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# Global performance strategies in leading Japanese automotive organisations

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**Abstract**. The purpose of this paper is to examine the correlation between the evaluation of performance strategies in leading automotive organisations located in Japan during four economically significant periods. Furthermore, the article aims to determine key performance factors that have had an influence on automotive organisations in the most recent and current period. The sample group includes 14 large and very large corporations. This paper draws on both theoretical and empirical research. A questionnaire was created as part of the research and was pre-tested in order to increase its internal validity. The actual survey was conducted through semi-structured interviews with managers at the

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top management level. To address the aim, non-parametric statistical methods have been used (Kruskal-Wallis test and Spearman correlation), mainly due to the relatively small testing sample of companies and the Shapiro-Wilk test failing at the five percent level of significance. Additionally, exploratory data analysis methods have been applied. Despite the noticeable deviation in the period of economic recession, the results indicate an increase in the significance of the individual factors in the periods in question. Another interesting finding is the growing power of factors oriented at innovation and the future environment. This means that, for the companies, measuring these factors will be crucial henceforth.

**Keywords:** performance management, strategy, automotive industry, Japan, environment, innovation

**JEL Classification:** C14, F64, L25, O31

## 1. INTRODUCTION

Effective performance and strategic management have been considered to be among the most significant aspects that affect companies' ability to grow. Performance management that uses information gained from various analyses for strategic decisions is an inevitable part of every decision-making process of managers nowadays, as confirmed in studies that have revealed a positive correlation between strategic thinking and corporate performance (Juma et al., 2016; Lončar, 2017; Olaniyi & Elumah, 2016).

So far, many scientists have tried to identify how to effectively measure performance using various financial and nonfinancial measures (or key performance indicators – KPIs) to gather complete information that qualifies for optimal managerial decision-making (Blahová et al., 2017; Franco-Santos et al., 2007, Marr, 2012; Neely et al., 2005). Some studies have determined performance by measurements focusing on financial and non-financial indicators, while others have emphasized particular measures like waste reduction, motivated employees, customer satisfaction, knowledge management, superior quality and operating efficiency on which a company should focus (Abernethy et al., 2004; Arai et al., 2013; Bencsik, 2021; Bouwens & Van Lent, 2007; Leachman et al, 2005; Nagar, 2002).

Performance in the automotive industry has been affected by many (sometimes radical) changes since the introduction of the very first modern car at the end of the nineteenth century. Nowadays, the industry has had to reconsider its entire thinking, "with the focus on the use rather than the production of vehicles, in order to make the lives of individual users more enjoyable, more efficient and safer" (PricewaterhouseCoopers, 2018, p. 3).

Since the 1960s, Japan has been one of the world's three largest car manufacturers, securing its position as a world leader in automotive production and technology (Neely, 2017). According to the OICA (2021) - the International Organization of Motor Vehicle Manufacturers, the top 3 car producing countries in the world in 2021 were China, the USA and Japan.

In 2021, China was the world's largest car manufacturer, producing more than 21.4 million passenger vehicles and 4.6 million commercial vehicles, for a total production of just over 26 million vehicles. Among the largest domestic automakers in China, known as the traditional "Big Four", were SAIC Motor, Dongfeng, FAW and Chang'an. In 2021, the United States was the world's second-largest automaker, although it produced less than half as many cars as China, with more than 1.5 million cars and 7.6 million commercial vehicles. The largest automakers in the United States, referred to as the "Big Three," were

General Motors, Ford Motor Company and Fiat Chrysler. In 2021, Japan was the world's third-largest automotive producer, which produced more than 7.85 million vehicles. The largest automakers in Japan included Toyota, Suzuki and Honda (OICA, 2021).

The Japanese automotive industry environment has proven attractive to many scientists as well as practitioners due to its prominent changes. During the economic boom in the 1970s and 1980s, the Japanese automotive industry significantly flourished, twice increasing production and becoming the world-leading producer of 11 million cars, 3 million more than its U.S competitors (Anderson, 1982). In 1980, Japanese automobile production accounted for 28 percent of the global market share. In addition, it accounted for one-quarter of the U.S. market (Lin, 1996), around one-quarter of the Benelux market, and one-third of the Scandinavian market (Dohse et al., 1985). According to a study by Lieberman et al. (1990) on the top management and labour productivity in three Japanese automobile companies between the early 1950s and 1987, there was a positive correlation between efficient labour management and increasing labour productivity.

In the early 2000s, performance management in Japanese automotive companies has increasingly focused on individual performance by using incentives like promotion, compensation and decreasing the dependency on seniority, which has caused a significant transformation from an institutionalized seniority system towards a performance orientation (Pudelko & Mendenhall, 2007). Japanese manufacturing companies have also increasingly concentrated on customer interaction, i.e., engaging customers in the quality improvement process (Phan et al., 2011). According to Nobeoka et al. (2002), the performance of Japanese automotive companies improves when strong ties are built with their customers and customer-oriented strategies are adopted.

Although a continuity in traditional Japanese processes and thinking is still preferred, some Western managerial ideas have already been incorporated in their decision-making. However, the perceived role of performance management in Japan has continued to focus on a sense of belonging rather than on competitiveness and pressure (Haghirian, 2010b).

With these challenges in mind, this paper aims to investigate how corporate strategies influencing performance management and their measurement have been changing, and which areas of performance were perceived as more important in the given periods by automotive corporations located in Japan. Moreover, the paper focuses on determining key performance factors that have recently been influencing automotive organisations. The results indicate a future change with regard to the growing importance of factors focused on innovations and the environment.

Our study addresses the following research questions. Is there a statistically significant increase in overall performance in Japanese automotive companies in the four economic periods? Is there a statistically significant increase in environmental and innovation factors on overall performance in Japanese automotive companies in the four economic periods?

This paper is set out as follows: Firstly, the literature review is performed, followed by the research objectives and methodology. Data collection and analysis are described in the subsequent section, followed by results that are discussed and elaborated upon in the follow-up section. Conclusions including limitations of this paper and future study directions are drawn in the last section.

## 2. LITERATURE REVIEW

Japan was the first country to challenge the United States on efficiency and performance (especially in internal processes and innovations), followed by Korea and China (Nohria, 2004). Until the end of the 1980s, the Japanese economy was seen as the most successful economic model in the world (Drucker, 1971; Hayes, 1981; Pudelko & Haak, 2005; Pudelko & Mendenhall, 2007). One major aspect influencing economic

success was the strong connection between government and economy. Stability was one of the main goals behind this cooperation, and it supported technological and innovation processes (Lukas & Saito, 2009).

The most significant aspects can be found in the field of manufacturing. After World War II, Japanese companies, reformed and funded by the United States during its occupation and reconstruction of Japan (Office of the Historian, 1945-52), developed into world leaders of effective and high-quality production processes (Haghirian, 2016), which were strongly supported by a strong work ethic and goal orientation as well as a love for learning and improving processes (Reischauer & Jansen, 2005). These cultural traits supported the development of unique and effective manufacturing processes during the post-war economic growth period. Japanese manufacturing or monotsukuri (the making of things) has become the centre of Japanese management processes and the backbone of Japanese economic development.

According to the empirical research conducted by Cusumano & Nobeoka (1992) that covered the great economic boom during the 1970s and '80s, Japanese manufacturing companies (especially in the automotive industry) demonstrated the highest levels of productivity (calculated in total sales growth) compared to its U.S. competitors, because they used particular structures and processes. The improvement in Japanese automotive companies' performance occurred due to the development of a customer-oriented approach that customized the products to meet the customers' needs. During this period, the growth trend in the Japanese automotive industry was also influenced by increased manufacturing efficiency as well as creativity in creating new products that improved the overall performance. Concepts and approaches like Just-in-time (JIT), kaizen, jidoka, andon and the 5S System started to play dominant roles in manufacturing philosophy and became globally known and respected.

The economic development in the Japanese automotive industry was (at that time) and still is driven by two main features - high quality and high productivity. Cusumano & Nobeoka (1992) confirmed the enormous efforts of Japanese companies when introducing new products, i.e., nine Japanese automotive companies involved in the study introduced 94 new products and achieved a 60 percent expansion rate between September 1981 and May 1988.

When comparing the Japanese automotive industry with the Canadian and the U.S. automotive industries between 1970 and 1980, Fuss and Waverman (1985) discovered that the total factor productivity (TFP) of the Japanese automotive industry grew faster than the TFP of the United States and Canada. The Japanese growth rate reached 4.3 percent per annum, compared with Canada's 1.4 percent and the United States' 1.6 percent. This result is compatible with findings of Clark and Fujimoto (1989), where the lead time of the Japanese companies' projects in the automotive industry was shorter in comparison to U.S projects by 17 months and European projects by 22 months.

