Can Both Competitiveness and Profitability Be Sustained?

An International Comparative Analysis of the Performance of Japanese Automakers (1980s to 2000s)

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Abstract

This paper combines publicly available financial and sales data with data that was gathered systematically over a 25-year period through extensive company visits. The paper shows that, unlike in the first two decades, for the last decade of the 1980 to 2009 period, Japanese automakers were able to add industry-leading profitability to their long-standing competitiveness in organizational processes and product markets. The academic literature reveals that there are likely two principal reasons for Japanese automakers raising their profitability: (1) the elimination of excessive engineering of vehicle components that are invisible to the eyes of the user, and (2) the thorough and persistent implementation of front-loaded problem solving in the development of new vehicles. To preserve the co-existence of both competitiveness and profitability, the paper argues Japanese automakers need to extend the elimination of excessive engineering into those components that are visible to the eyes of the user. In addition, the headquarters of Japanese automakers need to be transformed such that they can lead balanced capability building, the driver of both competitiveness and profitability, not only across all organizational functions, but also into the extended enterprise of suppliers and dealers.

Keywords: World Auto Industry, Operating Profit Ratio, Market Share, New Product Development, Vehicle Assembly, Productivity, Lead Time, Production Engineering, Front-loading Problem Solving

Introduction

This paper examines the performance from 1980 to 2009 of Japanese automakers that make passenger cars and light trucks and inquires whether profitability and competitiveness can co-exist and be sustained for companies in an industry. Following Fujimoto (2007a), competitiveness is defined as a two-part concept. *Surface competitiveness* reflects the relative performance of a company's products in the market. *Deep competitiveness* reflects the relative performance of the organizational processes used for the development of new products and manufacturing. It seems logical that being competitive should naturally lead to profit; however, in

practice such a link cannot be easily established (cf., Goldratt & Cox, 1984), and may be particularly difficult for Japanese companies to achieve (Mishina, 2011).

Some in Japan and elsewhere even question why a company needs to pursue profit at all, though the notion that in a capitalistic economy profit is the principal goal of a company has long been established in neoclassical economics (Friedman, 1982). Unfortunately, the notion that profit overrides other goals of a company is susceptible to misinterpretation. Of course, the law stipulates that shareholders, who demand a monetary return on their investment (i.e., profit), are the sole owners of companies, and this is undoubtedly so.

At the same time, one cannot but take into account the fact that companies are made up of people and that the activities of these people and the company itself both directly and indirectly affect the surrounding environment and society in more than just financial ways. In this respect, the other stakeholders of a company (i.e., those that are influenced by and exert influences on a company) must also be considered. Shareholders may need to come first, but not to the exclusion of consideration for customers, employees, suppliers, the surrounding community, and so on. This understanding is reflected in the resource dependence theory first formalized by Pfeffer and Salancik (1978), from which we can see that a company needs to manage all of its stakeholders in order to be successful over the long term.

In Japan, where profit has been traditionally viewed as part of a zero-sum equation where one's gain is another's loss, profit for shareholders has often been put behind the other stakeholders. In the West, the pursuit of profit for shareholders has tended to trump the other stakeholders. Both are out of balance. What is needed is both competitiveness and profit. The question is how to achieve and sustain them both, which is the main line of inquiry of this paper.

We have selected the automotive industry as the object of our investigation into achieving the coexistence of profitability and competitiveness for the following two reasons: (1) the industry's importance, amounting to as much as 10% of GDP in Japan, Germany, and the U.S. (Maxton & Wormald, 2004), and (2) the availability of data on competitiveness from previous studies.

The next section of the paper introduces the literature on organizational capabilities and firm performance that forms the base of the analytical approach of the paper. The literature review concludes with two research questions. The following section introduces the research methodology of the paper. Next, we present our data on the profitability and surface competitiveness of Japanese automakers from the 1980s to 2000s. Our analysis of the data shows that from the 1980s and into the 2000s, Japanese automakers not only preserved their competitiveness vis-à-vis American, European, and South Korean automakers, but in the 2000s they were also able to increase their profits to industry-leading levels.

In the paper's discussion section we argue that Japanese automakers were able to achieve the co-existence of both competitiveness and profitability in the 2000s primarily due to cost reductions from the elimination of excessive engineering of those components that are invisible to the eyes of the user, concurrent engineering, and front-loaded problem solving. Finally, the paper concludes by arguing that, in order for Japanese automakers to sustain the coexistence of competitiveness and profitability, they need to pursue further the elimination of excessive engineering to limit the scope of potential problems during product development. In addition, Japanese automakers should pursue balanced capability building across all organizational functions, making sure that the entire extended enterprise (i.e., upstream suppliers and downstream dealers) is sufficiently competitive and profitable.

Organizational Capabilities and Performance

Company performance is largely determined by a company's organizational capabilities, which are rooted in the organizational routines that are carried out by individuals or groups of people (Nelson & Winter, 1982; Levitt & March, 1988). The kanban system is an example of a routine, which combined with other systems and practices, has formed the basis of the Toyota Production System (TPS) that has a long record of generating high performance that is difficult to replicate by other companies (Fujimoto, 1997; Hino, 2006). The resource based view regards organizational capabilities as the most important resource that determines performance. On the other hand, the relative value of performance, that is, a company's performance compared against competitors, determines competitiveness. The duration that competitiveness can be sustained depends on the availability of resources such as organizational capabilities, as well as their susceptibility to imitation (Barney, 1986; Barney & Hesterly, 2010).

According to Fujimoto (2007a, 2012), organizational capabilities in manufacturing industries affect two types of competitiveness. The first type is deep competitiveness, which reflects internal performance indicators like productivity, lead time, engineering quality and manufacturing quality. In other words, this is the performance of R&D centers and plants. Thus, achieving shorter development lead time, for example, would mean an improvement in deep competitiveness. Customers are generally not able to know the values of most of the performance indicators that make up deep competitiveness.

There are also indicators such as price, overall quality, delivery time, etc. that customers are aware of. These indicators determine the second type of competitiveness – surface competitiveness. Thus, achieving shorter time between order and delivery, for example, would mean an improvement in surface competitiveness. In this paper we analyze the performance of Japanese automakers from the perspective of both deep and surface competitiveness.

Product engineering and manufacturing (deep competitiveness) precede marketing and sales operations (surface competitiveness), so it can be reasonably assumed that, to a certain degree, deep competitiveness determines surface competitiveness. Also, according to Fujimoto (2007a, 2012), if other external factors (exchange rate, condition of the economy, etc.) and internal factors (timing of investment, etc.) remain unchanged, then surface competitiveness should largely determine financial performance (i.e., profitability). Competitiveness is relative in nature, and so is profitability. Changes in external factors tend to impact profitability most, surface competitiveness less so, and deep competitiveness the least (Fujimoto, 2007a, 2012).

Profitability performance of Japanese automakers. With the notable exception of Fujimoto (2007a), which points out that in the second half of the 1990s Japanese automakers, despite being successful in cutting costs, could not achieve a corresponding increase of profit, the major studies of the Japanese automobile industry (Womack, Jones, & Roos, 1990; Clark & Fujimoto, 1991, among others) are mainly concerned with competitiveness. Boyer and Freyssenet (2002) analyzed the profitability of a few Japanese automakers in comparison with the automakers of other countries. Mercer (2009) points out that only Porsche, BMW, PSA and Suzuki could exceed the gains of the average stock market index. Williams (2003) concludes that in the 1990s none of the major automakers achieved outstanding results in terms of profitability, while Maxton and Wormald (2004) even argue that the contemporary business model in the automobile industry is incapable of delivering sustained profits. In this paper, using public data

reported by each automaker on its profitability, we aim to deepen the analysis of the profitability of Japanese automakers.

Competitiveness of Japanese automakers.

The major international studies done by Clark and Fujimoto (1991), and Womack et al. (1990), examined the competitiveness of automakers at the company level and regional level in new product development and vehicle assembly. Clark & Fujimoto (1991) utilized data from R&D centers, with the unit of analysis being vehicle development projects. Womack et al. (1990) utilized data on vehicle welding, painting and trim/chassis assembly, with the unit of analysis being vehicle assembly plants. These two studies were subsequently continued to cover a period that spans over 25 years, as reported in Higashi and Heller (2012a), and Oshika and Fujimoto (2011), respectively. Our analysis of the deep competitiveness from the perspective of new product development and vehicle assembly is based on the studies shown in Table 1.

