

# THE EFFECT OF GAMIFICATION ON CUSTOMER RETENTION IN AUTOMOTIVE AFTER-SALES SERVICES: A CASE STUDY OF THE AUTHORIZED CAR DEALER IN INDONESIA

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## Abstract

The automotive industry, an important pillar in the global economy after the 2008 global financial crisis, is facing new challenges in the wake of the COVID-19 pandemic with a projected increase in car sales and a decline in new car sales margins. Automotive after-sales service proved to be crisis-proof during COVID-19 and made car manufacturers prioritize it as a source of profit. To retain customers and profits, high-quality after-sales service is key. In the context of intense competition, gamification is an attractive strategy to achieve sustainable business growth. However, the impact of gamification on customer retention in automotive after-sales service is still not well understood and few studies have addressed it. This study investigates the impact of gamification on customer retention in automotive after-sales service through questionnaire data from main dealer customers. The analysis shows that gamification has both direct and indirect effects on customer satisfaction and engagement on customer retention. The findings provide important insights for the automotive industry in improving after-sales service strategies and understanding the role of gamification. Practical implications include developing more effective gamification strategies and a better understanding of customer preferences. Future studies could focus more on exploring additional variables and longitudinal research over a longer period to further explore the resilience of gamification's impact.

**Keywords:** Gamification, Customer Retention, Automotive Aftersales Service, Customer Satisfaction, Automotive Dealership.

## 1. INTRODUCTION

After recovering from the 2008 global financial crisis, the automotive industry has become an important pillar in the global economy, as it is a profitable and viable industry. Practitioners predict that in the most likely outcome scenario after covid-19, annual car sales will increase from 77 million in 2020 to 97 million in 2025 and 121 million in 2030 (Harrison, 2020).

With the extension of product life, the profit margin in the automotive sales sector decreases. This has led automakers to prioritize the aftermarket, which has become a source of profit for manufacturers and dealers (Aboltins & Rivza, 2014).

Increased competition in the automotive industry has encouraged automotive companies to focus on after-sales strategies to retain customers. High-quality after-sales service is a key factor in building customer satisfaction, which in turn contributes to long-term customer retention.

In the automotive industry, understanding and retaining customers is crucial as losing customers can be detrimental to a business while retaining existing customers can provide sustainable profits. Therefore, focusing on customer retention is an important step in maintaining profits and growth of the automotive business in the long term (Akaeze & Akaeze, 2017).

In the increasingly fierce market competition, automotive companies are always looking for innovative approaches to engage customers and build lasting relationships (Liu et al., 2018). One approach that has received attention is gamification, which involves using game elements in a non-game context to create effective and engaging experiences in the workplace (Chopade, 2023).

In the context of automotive after-sales service, the use of gamification can include various aspects, such as giving awards, creating achievements, or organizing competitions between customers. This approach aims to motivate customers to stay engaged in after-sales service, improve their interaction with automotive dealerships, and strengthen emotional bonds with the brand.

Research on the impact of gamification on customer retention in automotive after-sales service is limited, although the concept of gamification has been applied in various sectors. A recent study by Kridiawan & Wang (2023) conducted a systematic analysis of 1,373 articles from Scopus indexed journals published in the last ten years (2014-April 2023).

The results showed that research on customer retention in the automotive industry involving gamification is scarce, while recent research trends focus on machine learning, marketing, and social media. Thus, this study aims to fill this knowledge gap by investigating the influence of gamification on customer retention in the context of automotive after-sales service.

This research will use a quantitative approach to collect and analyze data from customers who use automotive after-sales services at a leading automotive dealership. Data will be collected through a questionnaire that includes questions about customer experience, participation in gamification activities, and customer retention levels. Descriptive analysis, inferential statistics, correlation, and regression will be used to test the relationship between the use of gamification and customer retention rates.

It is expected that this research will make an important contribution to the automotive industry in understanding the potential of gamification as a tool to improve customer retention. The results of the study can provide valuable insights for automotive dealerships in designing and implementing effective gamification strategies. In addition, this research can provide a better understanding of customer needs and preferences in the context of automotive after-sales service, which can assist automotive companies in developing more targeted innovations.

In continuation of this study, future research could explore specific aspects of gamification, such as the most effective type of reward or optimal level of engagement, as well as moderator variables that might influence the relationship between gamification and customer retention.

## **2. LITERATURE REVIEW**

### **2.1 Automotive After-Sales Service**

Automotive after-sales service is the set of activities provided to vehicle owners after purchase, including maintenance, repair, spare parts, and customer service. Literature studies in the context of automotive after-sales service include best practices, customer satisfaction, customer relationship management, and strategies to improve service quality.

