following the financial crisis at the beginning of the 1990s, was characterized by the restructuring of the domestic industry. The shrinking of the domestic market from 7.8 million units in 1990 to 5 million units in 2010 was outweighed by a twofold rise in foreign sales (9.1–18 million units). These sales were mostly led by foreign production, with a fourfold increase (3.3–13.2 million). Exports were substituted by local production between 1985 and 1995, and new product policies were implemented to strengthen localized models, since the

project of the "world car" appeared to be a failure. In Asia, and particularly in the Association of Southeast Asian Nations (ASEAN) countries, Japanese automakers became firmly established as dominant actors, with local production levels having increased from merely 1 million units in 1990 to 7 million units in 2010. Domestic production and sales varied throughout the 2000s between 8 and 12, and 4 and 6 million units per year, respectively, mainly due to stable motorization rates. Coupled with the ongoing economic recession, this foreign sales and production-led growth regime has been the biggest challenge for Japanese carmakers and suppliers in terms of productive and organizational reorganization since the mid-1990s.[9]

Among the mature automotive industries, along with Germany and Korea, Japan is the only country that is still able to combine relatively large domestic sales/production and exports volumes with high foreign production and sales. However, the legacy of the 1960s (large numbers of car and parts manufacturers, specific labour and inter-firm relations, and strong political intervention and regulation) became problematic after the burst of the economic bubble. The following section will examine the evolution of the Japanese automotive industry since then, and especially the diverging trajectories of its carmakers.

Heterogeneity of Carmakers' Trajectories and Performances

The Japanese transport system is, if not complex, at least ambivalent. Although, among developed countries, Japan is characterized by the highest share of public transport in the transport mix and by extremely high car ownership costs, there has been a sound market for passenger cars from the early 1980s onwards. Since the stagnation in sales at the beginning of the 1990s, due to the geographic peculiarities of the country and a specific regulation to favour small cars, the Japanese car market has been split into two main segments: mini-cars (*kei jidosha*) and standard cars (Table 8.1). Along with these trends, consumption patterns have also evolved, with longer periods of car ownership (nowadays, a car is in service for 13 years on average, twice as long as in the mid-1970s), the development of a used cars market (also for exports), and high

Table 8.1 Evolution of the Japanese car market structure (1990–2017)

	Average market share per segment (1993–2017)				Evolution of the overall market share (1997–2017) (%)	Evolution of market share & product mix (1997–2017)					
						Standard		Small		Mini	
	Standard (%)	Small (%)	Mini (%)	Total (%)		Market share (%)	Product mix (%)	Market share (%)	Product mix (%)	Market share (%)	Product mix (%)
Toyota	40.6	45.2	0.5	30.9	+2.8	+6.7	+22.9	+15.3	−24.4	n.a.	n.a.
Nissan	13.6	20.0	5.8	14.2	−5.5	−6.5	+12.6	−8.6	−41.7	n.a.	n.a.
Honda	9.6	16.6	15.3	14.5	+1.5	−4.8	+1.0	+1.9	−30.7	+10.9	+29.7
Mazda	5.9	5.8	3.0	5.0	−0.8	+5.6	+52.5	−3.2	−54.4	−1.4	+2.0
Mitsubishi	3.3	3.7	8.4	5.0	−5.9	−4.5	+15.1	−4.9	−30.5	−12.0	+15.4
Subaru	5.7	2.5	4.8	4.0	−0.8	+7.6	+78.6	−4.4	−59.2	−5.7	−19.4
Suzuki	0.4	2.9	31.4	10.6	+3.4	n.a.	n.a.	+5.2	+4.9	−7.2	−6.6
Daihatsu	0.0	0.6	30.9	9.4	+5.0	n.a.	n.a.	+1.2	−1.9	+4.1	+1.8
Average	25.4	45.3	29.3	100.0		+15.9		−28.3		+12.5	

