

Evaluation on the Impact of Quality Dimensions for Social Perception

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ABSTRACT

This study investigates the effect of element for the quality management system (QMS), especially the impact of corporate social responsibility (CSR) in terms of Garvin's quality dimensions. A quantitative survey approach was applied; results were analyzed using exploratory factor analysis and confirmatory factor analysis. Both analyses were conducted in Japan and France, using sample sizes $n = 264$ for Japan and $n = 286$ for France. Structural equation modeling was used to examine the relationships among the various components of the conceptual model, including five different dimensions: serviceability, CSR, ownership cost, customer satisfaction, and customer loyalty. The results of the structural model support four of the five hypotheses and reveal that serviceability factors play an important role in improving customer loyalty. This study empirically tests the conceptual model and discusses the managerial implications.

Keywords: Serviceability; Ownership cost; CSR; Customer satisfaction; Customer loyalty.

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1. INTRODUCTION

The quality management system (QMS) is intended to be integrative element which brings together aspects of the company, the core business domain and customer satisfaction, integrating people, processes, regulatory requirements, technology, risks and opportunities, with the main purpose of delivering the best practice (Seljan, 2018). Japanese quality management has been globally recognized for its efforts to improve the quality of products, particularly for its success in increasing efficiency and reducing costs (Ishikawa, 1985; Akiba *et al.*, 1992). For this purpose, it is useful to consider various quality dimensions, such as the eight proposed by Garvin (1987): performance, feature, conformance to standard, aesthetics, perceived quality, reliability, durability, and serviceability. In recent years, many scholars (Hazen *et al.*, 2016; Yogi, 2016) have continued to examine Garvin's quality of dimensions throughout various fields to understand and meet customer demands for product

quality and to bridge the gap between changing consumer demands. On the other hand, corporate social responsibility (CSR) is gaining attention as a way to enhance brand image, as various customers have recently begun to take a stronger interest in corporate ethics and sustainable development. The impact of CSR on customer behavior has been studied since its introduction considering the positive brand reputation it generates and the criticism surrounding it. As an approach to environmental, social, and governance investments and sustainable development goals (SDGs), the corporate endeavor needs to be implemented based on the guidelines of the United Nations (United Nations, 2019) and Ministry of Economy, Trade and Industry of Japan (2019). According to the Stern Review on the Economics of Climate Change (Banerjee, 2007) by The Economist (Barnett, 2007; Barnett *et al.*, 2006), ecological sustainability could become the central social responsibility challenge for business. Thus, managers must be able to determine how their organizations can become more socially responsible, ecologically sustainable, and economically competitive (Orlitzky *et al.*, 2011). Against this background, further research from the customer perspective on automotive quality is important for the continued development and success of the automotive industry. Although existing research has demonstrated that the serviceability which is one of QMS element provide significant benefits to the manufactured product, no research has investigated the adoption of the dimensions in the context of the customer's perspective on CSR.

Therefore, this study has several objectives. First, the related variables of quality dimensions, cost of ownership, CSR, customer satisfaction, and customer loyalty need to be defined through factor analysis. Second, a new research contribution for practitioners is to develop a one of QMS framework for representing the relationships among quality dimensions, cost of ownership, CSR, customer satisfaction, and customer loyalty.

The remainder of this paper is organized as follows: Section 2 reviews previous studies; Section 3 presents the methodology of analysis; Section 4 presents the discussion and implication; and, Section 5 concludes this paper and discusses future research topics.

2. PREVIOUS STUDIES

Although the definition of product quality varies, many scholars have introduced it based on the meaning given by Juran (1974), who stated that quality is fitness for use, and Deming (1982), who stated that only the customer can define quality based on judgments about a product or service. Garvin (1987) attempted to bring together these and other definitions through eight aspects of quality to guide manufacturers in providing high-quality products. Most of the measurement scale items were aligned with the original description by Garvin (1987), adapted from Kianpour *et al.*(2014), and then further enhanced with the associated field of study. Based on Syahrial *et al.* (2018), this study extracted serviceability and ownership cost as dimensions that have a particularly high impact on customer satisfaction.