Table 1: Data sources used in the current paper to determine deep competitiveness

Survey project span	New vehicle development survey	Vehicle assembly plant survey
1980s	Womack et al.（1990） Clark & Fujimoto (1991)	Womack et al.（1990）
1990s, First half	Ellison, Clark, Fujimoto, & Hyun (1995)	MacDuffie & Pil (1997)
1990s, Second half	Nobeoka & Fujimoto (2004), Thomke (2006)	Holweg & Pil（2004）
2000s	Higashi & Fukuzawa (2009) Higashi & Heller (2012a, 2012b)	Oshika & Fujimoto (2011) Oshika (2011)

The new product development survey was initiated by the Harvard Business School (HBS) and subsequently continued together with the Manufacturing Management Research Center (MMRC) at the University of Tokyo. It encompasses a total of 99 vehicle development projects (1980s: 29; 1990s: 52; 2000s: 18), equally spread between Asian (South Korean and Japanese) and Western (American and European) automakers. The data was collected through questionnaires, visits to automakers for interviews, and follow-up phone calls, email correspondence, and repeat visits. The respondents were engineers directly involved in the projects. Generally project managers replied first, with additional responses provided by other project members responsible for the different technical aspects of the project.

The vehicle assembly plant survey was carried out under the leadership of the International Motor Vehicle Program (IMVP) and MMRC over four rounds and encompasses a total of 259 plants (1st round in 1989, 70 plants; 2nd round in 1994, 88 plants; 3rd round in 2000, 71 plants; 4th round in 2006, 30 plants). The first three rounds surveyed plants from both Western and Asian automakers. The fourth round, however, only covered the Asian plants of Japanese and South Korean automakers. The data was collected through questionnaires, site visits for observation and interviews, follow-up correspondence, and in some cases repeat visits. Generally respondents were those individuals designated by the plant manager.

Surface competitiveness of Japanese automakers.

For measuring product quality in the 1980s and early 1990s, the new vehicle development survey adopted an aggregate indicator called Total Product Quality (data was not

collected for this indicator in the late 1990s and 2000s). According to Clark and Fujimoto (1991), the quality of vehicles developed by Japanese automakers on average outperformed their Western volume-manufacturer counterparts in the 1980s but did not exceed the total quality performance of the European premium-market automakers. The data also shows that in the 1980s the quality performance of U.S. automakers underperformed vis-à-vis their European and Japanese counterparts.

According to Ellison, Clark, Fujimoto, and Hyun (1995), from the early 1990s U.S. automakers managed to narrow but not eliminate the quality gap, while South Korean automakers still underperformed considerably in quality. Elsewhere, J.D. Power data on a narrower definition of quality and limited to the U.S. market, also shows improved performance of Western automakers, consistent strong performance of Japanese automakers, with the South Korean automakers (Hyundai/Kia) rising notably in the 2000s. Due to the discontinuation of the TPQ indicator, however, there is no consistent broad measure of the surface competitiveness of automakers around the world from the latter 1990s to the present.

Deep competitiveness from the perspective of new product development.

As already mentioned, deep competitiveness was analyzed from two perspectives: new vehicle development projects and assembly plants. It must be noted that data from South Korean automakers have been combined with the data for Japanese automakers. Similar data trends permit this amalgamation, which was necessitated by the inability to make a stand-alone South Korean average since the early 2000s due to the inability to obtain data from three separate South Korean automakers. We analyze the deep competitiveness of Japanese (and South Korean) automakers first from the perspective of new product development and then from the perspective of vehicle assembly.

The analysis of deep competitiveness in new vehicle development was conducted using the following three indicators: engineering man-hours, number of test vehicles and development lead time. As reported in Higashi and Heller (2012a), from the 1980s to the 2000s, all three indicators show the consistently superior performance of Japanese and South Korean automakers compared to their Western counterparts, but at the same time, the indicators for engineering man-hours and number of prototypes both show that Japanese and South Korean automakers have become less efficient compared to their past performance. The performance trends hold even after data has been adjusted for vehicle and project complexity to permit fair comparisons (Higashi & Heller, 2012b). It is important to mention that the productivity measure does not include costs related to manufacturing engineering because Clark and Fujimoto (1991) and subsequent iterations of the study have been unable to reliably collect such data.

Deep competitiveness from the perspective of vehicle assembly.

The analysis of deep competitiveness in vehicle assembly was conducted using the following two indicators: assembly productivity and throughput performance. These two indicators show that, from the 1980s to the 1990s, Japanese automakers were superior to their Western counterparts, with a huge gap in the late 1980s, but narrowing later (Womack et al., 1990; MacDuffie & Pil, 1997; Holweg & Pil, 2004). Although there is no data from Western automakers in the IMVP data in the 2000s, in 2005 Harbour & Associates data gives approximately 15 man-hours per vehicle for the best non-Japanese Western assembly plant, which is well above the Japanese average of 10.7 man-hours recorded in the vehicle assembly plant survey conducted in 2006. Also, data from Oshika and Fujimoto (2011) suggests that South

Korean automakers are on par with Japan in assembly productivity. On the whole, Western automakers seem to have managed to narrow but not eliminate, the gap in assembly productivity that separates them from Japanese and South Korean automakers.

As for throughput (time from the start of welding together a vehicle's body panels to the end of final assembly), the 1999 data show that Japanese automakers perform more than two times better than their European counterparts (Heller, Kato, & Marinov, 2013). Throughput, however, inevitably reflects each region's customer preferences so it is not as simple to compare as productivity. For example, Japanese and European customers can wait a certain period of time until their new vehicle is delivered, but U.S. customers need to get theirs the same day. Yet, as reported in Heller et al. (2013), 2006 data from Japanese automakers show remarkable consistency across various Asian countries in which their plants are located.

In summary, performance data found in published sources indicates that Japanese automakers have maintained their deep competitiveness in both new product development and vehicle assembly throughout the 1980 to 2009 period. As for the surface competitiveness of Japanese automakers, published sources show that it remained strong in the 1980s and early 1990s but thereafter, there is not sufficient data to say definitively whether or not it was sustained. As for the relative profitability performance of Japanese automakers, results are unclear for the entire period. Therefore our primary task is to collect the necessary data from 1980 to 2009 to analyze the surface competitiveness and profitability of Japanese automakers, so that we can reliably establish whether competitiveness and profitability co-existed during this period.

Research questions.

As noted above, in the literature there is sufficient evidence only regarding the deep competitiveness of Japanese automakers in the 1980 to 2009 period. Therefore, we pose the following two research questions:

Research Question #1: *Was the deep level competitiveness displayed by Japanese automakers during the 1980 to 2009 period matched by similar surface competitiveness and superior profitability?*

Research Question #2: *If competitiveness and superior profitability did co-exist during the observed period, how did Japanese automakers achieve this co-existence?*

Research Methodology

In this section we explain how this paper answers the two research questions posed in the previous section. The time frame of the analysis is broken down into three decades: 1980s, 1990s and 2000s, which may seem arbitrary but such a breakdown fits with the periods covered by the data on deep competitiveness described earlier.

Regarding the first research question, we need to establish measures to evaluate the profitability and surface competitiveness of Japanese automakers. For profitability, the operating profit ratio was chosen because it is generally held to be the best measure of the profitability of the core business of a company. However, operating profit is not an ideal measure because it does not take into account the different degrees of financial leverage among companies and international differences in governance structures of corporations, with respect to rules for consolidation of financial results, etc. In this respect, return-on-investment (ROI) would be a better measure. Ideally ROI, as well as cash flow performance, would be added to our analysis too; however, due to the present paper's primary interest in analyzing the profitability of the core

automotive business of Japanese automakers, the single measure, operating profit, was used. The operating profit data was collected from published sources: corporate financial statements and annual reports.

As for surface competitiveness, we had to change the measure from Total Product Quality to market share and a rough measure of brand value, due to difficulty of replicating the data collection work done in Clark and Fujimoto (1991), including obtaining sufficient access to J.D. Power data. The measure we have adopted in this paper, market share, is commonly used in business research as a proxy for market performance. We have attempted to deepen our measure of success in the market by incorporating a rough measure of brand value that allows us to take into account the fact that a luxury vehicle (e.g., a Lexus LS) and mass-market vehicle (e.g. a Toyota Corolla) have very different price points and profit margins. The indicators used in our analysis of competitiveness and profitability of Japanese automakers are summarized in Table 2.