Source: Author's calculations based on statistics of the Japan Automobile Dealers Association (JADA) and the Japan Mini-Vehicles Association

motorization rates in rural and suburban areas, compared with low ones in big cities. Car sharing is still underdeveloped (in 2014, the car fleet did not exceed 12,000 cars for roughly 450,000 users, with ten major providers having an average ratio of around 70 users per station). The dealership structure is organized around strong vertical integration and, due to the high number of dealers, most of them suffer from low profitability (few cars sold per outlet). These market tendencies have bolstered Daihatsu and Honda in the market of mini-cars, while Suzuki's position has weakened in this segment, which is the core of its product mix. At the same time, Toyota, Mazda, and Subaru have attained a competitive edge in the market of standard cars, a segment in which Nissan and Honda have made few investment efforts to maintain their position and lost the greatest market share. The worst situation was that of Mitsubishi, which was keen on making efforts in these two segments, but nevertheless lost a substantial portion of its market share. As a matter of fact, due to the media coverage of its quality problems in 2015 and 2016, its vulnerable position in terms of internationalization (strong in Southeast Asia only), and its weakened product portfolio, Mitsubishi, as a mid-size carmaker with several problems, had no other choice but to be acquired by Nissan and join the Renault-Nissan Alliance. A similar fate is conceivable for Mazda, Suzuki, and Subaru, whose links with Toyota have recently become stronger. As a consequence of the above market trends and the steady but still fragmented regionalization of automotive industries in Asia (Heim 2017b, 2018), there is a tendency towards consolidation at the top of the supply chain.

Among the seven Japanese carmakers, only Toyota, Nissan, Honda, Mazda, and Subaru have product ranges that cover most of the car segments. The two remaining carmakers, Suzuki and Daihatsu, mainly produce mini-cars, contributing, respectively, 31.4% and 30.9% of the domestic sales of mini-cars between 1993 and 2017 (Fig. 8.1).[10] In other words, this indicates that Suzuki and Daihatsu have very different productive and organizational scales compared with the five main "volume automakers". Toyota produces between 9 and 11 million vehicles per year. The production volumes of Nissan (without counting the volumes of Renault) and Honda fluctuate, respectively, between 5 and 4 million units, while Suzuki stands at roughly 3 million, Mitsubishi, Mazda, and