2.1 Serviceability

Serviceability refers to "the speed, politeness, and ability"(Garvin, 1987). Serviceability is primarily examined by customers after contracting of integrated machineries and throughout its lifecycle. In the recommended procedure, products

with high serviceability are easily serviced or repaired in after-sales service (Larson, 1993). It has been pointed out that the point of contact between a company and its customers is serviceability (Minami, 2012). Since efficient service is essential from the customer's perspective, serviceability is expected to influence customer satisfaction, cost of ownership, and customer loyalty.

2.2 Cost of ownership

“Cost of ownership” refers to the total cost of purchasing and maintaining a product throughout its life cycle. It is a concept that goes beyond the initial product purchase and thereafter represents the total customer costs along the product life cycle (Ellram, 1994). The fuel consumption associated with the operation of the product significantly impacts the customer's economic situations. However, as it is difficult for customers to evaluate depreciation costs separately, this study excludes this to access the benefits of cost of ownership on customer satisfaction and loyalty.

2.3 CSR

The relevance of CSR to stakeholder theory has been examined (Henriques, 2010). From the corporate perspective, CSR is both a social influence and an important corporate resource. It is believed to influence customers' perception of the company (Yuen *et al.*, 2016). There are two types of social responsibility: voluntary, such as charitable donations, and mandatory, which is responsibility established by law or regulation (Frederick, 1983). In previous studies, corporate CSR activities were often divided into four dimensions: environmental, social environmental, social, employee, and governance dimensions (Waller, 2016). The environmental dimension refers to the environmental involvement that a firm has, and the social dimension refers to how the firm interacts with society. The employee dimension is how the company interacts with and treats its employees. Finally, “governance” refers to a company's obligations and duties to its shareholders (Waller 2016) and their management of various aspects.

CSR is a self-regulating act wherein the companies can choose what to disclose. Other than the Global Reporting Initiative, which was established in 1997, no other initiatives exist. Various studies have proposed new (Rahdari and Rostamy, 2015) and composite indicators (Dočekalová and Kocmanová, 2016). These indicators are used to evaluate a company's involvement in CSR activities from a stakeholder's perspective (Cooper, 2004).

2.4 Customer satisfaction

Customer satisfaction refers to the customer's evaluation of a product or service based on the cumulative experience of using it. The products or services used can influence customer satisfaction. According to Crosby *et al.* (1990), customer satisfaction is the result of an evaluation of the quality of the previous transaction between the customer and the organization (Boulding *et al.*, 1993), which then generates future expectations for the quality of the product or service. The customer's satisfaction is the result of their evaluation of the quality of the previous transaction (Rust *et al.*, 1994). Rust and Oliver (1994) describe customer satisfaction as the customer's reaction related to the purchase emotion or experience of a product or service. When high customer satisfaction is achieved, customer complaints to the organization decrease, which in turn increases customer loyalty to the product (Fornell *et al.*, 1987).

2.5 Customer loyalty

Customer loyalty refers to a customer's willingness to repurchase similar products and services in the future (Zeithaml *et al.*, 1996). Various studies have demonstrated the positive relationship between customer satisfaction and loyalty (Flint *et al.*, 2011). Satisfied customers responded by voluntarily promoting the products and services they experienced to third parties (e.g., family, friends, and others) who sought their advice. Positive word-of-mouth is a strong representation from customers and is expected to enhance the manufacturer's image. The conceptual model is illustrated in Figure 1. This study formulates the following hypotheses:

Hypothesis 1 (H1(+)): Serviceability positively influences ownership costs.

Hypothesis 2 (H2(+)): Serviceability positively influences customer satisfaction.

Hypothesis 3 (H3(+)): Ownership cost positively influences customer satisfaction.