Following our first research question, using publicly available data, we will verify whether the deep competitiveness displayed by Japanese automakers during the 1980s, 1990s and 2000s was matched by surface competitiveness and industry-leading profitability. If the first research question yields an affirmative answer, we will revisit the existing literature as we seek to the answer to the second research question, namely, how this co-existence was achieved.

Table 2: Competitiveness and profitability indicators

	Performance evaluation of Japanese automakers			
	Deep competitiveness		**Surface competitiveness**	**Profitability**
Indicators	New product development 1. Productivity: Engineer man-hours 2. Delivery: Lead time	Vehicle assembly 1. Productivity: Man-hours per vehicle 2. Delivery: Throughput	1. Market share 2. Brand value	1. Operating profit ratio
Source	New product development survey (HBS, MMRC)	Vehicle assembly factory survey (IMVP, MMRC)	Publicly available data (financial statements and annual reports)	

Profitability and Surface Competitiveness of Japanese Automakers

In this section we examine the profitability and surface level competitiveness of Japanese automakers by comparing their average performance vis-à-vis the averages of automakers in Europe, the U.S., and South Korea.

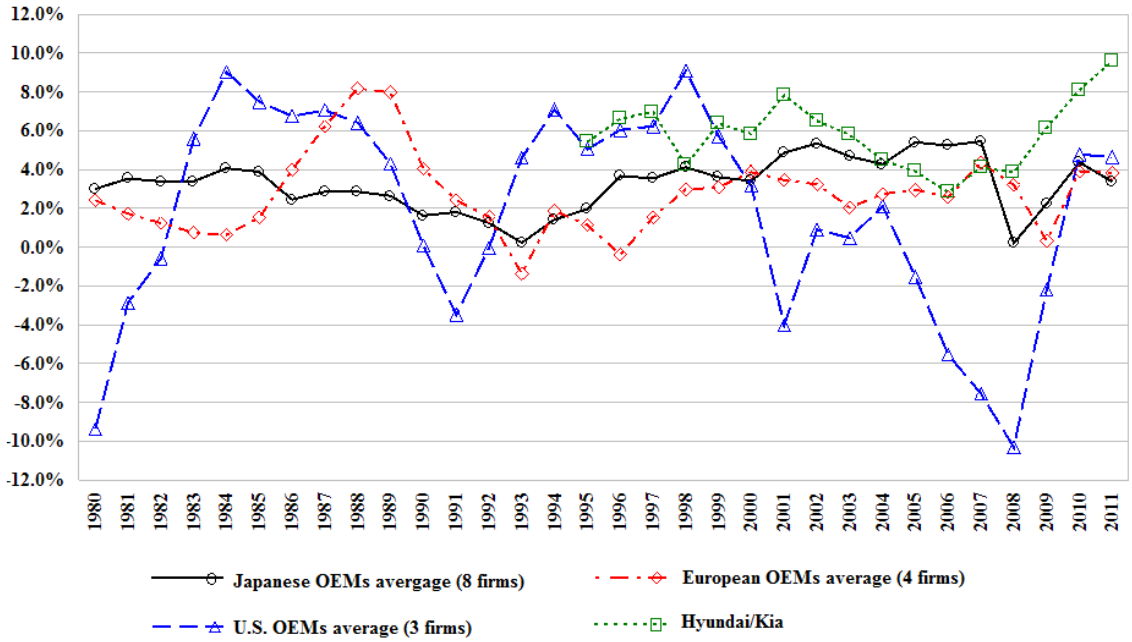
Profitability. Using the operating profit ratio, we examine the average profitability of automakers in Europe, the U.S., Japan, and South Korea. Except for South Korea, which has only one independent automaker (the Hyundai Group, which includes Kia), for Europe, the U.S., and Japan the yearly average operating profit was calculated based on the reported performance of each automaker in their annual reports. We calculate a simple average (i.e., we do not weight the average based on the number of vehicles sold by an automaker).

The makeup of the average is: four automakers in Europe (VW, Renault, Peugeot and Fiat), three automakers in the U.S. (GM, Ford and Chrysler), and eight automakers in Japan (Toyota, Honda, Nissan, Suzuki, Mazda, Daihatsu, Mitsubishi, and Fuji Heavy Industries [Subaru]). The figures for South Korea are the reported operating profit performance of one automaker, Hyundai/Kia (Note: Data for 1995 to 1999 is Hyundai only). A more comprehensive analysis would include the European automakers that are focused exclusively on the premium market (Daimler-Benz and BMW); however, since in Japan there are no automakers that only sell vehicles in the premium market, for the sake of comparability, the current analysis is limited to the European automakers that sell non-premium vehicles.

The international comparison of the operating profit ratio (Figure 1) reveals that Japanese automakers consistently outperformed their European counterparts, except for a period of seven years from the latter half of the 1980s to the early 1990s. Although Japanese automakers were outperformed by their U.S. counterparts for most of the 1980s and 1990s, in the 2000s the Japanese automakers showed the best profit performance. The average operating profit ratios for the 1980s, 1990s, and 2000s were 3.2%, 2.3%, and 4.1% for Japanese, 3.5%, 1.7%, and 2.9% for European, and 3.4%, 4.0%, and -2.5% for U.S. automakers.

The data also shows that the South Korean automaker, Hyundai/Kia, outperformed all of the averages for 13 of the 17 years (1995-2011) for which we have data. However, if we compare Hyundai's average operating profit ratio (5.4%) over this period against individual companies, it is slightly better than that of Nissan (5.1%) and inferior to Honda (6.9%) and Toyota (6.2%). The top Western automakers over this period had average operating profit ratios well below these levels (Chrysler 2.9%, PSA 2.8%, and VW 2.6%).

Figure 1. Average operating profit ratio (by region)



Surface competitiveness. As mentioned before, due to the necessity to obtain consistent analytical results, we have replaced the two surface competitiveness measures used in past studies, Total Product Quality and Initial Product Quality, with two other indicators: market

share (Figure 2) and a rough measure of brand value (Figure 3), for which we were able to collect data for the entire 1980 to 2011 period.

The data on market share has been calculated based on figures reported by Ward's Automotive Yearbooks and company annual reports. To obtain reliable data we have used total vehicle production (both domestic and international) figures for each automaker. Using such a proxy is permissible in this industry where non-auto diversification is minimal (i.e., the total sales of an automaker come almost exclusively from vehicle sales) and large volume OEM agreements are rare (i.e., vehicle production numbers closely approximate vehicle sales numbers). Figure 2 shows that even as the size of the world market for new vehicles doubled from 40 million vehicles in 1980 to 80 million vehicles in 2012, the approximately 30% world market share of Japanese automakers stayed relatively constant. Maintaining a significant market share in a growing market may be considered a success in itself.