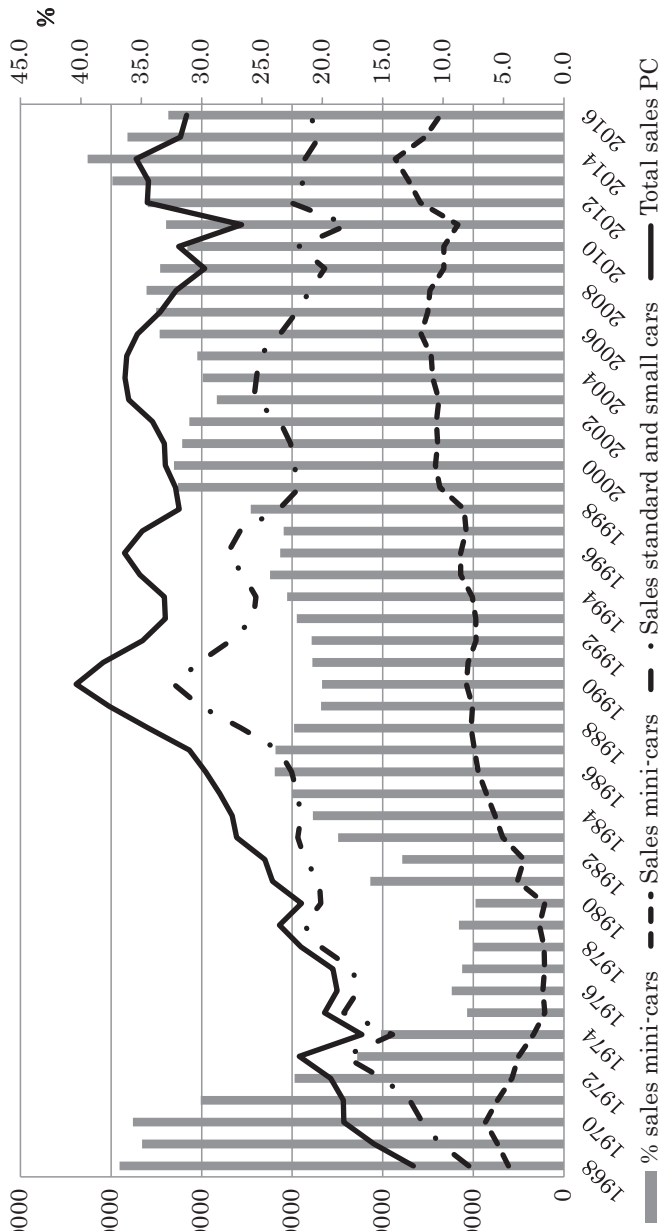

Fig. 8.1 The Japanese automotive market and mini-cars (1968–2016). In 1955, mini-cars had a 360 cc engine. Engine size was then upgraded to 550 cc in 1976, and to 660 cc in 1990 (this also includes the size of the body). Along with specific incentives (lower road, annual use, and sales taxes, lower insurance costs, and no need for a parking space), this explains why sales of mini-cars have been constantly increasing from the beginning of the 1980s]. Source: Created by the author from data published by the Japan Automobile Manufacturers Association (JAMA)

Daihatsu at just over 1 million each, and Subaru at less than 1 million. In an industry where economies of scale and diversification are important determinants of profitability, Toyota is the dominant actor in Japan. Moreover, with Daihatsu in its business group and a possible growing acquisition of stakes in Suzuki and Subaru, Toyota is set to maintain its position as market leader and dominant player in the country.[11] Although domestic sales account for 18% of its worldwide sales, Toyota's domestic production (with 2 million cars exported yearly) is still at the core of its industrial strategy, especially when compared with Nissan and Honda. However, its domestic market share has been decreasing steadily and slowly since 1990, from more than 51% to 29.4% in 2017. The second carmaker, Honda, only has a 16% market share, followed by Nissan, Daihatsu, and Suzuki, each at around 11%. Despite its decline, Toyota's development path and trajectory are still characterized by a strong domestic base, with 35% of domestic production carried out by the company itself and 38% of its worldwide production occurring in Japan. In comparison, Nissan and Honda each account for around 10% of Japan's domestic production, roughly the same level as Suzuki, Mazda, and Daihatsu, and less than 20% of their worldwide production is done in Japan (Table 8.2, Heim 2009: 519–520). Nissan and Honda nowadays are much more reliant on the American market than their domestic market. Their domestic production shares over worldwide production account for less than 20%, and domestic production exported is equal to over 50% for Nissan and 10% for Honda. Honda's low level of exports has several causes (e.g., fluctuations in exchange rates), but the main factor is to be found in its product policy in Japan, focusing on lower segments. Indeed, 45.2% and 35.6% of its domestic sales were in the segments of mini-vehicles and small-sized sedans in 2017.

All these elements converge towards the conclusion that among the five "volume automakers", only Toyota and Mazda have maintained a strong domestic production base. However, Toyota has stronger bargaining power, and its decision-making processes are still very much guided by its Japanese headquarters. Moreover, its willingness to further develop alliances and partnerships with other domestic carmakers starting from the second half of the 1990s is an indicator of its stronger dependency on the domestic industry.[12] This strategy is similar from many points of view

Table 8.2 Comparison of externalization efforts of 200 parts

	Externalization[a]				Internalization[a]			
	Engines[b]	Mechanical organs[b]	Other parts[b]	Total	Engines	Mechanical organs	Other parts	Total
Toyota	111	93	99	303	24	18	6	48
Nissan	119	96	104	319	14	4	2	20
Honda	118	89	108	315	13	7	2	22
Mitsubishi	128	98	97	323	10	6	1	17
Mazda	113	85	88	286	9	5	1	15
Subaru	95	80	79	254	2	5	1	8
Daihatsu	90	76	99	265	13	7	5	25
Suzuki	107	94	106	307	9	5	2	16
Average	110	89	98	297	12	7	3	21
Average Japanese Big three (Toyota, Nissan, and Honda)	116	93	104	312	17	10	3	30

Source: IRC (2014: 12)

[a] *Externalization* covers the number of firms and *internalization* the number of parts