Hypothesis 4 (H4(+)): Corporate social responsibility positively influences customer satisfaction.

Hypothesis 5 (H5(+)): Customer satisfaction positively influences customer loyalty.

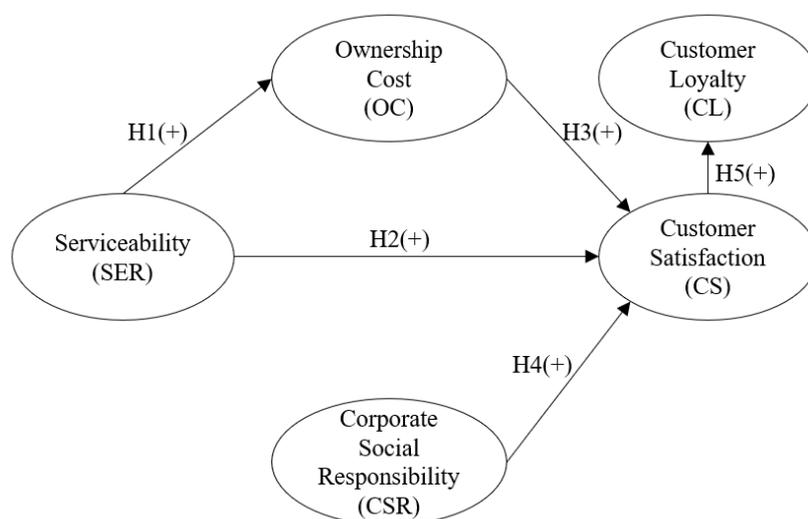


Figure 1. Conceptual model

3. RESEARCH METHODOLOGY

A quantitative survey was conducted among Japanese and French automobile users to analyze customers' perspectives on automobile quality and CSR. A quantitative research method using a questionnaire survey was conducted to achieve the research objectives (Hazen *et al.*, 2006).

3.1 Measurements and questionnaire

The measurement items were created by adopting most of the established measurement scales, with a few modifications to further adapt them to this research area. We empirically test each hypothesis through the items in these measurement scales. Prior to conducting this survey, we commissioned a research firm to conduct a questionnaire survey of Japanese and French citizens. Attribute items comprised

gender, age, annual income, type of residence, and other factors. Items were rated on a 7-point Likert scale ranging from 1 (not at all agree) to 7 (very much agree).

3.2 Data collection and demographic

A total of 643 online questionnaires were completed in July 2022. We applied the same method to clean the data obtained from Japanese and French citizens; that is, we excluded inappropriate responses (e.g., the same answer for all questions) which comprised 93 responses, 50 from Japan, and 43 from France. Finally, 550 responses (264 respondents from Japan and 286 from France) were deemed useful for the analysis. The attributes of the survey respondents are presented in Table 1. A total of 68.2% of Japanese respondents and 48.6% of French respondents were male, and 52.3% of Japanese respondents and 42.2% of French respondents were middle-aged (40–59 years old). As this was an open survey covering all of Japan and France, the largest proportion of respondents were working adults (company employees, medical professionals, salespeople, government employees, etc.). Thus, it was assumed that they had the knowledge to evaluate each of the scales in this study. Regarding vehicle characteristics, a variety of vehicle makes and models were included. Given the diversity of customer backgrounds, makes, and models, this survey generalizes the results of the automotive experience in Japan and France.