The ability to adapt to a fast-changing environment and work on continuous innovations of products, services and processes, has influenced the overall performance of the majority of Japanese companies in the last several decades. Despite the problems that the Japanese economy has had to face in the early 2000s, it has still kept its strongest competitive advantages in car manufacturing, production of machinery and equipment, and the fabrication of radio, TV and communication equipment (Witt, 2006). Currently, Japan remains the world's third largest economy and a major exporter of capital (Silver, 2020).

This success of continuous improvement of Japanese automotive products suggests that the innovation in products has a positive correlation with the improvement in Japanese corporate performance in comparison to their competitors. The significant difference between Japanese automotive companies and their competitors stemmed from adopting a lean production system (Chen et al., 2015). This system qualified the Japanese companies to apply efficient processes to minimise costs, select the right products that create added-value, and adopt the lean system during the product value stream (McManus et al., 2007). Moreover, according to Vieira et al. (2012), the absenteeism rate is low in Japanese automotive companies in comparison to U.S. and European companies.

Japanese automotive companies have adopted systems that help them to improve their manufacturing performance, like total productive maintenance and total employee participation (Yamashina, 1995). For example, Denso Corporation, a global Japanese automotive components manufacturer, adopted these systems in the 1960s in order to enhance the company's manufacturing performance and to create an advantage over its competitors (Sharma & Shudhanshu, 2012).

In recent years, automotive-related manufacturing accounts for 89% of the country's largest manufacturing sector, the transport machinery industry. Automotive components and vehicles account for 18% of all manufacturing shipments in Japan (Neely, 2017).

In 2021, Toyota was the leading automaker in Japan, selling approximately 1.42 million vehicles. Despite a 2.1% decline from the previous year, Toyota reported more than double the number of units sold than the runner-up Suzuki that sold nearly 631,000 vehicles in 2021 (Gorka, 2022).

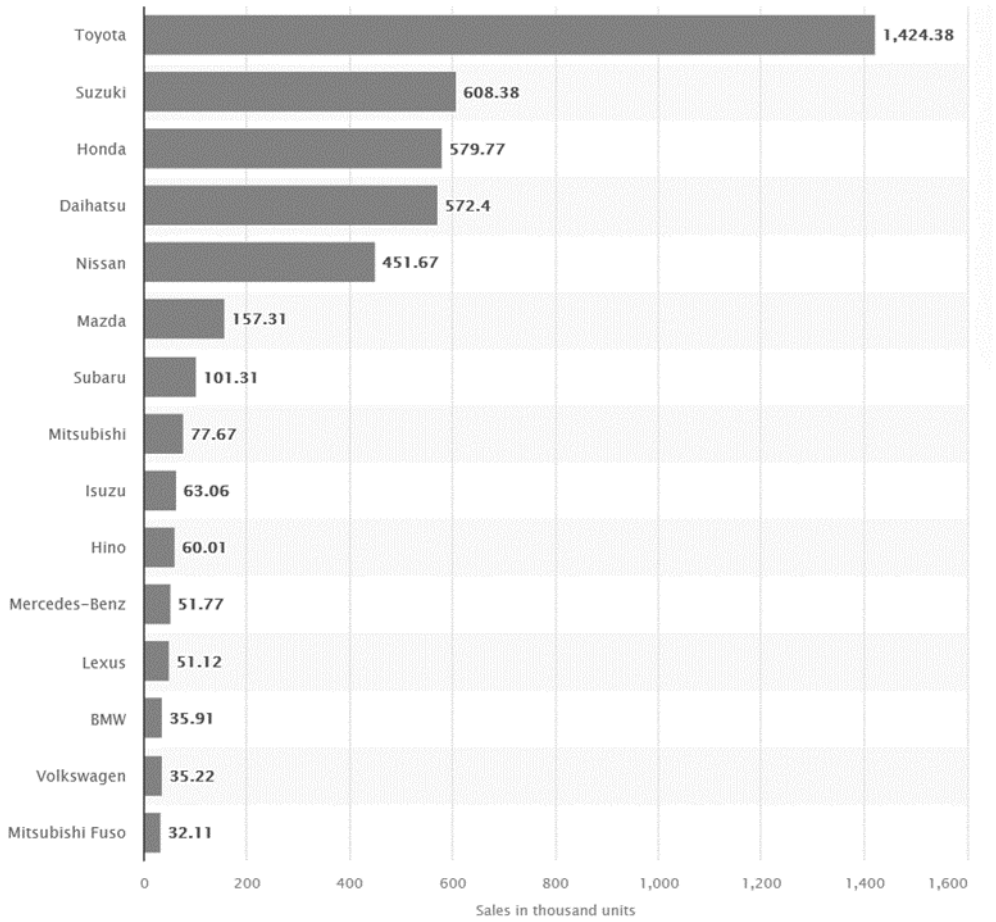


**Figure 1. Sales volume of leading car brands in Japan 2021.**
*Source*: Gorka (2022)

As the world has been changing quickly recently, Japanese automotive companies have had to adapt to these changes by focusing on significant progress with their enterprise performance management and measurement systems. Apart from a focus on traditional indicators in financial, customer, internal processes, innovation and employee perspectives, increasing efforts have been made from social and environmental perspectives (Blahová et al., 2015).

Among the first studies in which corporate social responsibility is positively correlated with financial performance is the one performed by Waddock and Graves (1997). They found out that corporate social responsibility has a positive correlation with the firm's prior financial performance and future financial responsibility. A survey conducted by KPMG (Kolk et al., 2005) that took into consideration 250 Japanese companies in various sectors including automotive, utilities, computers, and electronics, showed that Japanese automotive companies demonstrate the highest social responsibility performance due to their interests in different processes (including employees, customers, social and environmental concerns, etc.).

A study conducted by Cortez and Cudia (2010) found a relationship between the financial performance of Japanese automotive companies and their environmental performance having an impact on sales, net income and assets. Moreover, a positive correlation between environmental innovation and sales was uncovered, mainly in the growing tendency of customers to prefer eco-friendly products.

Currently, the automotive industry in Japan has 78 factories in 22 prefectures and employs more than 5.5 million people, making it a major contributor to the country's economy (Regan, 2020).