[b] *Engine parts*: main components, valves, fuel systems, intake and exhaust systems, lubrication and cooling systems, electronic systems, and parts for hybrid and electric engines. *Mechanical organs*: powertrain systems, steering systems, and brake and suspension systems. *Other parts*: wheels, body parts, passenger compartment parts, body electronics parts, and other equipment parts

to those of the Volkswagen Group (even though about 40% of its worldwide sales occur in China), Daimler, BMW, and Hyundai-Kia (the latter even increased its domestic production by more than 800,000 units between 2000 and 2010, from roughly 2.2 to 3 million cars). Conversely, the three American carmakers, the two French carmakers, and Fiat (which acquired 100% of the Chrysler Group in January 2014) have followed the opposite trajectory. In terms of internationalization of Japanese carmakers, Toyota has a better geographic mix than Nissan, Honda, Mazda, and Subaru. Mazda and Subaru missed the wave of internationalization their production bases, with, respectively, 75% and 80% of worldwide production volumes manufactured in Japan in 2014 and, even more importantly, 81% and 71% of their domestically produced vehicles exported. As latecomers in foreign markets, they are hindered not only by the volatility of the exchange rates but also by their weak positions in defining financial and technical rules and standards in the emerging markets. Most of Suzuki's turnover comes from India, thanks to its joint venture with the local carmaker Maruti (roughly 47% of market share in India and 53.3%, 51.3%, and 36.6% of worldwide production, sales, and turnover made in India in FY 2018), while it has a domestic production share of 35%, mainly for the domestic market (only 15% exports). The Japanese carmakers are major players in Southeast Asia and Mexico, but in other emerging markets, such as Brazil, Russia, and India, most of them are in the tier-2 group. Even more worryingly, they lag behind the American and European carmakers in China. While Chinese domestic brands nowadays account for roughly 40% of overall domestic sales, Japanese carmakers' market shares have been continuously decreasing in China since the 2000s. In the 1990s, they exported cars from Japan and held the largest market share in this country until the beginning of the 2000s. The Chinese government then decided to cut these imports and attract FDIs through a policy of joint ventures with domestic makers, which were in favour of Volkswagen and GM.

These evolutions show extremely contrasted trajectories among the seven Japanese carmakers. Besides, their product policies, especially for new energy vehicles and entry segments, are affected by inconsistencies regarding market trends in several countries. As a matter of fact, since the mid-1980s, they have been following internationalization strategies that

have had various impacts on their organizations and on domestic labour relations. The following section will be specifically devoted to analysing the changing nature of these inter-firm relationships and their effects on labour relations.

Inter-firm and Labour Relations Under Tension

The historical/institutional legacies of the 1960s and the market evolutions begun in the 1990s highlighted in the previous sections led to specific challenges for Japanese car and parts makers. In Japan, carmakers started early on to outsource a large portion of their R&D and production capabilities (including final assembly), while retaining strong control over their supply chains. The elements that represented the strengths of this industry until the 1980s (manufacturing capabilities and their central role in firm strategies and organization, strong reliance on outsourcing with quasi-vertical integration, labour relations stressing collective working units and standards, and strong reliance on small and medium-sized enterprises [SME]) were not only threatened by the financial crisis of the 1990s but also appeared to act as barriers to more comprehensive development and internationalization.

Relationships between carmakers and suppliers revolved around cooperative patterns not seen in the West, where arm's-length relationships gave primacy to short-term contracts with lower levels of inter-firm cooperation (Asanuma 1989; Sako 1996: 651). In the 1960s and 1970s, the (demand-led) growth regime was a trigger for the outsourcing not only of parts but also of the final assembly of cars. Despite extensive literature emphasizing long-term and trust-based inter-firm relationships, Japanese carmakers have very distinct policies regarding the management of their supply chains. Except for Honda, all carmakers developed suppliers associations (*kyoryokukai*) in order to bring their main suppliers together and cooperate with them. The main characteristics of Toyota's suppliers association are strong geographic agglomeration in the Aichi Prefecture area and a relatively high degree of financial and productive integration (Nakajima 1996), in contrast to what is seen for other carmakers. For instance, Mitsubishi's association is dispersed all over the country and,

while around 98% of transactions are carried out within Toyota's association, this figure falls to 31% in the case of Suzuki. Besides, while it was claimed that inter-firm relationships were exclusive (a supplier working for a carmaker was not permitted to have transactions with other carmakers), this peculiarity lost its strength at the end of the 1970s, resulting in greater diversification of supply chains. For instance, more and more tier-1 and tier-2 suppliers became members of several of these associations.