3.3 Bias and sample reliability

To assess non-response bias, we selected the first and last 10% of respondents to compare early and late respondents (Armstrong *et al.*, 1977). A t-test was used to assess these two samples, which concluded that no significant differences existed. There is no non-response bias in this study. Common method bias is a possible problem in any survey (Tabacknick *et al.*, 2007; Flynn *et al.*, 1990). A common test for measuring common method bias is Herman's one-factor test (Possakoff *et al.*, 1986). As the factors extracted from the Japanese data accounted for 76.84% of the total variance and the first factor accounted for 41.93% of this, it can be concluded that there was no single factor representing the majority of the variance. Additionally, the extracted factors of French data accounted for 64.46% of the total variance, where the first factor was 40.52% of the variance. To examine normality and outliers, Kaiser-Meyer-Olkin (KMO) test and the Bartlett sphericity test were applied. These methods measure the sampling accuracy. For sampling accuracy, a KMO value close to 1 represents a more accurate sample size. For Bartlett's sphericity test, the p-value was used as a measure of the significance of the correlation between factors. The KMO value was 0.927 for Japanese and 0.917 for French, and the chi-square values for Bartlett's test were 8,045.654 for Japanese and 3,841.321 for French, with a p-value <0.05. Thus, there was little concern regarding multicollinearity, and all measurement scale items were highly appropriate for factor analysis.

Reliability refers to the overall consistency of a test that yields a given measurement result. The results in this section are reported in Table 2. The reliability of each factor was measured using Cronbach's alpha test. Factors with an alpha of 0.7 or greater were deemed reliable (Nunnally, 1978), indicating that the items on each measurement scale were appropriate for the survey.

3.4 Exploratory factor analysis

Exploratory factor analysis (EFA) was used to generate theories and hypotheses by analyzing the extracted factors and their respective measurement scale items. The items of the measurement scale were grouped on the basis of each factor extracted and share one variance. A total of 5 factors were extracted, accounting for 76.84% and 70.35% of the total for Japanese and French, respectively. All factors obtained eigenvalues greater than 1.0 (Hair *et al.*, 2014). According to Table 2, 5 new factors with high factor loadings (factor loadings >0.05) were identified: cost of ownership (4 items), serviceability (7 items), customer loyalty (4 items), customer satisfaction (6 items), and CSR (8 items). Thus, sufficient factor loadings indicated that all variables contributed significantly to their respective factors. The basic relationship between the constructs can be confirmed as first evidence from the factor correlation matrix. According to the results, there were positive correlations among all constructs, significant at the 0.01 level (two-sided). The factor correlation matrix for all constructs is presented in Table 3.

3.5 Confirmatory factor analysis

Confirmatory factor analysis (CFA) was then conducted to verify construct validity (Gerbing *et al.*, 1988). The measurement model was applied to identify the relationship between the factors and their corresponding measurement scale items (observed variability), followed by a structural modeling method to verify the hypothesized relationships. The following subsections describe CFA validation.

3.5.1 Measurement model evaluation

Goodness-of-fit statistics were examined using a measurement model. The cut-off points for each goodness-of-fit index (GFI) were a ratio of chi-square to degrees of freedom (χ^2/df) less than 5.0, a comparative fit index (CFI) between 0.9 and 1.0, and a root mean square error of approximation (RMSEA) value less than 0.080. The Japanese model fit indices resulted in a relative chi-square of 2.51, CFI = 0.975, GFI = 0.921, and RMSEA = 0.064. The French model fit indices resulted in a relative chi-square of 2.09, CFI = 0.969, GFI = 0.918, and RMSEA = 0.062. These indicated that the measurement model was a relatively good fit and established one-dimensionality. After EFA, we examined the measurement model via CFA and identified several measurement scales that did not directly measure the factors and were therefore excluded from subsequent analyses. Each scale item is also listed in Appendix A. In CFA, several measurement scales were excluded from subsequent analyses. Thus, the 17 scale items included in the goodness-of-fit measurement model are serviceability (4 items), ownership cost (3 items), corporate social responsibility (4 items), customer satisfaction (3 items), and customer loyalty (3 items).