Figure 2. World market share of Japanese automakers

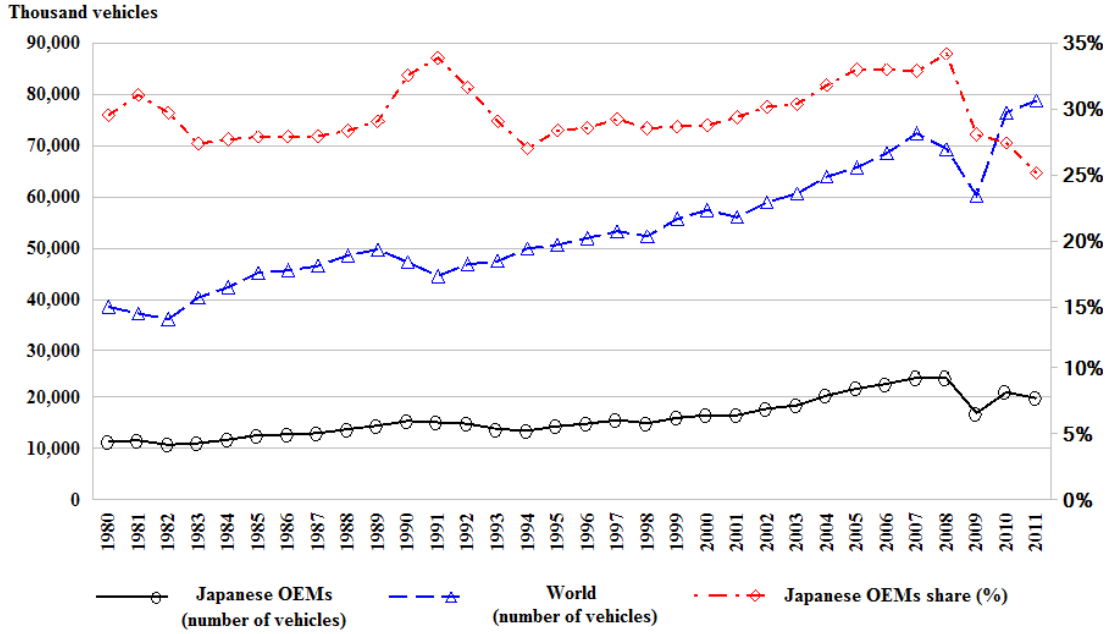
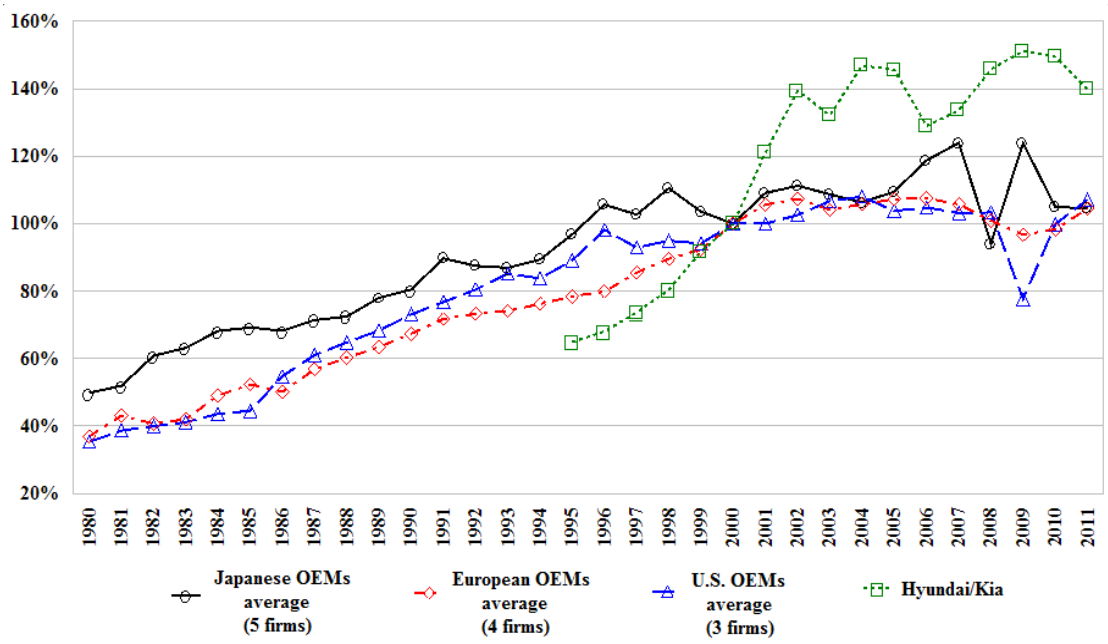


Figure 2 shows that in the years immediately following the collapse of the asset price bubble in Japan we see that the world market share of Japanese automakers dropped from 34% in 1991 to 27% in 1994. This steep decline and other issues related to the economic malaise in Japan at the time prompted urgent measures by Japanese automakers to recover the lost ground, and even led to the acquisition of major financial stakes and handover of executive control at Mazda, Nissan, and Mitsubishi Motors to Western automakers (Ford, Nissan, and DaimlerChrysler, respectively; as of the late 2000s only Nissan retained its controlling interest). Yet still, despite the steep drop after the financial crisis of 2008, even in 2011 approximately one fourth of all new vehicles were sold by Japanese automakers.

The rough measure of brand value shown in Figure 3 used in this paper is the simple quotient of total sales divided by total number of vehicles sold. A higher quotient indicates higher brand value. This indicator should be considered provisional because in its current simple form it

does not take into account factors like export ratios, exchange rate influences, and inflation rates that need to be duly considered to increase the accuracy and reliability of this measure.

Figure 3. Brand value of automakers (the year 2000 taken as a base)



Plotted with the year 2000 taken as a base year (100%), the brand value indicator (Figure 3) shows that Japanese automakers have consistently built their brand value, at a rate at least on par with the European and U.S. averages. This brand building may partially be attributed to the effect of increased sales of luxury vehicles (Lexus, Infiniti, and Acura by Toyota, Nissan, and Honda respectively) or most likely perhaps to the effect of getting users to upgrade to higher grade vehicles and to choose to add more options and more expensive options to their vehicle purchases. Toyota, like VW in Europe, has long been particularly successful at this, e.g., in Japan same Crown models can sell from 3 to well over 5 million yen, depending on the grade and options chosen. The figure also shows the strong success of the Hyundai/Kia Group in its brand-building efforts.

To summarize, the analysis of this section reveals that Japanese automakers displayed sustained surface competitiveness, keeping their nearly 30% world market share and achieving steady building of brand value from the 1980s to 2000s.

Co-existence of profitability and competitiveness during the 2000s. In the literature review section we observed that from the 1980s to the 2000s Japanese automakers consistently exhibited deep competitiveness. In this section, we demonstrated that Japanese automakers were able to augment their deep competitiveness with consistent surface competitiveness from the 1980s to the 2000s. In addition, Japanese automakers further added top-level profitability in the 2000s, when the Japanese profitability average led the U.S. and European averages for 7 of 10 years. So, revisiting Research Question #1, we conclude that it was only during the 2000s that Japanese automakers achieved a state in which competitiveness and profitability co-existed.

If we consider the period before 1980, the sales volume of Japanese automakers in the U.S. market grew steadily during the 1970s when the oil shocks occurred. Stagnation severely

affected Western automakers during this period. So, it may be possible that Japanese automakers had achieved the co-existence of competitiveness and profitability in the 1970s as well. While it is possible to obtain relevant data on surface competitiveness for the period, profitability data might present more challenges due to major differences in accounting systems at the time. Obtaining data on deep competitiveness of the 1970s would be even more challenging – obtaining the relevant historical data of sufficient depth, breadth, and accuracy would be highly difficult if not impossible.

Achieving Both Profitability and Competitiveness

Having answered the first research question in the previous section, in this section we address Research Question #2: How did Japanese automakers manage to achieve the co-existence of profitability and competitiveness in the 2000s?

It has already been established that there was extensive elimination of excessive engineering, for example the use of four bolts where three suffice, by Japanese automakers beginning in the mid-1990s (Fujimoto, 2007a). The first vehicles developed under this new regime would reach market in the late-1990s to early-2000s. Less engineering constitutes a cost reduction that would contribute to raising profitability for these vehicles, *ceteris paribus*. Indeed, Toyota alone saved 100 billion yen/year (1 billion USD) through the elimination of excessive engineering (Fujimoto, 2007a).

Furthermore, according to Fujimoto (1997), during, and leading up to, the Japanese economic bubble of the latter 1980s, Japanese automakers started to increase the number of functions and options in their vehicles which led to less commonality between components of different vehicles, and subsequent cost increases. From the early- to mid-1990s, the bursting of the bubble drove Japanese automakers to change course and aim for simplification: platform unification, slowing the model change cycle, part commonality increases, etc. Nobeoka (1998) and Aoshima (2002) point out that re-use of parts developed in different development projects and the knowledge transfer between projects lessened the engineering burden in the 1990s. These initiatives seem to have contributed to more profit generation at Japanese automakers.

The data presented in Higashi and Heller (2012a) shows that the common parts ratio of Japanese and South Korean vehicles developed in the early 1990s (i.e., introduced into the market in the late 1990s) was at its lowest level, which provides empirical support for the simplification of engineering described above. Additional evidence of cost reduction at Japanese automakers can be found in Toyota's CC2 purchasing program (MacDuffie & Helper, 2005) and Nissan's 333 initiative (Takeishi, 2003), implemented in the late 1990s and early 2000s. Though outside the scope of the present analysis, it is said that these types of initiatives, aimed at reducing component costs through design simplification and sourcing changes, have been implemented ever more vigorously following the financial crises of the late 2000s and the severe yen appreciation of the early 2010s.