The Polarization of the Supply Chain

Table 8.2 shows the different degrees of productive internalization/externalization. First, the Japanese big three (Toyota, Nissan, and Honda) have a greater degree of both externalization and internalization of parts production. They are especially concerned with keeping a high level of competition among suppliers and of internalization for the production of core parts, that is, those related to the engine and mechanical components. While Toyota, differently from Nissan and Honda, has delegated a great number of production processes to its suppliers, it has also relied on a moderate number of mega-suppliers (domestic average on the three segments, engine parts, mechanical organs, and other parts), most of which are members of its suppliers association. Toyota has also kept a high level of internal production of core elements. In other words, Toyota has developed a competitive regime in which a restricted number of suppliers are not only in competition with one another for the production of similar parts, but also in competition with Toyota's own internal departments. On the other hand, Nissan and Honda rely more heavily on their supply chains, displaying greater externalization capabilities with weaker control over several production processes. In sharp contrast, the other three "volume automakers" (Mitsubishi, Mazda, and Subaru) have very different policies. Mitsubishi and Mazda make use of a high number of suppliers, especially in the Chugoku region (around Hiroshima), and have relatively high levels of internalization of parts production, while Subaru has a smaller panel of suppliers and lower levels of internalization, especially for engine parts. As for the two specialist makers, Daihatsu and Suzuki, their policies are also very different. Daihatsu relies on a smaller panel of

suppliers and higher degree of internalization than Suzuki. This is explained by its incorporation into the Toyota Group and the promotion of Toyota's supply management system. Our comparison indicates that Toyota has greater control over its supply chain than the other Japanese carmakers.

The chief peculiarity of the Japanese supply chain is its higher density of SMEs, compared with other developed countries. Few of these SMEs are part of the suppliers associations and, with domestic automobile production and sales stagnating since the mid-2000s, the polarization of the automotive sector has changed cooperation patterns and worsened labour conditions across SMEs. Moreover, regional competition (China, India, and Southeast Asia) put pressure on firms at the bottom of the value chain in the 2000s. While some research emphasizes that smaller suppliers in neighbouring countries have not yet caught up with their Japanese counterparts (Akabane et al. 2018), the regionalization of the Asian automotive supply chain is underway, and Japan is still a central actor (Jetin 2018). In some sectors with lower technological know-how and labour-intensive processes, such as tool-making or wire harnesses, Japanese firms have lost their competitive edge. Table 8.3[13] is an illustration of the changing nature of the wage-labour nexus in the Japanese automotive industry since the mid-2000s.

Between 2004 and 2014, the number of SMEs constantly decreased, while wages stagnated (the yearly average wage in firms with fewer than 500 employees was 3.2 million yen in 2014, almost the same as in 2004). In 2004, SMEs with less than 50 employees accounted for 79.5% of the firms in the industry (6111 firms), and their yearly wages were around 57% of the average wage in the industry. Ten years later, the proportion of these firms declined to 74% (4419 firms, as 1692 firms, 27.7% of the firms in 2004, disappeared), and their yearly wages dropped to 55%. During the same period, however, the share of large firms (more than 1000 employees) and the wages of their employees increased. Moreover, the biggest firms (more than 5000 employees) greatly diminished their efforts in terms of investments (from 8.43 million yen per employee in 2004 to 2.27 in 2014), whereas investment levels remained stable in firms with less than 300 employees and decreased in firms with more than 300 employees (from 4.04 million yen to 1.7 million yen).

Table 8.3 The wage–labour nexus in the Japanese automotive industry (2014)

Firm size	Number of firms	Number of employees	% of total workforce	Average wage∗	Added value per employee∗	Inv. per employee∗
4–9	1852	11,582	1.34	2.8	5.43	n.a.
10–19	1244	17,063	1.98	3.2	6.14	n.a.
20–29	754	18,556	2.15	3.3	6.42	n.a.
30–49	569	22,269	2.58	3.6	7.28	0.54
50–99	625	43,869	5.08	3.7	7.89	0.80
100–199	431	60,032	6.95	4.1	9.58	1.13
200–299	156	38,072	4.41	4.6	9.75	1.25
300–499	134	51,794	6.00	5.1	11.77	1.40
500–999	103	73,940	8.56	5.2	10.92	1.52
1000–4999	80	149,405	17.30	6.0	14.63	1.66
>5000	23	377,027	43.66	7.2	29.01	2.27
Total	5971	863,609	100.00	5.8	18.86	1.68

Source: Author's calculations based on METI, Census of Enterprises, 2014 (∗ million yen)