Research shows that the management of co-generated knowledge between customers and service providers is crucial in automotive after-sales service. In the digital age, technologies such as online platforms, mobile applications, and customer management systems are increasingly playing an important role in automotive after-sales service. These allow customers to easily access information about maintenance schedules, book services, and communicate with automotive dealers. This digital transformation can improve efficiency and customer satisfaction (Sundaram & Dey, 2018).

Customer participation in automotive after-sales service through online communities, such as discussion forums or social media, has been shown to have positive potential for customer satisfaction. Research by Lee et al. (2015) shows that customers who are active in online communities often gain valuable information, share positive experiences, and find solutions to after-sales service problems. This can increase customers' feelings of engagement with an automotive brand or dealer, create stronger relationships, and even influence their decision to remain loyal to a particular brand or dealer. Therefore, customer interactions in online communities can be an important factor in understanding and improving customer satisfaction levels in automotive after-sales service.

## **2.2 Customer Retention**

Customer retention refers to efforts to maintain existing customers in a business or organization. Literature studies on customer retention include factors that affect customer retention, customer retention strategies, and customer retention measurement.

According to research by Chen et al. (2017) found that several factors affect customer retention. Among them are price and discount attributes, personal sales interactions, and relationships with customers. The results of this study emphasize the importance of satisfactory price and discount attributes in supporting customer retention. In addition, satisfactory personal sales interactions were also identified as the most important factor for increasing the likelihood of customer retention.

Research by Bahri-Ammari & Bilgihan (2017) highlights the important role of distributive justice in linking satisfaction levels with loyalty programs and relational satisfaction. The results of this study indicate that there needs to be special attention to distributive justice to promote customer satisfaction and loyalty. They also found that satisfaction with loyalty programs is a key predictor of satisfying relationships with service providers and customer retention.

From the perspective of industry experts, service quality and personalized attention are considered the most important factors in retaining customers, followed by high repair costs and the time taken to deliver services. However, from the customer's perspective, service quality and personalized attention are considered the main factors, followed by the time required to receive service. In addition, factors such as time in the service process, service quality, personalized attention, time in the workshop, and the level of customer awareness of warranty benefits were considered as causes according to industry experts. However, customers also consider lack of care as one of the factors contributing to customer retention, not just low customer awareness of warranty benefits (Kumar et al., 2017).

## 2.3 Gamification

Gamification refers to a design approach that seeks to deliver similar positive experiences as seen in games, and consequently influence user behavior and cognitive processes (Huotari & Hamari, 2017). In literature, the definition of gamification usually focuses on the experiential aspect (game play experience) or game design. Elements such as points, achievements and leaderboards are used to motivate and engage users in various activities. The main goal of gamification is to increase user motivation, engagement, and participation in various domains, including education, business, and technology.

Research by Xi & Hamari (2020) shows that gamification has become a popular technique in marketing. Many companies believe that gamification has the potential to increase consumer engagement, awareness, and brand loyalty. Achievement-related gamification features and social interaction were positively associated with all three forms of brand engagement (emotional, cognitive, and social).

Immersion-related gamification features are only positively associated with social brand engagement. In addition, brand engagement was further positively associated with brand equity. The results suggest that gamification can positively impact brand engagement and further improve brand equity, and that gamification appears to be an effective technique for brand management.

Research by Rodrigues et al. (2021) investigated how gamification can be used in an app context to influence user engagement and attitudes towards brands. The study highlighted that Nike Run Club utilized gamification elements successfully. They provided challenges, achievements, and rewards to users who actively participated in running and exercising using the app. This study confirms that a smart gamification strategy in a mobile app can be an effective tool in building user engagement and increasing positive brand attitudes.

## 2.4 Customer Engagement

Customer engagement refers to the level of customer involvement and interaction with automotive after-sales service. High customer engagement can increase emotional bonding with the brand and encourage active participation in after-sales activities, which in turn can influence customer retention. Several previous studies have investigated the factors that influence the level of customer engagement in the context of automotive after-sales service.

One of the studies relevant to this topic is the research conducted by Li et al. (2019). In their study, they found that customer interactions with automotive dealers, such as participation in after-sales events and effective communication, contribute positively to the level of customer engagement. The results of this study indicate the importance of creating an environment that encourages customer engagement in after-sales service to improve customer retention.

In addition, research conducted by Johnson et al. (2020) also highlighted the role of technology in improving customer engagement in automotive after-sales service. They found that the integration of technology such as mobile applications or online platforms can improve customer interactions with dealers and help customers feel more involved in the after-sales process.

## 2.5 Customer Satisfaction

Customer satisfaction refers to the level of customer satisfaction with automotive after-sales service. A high level of customer satisfaction can increase customer loyalty and retention, as satisfied customers tend to return to use the same after-sales service. Several studies have identified factors that contribute to the level of customer satisfaction in the context of automotive after-sales services.