3.5.2 Verification of construct validity

Construct validity comprises convergent and discriminant validity. Convergent validity refers to the extent to which the observed variable measures the inherited factor. The Average variance extracted (AVE), which is the value of the variance introduced by the factor relative to the measurement error, is a well-known analysis for assessing convergent validity. AVE is the value of the variance introduced by the factor for measurement error (Fornell *et al.*, 1981). The standardized factor loadings for each factor were all greater than 0.7, directly explaining the high AVE and

construct reliability (CR) and adequate convergent validity. The criteria for AVE is 0.5 and CR is 0.7 (Bagozzi *et al.*, 1988; Byrne, 1989). In this study, AVE ranged from 0.673 to 0.916 in Japan and from 0.659 to 0.761 in France, and CR ranged from 0.861 to 0.978 in Japan and from 0.881 to 0.905 in France (see Table 3). Hair *et al.* (2014) proposed using the square root values of the AVEs to compare them with the square correlations between factors, and we organized them in the same way in our study. The diagonal values are the square roots of the AVEs for each factor. Each diagonal value exceeded the respective inter-construct correlation. The discriminant validity was supported, as presented in Tables 4 and 5.

Table 1. Demographic data of respondents

		Japan	France
Gender	Male	68.2%	48.6%
	Female	31.8%	51.4%
	Total	100.0%	100.0%
Age	40 years old or younger	17.8%	39.5%
	40–49	21.6%	22.9%
	50–59 years old	30.7%	19.3%
	60 or older	29.9%	18.4%
	Total	100.0%	100.0%
Driving experience	More than 10 years	72.6%	86.9%
	Between 5 to 10 years	17.8%	7.0%
	Less than 5 years	9.6%	6.1%
	Total	100.0%	100.0%
Frequency of driving	Several times a week	36.0%	33.4%
	Everyday	42.3%	57.1%
	Once a week	15.0%	5.8%
	Few times a month	6.7%	3.6%
	Once a month	0.0%	0.0%
	Total	100.0%	100.0%
Powertrain type	Gasoline	65.9%	34.3%
	Hybrid	32.5%	7.3%
	Diesel	0.3%	41.3%
	Other	1.3%	17.1%
	Total	100.0%	100.0%

Table 2. Results of reliability analysis and EFA (Factors 1–3)

	Factor Loading		Eigen value		Reliability coefficient (alpha)	
	Japan	France	Japan	France	Japan	France
Factor 1. Serviceability (SER)						
Your car has easy access to spare parts.	0.718	0.555				
Your car needs fewer self-inspections.	0.698	0.458	12.16	12.25	0.918	0.921
Your car is easy to self-inspect.	0.783	0.564				
Your car is eligible for repairs and other maintenance services.	0.800	0.464				
Factor 2. Ownership cost (OC)						
Your car's fuel consumption is reasonable.	0.602	0.779				
Your car's maintenance cost is reasonable.	0.738	0.757	5.54	3.90	0.869	0.873
Your car's service or repair cost is reasonable.	0.714	0.799				
Factor 3. Corporate social responsibility (CSR)						
You think that the environmental aspect of CSR is very important.	0.943	0.855				
You think that the social aspect of CSR is very important.	0.956	0.883	2.32	1.69	0.940	0.918
You think that the employee aspect of CSR is very important.	0.931	0.817				
You think that the governance aspect of CSR is very important.	0.956	0.794				

Table 2 (continued). Results of reliability analysis and EFA (Factors 4 and 5)

	Factor Loading		Eigen value		Reliability coefficient (alpha)	
	Japan	France	Japan	France	Japan	France
Factor 4. Customer Satisfaction (CS)						
You think that it is nice to use this company's services or products.	0.598	0.790	1.22	1.52	0.914	0.892
You do not regret using this company.	0.600	0.606				
You think that this company offers exactly what you need.	0.552	0.709				
Factor 5. Customer Loyalty (CL)						
You would not change for another company.	0.828	0.595	1.04	1.05	0.949	0.920
You use this company as your first choice.	0.821	0.612				
You intend to use this company's products and services again.	0.753	0.869				