As a consequence, within ten years, the Japanese automotive supply chain evolved in an unprecedented way. The top of the supply chain underwent a process of concentration, while at its bottom the scale of production shrank, with the same constraints for the remaining firms. Large firms were able to reduce their domestic investments, focusing especially on FDIs, whereas the smallest firms, hindered by limited FDIs, had to maintain high investment levels to both meet the cost and quality targets of their Original Equipment Manufacturers (OEM) and cope with international competition. In addition, productivity gains could not be redistributed to their employees. With carmakers and tier-1 suppliers maintaining their policies of cost reductions, the burden at the bottom of the supply chain became even heavier at the start of the twenty-first century. In 2005, when Toyota announced its VI policy,[14] its CEO emphasized that the ongoing quality improvements and cost reductions were targets that had to be pursued by the Japanese industry in the coming years. For what concerns the suppliers, these two targets have extremely different impacts in relation to firm size, portfolio policy, and technological knowledge. The biggest firms can cut costs relatively easily using several approaches, such as externalization of production, specific employment policies, or sale of non-profitable activities. In contrast, reducing costs

by 30% in one or three years is an extremely challenging objective for the smallest firms, which heavily rely on one main OEM and have general and hardly transferable technological knowledge. In order to meet the cost targets set by their client firms, most of the remaining SMEs have either built transplants in neighbouring countries or hired foreign workers from China and Southeast Asia under the so-called foreign workers training programme. Created in the 1990s, this programme allows foreigners to enter Japan as trainees for a period of three years. They are supposed to be on-the-job training programme during the first year and to work for an average monthly wage of US$500–750 for the following two years. This peripheral workforce generates new tensions among workers and, although some independent labour unions tackle these issues, their status is weak. Indeed, this situation has tended to worsen overall working conditions in SMEs. Medium-sized companies have been able to maintain their position in Japan thanks to their close relations with OEMs and their strategies regarding diversification of products, markets, and client firms. While in the 1960s and 1970s employment conditions were often better in subcontracting firms, this is no longer the case nowadays. For instance, Toyota's eight contract assemblers (*itaku* makers) paid on average higher wages than Toyota until the second half of the 1970s, and employment length was longer than at Toyota until the mid-1990s (Kikuchi 2016: 178–183). As a matter of fact, competitive intensity became stronger at the bottom of the supply chain and economic inequalities increased among big and small firms alike.

The Evolution and Persistence of the Wage-Labour Nexus

Another legacy of the 1960s was the practice of ranking the performance of working units and suppliers as a necessary condition to reduce materials and labour costs and to provide high quality standards. The economic downturn at the beginning of the 1990s affected this compromise, and most Japanese OEMs and mega-suppliers introduced new managerial practices to assess individual performance (Shimizu 2004). At the same

time, a dual system of single sourcing of components to tier-1 suppliers and multiple sourcing of other parts (parts ordered involved a division of labour among at least three suppliers) was maintained (Fujimoto 1999: 309–320; Nishiguchi 1994: 19–139). To ensure profitability and keep control over their suppliers, the major Japanese carmakers have internal labour markets (ILMs) extended to a wide range of corporations (Heim 2017a). The transfer of workers (blue and white collars) to tier-1/2 suppliers is still a common practice that enables Japanese carmakers to keep a relatively young workforce and to stimulate competition among employees for higher positions. For instance, in 2014, 39.5% of the 1057 executives of 93 core suppliers and companies affiliated to Toyota had occupied or were occupying positions of responsibility at Toyota, some of them (45) being transfers from Toyota itself. Among these executives, 26% had also worked or were working for other suppliers from the Toyota Group, and 17% had worked or were working both for Toyota and other suppliers (IRC 2014). These figures highlight a specificity of inter-firm relations in the Japanese automotive industry, which does not rely heavily on cross-shared ownership but rather on extended internal labour markets, giving Japanese carmakers a higher degree of flexibility than their Western counterparts and, consequently, a sound competitive advantage. Such a flexible tool is rooted in a specific collective bargaining system that engenders not only profound differences among companies but also inequalities between regular employees and temporary workers, the latter being excluded from unionism.