Research by Smith et al. (2018) shows that service quality, including responsiveness, communicativeness, and efficiency, are important factors associated with customer satisfaction in automotive after-sales service. In addition, their results also highlight the importance of clear and precise communication between dealers and customers in improving customer satisfaction.

Another study by S. Lee et al. (2019) investigated the relationship between customer satisfaction and customer retention in automotive after-sales service. They found that customer satisfaction is significantly related to customer retention. Customers who are satisfied with the after-sales service have a higher tendency to keep using the service repeatedly.

## 2.6 Gamification in Automotive After-Sales Services

Gamification has become an increasingly popular approach to improving customer engagement and strengthening retention in automotive after-sales service. In gamification, game elements, such as points, levels, challenges, rewards, and positive feedback, are applied in the context of automotive after-sales service to create an engaging and motivating experience for customers. Some common factors or elements that are often used in the implementation of gamification in automotive after-sales service are described below (Brown et al., 2019; Diewald et al., 2015; Lindemann, 2019): Discounts and Special Offers, Free Service Programs, Service Guarantees, Awards and Recognition, Badges or Achievement Marks, Loyalty Programs, Interactive Application Features, Educational Content or Product-Related Information, social activities or online communities, competitions or contests.

## 2.7 Related Research

Based on research by Wang et al. (2019) explained that the use of gamification in the context of automotive after-sales service can increase customer engagement, motivation, and customer loyalty. This confirms that gamification can be an effective tool in building long-term relationships between companies and customers as shown by customer retention to come to automotive dealerships. Another study by (Huotari & Hamari, 2017) showed that personalization in gamification, such as accommodating individual customer preferences and needs, can increase the effectiveness of gamification in influencing customer retention. Research conducted by Yang et al. (2017) and Rodrigues et al. (2021) investigated how gamification-based applications influence customer engagement and attitudes, which can be adapted in this study. Therefore, the explanation in this study explains the hypothesis as follows:

*H1: The use of gamification has a positive effect on customer retention.*



Research conducted by (Johnson et al., 2020) highlighted the role of technology in improving customer engagement in automotive after-sales service. They found that the integration of technology such as mobile applications or online platforms can increase customer interaction.

Djohan et al. (2022) examined the potential of gamification to stimulate repurchases in online marketplaces. The findings of this study provide insight into the influence of gamification on customer behavior and the importance of engagement and experience in driving repurchases. Harwood & Garry (2015) investigated the effects of gamification on customer engagement, their research on the experience of customer engagement in a gamified environment can increase customer interaction. Based on the research conducted previously, it explains the hypothesis that is compiled as follows:

*H2: The use of gamification has a positive effect on customer engagement.*

The level of customer engagement in gamification also has a significant impact on customer retention. According to Hamari & Koivisto (2015) high engagement in activities involving gamification can strengthen customer relationships with brands or companies and increase customer loyalty. Another study conducted by Thakur (2016) explored customer engagement and loyalty in the context of mobile device shopping. Although not focused on the automotive industry, this study provides insight into customer behavior and engagement in the context of technology, which can affect customer retention. Based on previous research, it explains the hypothesis that is compiled as follows:

*H3: Customer engagement has a positive effect on customer retention.*

Djohan et al. (2022) explain that customer experience and the level of customer engagement play an important role in the relationship between gamification and customer satisfaction. This research provides an understanding of how gamification can be used to influence customer satisfaction in the context of an e-marketplace, which can be adopted in the context of automotive after-sales service.

Research by Smith et al. (2018) showed that service quality, including responsiveness, communicativeness, and efficiency, are important factors associated with customer satisfaction in automotive after-sales service. In addition, their results also highlight the importance of clear and precise communication between dealers and customers in improving customer satisfaction. The research "The use of Gamification to increase customer satisfaction and brand loyalty: The Nike case" conducted by Brunello (2014) explains that the proper use of gamification can increase customer satisfaction. Based on the research that has been done before, it explains the hypothesis that is compiled as follows:

*H4: The use of gamification has a positive effect on customer satisfaction*

The literature study conducted by (Jantan et al., 2018) highlighted the factors that influence customer retention in automotive after-sales service. They found that customer satisfaction, service quality, price, and effective communication have an important role in maintaining customer retention.

Tawinunt et al. (2015) presented an understanding of the dynamics that influence customer retention, namely customer satisfaction. Hong & Kim (2020) explore the relationship of customer satisfaction to long-term relationships with

customers or relevant to customer retention. García et al. (2020) examined the role of car manufacturers and marketing channels in influencing consumer loyalty. Satisfaction with service will affect customer loyalty or retention in after-sales service. Based on research that has been done before, it explains the preparation of the following hypothesis:

*H5: Customer satisfaction has a positive effect on customer retention*

### **3. METHODOLOGY**

#### **3.1 Authorized Car Dealer in Indonesia**

Dealer XYZ is the largest Toyota car dealer network in Indonesia. They have been a partner of Toyota Motor Corporation since 1975 and currently have dozens of branches spread across various cities throughout Indonesia.