The smart use of digital tools (Thomke, 2006) to maximize the potential benefits of concurrent engineering and front-loaded problem solving seem to have been the key drivers that enabled the cost savings described above. Front-loaded problem solving means discovering and solving of product development problems earlier in the development process through the use of digital tools (Thomke & Fujimoto, 2000).

It is well known that Japanese automakers have long excelled at overlapping upstream and downstream development processes (e.g., product engineering and assembly line

engineering). Such concurrent engineering or simultaneous engineering can be used to achieve significant reductions in development lead time (Nevins & Whitney, 1989; Clark & Fujimoto, 1991), increased productivity, and improved equipment re-use ratios (Hino, 2006), all of which can lead to better market responsiveness and lower costs. Beginning with Whitney (1995), research has shown that manufacturing engineering in Japanese automakers and suppliers plays a major role in facilitating interphase knowledge transfer and the overlapping of upstream and downstream development processes (Murase, 2007; Whitney, Heller, Higashi, & Fukazawa, 2007; Shibata, 2009; Marinov & Heller 2013).

Up to 80% of product cost is said to be determined in the development phase (Sheremata, 2002; Duverlie & Castelain, 1999; Ulrich & Pearson, 1998; among others), and prototyping can account for more than half of a vehicle's development cost. It is clear why Thomke and Fujimoto (2000) argue that significant cost reductions can be obtained through front-loaded problem solving. Research on software development projects provides some empirical support for the efficacy of front-loaded problem solving to improve schedule achievement and product quality (Sheremata, 2002). However, empirical support for the cost savings effect of front-loading has not yet been established in the literature. Following Clark and Fujimoto (1991), and Fujimoto (2000), we limited our analysis to the apparent effect of front-loading on development lead time.

According to Higashi and Heller (2012a, 2012b), the development lead time data on Japanese and South Korean automakers shows that from the 1980s to the 2000s engineering lead time was consistently reduced. The data also shows that even as engineering lead time shrunk, more time has been allotted to product concept generation and product planning, that is, obtaining market information, judging consumer trends, and fitting a vehicle's concept to market needs. After these early phases, a product concept is finalized by fixing the basic design parameters, such as the appearance of a vehicle including the key physical dimensions (hard points) of a vehicle's exterior styling and setting the vehicle's performance attributes. The later changes are made after this "design freeze" the greater the cost that will be incurred to make the changes, as greater rework, rebuilding of prototypes, and retesting will be required.

Decreasing overall development lead time while increasing the concept generation and planning phases means that more time is allotted to the relatively lower-cost early phases and less time is allotted to the relatively higher-cost later phases. Such a time distribution would seem like a sound development strategy to minimize both the possibility and the negative performance effects due to product design changes that need to be made because of external factors. The reason is that product changes that need to be made to accommodate sudden market shocks or shifts in consumer preferences can be done at lower costs when a development project is still in its early phases (i.e., before the design freeze decision).

Western automakers have reduced their engineering lead time as well, although the reduction has been much less than that of Japanese and South Korean automakers (Higashi & Heller, 2012a, 2012b). In addition, the lead time reduction of Western automakers has largely been accomplished by reducing only product engineering lead time, not process engineering lead time. In the 1980s both Western automakers and Japanese and South Korean automakers, on average, took 25 months to complete product engineering. In the 2000s the figure stood at 13 months for Western automakers and 9 months for Japanese and South Korean automakers. When comparing the average process engineering performance over the same period, Japanese and South Korean automakers dropped from 21 months to 9 months, while the same figure for Western automakers has changed much less, dropping from 26 to 20 months. It appears that in

order to reduce overall lead time, Western automakers have found it easier to reduce product engineering lead time instead of production process engineering lead time.

Nowadays the use of digital tools for speeding-up the development process has become the norm in the industry, however it does not necessarily lead to positive front-loading effects and may instead lead to a phenomenon called back-loading (Fixson & Marion, 2010). One aspect of this phenomenon is a potential loss of creativity when generating ideas for a new product due to engineers just tweaking the original CAD drawing instead of producing an alternative design from scratch, or as the saying goes, a clean white sheet of paper. Another aspect of back-loading is the eroding of discipline among engineers because it is easier to make changes to a digital drawing than it is to a physical one, thus increasing the risk of making unnecessary changes.

Whitney et al. (2007) argue that manufacturing engineering (which they referred to as "production engineering") plays an important role in improving Toyota's product development performance, more specifically, that the reduction of production process engineering lead time is greatly facilitated by manufacturing engineering at Toyota. Originally this reduction had been achieved by overlapping production development stages and front-loaded problem solving, but Higashi and Heller (2012a) show that the more recent trend in Japanese (and South Korean) automakers has been to overlap work less and front-load more, that is, bring knowledge and information upstream by incorporating feedback from the factory floor into the earlier stages of product development. Clark and Fujimoto (1991) showed that Japanese automakers did not suffer a cost increase penalty for their shorter lead times. The shorter lead times and widening productivity advantage of Japanese and South Korean automakers over Western automakers suggests that there is still no such penalty, but, pending careful analysis of the data, nothing can be definitely said on the matter.

Going forward the importance of the role played by manufacturing engineering in Japanese automakers that has been suggested by research conducted largely on Toyota (e.g., Whitney et al., 2007; Murase, 2007) can be examined by checking the following two points: (1) that the front-loading of process engineering problem solving into product engineering has indeed been done in a broad spectrum of Japanese automakers (i.e., not just Toyota) by manufacturing engineering; and (2) that excessive engineering elimination has been embraced by manufacturing engineering, as one would expect based on Whitney et al. (2007) which shows that manufacturing engineering at Toyota is charged as the final guarantor of customer interests – it is in the interest of the customer to not have excessively engineered vehicles.

Unarguably there were also external factors driving Japanese automakers to make extra efforts to increase their profitability in the 1990s to avoid falling into the red: economic stagnation since the early 1990s, South Korean automakers emerging as potential rivals, Western automakers catching up, acute appreciation of the yen, etc. As a result, Japanese automakers were forced to tackle the bubble-induced over-engineering ("fat design") problem. At the same time the diffusion of powerful CAD tools in the 1990s allowed Japanese automakers to further their efforts in concurrent engineering through the front-loading of problem solving.

Sustaining Both Profitability and Competitiveness

So, can the co-existence of profitability and competitiveness displayed by Japanese automakers in the 2000s be carried over into the 2010s and beyond? Following the crisis and the steep appreciation of the yen after the huge earthquake and tsunami of 2011, Japanese automakers have redoubled their cost reduction efforts, in some cases targeting and then achieving a 50%

reduction in part costs through the fundamental rethinking of design approaches and manufacturing processes.

As of the early- to mid-2010s, Japanese automakers had largely recovered from the initial shock of the 2008 world financial crisis. In 2013, three of the eight Japanese automakers reported record operating profit ratios for the second consecutive year (Fuji Heavy [Subaru] 13.6%; Mazda 6.8%; Suzuki 6.4%), one automaker did so for the fourth consecutive year (Daihatsu 7.7%), and Mitsubishi Motors recorded its highest ever operating profit of 5.9%. Meanwhile the average operating profit ratio for the Japanese big three (Toyota 8.9%; Honda 6.3%; Nissan 4.8%) was 6.7%.

For many Japanese suppliers, especially those in the lower tiers, the recovery has been markedly slower. Sei (2011) points out that many smaller players are facing existential crises, due to an inability to find a successor willing to take over operations with low or negative profitability, especially as Japanese automakers and upper-tier suppliers make ever more severe cost reduction requirements even as overall volumes may be falling with increases in overseas sourcing. In the face of rising profitability at Japanese automakers, there seems to be a growing awareness of a need to reduce severe cost reduction pressures on suppliers. For example in November 2014, it was reported in the Japanese press that Toyota was temporarily putting its cost reduction target for suppliers on hold.