After three decades of economic recession, the Japanese automotive industry has had to adapt to retain its competitiveness. The common patterns of transactions with suppliers and dealers, as well as the wage-labour nexus, were revisited, so that its strengths (low costs and high standards) could be restored after the losses of the 1990s. These structural changes, which had never been seen before, were rather incremental at the top of the supply chain but deeply affected its bottom. The ongoing concentration at the top of the supply chain is also driven by the latest technological evolutions, which are having a dramatic impact on the worldwide auto industry. Such evolutions are dealt with in the next section.

Technological Changes and Product Policies Uncertainties

The development of alternative propulsion systems (hybrid and fuel-cell vehicles in Japan) and energy policies are two closely intertwined core issues in Japan. Emission regulations, incentives to buy new energy vehicles, and safety regulations, which have gained in popularity in several parts of the world, are disrupting the business models of Japan's carmakers and mega-suppliers. Carmakers used to develop under-body components in-house, which was their core business. Despite the growing outsourcing of several R&D domains since the 2000s, Japanese carmakers (as seen above) have retained control over critical technological developments. For instance, in the Toyota Group, the assembly of mini-cars is completely delegated to Daihatsu. However, the development of models is done jointly, with Toyota's chief project engineers heading the R&D groups. As for the development of batteries, Japanese carmakers have kept in-house battery management systems. They are also concerned with the development of new materials in order to lower the weight of vehicles, and have formed several consortiums to define standards for batteries and charging infrastructures. In other words, they are not willing to lose knowledge in these new technological fields. Yet, they face two main problems.

First, the group-based approach that they have inherited can be a risk when considering the timeframe for the development of new technologies. Two Japanese mega-suppliers, Hitachi Automotive Systems (HAMS) and Denso, are intensively engaged in the field of automatic braking systems. However, HAMS has been able to develop this complex automotive component more quickly than Denso, since it has more flexible and adaptive capabilities and is an independent supplier, while Denso, as part of the Toyota Group, has had to follow stricter bureaucratic rules and accept a clear-cut division of tasks with other firms, which has slowed down the pace of innovation (Lee 2018). External resources in the so-called *keiretsu* can also curb innovation. Second, energy consumption is a critical issue in Japan. According to Smitka, "since 1973 demand led by the transport sector rose 70 per cent and that by the household sector 90 per cent. Together they now account for one-third of energy consumption. Half of that, or one-sixth

of Japan's total energy usage, is used to power vehicles" (Smitka 2018: 113). As Japan is highly dependent on energy imports, a national debate is taking place as to whether regulations should favour the use of public transport (far less energy consuming than private transport) or provide incentives to further consolidate the market of battery electric vehicles, or BEVs (with less than 1.5 million cars on the roads in 2018 and high electricity prices). Even if the BEV strategy is preferred, this might not eliminate the problem of energy imports, considering that coal and liquefied natural gas (LNG) imports might replace oil imports, as Smitka rightly argues.

In developing BEVs, Japanese carmakers are now facing challenges that are not only technological but also political. Although Toyota, Honda, and Nissan have invested a lot of money and energy to develop hybrid, fuel-cell, and electric vehicles, a mature market of BEVs is highly improbable in the next two decades. The political compromises that will be found are a core issue for the future of Japanese carmakers and of the overall auto industry.

Conclusions

Since the financial crisis at the beginning of the 1990s, the Japanese automotive industry and its carmakers have had to adapt their productive models inherited from the 1960s and 1970s. While Japan's auto industry is still central in the Asian productive network, its subtle compromise between production outsourcing and carmakers' control over the supply chain has been reshaped. The most competitive firms, both carmakers and mega-suppliers, have reinforced their position as dominant actors. This trend of power concentration at the top of the supply chain has caused severe damage to the smallest firms. The growth disparities triggered by the economic recession of the 1990s have resulted in a less balanced redistribution of the sources of profit, which has caused the population of the smallest and weakest firms to decline. While Japanese auto firms still have competitive strength down to the tier-2 level, the industrial compromise that fostered strong ties and a well-balanced division of labour in the supply chain has clearly been affected. This, in turn, threatens one of the Japanese carmakers' sources of profitability and continuous costs reduction, and also affects

their technological development capabilities, as the numerous defect problems encountered by some car and parts makers indicate. In the past, improvements in quality standards were achieved thanks to the involvement of the whole supply chain. This regime of production is still sustainable in firms of the size and importance of Toyota, but the future of the other firms, such as Mazda and Subaru, should undoubtedly be on the policymakers' agenda. Another key aspect regards labour issues in some regions, such as around Hiroshima (highly dependent on Mazda and Mitsubishi), where production downsizing might accelerate in the future.