Dealer XYZ has a good reputation as an authorized Toyota dealer that provides quality after-sales service.

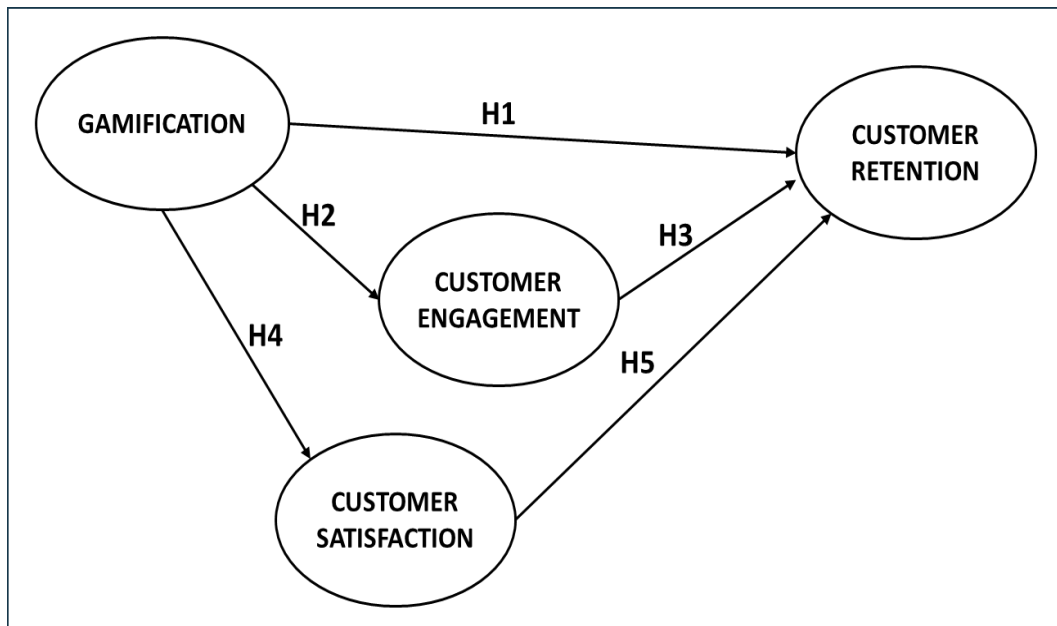
In research with the title of the influence of gamification on customer retention in automotive after-sales service, it is necessary to collect data involving customers in the automotive industry, especially authorized vehicle dealers who can represent the automotive after-sales business with the application of gamification to customer retention. For this study, researchers collaborated with XYZ Dealer as an authorized Toyota dealer in Indonesia with several considerations:

- Authorized vehicle dealers that provide sales or after sales services for the most dominant Toyota car brand in Indonesia. (Toyota market share 31.6% in 2022)
- Authorized dealer with the highest number of branches in Indonesia with 127 out of 361 Toyota dealers.
- Authorized dealers spread in almost all cities in Indonesia (both big cities like Jakarta to small cities in Kalimantan), representing the distribution of vehicles in the Indonesian automotive industry.
- Authorized dealers that dominate Toyota sales in Indonesia (40.6% of the Toyota sales market in 2022)
- Official dealer of modern vehicles and has a digital platform that has a gamification program in managing customers.

#### **3.2 Research Model**

The research model is a structure or conceptual framework used in research to plan, organize, and direct the steps in answering research questions and testing hypotheses. In research on "The Effect of Gamification on Customer Retention in Automotive after Sales Service," the research model integrates relevant variables and describes the relationship between these variables.

To develop the research model, regarding the limited research on the influence of gamification on automotive after-sales service, the researcher conducted a study of relevant articles including those related to other industries. The research articles on which the research model was based and adapted are shown in Figure 1.



**Figure 1: Research Model**

This research model presents a conceptual framework of how gamification, customer engagement, and customer satisfaction are interrelated in influencing customer retention in automotive after-sales service.

It is hoped that this research will provide useful insights for automotive companies in designing effective gamification strategies to increase customer retention and strengthen long-term relationships with customers in the context of automotive after-sales service.

### **3.3 Research Design**

The research design used in this study is a quantitative design through the survey method. This research design was chosen because the main objective of the research is to investigate the effect of gamification on customer retention in the context of automotive after-sales service. Through the survey method, data will be collected from a sample of automotive after-sales service customers who have experienced the use of gamification.