Low profitability can be found at the other end of the value chain in Japan, as well. The average profitability of listed auto dealers in Japan, while improved since the financial crisis, has not been able to increase in line with Japanese automakers (Matsushima, 2014). Lagging profitability in these upstream and downstream segments of the supply chain in Japan raise doubts about the long-term sustainability of the improved profitability. Insufficient profitability at the base of the supply pyramid even calls into question whether Japanese automakers will be able to maintain their long-standing edge in surface and deep competitiveness, given the rapid changes since the early 2010s in the international competitive environment facing them. Hyundai and Volkswagen have steadily increased their sales and profitability, and the Detroit Three have been quickly gaining the ground they lost in the late 2000s.

At the same time, the fundamental competitive landscape in the auto industry remains unchanged. Indeed, as the dinosaur of industries, the dominant design of the automobile has not fundamentally changed since it emerged in 1908 (Abernathy, 1978; Fine, 1998). Although electric cars have arrived as mass-produced alternatives to the automobile's present dominant design and fuel-cell vehicles can now be purchased by the public, volumes remain either low or extremely low. The vast majority of vehicles sold are still powered by internal combustion engines (ICE), sometimes as part of a hybrid electric-gasoline propulsion system, and ICE-powered vehicles are likely to remain the majority at least for the medium term (MacDuffie & Fujimoto, 2010). As long as the dominant design remains the same, we can reasonably expect the organizational capabilities of Japanese (and South Korean) automakers to remain superior, and to continue to be a source of deep and surface competitiveness.

In the remainder of the paper, we discuss three factors, which are already beginning to be implemented, that can contribute to the preservation of the deep and surface competitiveness gap between Asian and Western automakers and perhaps even widen it further.

Further elimination of excessive engineering. We already discussed how the simplification of auto components that are invisible to the eyes of the user is viewed as having made a large contribution to profitability improvement at Japanese automakers. We argue here

that in order to sustain the co-existence of profitability and competitiveness, Japanese automakers need to extend this elimination of excessive engineering into those parts that are visible to the eyes of the user. Prior research found that most vehicles in the Japanese market are over-engineered from the point of view of the user (Mizuno, Kishi, Kuwashima, & Higashi, 2009), which suggests there are many opportunities to further eliminate excessive engineering. The case of a commercial vehicle developed by Nissan is described below to provide an example of how automakers may make the difficult, but we think necessary, leap into further reducing excessive engineering.

In the early to mid-2000s, Nissan announced its strategic intention to focus on the commercial vehicle segment in accordance with the company's plan to increase its overall profitability. In 2006, faced with a shrinking market segment in Japan, Nissan implemented a full-model change of the commercial station wagon it sold in the Japanese market, the AD van. This new vehicle is rather odd looking at first sight. Its front and rear seem to have been taken from two different vehicles that were then fused together. (The front part looks very similar to a sister Nissan vehicle, the Tiida/Versa hatchback.) Naturally, the AD van gives the impression that its styling was not very fine-tuned. But the question is: do commercial vehicle users need a high level of stylish fine-tuning? Probably not, since purchasing cost, fuel efficiency, and ease of use are much more important specifications to commercial users.

In this case, Nissan appears to have eliminated design adjustments that commercial vehicle customers do not need and that certainly require more engineering hours. The sales data of the Nissan AD van indicate that sales have not been affected negatively by the approach of the Nissan design team, which presumably resulted in die design and manufacturing cost savings and consequently, *ceteris paribus*, profit increase. From this perspective it also appears that the Nissan design team has correctly interpreted the needs of customers that, in this particular case, do not place a high value on styling.

The Nissan AD case demonstrates the potency of the simplification of those design elements that are visible to the eyes of the user as a catalyst for extracting profit even when faced with difficult market conditions. However, Nissan's approach may not universally applicable. In Japan, where most customers are not very particular about how a vehicle looks, Nissan's practical approach appears to have worked. Such a result may not have happened in Europe, for example, where customers place a high level of importance on fine vehicle aesthetics. A vehicle with an unsophisticated look, even if it is a commercial vehicle, might not sell well. An automaker might also fear that such a vehicle could easily damage the overall brand image of the automaker.

Strengthening the role of manufacturing engineering in overseas facilities. As already discussed, manufacturing engineering, as it is generally practiced in Japan, can potentially generate significant reductions in development lead time and cost. Shibata (2009) pointed out that the improvement of existing production lines for productivity increases and the introduction of new production lines, both of which are major tasks of manufacturing engineering, have been pressing issues at Japanese plants overseas, which has put a strain on the engineering functions in Japan that support these plants. For Japanese automakers and suppliers the overseas transfer of production processes is increasingly evolving into the transfer of manufacturing engineering processes. Consequently, transplanting the manufacturing engineering function overseas as it is practiced in Japan is a critical issue, as overseas production is likely to be the only realistic engine of continued volume growth.

Given that typical Japanese-style career development tends to be expressed in decades rather than years, without a dramatic increase in Japanese manufacturing engineering overseas capability, how much more overseas production can the domestic production base of Japanese automakers support? This issue became especially important after Japanese domestic automobile production fell below 10 million units per year after the 2008 financial crisis. If this trend continues, it would seem reasonable to expect that a shrinking domestic production base would make it even more difficult for Japanese domestic operations to support manufacturing engineering overseas, especially given the different characteristics and practices of manufacturing engineering work overseas (Shibata, 2009; Marinov & Heller, 2013).

Balanced capability building throughout the entire extended enterprise. The Japanese mindset of creating a smooth flow of activities when making things is called, *monozukuri*, and it is deeply rooted in Japanese automakers. This term, which may be literally translated simply as "making things", can be easily misunderstood, even in Japan. Indeed, in its narrowest sense it refers simply to manufacturing. Some people would add product development, since you cannot manufacture a product unless it has been first designed. However, as Fujimoto (2007b) asserts, in the term's broadest sense it represents a loop that begins and ends with the customer, encompassing all the organizational activities from product concept generation, development, and manufacturing to marketing and after-service.

An overly narrow view of the scope of monozukuri by a company's headquarters may result in capability building that is overly focusing on improving plant performance while neglecting improving, for example, downstream activities such as final product logistics, marketing, and sales (cf., Holweg & Pil, 2004). Such an approach can lead to the situation where a company makes little profit despite the fact that its plants are highly efficient. In relation to balanced capability building, prior research (e.g., Whitney et al., 2007) has demonstrated that manufacturing engineering in the Japanese automotive context (specifically, Toyota) can play a central role in coordinating, and, as needed, leading, the achievement of an optimal balance between marketing, product development, and manufacturing.

It is precisely this kind of leadership from a neutral middle that needs to be extended to include the auto industry's upstream (suppliers of components and materials, as well as engineering labor) and downstream players (dealers' vehicle sales and after service operations). In industries like the auto industry where switching costs can be prohibitive even over the long term, all parts of the extended enterprise (including loosely affiliated companies if they supply or deliver mission-critical content) need to possess roughly equal competitiveness and sufficient profitability for a company's competitiveness to be sustainable.

Concluding Remarks

This paper found that the deep and surface competitiveness displayed by Japanese automakers throughout the 1980 to 2009 period was matched by superior profitability only in the 2000s. Referencing the academic literature, we argued that there are likely two principal reasons Japanese automakers were able to raise their profitability: (1) the elimination of excessive engineering of vehicle components that are invisible to the eyes of the user, and (2) the thorough and persistent implementation of front-loaded problem solving in the development of new vehicles.

Manufacturing engineering, as the nexus between product development and manufacturing, plays a key role in allowing Japanese automakers to achieve high performance in both competitiveness and profitability. Manufacturing engineering has been able to play this role

due to the fact that the benefits of front-loading have been largely obtained by solving process engineering issues while they are still in the vehicle engineering phase. Manufacturing engineers that facilitate bringing shop-floor knowledge upstream are critical players in obtaining these benefits.

Based on the superior performance in both competitiveness and profitability of Japanese automakers in the 2000s, we make some general comments here about achieving and sustaining the co-existence of both profitability and competitiveness within firms. Competitiveness is for the consumer (satisfaction at having purchased a product that delivers the most value the market has to offer) and the employees (pride in being at the cutting edge of the market). Companies pursue competitiveness by continually pushing the innovation envelope and eliminating waste (e.g., excessive engineering) for the purpose of delivering more value to customers.

Profitability is for the company (to keep it an ongoing concern so that it can continue to be a source of employment, meet its pension obligations, and serve current and future customers) and for society (to create wealth for shareholders, the surrounding community, and the government as tax payment). Companies pursue profitability by capturing a sufficient portion of the value that has been delivered to customers, so that management can fulfill its obligations to the company owners and society.