Besides, as the national population declines, the car market is bound to shrink in the coming decades, and its product mix between internal combustion engines and alternative powertrains will not change drastically. The fact that most Japanese carmakers find it hard to define strategies as transport service providers or to understand market trends in some emerging countries is a sign of their strong reliance on manufacturing capabilities. Yet, the energy policies that will guide the overall Japanese transport system are even more important for the future of the Japanese automotive industry. The dilemma between pursuing the primacy of the collective transport system and favouring a transition towards more fuel-efficient cars is as important as the ability of Japan's core carmakers and suppliers to develop alternative powertrains.

Notes

1. Excluding bus and truck makers, as well as Mitsubishi, which merged with Nissan in 2016.
2. Both Mazda and Nissan faced hard times in the 1990s. Nissan had major financial and profitability problems at the very time when the upper management decided to change its organization (the Nissan Way), which is why it had to sign an Alliance with the French carmaker Renault in 1999 (Heller 2009). Mazda merged with Ford in the first half of the 1990s, but a disinvestment process was initiated by Ford after the 2008 financial crisis.
3. These two management tools also implied other organizational capabilities, such as shorter vehicle development times (Fujimoto 1999: 173–222), the continuous improvement of work standards and processes, and team work.

4. In 1945, there were no more than 111,233 four-wheel cars in Japan and, among them, only 25,533 were private cars, most of them imported (Kamiyama 2016: 34).
5. At present, eight *itaku* makers (Toyota Industries, Kanto Auto Works, Toyota Auto Body, Daihatsu, Hino, Central until 2012 and its merge with two other subsidiaries to give birth to Toyota Motor East Japan, Subaru, and Toyota Kyushu), plus three other affiliated firms (Gifu Auto Body to Toyota Auto Body, Daihatsu Kyushu, and Hino Auto Body), are involved by Toyota in the final assembly of more than half of its domestic production. In comparison, Nissan works with five *itaku* makers, Mitsubishi with two, and Honda, Mazda, and Subaru with one each.
6. Exports volumes first exceeded domestic sales in 1980.
7. In 1985, roughly 3.5 million Japanese cars were sold in the US, and only 1.2 million in Western Europe.
8. In Europe, due to the Block Exemption Regulation of the Treaty of Rome and the more constraining and protectionist policies designed by the European Commission (Pardi 2017), it was harder for the Japanese carmakers to build a dealership network.
9. However, this issue is not specific to Japan, considering that since 2010 more than half of worldwide vehicles production and sales have occurred in the so-called emerging countries.
10. The third main actor in this segment is Honda, with a 15.3% market share during the same period.
11. The topic of the acquisition of Suzuki by Toyota often makes the headlines in specialized newspapers. The main advantage for Toyota would be to gain access to the Indian market, where Suzuki has a strong position thanks to its alliance with Maruti. It is worth remembering that Toyota made early FDIs in India but then sold its stake to Hyundai.
12. In order to compete with GM and VW, Toyota developed a strategy of acquisitions/ventures with Japanese carmakers. In 1967, Daihatsu signed a first partnership with Toyota and was completely acquired by Toyota in September 1998 (51.2% of its shares). Toyota has also been Subaru's first shareholder since March 2006 (16.82% of its capital, 8.7% in 2006), after GM sold its shares in October 2005 (20% of the capital acquired in December 1999). In November 2006, Toyota also acquired 5.9% of Isuzu's capital, currently being its third shareholder (6.34% of shares). In 2017, Toyota acquired a 5% stake in Mazda, and the two companies announced new joint-development projects, especially of electric vehicles.

13. Compared with the same figures in 2004 (Pardi 2011: 135).
14. Since the beginning of the 2000s, Toyota has defined three cost reduction policies for its suppliers. On 21 December 2009, following the subprime crisis, Toyota announced a plan, RRCI, whose target was to reduce the cost of purchased parts by 30% within one year. This followed two previous policies, CCC21 in 2000 and VI in 2005, with respective cost reduction targets of 30% within three years and 30% within one year.

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