This research will use a questionnaire as a data collection instrument that will be administered to respondents. The questionnaire will be designed to collect data on customer perceptions of the use of gamification in automotive after-sales services, the level of customer involvement in gamification, customer satisfaction, as well as other factors relevant in the context of the research.

The operational definitions and measurements of the research variables are determined based on the literature review and the research conceptual framework shown in Table 1.



**Table 1: Operationalization Variable in the Model**

Variable	Indicator	Source
GA Gamification	GA1 Perceived usefulness	Adapted from (Rodrigues et al., 2021) (Yang et al., 2017)
	GA2 Perceived ease of use	
	GA3 Perceived social influence	
	GA4 Player motivation	
CE Customer Engagement	CE1 Frequency of Interaction	Adapted from (Thakur, 2016) (Harwood & Garry, 2015) (Rodrigues et al., 2021) (Djohan et al., 2022)
	CE2 Time Spent	
	CE3 Participation in Loyalty Program	
	CE4 Response to Communication	
	CE5 Activity in Customer Community	
	CE6 Engagement in Gamification Features	
CS Customer Satisfaction	CS1 General evaluation of after-sales service	Adapted from (Harwood & Garry, 2015) (Djohan et al., 2022) (Rodrigues et al., 2021)
	CS2 Responsiveness	
	CS3 Quality of service	
	CS4 Satisfaction with price	
	CS5 Communication and Information	
	CS6 Recommendations	
CR Customer Retention	CR1 Periodic service retention rate	Adapted from (Hong & Kim, 2020) (García et al., 2020)
	CR2 General repair service retention rate	
	CR3 Emergency service utilization rate	
	CR4 Warranty utilization rate	

Data will be collected from a sample of automotive after-sales service customers selected using simple random sampling techniques. Data analysis will be carried out using smartPLS 4 statistical techniques for structural equation modeling (SEM) data processing with the partial least squares (PLS) method.

### 3.4 Population and Sample

The population in this study are automotive after-sales service customers in a certain area or automotive company. This population includes customers who have used automotive after-sales services and are potentially affected by the implementation of gamification in these services. The population in this study are customers who have purchased a new vehicle at Dealer XYZ in the duration of 2019-2022 throughout the Dealer XYZ network in Indonesia, which is 465,088.

The number of samples in this study was determined by the Slovin formula as follows:

$$n = \frac{N}{1 + N(e)^2}$$

*Description:*

*n = number of respondents*

*N = total population*

*e = error rate (in this study 5%)*

Based on the above calculations, the number of samples that will be met with an error rate of 5% is 400 respondents.

### 3.5 Data Collection & Analysis

Data collection in this study will be carried out using a survey method using a questionnaire as a data collection instrument. Survey data collection through 2 methods, namely hardcopy questionnaires (Customer service) and Softcopy questionnaires (Google form link by WA blast database).

This research data will be analyzed with relevant statistical techniques, using smartPLS 4, to test hypotheses and produce valid findings. There are three testing models in this study, namely measurement model evaluation (to test validity and reliability), structural model evaluation (to test multicollinearity, hypothesis testing, mediation testing) and model fit evaluation.

## 4. RESULT & DISCUSION

### 4.1 Description of Respondents

In this section, a description will be made of the research participants, namely automotive after-sales service customers who are respondents in this study. The information to be conveyed includes demographic characteristics, such as age, gender, education, and experience using automotive after-sales services. Detailed descriptions of respondents are shown in Table 2.

**Table 2: Profile of the respondents (n = 510)**

Variables	Categories	Number	Percent
Survey Type	Online - Google Form	360	71%
	Manual Survey	150	29%
Gender	Male	401	79%
	Female	109	21%
province of residence	Sumatera	59	12%
	Kalimantan	17	3%
	Banten	2	0%
	Jawa Barat	53	10%
	Jawa Timur - Bali	48	9%
	Jatabek	331	65%
Age	17 - 24	19	4%
	25 - 32	96	19%
	33 - 40	175	34%
	41 - 48	145	28%
	49 - 56	66	13%
	≥ 57	9	2%
Kind of Car	Avanza	149	29%
	Rush	52	10%
	Innova	85	17%
	Agya	45	9%
	Calya	40	8%
	Fortuner	30	6%
	Others	109	21%
Car Ownership Type	Personal	78	15%
	Company	432	85%
Digiroom application users	No	84	16%
	Yes	426	84%

The study involved 510 after-sales service respondents at Auto2000, 71% via google form, 29% manual questionnaire. Gender: 79% male, 21% female. Respondents from various regions: Sumatera (12%), Kalimantan (3%), Banten (0%), Jatim (10%), Jabar (10%), & Jatabek (65%). The majority age 33-40 years (34%), 41-48 years (28%) & 25-33 years (19%). Car owned by majority of respondents: Avanza (29%), Innova (17%), and Rush (10%). Car ownership is 85% private car, 15% company-owned. Respondents who have used the Digiroom App totaled 426 (84%) and answered the research survey questions.