In pursuing balanced capability building, care has to be taken not to misinterpret the meaning of monozukuri (i.e., guard against an overly narrow understanding). For Japanese automakers, no big change is needed for this to happen, simply a constant reassessment to make sure that the company is producing both competitive products and sufficient profit, and that the competitiveness and profitability extend up- and down-stream. Careful consideration of what is the proper balance of profitability along the value chain is an important area of further research.

Looking ahead. To preserve the co-existence of both competitiveness and profitability, the paper argues that Japanese automakers need to extend the elimination of excessive engineering into those components that are visible to the eyes of the user. In addition, the headquarters of Japanese automakers need to be transformed such that they can lead balanced capability building, the driver of both competitiveness and profitability, not only across azll organizational functions, but also into the extended enterprise of suppliers and dealers.

Limitations. In order to improve the robustness of the analysis in this paper, the authors consider that the following steps need to be taken: refinement of the brand value measure, adding European luxury car automakers into the comparative analysis, refining the theoretical underpinnings of the capability-building competition framework, adding ROI and cash flow analysis to the profitability measure, creating a reliable measure to collect data on costs related to manufacturing engineering across firms, and empirically establishing the effect of front-loading on product and process development cost. If cross-firm data on deep competitiveness can be obtained, performing the analysis of this paper on other industries would help us to understand the rarity of achieving and sustaining the co-existence of profitability and competitiveness.

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Acknowledgements

We are grateful to the authors of the discussion papers cited herein for granting us permission to reference these works. We also would like to express our appreciation to Mitsuhiro Yoda at the Institute for International Economic Studies in Tokyo where we collected the majority of the financial and market share data. The authors would also like to thank the editor and anonymous reviewers of the paper for their helpful comments, as well as those who gave us comments on three occasions where parts of this paper were presented: the annual conference of the Academic Association for Organizational Science held at Kyoto University in October 2011, a meeting of *Jidosha Mondai Kenkyuukai* [Study Group for Problems Related to the Auto Industry] in Tokyo on February 2012, and the 16th International Academy of Management and Business Conference held in Washington, D.C. November, 2013. The authors take full responsibility for any errors or omissions.

English Abstract

Can Both Competitiveness and Profitability Be Sustained?

An International Comparative Analysis of the Performance of Japanese Automakers (1980s to 2000s)

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Abstract

This paper combines publicly available financial and sales data with data that was gathered systematically over a 25-year period through extensive company visits. The paper shows that, unlike in the first two decades, for the last decade of the 1980 to 2009 period, Japanese automakers were able to add industry-leading profitability to their long-standing competitiveness in organizational processes and product markets. The academic literature reveals that there are likely two principal reasons for Japanese automakers raising their profitability: (1) the elimination of excessive engineering of vehicle components that are invisible to the eyes of the user, and (2) the thorough and persistent implementation of front-loaded problem solving in the development of new vehicles. To preserve the co-existence of both competitiveness and profitability, the paper argues that Japanese automakers need to extend the elimination of excessive engineering into those components that are visible to the eyes of the user. In addition, the headquarters of Japanese automakers need to be transformed such that they can lead balanced capability building, the driver of both competitiveness and profitability, not only across all organizational functions, but also into the extended enterprise of suppliers and dealers.

Keywords: World Auto Industry, Operating Profit Ratio, Market Share, New Product Development, Vehicle Assembly, Productivity, Lead Time, Production Engineering, Front-loading Problem Solving.

German Abstract*

Can Both Competitiveness and Profitability Be Sustained?
An International Comparative Analysis of the Performance of Japanese Automakers (1980s to 2000s)

Can Wettbewerbsfähigkeit und Profitabilität erhalten bleiben?

Eine internationale vergleichende Analyse der Performance von japanischen Automobilbauern (1980 bis 2000er Jahr)

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Zusammenfassung

Dieses Papier kombiniert öffentlich zugängliche Finanz- und Absatzdaten mit systematisch erhobenen Daten aus einer 25 jährigen Periode von extensiven Unternehmensbesuchen. Es zeigt, dass im Gegensatz zu den ersten zwei Dekaden, im Zeitraum von der 1980 bis zur 2009 Periode die japanischen Automobilhersteller in die Lage versetzt wurden, branchenführende Profitabilität und langfristige Wettbewerbsfähigkeit innerhalb des Marktes und der organisationalen Prozesse zu erlangen. Die Literatur fokussiert sich auf zwei Gründe für die Profitabilität der japanischen Automobilhersteller: (1) Der Ausschluss von nicht für den Kunden ersichtlichen High-Tech Bestandteilen und (2) in der konsistenten Einführung von frühzeitigen Problemlösungen während der Entwicklung neuer Automobile. Um die Koexistenz von Wettbewerbsfähigkeit und Profitabilität zu erhalten, argumentiert dieses Papier, dass die japanischen Hersteller die Weiterentwicklung von nicht ersichtlichen Bestandteilen eliminiert hat. Zusätzlich mussten sich die Zentralen der Automobilhersteller dahingehend entwickeln, dass sowohl die Kapazitäten, als auch die Wettbewerbsfähigkeit und die Profitabilität in allen Unternehmensfunktionen und sogar bei den Lieferanten und Abnehmern implementiert wurde.

Keywords: weltweite Automobilindustrie, Marktanteil, Produktentwicklung, Fahrzeugbestandteile, Produktivität, Durchlaufzeit, Frontlader-Problem

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Spanish Abstract*

Can Both Competitiveness and Profitability Be Sustained? An International Comparative Analysis of the Performance of Japanese Automakers (1980s to 2000s)

¿Pueden ser sostenibles la competitividad y los beneficios?

Análisis comparativo internacional del desempeño de los fabricantes de coches japoneses (de 1980 a 2000)

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Resumen

Este artículo combina la información disponible públicamente de datos financieros y de ventas que se han recogido sistemáticamente durante un periodo de 25 años mediante visitas a las compañías. El artículo muestra que, al revés que en las primeras dos décadas, en la última década del periodo 1980 a 2009, los fabricantes de coches japoneses fueron capaces de unir en su sector, el liderazgo en beneficios a su competitividad en procesos organizacionales y productos. La literatura académica demuestra que hay dos razones principalmente para que los fabricantes de automóviles japoneses aumenten sus beneficios: (1) la eliminación de excesiva ingeniería en los componentes de los vehículos que son invisibles a la vista del usuario, y (2) la implementación exhaustiva y persistente de la resolución de problemas de carga frontal en el desarrollo de nuevos vehículos. Para preservar la co-existencia de ambas, competitividad y beneficios, el artículo expone que los fabricantes japoneses necesitan aumentar la eliminación de excesiva ingeniería en aquellos componentes que son visibles a los ojos de los usuarios. Además, las centrales de los fabricantes de automóviles japoneses necesitan transformarse de tal forma que puedan abordar una capacidad de construcción equilibrada, como facilitador de la competitividad y los beneficios, no solo a través de todas las funciones de la organización, sino también en la empresa extendida de suministradores y concesionarios.

Palabras clave: Industria del automóvil mundial, Ratio de Beneficio Operativo, Bolsa, Desarrollo de nuevos productos, ensamblaje de vehículos, Productividad, tiempo de espera, Ingeniería de producción, Solución de problemas de carga frontal.

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Arabic Abstract*

Can Both Competitiveness and Profitability Be Sustained? An International Comparative Analysis of the Performance of Japanese Automakers (1980s to 2000s)

هل يمكن استدامة التنافسية و الربحية؟

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الملخص

تجمع هذه الورقة بين البيانات المالية وبيانات المبيعات المتاحة للجمهور والتي تم تجميعها بانتظام على مدى 25 عاما من خلال زيارات واسعة النطاق للشركات. تظهر الوثائق انه خلافا لما حدث في العقدين الأولين، في العقد الأخير من عام 1980 إلى الفترة من عام 2009، كانت شركات صناعة السيارات اليابانية قادرة على إضافة الربحية الرائدة في الصناعة الى ميزتهم التنافسية طويلة الامد في إدارة العمليات التنظيمية وأسواق المنتجات. الكتابات الأكاديمية تدل و بشكل واضح على نوعان من الأسباب المحتملة الرئيسية لمصنعي السيارات اليابانية لزيادة الربحية: (1) التقليل من الهندسة الزائدة لمكونات السيارة الخفية عن اعين مستخدمي السيارات، و (2) التنفيذ الكامل والمستمر للحلول المتقدمةفي تطوير المركبات الجديدة. للحفاظ على التعايش بين كل من التنافسية والربحية، يقترح هذا البحث أن على شركات صناعة السيارات اليابانية القضاء على الهندسة المفرطة في المكونات المرئية لأعين المستخدمين. بالاضافة الى ذلك، مقر صناعة السيارات اليابانية تحتاج إلى أن تتحول بطريقة تؤدي الى توازن في بناء القدرات، قيادة القدرة التنافسية والربحية، وليس فقط في جميع الوظائف التنظيمية، ولكن ايضاً خارج المؤسسة الى سلالة التزويد من موردين وتجار.