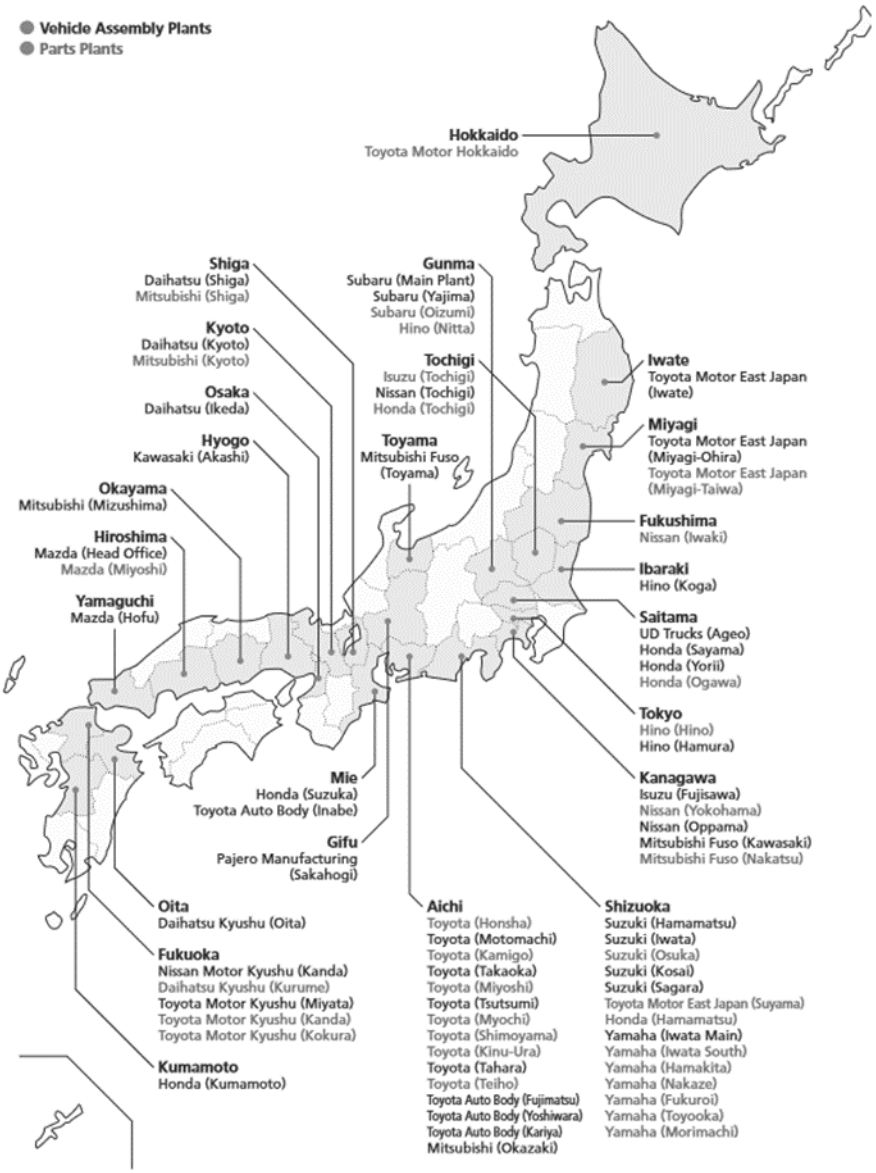


**Figure 2. Locations of auto manufacturing plants in Japan.**

*Source*: JAMA (2021)

Japanese automakers and automotive companies have continuously invested sizeable resources in alternative fuel technologies to reduce vehicle emissions (CO2, NOx) (Potter & Graham, 2018). Irrespective of the Volkswagen diesel scandal in 2015, automakers worldwide have been under great pressure to invest in alternative fuel vehicles (Lee, 2018). In this regard, Japanese automotive companies have adapted two levels of concern regarding reducing carbon emissions in manufacturing processes.

The first level takes into consideration a reduction of carbon emissions through creating eco-friendly products that work efficiently. Within the production process, toxic substances that may harm the environment are isolated. The second level deals with the manufacturing of a product with a low energy consumption that satisfies the consumers' wants and cares about the environment at the same time (Hopkins, 2012). According to Wokutch (2014), Japanese automotive companies are pioneers in the field of environmental protection by concentrating on fuel efficiency. Toyota and Honda are examples of companies producing low-polluting and fuel-efficient cars.

Another important aspect connected with the latest changes in Japanese companies deals with the relationship between Japanese automotive companies and their suppliers. This interconnection is based on the keiretsu system (alliance of different companies from various sectors), which gives Japanese companies the advantage of building a strong relationship with their suppliers and to help them to apply the lean production method and to control their supply efficiently. This is characterized by a long-term relationship, deep cooperation, and an exchange of personnel and technology (Ahmadjian & Lincoln, 2001). This specific buyer-supplier keiretsu relationship also survived Japan's economic recession, when a restructuring of relationships was anticipated (Kosaka et al., 2019).

This has been confirmed in a study by Al-Abdallah et al. (2014), which emphasizes that one of the main factors that improves the competitiveness of Japanese manufacturing companies is a strong relationship with suppliers. Moreover, it confirms an inflexibility towards changing partners. According to Kotabe et al. (2003), the strong external performance of Japanese automotive companies with their suppliers is due mainly to technology exchange, which has a powerful effect on establishing a long-term relationship between them. According to Tabeta (1998), this relationship helps to minimize costs for both groups.

In addition, the hierarchical keiretsu system helps car assemblers lower their transaction costs by concentrating on suppliers' production management processes and by improving their corporate images to be compatible with their suppliers (Dyer, 1996). According to McGuire & Dow (2005), among the significant benefits of the keiretsu system are a protection from market failure and a reduction of financial risks. Keiretsu networks provide protection to resist against crises because of pooling financial burdens and merging the goals of maximizing profits among the companies in the network (Lincoln & Gerlach, 2004).

## 3. RESEARCH OBJECTIVE, METHODOLOGY AND DATA

The main research objective was to examine the correlation between the evaluation of performance strategies in 14 leading Japanese automotive companies during four economically significant periods (period 1: Before 1990 – Economic Boom, period 2: 1991-2005 – Recession, period 3: 2006-2020 – Recovery, and period 4: 2021-2025 – Future Prospects).

These periods were selected with respect to the historical development in Japan following the end of the Second World War. Until the 1980s, the Japanese economy was regarded as one of the most successful economic models in the world, a fact confirmed by numerous scholars (Drucker, 1971; Hayes, 1981; Pudelko & Haak, 2005; Sakai, 1990). An extremely strong point during this era was the powerful link between the government and the economy, which strived to ensure stability and promote technological advances (including innovations).

However, after decades of strong economic growth, in the 1990s came a period of slowdown and recession (also known as the "Lost Decade"), which in turn affected the first years of the new millennium. Many works criticized (Haghirian, 2010a; Porter et al., 2000; Pudelko, 2009) the traditional Japanese style of management involving attributes such as lifetime employment, the seniority system and group-oriented decision-making. Yet, the main reason for this decline may have been the excessive increase of loans by the state-owned Bank of Japan.

Thanks to the efforts of the Japanese government led by Prime Minister Shinzo Abe between 2012 and 2020, which were mainly based on the Bank's aggressive fiscal policy, monetary loosening and structural reform, moderate growth was achieved during that period (Fukuda, 2015; Solis, M. & Urata, 2018). In spite of this fact, deviations occur even at the present time, for example with respect to the Fukushima disaster or the COVID-19 pandemic.

The initial phase of this study involved an intensive study of the theoretical basis in order to identify the most relevant studies that dealt with the performance of Japanese automobile companies, their use of different measures to assess company performance, and how this performance varied with different economic trends. The strategies that the companies followed during the period were also examined.

The research aimed at investigating the changes that have taken place in Japanese automotive companies in terms of management and performance measurement, as well as strategies and business practices in recent decades, in the context of the great economic boom in the 1970s and 1980s, the recession that followed in the 1990s and early 2000s, and the recovery in recent years. It also sought to identify current trends affecting Japanese businesses and their implications for the corporate world, as well as to identify perspectives that will have a significant impact on businesses in the future.

Depending on the previous literature search, a qualitative questionnaire was prepared. The first part of the questionnaire focused on corporate performance and its measurement, and the second part aimed at identifying strategies and business practices. This questionnaire served as the basis for interviews with 14 Japanese automotive companies.

The questionnaire focused on the area of measuring changes in the performance of the company, covering the performance of customers, employees, internal processes, external processes, innovation, finance, environmental and social responsibility, using a Likert scale, whereby respondents were asked to rate these changes over the period under study on a scale of 1 to 5, with "1" being very much and "5" not at all.

Furthermore, the overall business performance of the companies was assessed in percentages over the period under review. Subsequently, changes in the comparison of the overall business performance with that of competitors over the period under review were also assessed. Managers were asked to assess whether their business performance had improved, was similar to, or deteriorated compared to competitors in Japan and outside Japan.

This was followed by the identification of the most important performance indicators assessed by the companies, whereby respondents were asked to identify one or two performance indicators in each of the identified performance areas (customers, employees, internal processes, external processes, innovation, finance, environmental and social responsibility) in each of the periods studied.

Subsequently, the research focused on estimating the importance of the company's performance indicators in various areas focused on customers, employees, internal processes, external processes, innovation, finance, environmental and social responsibility. Using a Likert scale, managers were asked about these indicators on a scale of 1 to 5, with "1" very much and "5" not at all during the period under study.

The final section focused on the response of firms to trends in corporate performance indicators and whether managers used these trends to implement their strategies.

Due to the relatively small sample (14 companies) and the Shapiro-Wilk test failing at a five percent level of significance, non-parametric statistics methods have been applied to address the main objective. Specifically, they are the Kruskal-Wallis test and Spearman correlation. With the Kruskal-Wallis test, we demonstrate whether there are any statistically significant changes in the evaluation of performance during the given periods. The Spearman rank correlation lets us determine if there is a statistically significant dependence between a particular period and the evaluation.

In addition, exploratory data analysis methods have been applied, principally the graphical representation of individual answers to the following three research questions:

RQ1: Is there a statistically significant increase of overall performance in Japanese automotive companies in the four economic periods?

RQ2: Is there a statistically significant increase of an environmental factor on overall performance in Japanese automotive companies in the four economic periods?

RQ3: Is there a statistically significant increase of an innovation factor on overall performance in Japanese automotive companies in the four economic periods?