Notes: KMO = 0.927 ($\chi^2 = 8,045.654$, $p < 0.05$); $n=264$ (Japan), KMO= 0.9172 ($\chi^2=3,841.321$, $p < 0.05$); $n=286$ (France)

Table 3. Results of reliability analysis and CFA (Factors 1–3)

	Sum of the squared standardized loadings		CR		AVE	
	Japan	France	Japan	France	Japan	France
Factor 1. Serviceability (SER)						
Your car has easy access to spare parts.						
Your car needs fewer self-inspections.	2.69	2.64	0.892	0.885	0.673	0.659
Your car is easy to self-inspect.						
Your car is eligible for repairs and other maintenance services.						
Factor 2. Ownership cost (OC)						
Your car's fuel consumption is reasonable.						
Your car's maintenance cost is reasonable.	2.03	2.19	0.861	0.890	0.676	0.730
Your car's service or repair cost is reasonable.						
Factor 3. Corporate social responsibility (CSR)						
You think that the environmental aspect of CSR is very important.						
You think that the social aspect of CSR is very important.	3.67	3.30	0.978	0.905	0.916	0.660
You think that the employee aspect of CSR is very important.						
You think that the governance aspect of CSR is very important.						

Table 3 (continued). Results of reliability analysis and CFA (Factors 4 and 5)

	Sum of the squared standardized loadings		CR		AVE	
	Japan	France	Japan	France	Japan	France
Factor 4. Customer Satisfaction (CS)						
You think that it is nice to use this company's services or product.	2.37	2.13	0.919	0.881	0.790	0.712
You do not regret using this company.						
You think that this company offers exactly what you need.						
Factor 5. Customer Loyalty (CL)						
You would not change for another company.	2.34	2.28	0.913	0.905	0.779	0.761
You use this company as your first choice.						
You intend to use this company's products and services again.						

Table 4. Results of the factor correlation matrix (Japan)

	SER	CSR	OC	CS	CL
SER	0.900				
CSR	0.180	0.942			
OC	0.787	0.029	0.869		
CS	0.671	0.253	0.555	0.936	
CL	0.663	0.240	0.514	0.896	0.937

Note: All correlations are significant at the 0.01 level (two-tailed).

Table 5. Results of the factor correlation matrix (France)

	SER	CSR	OC	CS	CL
SER	0.885				
CSR	0.459	0.905			
OC	0.780	0.352	0.890		
CS	0.841	0.395	0.619	0.881	
CL	0.787	0.417	0.642	0.818	0.905

Note: All correlations are significant at the 0.01 level (two-tailed).

3.6 Structural equation modeling

Structural equation modeling (SEM) was used to evaluate the proposed conceptual model. Goodness-of-fit statistics were examined using a measurement model. A large sample size is necessary for a comprehensive analysis. The 264 samples in Japan and the 286 samples in France exceeded the minimum sample size, making it reliable data (Hussey *et al.*, 2007). As with the measurement model, GFIs were also evaluated to prove the goodness-of-fit of the structural model. The results were CFI = 0.888, GFI = 0.961, and RMSEA = 0.077 in Japan, and CFI = 0.952, GFI = 0.897, and RMSEA = 0.075 in France. As the fit indices' values were within the cut-off point (Hu *et al.*, 1997), the structural model was statistically significant at a p-value of 0.01. These indices revealed that the measurement model was a relatively good fit. The results of the analysis are illustrated in Table 6. H1 indicates that serviceability significantly affects the cost of ownership in both countries (Japan; standardized coefficient = 0.788, p-value < 0.01; France; standardized coefficient = 0.7800, p-value < 0.01). This hypothesis is supported by previous studies (e.g., Sundin *et al.*, 2009) that established that total labor cost, availability of spare parts, and serviceability contribute to a lower cost of ownership during maintenance. H2 indicated that serviceability significantly impacts customer satisfaction in both countries (Japan: standardized coefficient = 0.577, p-value < 0.01; France: standardized coefficient = 0.898, p-value < 0.01). This result is supported by Cavalieri *et al.* (2007) in that