#### 4.2 Analysis of Measurement Model

In this section, the measurement model analysis (outer model) is carried out to provide an overview of the research variables and indicators. The purpose of the measurement model test is to evaluate the validity and reliability of the indicators used to measure a construct in the study. The results of the measurement model test will help in drawing stronger conclusions and research implications.

In the initial test carried out is to check the validity of the research model compiled according to the data that has been collected. Based on validity testing, there are 3 invalid measurement items, namely CET1, CET2, CET3 because they have an outer loading below 0.70 (Hair et al., 2019). Furthermore, the three items were removed from the model and re-evaluated. The test model display after eliminating invalid measurement items can be seen in Figure 2.

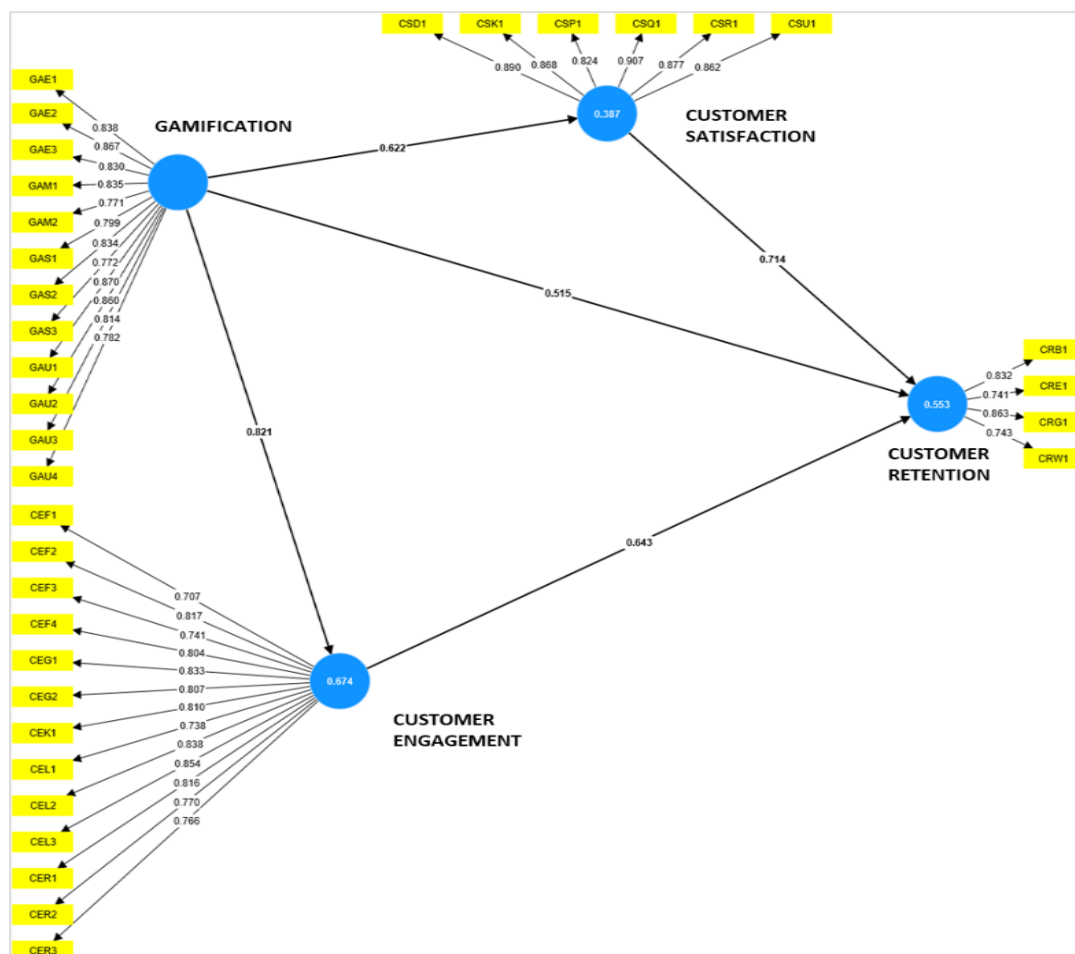


Figure 2: Outer Loading Validity Testing

After re-evaluation (removing 3 items), the measurement tool has strong validity with Outer loading between 0.707 to 0.907, exceeding the threshold of 0.700. The questions in the measurement tool effectively describe the variation in the variable.

Construct validity in this study is confirmed by the strong AVE level (0.630 - 0.760) as well as the HTMT discriminant validity test results (0.566 - 0.858) shown in Table 3.