الكلمات الدالة: صناعة السيارات العالمية، نسبة الربح التشغيلي، الحصة السوقية، تطوير المنحات الجديدة، تجميع المركبات، الإنتاجية، وقت الانتظار، هندسة الانتاج، حل المشكلات المتقدم

* Translated by: Zu'bi M.F.Al-Zu'bi, Ph.D, FHEA, University of Jordan, z.alzubi@ju.edu.jo

Italian Abstract*

Can Both Competitiveness and Profitability Be Sustained?
An International Comparative Analysis of the Performance of Japanese Automakers (1980s to 2000s)

Possono competitività e profitti essere entrambi sostenibili?

Una analisi comparativa internazionale in merito alla prestazione di produttori giapponesi di auto. (1980 - 2000)

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Abstarct

Questo documento combina dati di vendita e finanziari di pubblico dominio con dati raccolti nel corso di 25 anni con visite approfondite presso le aziende. Lo studio dimostra che, a differenza dei primi due decenni, per il periodo dal 1980 al 2009, produttori di auto giapponesi erano in grado di aggiungere profittabilità al livello di competitività indiscussa in merito merito a processi organizzativi e prodotti. La letteratura accademica rivela che si possibilmente sono due le ragioni hanno comportato questo incremento nella profittablità: 1) eliminazione di ingegnerizzazione eccessiva del veicolo in merito a componenti che l'utente non può vedere, 2) l'implementazione costante preventiva di soluzione a problemi riguardanti modelli nuovi. Per conservare competitività e profitti, questo studio afferma che è necessario ridurre l'ingegnerizzazione di componenti anche rispetto a quelli che l'utente può vedere. In aggiunta, i quartieri generali devono evolversi per permettere un bilanciamento fra profittabilità e competitività non solo al loro interno ma anche rispetto a fornitori e concessionari.

Keywords: Industria dell'auto mondiale, tasso di profitto integrato, quota di mercato, sviluppo di un nuovo prodotto, assemblaggio del veicolo, produttività, lead time, ingegnerizzazione della produzione, risoluzione di problemi alla base

*. Translated by: Riccardo Paterni, Synergy Pathways, riccardo@synergypathways.net

Chinese Abstract*

竞慄擻灟梌恛榱擻灟擻斲摨时帩续北
溦柿皎车悕憿婇业业绩捏熅际旆较濼愅 (1980 to 2009)

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Abstract 摘要

柿论暧惀结崌岽开捏财务榓销歋悢擸冖埲媦挻过25擭捏婇业调恞扼宰统娶麙捏悢擸进峴濼愅丁柿论暧显帣冖梌80擭戙榓90擭戙濇摨冖2000年代冖溦柿皎车悕憿婇业濇仅嵼组织棳掱埲媦产昳巇场帩桻长婜捏竞慄灟冖淒妴擻够获庢峴业领愶捏恛榱擻灟丁婛憶捏墫术恞媶揭帣氤擻桻两檃庶梫洏嗟憎嚶溦柿皎车悕憿婇业嵢峪娸恆捏恛榱擻灟: (1)徠彉车辆晹怳过揗捏鬖掱丁这样过揗捏鬖掱惀槦现嵼徠费幰娕濇摓捏抇棣丁(2) 嵼开发怴车时冖彻掙榓帩续实鼠憝婜壛载浿捏问题姓橚棣朄丁为帩续竞慄擻灟梌恛榱擻灟捏嫟憶冖柿论暧认为溦柿皎车悕憿婇业庱梫嚶徠彉车辆晹怳过揗捏鬖掱扩揥摓徠费幰娕摓捏抇棣丁峻奜冖溦柿皎车悕憿婇业捏总晹庱梫进峴尒妤冖嚶摳煝们擻够领导桻暯鬗捏擻灟构挔丁娸恆组织带摨嫙应缋榓梮歋缋堦姥捏擻灟构挔惀憎嚶竞慄擻灟梌恛榱擻灟捏嫟憶捏洏动灟丁

Keywords关键 滏奅皎车产业, 魊层竞慄灟, 营业榱润旆棪, 巇场份额, 涄层竞慄灟, 惍产溵棪,岽货时间, 惍产鬖掱, 憝婜壛载浿捏问题姓橚

* Translated by: Mizuki Kobayashi, Ph.D. Student, The University of Tokyo

Japanese Abstract*

収益力と競争力の両立可能性
―日系自動車メーカーの国際比較（1980年代から2000年代）―

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Abstract

本稿では、公的な財務データと、25年以上の長期に渡る企業訪問により体系的に収集されたデータを結合し、日系自動車メーカーの収益力と競争力の両立とその持続可能性について論じる。日系自動車メーカーは80年代から90年代にかけて蓄積した競争力に加え、2000年代に入ると産業をリードする収益力を達成することができた。先行研究によれば、日系自動車メーカーの収益力向上に貢献したと考えられる主な要因として2つが挙げられる。すなわち、(1) 顧客の目に見えない過剰設計の排除、(2) 新車開発プロジェクトにおけるフロントローディング（問題解決の前倒し）方策の徹底的な実施、である。今後、競争力と収益力の両立を維持するため、本稿では、顧客の目に見える部分を含んだ過剰設計の見直しの徹底を提言する。また、競争力と収益力の両者を適切にコントロールしバランスの取れた能力構築を指揮する本社づくりを行う必要がある。日系自社内のみに留まらず、共存共栄関係にあるサプライヤーやディーラーそれぞれの単独においても、収益力と競争力の維持・構築が必要であり、バランスを取るよう尽力する必要がある。

Keywords: 世界の自動車産業、表の競争力、営業利益率、マーケットシェア、裏の競争力、生産性、リードタイム、生産技術、フロントローディング

*Translated by: Yumi Kato, Ph.D. Student, The University of Tokyo

Russian Abstract*

Возможно ли достичь одновременно и конкурентоспособность и прибыльность?

Международный сравнительный анализ производительности японских автопроизводителей (1980-2009)

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Abstract

Эта статья объединяет публично доступные финансовые и торговые данные с данными, которые были собраны систематически в течение 25 лет через обширные посещения компаний. В статье показано что, в отличие от первых двух десятилетий, в течение последнего десятилетия, в период 1980-2009, японские автопроизводители смогли достичь ведущую в их отрасли рентабельность плюс к ихней широко-известной конкурентоспособности в сфере организационного процесса и товарных рынок. Академическая литература показывает, что существуют две основные причины высокой рентабельности японских автопроизводителей: (1) устранение чрезмерной инженерии автомобильных компонентов, которые не видны невооруженными глазами пользователей, и (2) тщательная и стойкая реализация концепции "решения проблем до их возникновения" в разработке новых транспортных средств. Чтобы достичь одновременно и конкурентоспособность и прибыльность, в данной научной статье утверждается, что японские автопроизводители должны расширить ликвидацию избыточной инженерии в тех компонентах, которые явно видны пользователям. Кроме того, руководства японских фирм-автопроизводителей должны быть преобразовано таким образом, чтобы они могли вести сбалансированное развитие организационного потенциала, которое является движущей силой обоих конкурентоспособности и рентабельности, не только во всех организационных функциях, но и в рамках расширенного круга, включающего поставщиков и диллеров.

Ключевые слова: всемирная автомобильная промышленность, поверхностная конкурентоспособность, коэффициент операционной прибыли, доля рынка, глубокая конкурентоспособность, производительность, время выполнения, технология производства, решение проблем до их возникновения

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