On the basis of these analyses, key factors for the measuring of performance in automotive companies were determined and subsequently subjected to a statistical analysis in order to determine the degree of dependence of the given factor on a particular period.

To achieve the research objectives, the method of questionnaire survey was applied, resulting therefore in a purely quantitative study using unique primary data. The research setting for this study was the Japanese automotive industry, particularly 14 large and very large corporations, with numbers of employees ranging from several hundred (260) to several hundred thousand (326,000). A survey conducted as part of this study showed that 57 percent of the companies involved in the study had more than 10,000 employees.

The companies that completed the questionnaire were engaged in the manufacturing of various components within the automotive industry, primarily in automotive electrical parts, precision mechanical and electronic components, industrial automation equipment manufacturing, car parts and sheet glass manufacturing, automotive development, energy and industrial systems, logistics consulting, electronics, etc.

The 8 (out of 14) companies that participated in the survey rank among the top 15 largest automotive manufacturers in Japan. The remaining companies rank among the less important car manufacturers but still significant for the research.

On a theoretical basis including an intensive study of relevant research papers focused on performance strategies in Japanese automotive companies, a survey questionnaire was developed and pre-tested with a Japanese manager of a selected automotive company. This increased the internal validity of the questionnaire and ratified its practical relevance.

The questionnaire survey was conducted between September and December 2019. The questionnaire was designed to explore how and to what extent Japanese automotive companies have changed in the field of performance strategies during the selected time periods and to reveal contemporary trends influencing them. The final questionnaire survey served as a basis for semi-structured interviews with managers at the top management level in 14 Japanese automotive companies. The reason for such a small number of respondents is the fact that the research focuses on a narrow sample group involving only large automotive companies in Japan. For this reason, it was hard to obtain a larger number of questionnaires. Interviews were used in preference to arms-length survey techniques, as executives considered their strategic decisions sensitive.

The questionnaire consisted of 15 questions, which were pre-coded in a standard way, the majority being selection on a scale of 1-5. The data were summarized and checked for extreme and missing values, and the analysis was conducted using the following questionnaire items: Innovations measurement (boom, recession, recovery, future), Environmental measurement (boom, recession, recovery, future), Overall

performance (boom, recession, recovery, future), Innovations importance (boom, recession, recovery, future) and Environmental importance (boom, recession, recovery, future).

The Wilk-Shapiro test was applied to check the items for normality. Because in their majority the answers are on the scale 1 – very important to 5 – not at all important (except overall performance), no indication of normal distribution was found in the data, and therefore non-parametric statistical methods were used to verify the hypotheses.

Thereafter, the main analysis of dependence was conducted, with only close-ended questions being analysed. To answer the research questions, the Kruskal-Wallis and Spearman correlation statistical tests were used. For all statistical calculations, we used statistical software R, version 3.6.1.

## 4. EMPIRICAL RESULTS AND DISCUSSION

This part describes the results of the statistical analysis. In Table 1, we can see the trend of the median value for the individual items, namely innovations measurement, environmental measurement, overall performance, innovations importance and environmental importance. The future prospects mostly have a falling tendency (apart from overall performance), indicating an increase in the importance of the individual factors in the given periods.

Table 1

Descriptive statistics of analysed data

| | n | mean | sd | median | mad | min | max | range | se |
|---|---|---|---|---|---|---|---|---|---|
| Innovations measurement (boom) | 14 | 2.71 | 1.27 | 3 | 1.48 | 1 | 5 | 4 | 0.34 |
| Innovations measurement (recession) | 14 | 2.07 | 0.83 | 2 | 1.48 | 1 | 3 | 2 | 0.22 |
| Innovations measurement (recovery) | 14 | 2.07 | 1.21 | 2 | 1.48 | 1 | 5 | 4 | 0.32 |
| Innovations measurement (future) | 14 | 1.79 | 1.25 | 1 | 0 | 1 | 5 | 4 | 0.33 |
| Environmental measurement (boom) | 14 | 3.21 | 0.97 | 3 | 1.48 | 2 | 5 | 3 | 0.26 |
| Environmental measurement (recession) | 14 | 2.79 | 0.7 | 3 | 0.74 | 2 | 4 | 2 | 0.19 |
| Environmental measurement (recovery) | 14 | 2 | 0.88 | 2 | 0.74 | 1 | 4 | 3 | 0.23 |
| Environmental measurement (future) | 14 | 1.79 | 1.25 | 1 | 0 | 1 | 5 | 4 | 0.33 |
| Overall performance (boom) | 13 | 77.92 | 12.12 | 80 | 14.83 | 60 | 100 | 40 | 3.36 |
| Overall performance (recession) | 13 | 66.15 | 10.44 | 65 | 7.41 | 50 | 85 | 35 | 2.9 |
| Overall performance (recovery) | 13 | 76.15 | 12.61 | 80 | 7.41 | 50 | 100 | 50 | 3.5 |
| Overall performance (future) | 13 | 84.38 | 10.99 | 85 | 7.41 | 70 | 100 | 30 | 3.05 |
| Innovations importance (boom) | 14 | 2.43 | 1.16 | 2.5 | 1.48 | 1 | 4 | 3 | 0.31 |
| Innovations importance (recession) | 14 | 2.14 | 0.95 | 2 | 1.48 | 1 | 4 | 3 | 0.25 |
| Innovations importance (recovery) | 14 | 2 | 1.24 | 2 | 1.48 | 1 | 5 | 4 | 0.33 |
| Innovations importance (future) | 14 | 2 | 1.41 | 1.5 | 0.74 | 1 | 5 | 4 | 0.38 |
| Environmental importance (boom) | 14 | 3.14 | 0.95 | 3 | 1.48 | 2 | 5 | 3 | 0.25 |
| Environmental importance (recession) | 14 | 2.79 | 1.05 | 3 | 0 | 1 | 5 | 4 | 0.28 |
| Environmental importance (recovery) | 14 | 2.14 | 1.03 | 2 | 1.48 | 1 | 4 | 3 | 0.27 |
| Environmental importance (boom) | 14 | 1.79 | 1.05 | 1.5 | 0.74 | 1 | 4 | 3 | 0.28 |

*Source:* Authors' processing from software R.
(n – total number in sample, sd – standard deviation, mad – median absolute deviation, se – standard error)

Moreover, the trend of the median value and mean values of overall performance shows a deviation in the growth during recession. Worth noting are the zero values in the MAD statistic concerning the measuring of innovation and environmental factors with regard to the future prospects. They suggest that the companies intend to measure these indicators.

Within the exploratory data analysis, individual answers to the relevant research questions are illustrated in the following diagrams. Figure 3, showing the overall performance of the automotive companies in the

individual periods, displays a growing tendency of the median value. Also note the recession values, which demonstrate a fall in performance, and the extreme values concerning recovery, which may indicate that some companies could experience difficulties in the recovery period. All companies expect higher values in the future, possibly implying positive thinking.

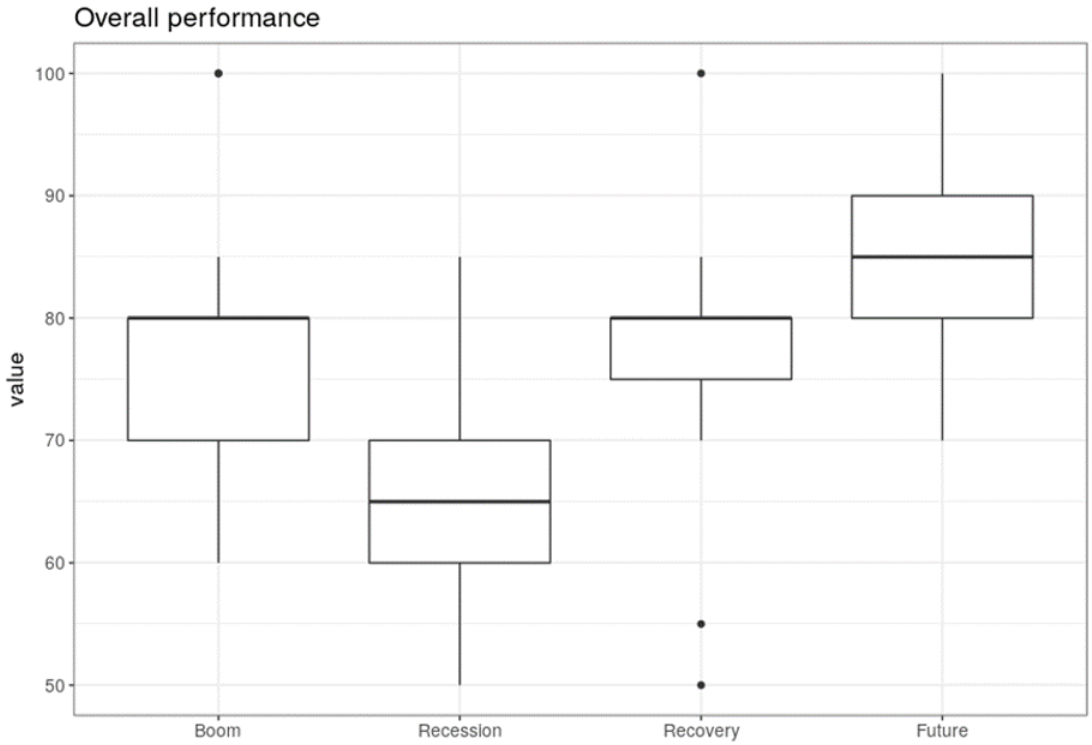


**Figure 3. Boxplot of the overall performance value trend in the individual periods.**
*Source*: Authors' processing from software R.