**Table 3: AVE and HTMT Test**

VARIABLE	AVE	HTMT (Heterotrait-Monotrait Ratio)			
		Gamification	Customer Satisfaction	Customer Engagement	Customer Retention
Gamification	<b>0.678</b>				
Customer Satisfaction	<b>0.760</b>	<b>0.656</b>			
Customer Engagement	<b>0.630</b>	<b>0.858</b>	<b>0.746</b>		
Customer Retention	<b>0.635</b>	<b>0.566</b>	<b>0.797</b>	<b>0.705</b>	

Testing with Fornell-Larcker analysis (root AVE > correlation) shows that the validity of the items is confirmed by the results of the cross-loading test, where the measurement items have a higher correlation with the relevant variables as shown in Table 4.

**Table 4: Fornell Locker Test**

VARIABLE	Fornell Lacker			
	Gamification	Customer Satisfaction	Customer Engagement	Customer Retention
Gamification	<b>0.823</b>			
Customer Satisfaction	0.622	<b>0.872</b>		
Customer Engagement	0.821	0.703	<b>0.793</b>	
Customer Retention	0.515	0.714	0.643	<b>0.797</b>

Reliability measurements of research variables also meet with a value of 0.810 - 0.957 for Cronbach's alpha (>0.70) and 0.874 - 0.962 for composite reliability measurements (>0.70). Based on reliability testing, it indicates that the measurement instrument has a high level of consistency and reliability. Reliability testing is shown in Table 5.

**Table 5: Reliability Test**

VARIABLE	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)
Gamification	0.957	0.957	0.962
Customer Satisfaction	0.936	0.937	0.950
Customer Engagement	0.951	0.952	0.957
Customer Retention	0.810	0.840	0.874

### 4.3 Analysis of Structural Model

Structural model analysis (inner model) is related to hypothesis testing of the influence between research variables. Structural model evaluation is carried out in several tests, namely multicollinearity testing and hypothesis testing.

To identify multicollinearity, the general analysis used is the calculation of the Variance Inflation Factor (VIF) or Tolerance value. A VIF value below 5 indicates that there is no multicollinearity between variables (Hair et al., 2019). Table 6 shows the results of testing the Inner VIF structural model.

**Table 6. Testing the structural model Inner VIF**

MULTICOLLINEARITY	Gamification	Customer Satisfaction	Customer Engagement	Customer Retention
Gamification		<b>1.000</b>	<b>1.000</b>	<b>3.106</b>
Customer Satisfaction				<b>2.003</b>
Customer Engagement				<b>3.768</b>
Customer Retention				

The estimation results show that the inner VIF (Variance Inflated Factor) value is less than 5, so there is no multicollinearity between the variables that affect customer satisfaction /customer engagement/ customer retention.

Hypothesis testing between variables is done by looking at the t statistic or p-value. If the t statistic of the calculation results is greater than 1.96 (t table) or the p-value of the test results is smaller than 0.05, there is a significant influence between the variables. In addition, it is necessary to convey the results and 95% confidence interval of the estimated path coefficient parameters.

Based on the guidelines for using PLS-SEM according to Hair et al. (2019), the steps taken in testing hypotheses with smartPLS 4 are to calculate the standard algorithm with bootstrapping, select subsample 5000, Confidence Interval Method with Bias Corrected and Accelerated (BCA) Bootstrap. Structural model testing or Hypothesis testing in this study is shown in Table 7.

**Table 7: Hypothesis testing results**

H	HYPOTHESIS STATEMENT	Patch Coefficients	T statistics ( O/STDEV )	P values	95% Confidence Interval	
					2.5%	97.5%
H1	Gamification -> Customer Retention	0.515	11.971	0.000	0.434	0.602
H2	Gamification -> Customer Engagement	0.821	32.519	0.000	0.770	0.868
H3	Customer Engagement -> Customer Retention	0.365	4.814	0.000	0.217	0.517
H4	Gamification -> Customer Satisfaction	0.622	14.025	0.000	0.535	0.711
H5	Customer Satisfaction -> Customer Retention	0.527	8.518	0.000	0.406	0.648

Based on the results of hypothesis testing above, it is known as follows:

1. The first hypothesis (H1) is accepted, namely that there is a significant influence, the use of gamification has a positive effect on customer retention in automotive after-sales service with patch coefficient (0.515), T statistic > 1.96 and P value (0.000 < 0.05).

Within the 95% confidence interval, the effect of gamification on customer retention lies between (0.434) to (0.602). When the use of gamification is increased with various activities, for example (frequency, joint events, etc.), the effect on customer satisfaction will increase to 0.602.