after-sales service is important for manufacturers to provide quality services to their customers and thus establish customer satisfaction. H3 examined the impact of cost of the ownership on customer satisfaction. This hypothesis was not supported for Japan and France (Japan: standardized coefficient = 0.109, p-value > 0.05; France: standardized coefficient = -0.056, p-value > 0.05). This indicates that the impact of ownership costs could not be determined in Japan and France. H4 revealed that CSR impacts customer satisfaction in Japan, but not in France (Japan: standardized coefficient = 0.170, p-value < 0.01; France: standardized coefficient = 0.081, p-value < 0.01). This result is supported by Mohammed's (2018) assertion that CSR affects customers and thus establishes customer satisfaction. H5 indicated that customer satisfaction was highly significant for customer loyalty (Japan: standardized coefficients = 0.899, p-values < 0.01. France: standardized coefficients = 0.842, p-value < 0.01). H5 was also supported in previous research (Cronin *et al.*, 1992). The hypotheses, paths, standardized coefficients, and results of the hypotheses (direct effect and mediation) are summarized in Table 6. This study used SPSS version 28 and AMOS software 28 for the analysis.

Table 6. Result of SEM

Hypotheses	Path	Standardized coefficients		Hypothesis supported?	
		Japan	France	Japan	France
H1	SER --> OC	0.788***	0.780***	Yes	Yes
H2	SER --> CS	0.577***	0.898***	Yes	Yes
H3	OC --> CS	0.109	-0.056	No	No
H4	CSR --> CS	0.170***	0.081	Yes	No
H5	CS --> CL	0.899***	0.842***	Yes	Yes

Path significant at *** $p < 0.01$

4. DISCUSSION AND MANAGERIAL IMPLICATIONS

This study reveals the importance of practicing Garvin's quality dimensions for customer satisfaction and loyalty in both Japan and France. Numerous studies (Hansen *et al.*, 1999; Hazen *et al.*, 2016; Yogi, 2016) have investigated Garvin's contribution. In particular, Syahrial *et al.* (2018) demonstrated that serviceability is an important quality dimension; The current study revealed serviceability to significantly impact cost of ownership and customer satisfaction in both Japan and France. Regarding Garvin's contributions, the current study adds new findings related to CSR. The 17 questions in the survey questionnaire proved to be easy to understand, with a high response rate in a short period of time from automobile users, and no ambiguous questions were highlighted. In terms of serviceability, service personnel can now work quickly and efficiently at the service center, depending on the vehicle model. Consequently, after-sales service, repair, and maintenance costs can be kept reasonable. In addition, customers can immediately take care of minor maintenance, such as checking air filters or cleaning the interior, without having to leave their cars at the service center. This eliminates labor costs and has been well received by

customers. Easy access to spare parts for maintenance, service, and repair contributes to further cost savings, as customers can compare spare part prices at various automobile-parts stores. Moreover, serviceability was found to affect customer satisfaction in Japan and France. The impact of cost of ownership on customer satisfaction could not be determined for both Japan and France. This indicates that customers are simply not satisfied with the cost of ownership both Japan and France. Dam (2020) states that customers' willingness to buy is because they value trust in the brand and the brand trust had a significantly positive influence on brand preference. Besides, Dam (2020) stated that brand trust had a positive impact on purchase intention. Perceived value had a positive effect on brand preference and perceived value had a positive influence on purchase intention as well (Dam, 2020). In addition, Yang *et al.* (2004) points out that in customers' consumption behavior, they feel more satisfied with perceived value than with the impact of changing prices on customer satisfaction. Hence, the cost of ownership does not directly affect customer satisfaction, which is likely to be strongly influenced by other factors. CSR also impacts customer satisfaction in Japan. However, we could not determine the same for France. It is believed that the public is willing to pay a high price for something of value in France (Kuo *et al.*, 2020). Compared with Japan, France exhibits a different approach to consumption. Kuo *et al.* (2020) demonstrated that French consumer behavior places great importance on brands. Hence, we believe that differences in consumer behavior led to differences in the results. Japan has a high awareness of CSR and has traditionally continued its efforts against environmental damage and global warming, including the Kyoto Protocol. In addition, Amoroso *et al.* (2017) confirmed that Japanese consumers are highly aware of CSR, which leads to their trust in the company. Hence, results from Japan H4 is considered to have supported the hypothesis.