To confirm the research question, the Kruskal-Wallis test was applied with the median congruence of H(3) = 13.668, p-value = 0.003394. Since the p-value is lower than 0.05, we have sufficient proof to reject H0. Consequently, we shall assume that there is a statistically significant difference between the time periods and the value.

The Spearman correlation has been calculated to prove the statistical dependence of the performance value and the individual periods S = 16495, p-value = 0.03321 with rho coefficient = 0.2958. Because there is sufficient proof for the rejection of a null hypothesis concerning the rho coefficient equal to 0, we shall further assume that the rho statistically differs from 0. The 0.2958 value indicates weak dependence.

Figure 4 illustrates the environmental performance of automotive companies during the specific periods. Note the falling tendency of the median value. To confirm the research question, the Kruskal-Wallis test was applied with the median congruence of H(3) = 17.748, p-value = 0.0004958. Since the p-value is lower than 0.05, we have sufficient proof to reject the H0. Consequently, we shall assume that there is a statistically significant difference between the time periods and the value.

The Spearman correlation has been calculated to prove the statistic dependence of the performance value and the individual periods S = 45556, p-value = 0 with rho coefficient = -0.5569. Because there is sufficient proof for the rejection of a null hypothesis concerning the rho coefficient equal to 0, we shall further assume that the rho statistically differs from 0. The -0.5569 value indicates a moderate negative dependence.

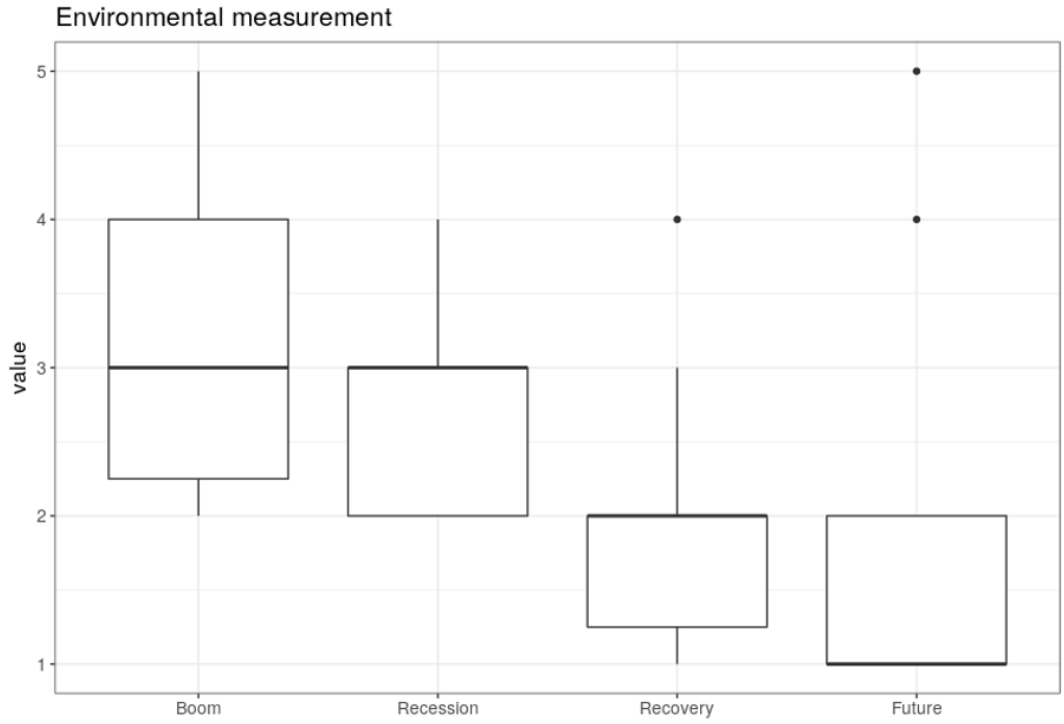


**Figure 4. Boxplot of the environmental performance value trend in the individual periods.**
*Source*: Authors' processing from software R.

Figure 5 illustrates the importance of the environmental performance of automotive companies during the periods in question. Note the falling tendency of the median value. To confirm the research question, the Kruskal-Wallis test was applied with the median congruence of H(3) = 13.292, p-value = 0.004046. Since the p-value is lower than 0.05, we have sufficient proof to reject the H0. Consequently, we shall assume that there is a statistically significant difference between the time periods and the value.

The Spearman correlation has been calculated to prove the statistic dependence of the performance value and the individual periods S = 43527, p-value = 0.000138 with rho coefficient = -0.4876. Because we have sufficient proof for the rejection of a null hypothesis concerning the rho coefficient equal to 0, we shall further assume that the rho statistically differs from 0. The -0.4876 value indicates a moderate negative dependence.

Figure 6 illustrates the innovation performance of automotive companies during the given periods. The diagram shows a falling tendency, which indicates that the companies have an interest in measuring the innovation factor. The extremely low variability concerning future prospects indicates that measuring the innovation performance will be crucial for the companies.

To confirm the research question, the Kruskal-Wallis test was applied with the median congruence of H(3) = 5.6801, p-value = 0.1283. Since the p-value is higher than 0.05, we do not have sufficient proof to reject the H0. We shall further assume that there is no statistically significant difference between the time periods and the value.

Figure 7 illustrates the importance of innovation performance of automotive companies in the individual periods. The diagram shows a moderately falling tendency, which indicates that the companies express an interest in the importance of innovation performance. The median value of the individual periods is quite similar, indicating that there will be no change during the stipulated periods.

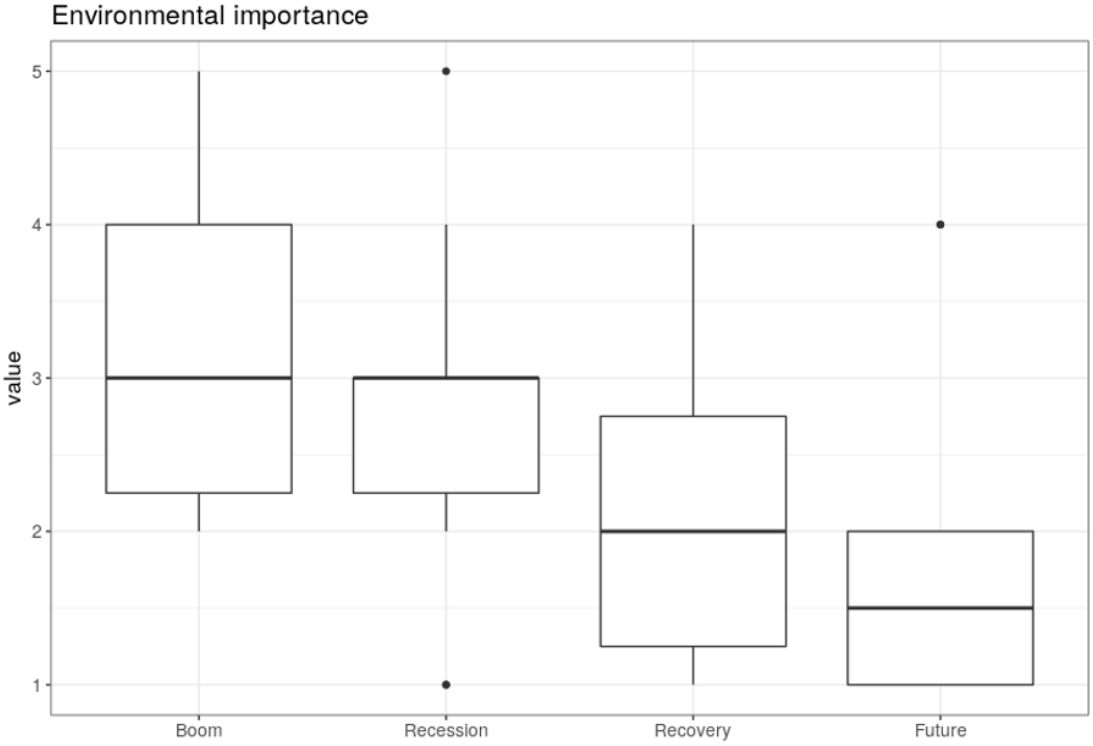


**Figure 5. Boxplot of the importance of the environmental performance value in the individual periods.**

*Source*: Authors' processing from software R.

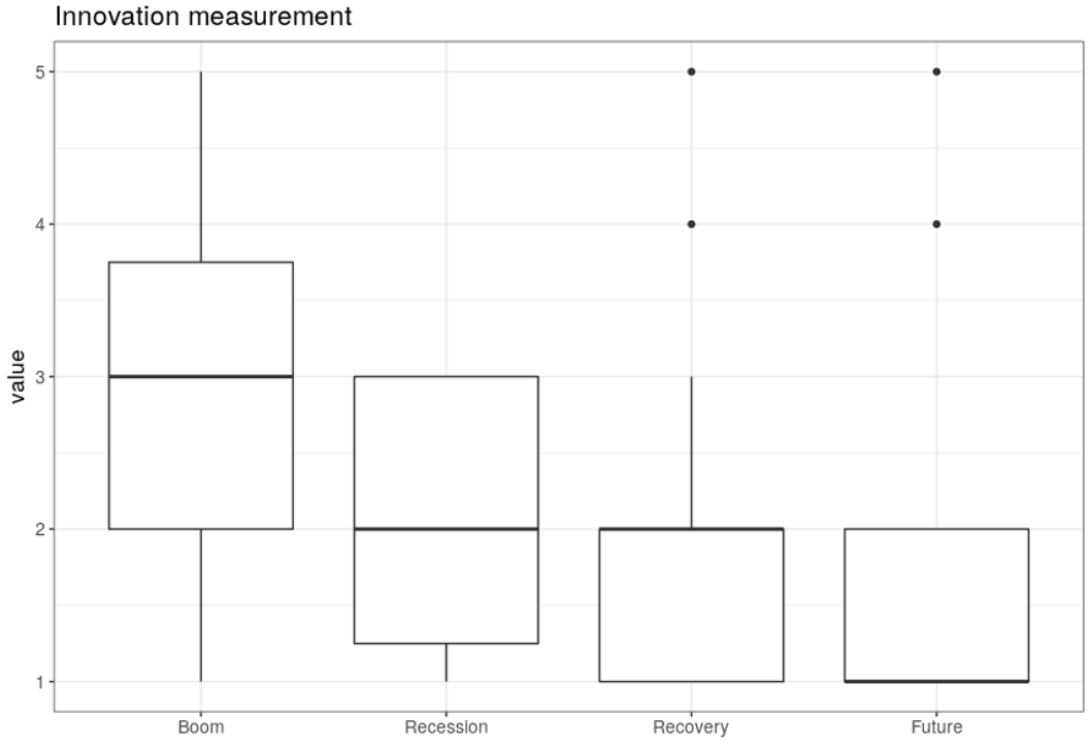


**Figure 6. Boxplot of the innovation factor measuring trend in the individual periods.**

*Source*: Authors' processing from software R.

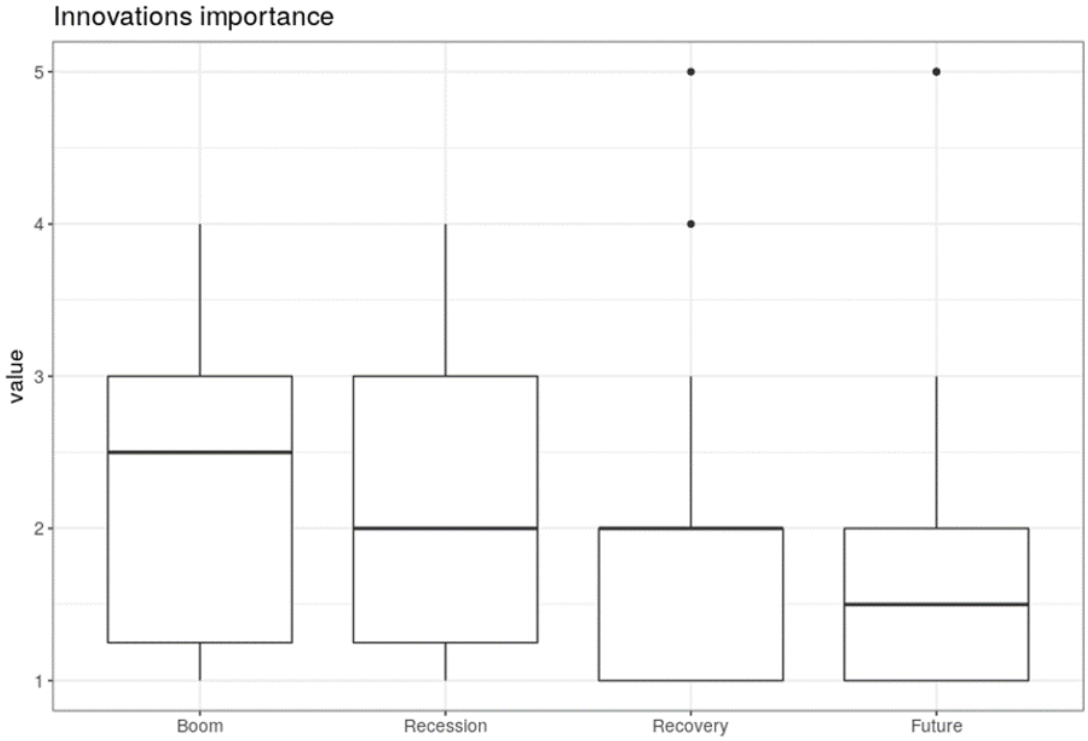


**Figure 7. Boxplot of the importance of the innovation performance trend in the individual periods.**

*Source*: Authors' processing from software R.

To confirm the research question, the Kruskal-Wallis test was applied with the median congruence of H(3) = 2.2701, p-value = 0.5183. Because the p-value is higher than 0.05, we do not have sufficient proof to reject the H0.

## 5. CONCLUSION

Today, new ways of creating value and improving business performance are being uncovered. Performance assessment, together with strategic thinking, has had to adapt to extensive globalisation effects, which have had enormous effects on corporations worldwide. Various attributes (related to, e.g., environmental and social areas) have had to be incorporated into strategic decisions to ensure long-term sustainability. Strategic thinking has been undeniably affecting corporate performance management and measurement in corporations worldwide for decades and more.

The research objective was to examine strategies focused on the performance of 14 leading Japanese automotive organisations over four specific time periods. These were selected with respect to the historical development of the country following the end of the Second World War, when over a relatively short period of time, the country, devastated by war, rose from the ashes to become the second largest economy in the world after the United States and the third largest economy after the United States and China post 2010.

Over six decades of economic development, Japan faced a number of natural as well as economic disasters, from the period of rapid economic growth (the "Japanese Economic Miracle") in the 1970s and 1980s, to the recession in the 1990s (the "Lost Decade"), to the period of recovery and moderate revival of the economy after 2000.

When Shinzo Abe became the Prime Minister in 2012, he introduced new economic policies known as "Abenomics," the main objectives of which were to stimulate the growth of the Japanese economy and to reduce public debt, which was 240 percent of GDP at the time. Although this policy had some positive effects on economic growth, public debt was reduced slowly, and the government was not able to achieve its long-term inflation target of 2 percent (Fukuda, 2015; Solis, M. & Urata, 2018).

The current albeit moderate growth has also been negatively affected by the COVID-19 pandemic that started at the end of 2019 in the city of Wuhan, Hubei Province, central China and gradually spread around the world. Furthermore, a sharp year-on-year decline in GDP and domestic demand caused by a state of emergency and a weakening of export markets occurred. Moreover, domestic demand was affected by the restrictive measures at the beginning of the year 2022, weak external demand and a sharp rise in energy, materials and commodity prices in the context of COVID-19 and the Russian-Ukrainian war (OECD, 2022).