Similar trends were observed while comparing SEM results from Japan and France. In both countries, the impact of CSR on customer satisfaction and loyalty is small, and it can be assumed that improving serviceability will lead to product purchase behavior. Owing to differences in consumer behavior between Japan and France, it is important for marketing managers to build a brand strategy and promote product releases in France. In Japan, consumers place more emphasis on price, whereas in France, consumers place more emphasis on brand.

In terms of managerial implications, management considers that several approaches are appropriate to ensure that the products they sell are in line with the market trends. to match market trends with the products they sell. This effort has been empirically demonstrated in this study. This effort has been empirically demonstrated in this study. From the customer's point of view, the serviceability aspect built into the vehicle is a very significant and significant cost of ownership. The serviceability aspect of the vehicle, from the customer's perspective, was found to form a highly significant and positive relationship with the cost of ownership. relationship with the cost of ownership. Therefore. The service manager is responsible for the safe and efficient service and repair processes in the service centers to ensure safe and efficient service and repair processes in the service centers. service and repair processes in the service centers. For example, service, repair and maintenance should not be service, repair and maintenance in isolation, but by offering multiple service packages and service menus. service packages or service menus, rather than service, repair and maintenance in isolation, so that the customer's cost of ownership is not too high. of ownership for the customer may not be too high. The study also indicates that,

compared to France, CSR influences customer behavior in Japan. From the perspective of increasing corporate value and for customer recognition, management should expand its CSR activities and continuously communicate them externally, as this is likely to increase satisfaction levels.

5. CONCLUSION

This study investigates the impact of serviceability, ownership costs, and CSR on customer satisfaction and loyalty in Japan and France, using the automobile industry as a case study. According to the results, Japanese customer demand remains one of the most important criteria, taking into account up-to-date serviceability and CSR. Conversely, French customers value serviceability. Proactive manufacturers will be able to build strong relationships with their customers through prompt and courteous customer hospitality. Therefore, manufacturers should monitor customer satisfaction to increase the number of loyal customers and attract new ones. This study also has certain limitations. This study analyzed only the customers' perspectives on vehicles that were not specific to powertrain in both Japan and France. As 85 to 90% of respondents owned gasoline-engine vehicles, the results were primarily based on such vehicles and represent how customers judged the cost of ownership and other product quality dimensions to be important. Future surveys targeting customers of electric mobility which are expected to be actively introduced in smart cities, are expected to provide new insights that will contribute significantly to reducing the cost of ownership and protecting the environment. Future research on service quality may also yield new results on the quality of mobility required in smart cities, in terms of both product and service quality. To explore important factors that influence loyalty, it is necessary to focus on the structure of service quality experienced by citizens living in the area, such as local mobility services and local community culture (Suzuki, 2010). Additionally, it is necessary to clarify the project management design of the architecture (Shirasaka, 2012). Furthermore, to visualize the marketing approach task of the person in charge, it is necessary to apply the assurance case (Menon *et al.*, 2009; Kelly *et al.*, 2004; GSN Community, 2011) to the project's process. The assurance case description method uses the argument decomposition pattern (Masumoto *et al.*, 2013). In the requirement definition, based on IEEE 1220 (IEEE, 2005), the process was shortened by considering time constraints (Yamamoto, *et al.*, 2013). It is also necessary to connect the whole project process to carry out knowledge management (Shibuya *et al.*, 2020).

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