The research focused on the Japanese automotive industry, one of the largest and most important industries in the world. Currently, Japan ranks third in the global market of automotive production, after China and the United States (Wagner, 2020). For the purpose of this study, 14 leading Japanese automotive organisations were approached, with the aim of examining the correlations between the evaluation of performance strategies in various fields. The companies participating in the survey were among the most important ones within the automotive sector, with their focus ranging from automotive electrical parts to industrial automation manufacturing and energy and industrial systems.

The goal was to discover which fields were important for the companies in question with regard to specific periods of time (period 1: Before 1990 – Economic Boom, period 2: 1991-2005 – Recession, period 3: 2006-2020 – Recovery, and period 4: 2021-2025 – Future Prospects), which fields were not of great interest, and what changes occurred during the aforementioned periods. The interim goal was to identify the current trends in these fields and the factors that will play a crucial role in the immediate future.

Both theoretical and empirical approaches were employed in the research. The first stage dealt with an intensive study of relevant publications focused on performance strategies in Japanese automotive companies, resulting in the creation of a questionnaire which was pre-tested in order to increase its internal validity. The survey itself focused on measuring changes in company performance and covered areas such as customer performance, employee performance, internal processes performance, external processes performance, innovation performance, finance performance, environmental and social responsibility performance. The actual survey was conducted at the end of 2019, involving managers at the top management level from 14 companies.

In the context of this qualitative data collection, the sample contained a small number of respondents, also with regard to the depth of research into the subject through personal interviews. Although the data collection was time consuming, it included a group of the most important representatives of the industry, namely 8 companies belonging to the top 15 largest automotive manufacturers in Japan.

Subsequently, the data was statistically processed using non-parametric statistic methods, namely the Kruskal-Wallis test and Spearman correlation, supplemented by an explorative data analysis. On the basis of these analyses, key factors for the measuring of performance in automotive companies were determined, with the factors being subjected to a statistical analysis in order to determine the degree of correlation of the given factor on a particular period.

The research results have confirmed the assumptions obtained from the intensive study performed during the first stage of the research, namely a growing importance of factors focused on innovations and the environment. This direction is also confirmed by the research reported in the literature review. Despite the deviation in the period of economic recession (1991-2005), an increase in the importance of the individual factors during the periods in question has been confirmed.

This study has limitations that could be addressed in further studies. One of the principal limitations is the relatively small number of companies involved in the study, caused by the narrow research group concerning only large automotive companies in Japan. The small sample size may also have affected the reliability of the survey results due to higher variability and hence bias. Further research might consider including more companies in the sample, whether from the automotive sector or beyond.

A future study direction worth considering would be a study focused on the automotive industries in China and in the United States as the current most important car manufacturers in the world, comparing the findings with this paper.

## REFERENCES


Abernethy, M. A., Bouwens, J., & Van Lent, L. (2004). Determinants of control system design in divisionalized firms. *The Accounting Review*, *79*(3), 545-570. https://www.jstor.org/stable/3203269

Ahmadjian, C. L., & Lincoln, J. R. (2001). Keiretsu, governance, and learning: Case studies in change from the Japanese automotive industry. *Organization Science*, *12*(6), 683-701. https://doi.org/10.1287/orsc.12.6.683.10086

Al-Abdallah, G. M., Abdallah, A. B., & Hamdan, K. B. (2014). The impact of supplier relationship management on competitive performance of manufacturing firms. *International Journal of Business and Management*, *9*(2), 192-202. https://doi.org/ 10.5539/ijbm.v9n2p192

Anderson, M. L. (1982). Structural changes in the world auto companies: The emerging Japanese role. *SAE Transactions*, *91*, 1802-1813. https://doi.org/10.4271/820444

Arai, K., Kitada, H., & Oura, K. (2013). Using profit information for production management: Evidence from Japanese factories. *Journal of Accounting & Organizational Change*, *9*(4), 408-426. https://doi.org/10.1108/JAOC-07-2010-0020

Bencsik, A. (2021). The sixth generation of knowledge management – the headway of artificial intelligence. *Journal of International Studies*, *14*(2), 84-101. https://doi.org/10.14254/2071-8330.2021/14-2/6

Blahová, M., Haghirian, P., & Pálka, P. (2015). Major factors affecting contemporary Japanese business environment. *International Journal of Productivity and Performance Management*, *64*(3), 416-433. https://doi.org/ 10.1108/IJPPM-09-2014-0138

Blahová, M., Pálka, P., & Haghirian, P. (2017). Remastering contemporary enterprise performance management systems. *Measuring Business Excellence*, *21*(3), 250-260. https:/doi.org/ 10.1108/mbe-12-2016-0060

Bouwens, J., & Van Lent, L. (2007). Assessing the performance of business unit managers. *Journal of Accounting Research*, *45*(4), 667-697. https://doi.org/10.1111/j.1475-679X.2007.00251.x

Chen, C. M., Delmas, M. A., & Lieberman, M. B. (2015). Production frontier methodologies and efficiency as a performance measure in strategic management research. *Strategic Management Journal*, *36*, 19-36. https://doi.org/10.1002/smj.2199

Cortez, M. A. A., & Cudia, C. P. (2010). The impact of environmental innovations on financial performance: The case of Japanese automotive and electronics companies. *Journal of International Business Research*, *9*(Special Issue 1), 33-46.

Cusumano, M. A., & Nobeoka, K. (1992). Strategy, structure and performance in product development: Observations from the auto industry. *Research Policy*, *21*(3), 265-293. https://doi.org/10.1016/0048-7333(92)90020-5

Dohse, K., Jürgens, U., & Nialsch, T. (1985). From" fordism" to" toyotism"? The social organization of the labor process in the Japanese automobile industry. *Politics & Society*, *14*(2), 115-146. https://doi.org/10.1177/003232928501400201

Drucker, P. F. (1971). What we can learn from Japanese management. *Harvard Business Review*, *49*, 110-122.

Dyer, J. H. (1996). Does governance matter? Keiretsu alliances and asset specificity as sources of Japanese competitive advantage. *Organization Science*, *7*(6), 649-666. https://doi.org/10.1287/orsc.7.6.649

Franco-Santos, M., Kennerley, M., Micheli, P., Martinez, V., Mason, S., Marr, B., Gray, D., & Neely, A. (2007). Towards a definition of a business performance measurement system. *International Journal of Operations & Production Management*, *27*(8), 784-801. https://doi.org/10.1108/01443570710763778

Fukuda, S. (2015). Abenomics: Why was it so successful in changing market expectations? *Journal of the Japanese and International Economies*, *37*(C), 1-20. https://doi.org/10.1016/j.jjie.2015.05.006

Fuss, M. A., & Waverman, L. (1985). *Productivity growth in the automobile industry, 1970-1980: A comparison of Canada, Japan and the United States*. https://www.nber.org/papers/w1735.pdf

Gorka, D. (2022). *Sales volume of leading car brands in Japan 2021*. https://www.statista.com/statistics/348427/car-sales-in-japan-by-brand/

Haghirian, P. (2010a). *Innovation and Change in Japanese Management*. Hampshire: Palgrave Macmillan.

Haghirian, P. (2010b). *Understanding Japanese management practices*. New York: Business Expert Press.

Haghirian, P. (2016). Japanese Management in the Twentieth Century. In P. Haghirian (Ed.), *Routledge Handbook of Japanese Business and Management* (pp. 21-31). Abingdon: Routledge.

Hayes, R. H. (1981). Why Japanese factories work. *Harvard Business Review*, *59*, 56-66.

Hopkins, M. (2012). *Corporate Social Responsibility and International Development*: *Is business the solution?* Abingdon: Routledge.

Japan Automobile Manufacturers Association, Inc.-JAMA (2021). *The motor industry of Japan 2021*.https://www.jama.or.jp/english/publications/MIoJ2021_e.pdf

Juma, G. A., Minja, D., & Mageto, J. (2016). The impact of strategic thinking on organisational performance: A case study of Uchumi supermarket limited. *International Journal of Supply Chain Management*, *1*(1), 75-94.

Kolk, A., van der Veen, M., Pinkse, J., & Fortanier, F. (2005). *KPMG international survey of corporate responsibility reporting 2005*. http://www.theiafm.org/publications/243_International_Survey_Corporate_Responsibility_2005.pdf

Kosaka, G., Nakagawa, K., Manabe, S., & Kobayashi, M. (2019). The vertical keiretsu advantage in the era of westernization in the Japanese automobile industry: Investigation from transaction cost economics and a resource-based view. *Asian Business & Management*, *19*(2), 36-61. https://doi.org/0.1057/s41291-019-00074-2

Kotabe, M., Martin, X., & Domoto, H. (2003). Gaining from vertical partnerships: Knowledge transfer, relationship duration, and supplier performance improvement in the US and Japanese automotive industries. *Strategic Management Journal*, *24*(4), 293-316. https://doi.org/10.1002/smj.297

Leachman, C., Pegels, C. C., & Kyoon Shin, S. (2005). Manufacturing performance: Evaluation and determinants. *International Journal of Operations & Production Management*, *25*(9), 851-874. https://doi.org/10.1108/01443570510613938

Lee, Ch. T., Lim, J. S., Fan, Y. V., Liu, X., Fujiwara, T., & Klemeš, J. J. (2018). Enabling low-carbon emissions for sustainable development in Asia and beyond. *Journal of Cleaner Production*, *176*, 726-735. https://doi.org/10.1016/j.jclepro.2017.12.110

Lieberman, M. B., Lau, L. J., & Williams, M. D. (1990). Firm-level productivity and management influence: A comparison of US and Japanese automobile producers. *Management Science*, *36*(10), 1193-1215. https://doi.org/10.1287/mnsc.36.10.1193

Lin, C. (1996). *The Japanese automotive industry: Recent developments and future competitive outlook*. https://deepblue.lib.umich.edu/bitstream/handle/2027.42/1064/87139.0001.001.pdf?sequence=2

Lincoln, J. R., & Gerlach, M. L. (2004). *Japan's Network Economy: Structure, Persistence, and Change*. Cambridge: Cambridge University Press.

Lončar, M. (2017). The impact of strategic management and strategic thinking approaches on business performance of companies operating in the retail industry. *European Project Management Journal*, *7*(1), 85-98.

Lukas, M., & Saito, M. (2009). Structural and Economic Changes. In P. Haghirian (Ed.), *J-Management: Fresh Perspectives on the Japanese Firm in the 21st Century* (pp. 45-72). Bloomington, IN: iUniverse.

Marr, B. (2012). *Key performance indicators (KPI): The 75 measures every manager needs to know*. Harlow: Financial Times/Prentice Hall.

McGuire, J., & Dow, S. (2005). Keiretsu Organization in a Changing Economic Context: The Evolution of Debt and Equity Ties Among Keiretsu Firms. In T. Roehl & A. Bird (Eds.), *Japanese Firms in Transition: Responding to the Globalization Challenge* (pp. 115-138). Oxford: Elsevier.

McManus, H., Haggerty, A., & Murman, E. (2007). Lean engineering: A framework for doing the right job right. *The Aeronautical Journal*, *111*(1116), 105-114. https://doi.org/ 10.1017/S0001924000001809

Nagar, V. (2002). Delegation and incentive compensation. *The Accounting Review*, *77*(2), 379-395.

Neely, A., Gregory, M., & Platts, K. (2005). Performance measurement system design – A literature review and research agenda. *International Journal of Operations & Production Management*, *25*(12), 1228-1263. https://doi.org/10.1108/01443570510633639

Neely, C. (2017). *The Japanese automotive industry*. https://www.japanindustrynews.com/2016/03/japanese-automotive-industry/

Nobeoka, K., Dyer, J. H., & Madhok, A. (2002). The influence of customer scope on supplier learning and performance in the Japanese automobile industry. *Journal of International Business Studies*, *33*(4), 717-736. https://doi.org/10.1057/palgrave.jibs.8491041

Nohria, N. (2004). *What the world can learn from Asia*. https://www.forbes.com/sites/iese/2014/01/28/what-the-world-can-learn-from-asia/#544b5a171a5a

OECD. (2022). *Japan Economic Snapshot. Economic Forecast Summary (June 2022)*. https://www.oecd.org/economy/japan-economic-snapshot/

Office of the Historian. (1945-52). *Occupation and reconstruction of Japan*. https://history.state.gov/milestones/1945-1952/japanreconstruction#:~:text=After%20the%20defeat%20of%20Japan,%2C%20economic%2C%20and%20social%20reforms

OICA (2021). *Top 10 car producing countries in the world*. https://worldpopulationreview.com/country-rankings/car-production-by-country

Olaniyi M. I., & Elumah, L. O. (2016). Strategic thinking and organization performance: Study of Nigeria firms. *Journal of Business Administration Research*, *5*(1), 23-27. https://doi.org/10.5430/jbar.v5n1p23

Phan, A. C., Abdallah, A. B., & Matsui, Y. (2011). Quality management practices and competitive performance: Empirical evidence from Japanese manufacturing companies. *International Journal of Production Economics*, *133*(2), 518-529. https://doi.org/10.1016/j.ijpe.2011.01.024

Porter, M. E., Takeuchi, H., & Sakakibara, M. (2000). *Can Japan Compete?* New York: Basic Books.

Potter, A., & Graham, S. (2018). Supplier involvement in eco-innovation: The co-development of electric, hybrid and fuel cell technologies within the Japanese automotive industry. *Journal of Cleaner Production*, *210*, 1216-1228. https://doi.org/10.1016/j.jclepro.2018.10.336

PricewaterhouseCoopers. (2018). *Five trends transforming the automotive industry*. https://www.pwc.at/de/publikationen/branchen-und-wirtschaftsstudien/eascy-five-trends-transforming-the-automotive-industry_2018.pdf

Pudelko, M., & Haak, R. (2005). *Japanese Management. The Search for a New Balance Between Continuity and Change*. Hampshire: Palgrave Macmillan.

Pudelko, M., & Mendenhall, M. E. (2007). The Japanese management metamorphosis: What Western executives need to know about current Japanese management practices. *Organizational Dynamics*, *36*(3), 274-287. https://doi.org/10.1016/j.orgdyn.2007.04.006

Pudelko, M. (2009). The end of Japanese-style management? *Long Range Planning*, *42*(4), 439-462. https://doi.org/10.1016/j.lrp.2009.04.001

Regan, E. (2020). *The Japanese Automotive Market: Driving Strong Demand in 2021 and Beyond*. https://tokyoesque.com/japanese-automotive-market/

Reischauer, E. O., & Jansen, M. B. (2005). *The Japanese Today: Change and Continuity*. Cambridge, MA: Belknap Press.

Sakai, K. (1990). The feudal world of Japanese manufacturing. *Harvard Business Review*, *68*(6), 38-49.

Sharma, A. K., & Shudhanshu, A. B. (2012). Manufacturing performance and evolution of TPM. *International Journal of Engineering Science and Technology*, *4*(3), 854-866.

Silver, C. (2020). *The top 20 economies in the world*. https://www.investopedia.com/insights/worlds-top-economies/

Solis, M., & Urata, S. (2018). Abenomics and Japan's trade policy in a new era. *Asian Economic Policy Review*, *13*(1), 106-123. https://doi.org/10.1111/aepr.12205

Tabeta, N. (1998). The Kigyo keiretsu organization and opportunism in the Japanese automobile manufacturing industry. *Asia Pacific Journal of Management*, 15(1), 1-18. https://doi.org/10.1023/A:1015428707475

Vieira, L., Balbinotti, G., Varasquin, A., & Gontijo, L. (2012). Ergonomics and kaizen as strategies for competitiveness: A theoretical and practical in an automotive industry. *Work*, *41*, 1756-1762. https://doi.org/ 10.3233/WOR-2012-0381-1756

Waddock, S. A., & Graves, S. B. (1997). The corporate social performance – financial performance link. *Strategic Management Journal*, *18*(4), 303-319.

Wagner, I. (2020). *Automotive industry in Japan – statistics & facts*. https://www.statista.com/topics/3764/automotive-industry-in-japan/

Witt, M. A. (2006). *Changing Japanese Capitalism: Societal Coordination and Institutional Adjustment*. Cambridge: Cambridge University Press.

Wokutch, R. E. (2014). Corporate social responsibility: Japanese style revisited. *Journal of Corporate Citizenship*, *56*, 11-30. https://doi.org/10.9774/GLEAF.4700.2014.de.00004

Yamashina, H. (1995). Japanese manufacturing strategy and the role of total productive maintenance. *Journal of Quality in Maintenance Engineering*, *1*(1), 27-38. https://doi.org/10.1108/13552519510083129