2. The second hypothesis (H2) is accepted, namely that there is a significant influence, the use of gamification has a positive effect on customer engagement in automotive after-sales service with patch coefficient (0.821), T statistic > 1.96 and P value (0.000 < 0.05).

Within the 95% confidence interval, the effect of gamification on customer retention lies between (0.770) to (0.868). When the use of gamification is increased with various activities, for example (frequency, joint events, etc.), the effect on customer satisfaction will increase to 0.868.

3. The third hypothesis (H3) is accepted, namely that there is a significant influence, customer engagement has a positive effect on customer retention in automotive after-sales service with patch coefficient (0.365), T statistic > 1.96 and P value (0.000 < 0.05).

Within the 95% confidence interval, the effect of gamification on customer retention lies between (0.217) to (0.517). When the use of gamification is increased with various activities, for example (frequency, joint events, etc.), the effect on customer satisfaction will increase to 0.517.

4. The fourth hypothesis (H4) is accepted, namely that there is a significant effect, the use of gamification has a positive effect on customer satisfaction in automotive after-sales service with patch coefficient (0.622), T statistic > 1.96 and P value (0.000 < 0.05).

Within the 95% confidence interval, the effect of gamification on customer retention lies between (0.535) to (0.711). When the use of gamification is increased with various activities, for example (frequency, joint events, etc.), the effect on customer satisfaction will increase to 0.711.

5. The fifth hypothesis (H5) is accepted, namely that there is a significant effect, customer satisfaction has a positive effect on customer retention in automotive after-sales service with patch coefficient (0.527), T statistic > 1.96 and P value (0.000 < 0.05).

Within the 95% confidence interval, the effect of gamification on customer retention lies between (0.406) to (0.648). When the use of gamification is increased with various activities, for example (frequency, joint events, etc.), the effect on customer satisfaction will increase to 0.648.

Based on the results of testing the research for the structural model, it can be concluded that Hypothesis 1 (H1), Hypothesis 2 (H2), Hypothesis 3 (H3), Hypothesis 4 (H4) and Hypothesis 5 (H5) are all accepted and significant.

Mediation testing is very important in analysis to understand the mechanism of how variables interact and influence each other. Researchers conducted mediation analysis and described the relationships involved in the structural equation model. Mediation testing is shown in Table 8.



**Table 8: Mediation test results**

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	P values
Gamification -> Customer Satisfaction -> Customer Retention	<b>0.328</b>	0.331	0.045	<b>7.356</b>	<b>0.000</b>
Gamification -> Customer Engagement -> Customer Retention	<b>0.299</b>	0.300	0.064	<b>4.670</b>	<b>0.000</b>

Gamification has a significant indirect effect on customer retention through mediation of customer satisfaction of (0.328) with t statistic (7.356 > 1.96) or p value (0.000 < 0.05). This shows that customer satisfaction significantly acts as a variable that mediates the indirect effect of gamification on customer retention. Gamification has a significant indirect effect on customer retention through the mediation of customer engagement of (0.299) with t statistic (4.670 > 1.96) or p value (0.000 < 0.05).

SmartPLS 4 has automatically issued a direct effect size, but the mediation effect size has not been automatically generated. Calculation of the effect size of mediation can be calculated manually with the effect size of mediation statistics  $\nu$ . Based on Ogbeibu et al. (2021) the effect size criteria for the effect of mediation use the criteria size 0.01 low, 0.075 Moderate, 0.175 High. The effect size of mediation (gamification → customer satisfaction → customer retention) can be calculated by multiplying the square of the direct effect of gamification → customer satisfaction by the square of the direct effect of customer satisfaction → customer retention according to research ( $0.622^2 \times 0.527^2 = 0.107$ ). Likewise, for the effect of gamification on customer retention with the mediation of customer engagement ( $0.821^2 \times 0.365^2 = 0.090$ ).

#### 4.4 Analysis of Model Fit

Model Correctness Fit is part of the analysis stage in SmartPLS 4 that evaluates the extent to which the proposed structural model fits the observational or sample data that has been collected. The purpose of this model evaluation is to ensure that the proposed statistical model fits the empirical data and provides reliable and correctly interpreted results.

Coefficient of Determination ( $R^2$ ) or R square testing in the model fit test is shown in Table 9.

**Table 9: R square test results**

	R-square	R-square adjusted
Customer Satisfaction	0.387	0.386
Customer Engagement	0.674	0.673
Customer Retention	0.553	0.55

The R square statistical measure describes the amount of variation in endogenous variables that can be explained by other exogenous or endogenous variables in the model. According to Hair et al. (2018) the qualitative interpretation value of R square is 0.19 (low influence), 0.33 (moderate influence) and 0.66 (high influence). The

magnitude of the influence of gamification on customer satisfaction (0.387) and customer retention (0.553) includes a moderate influence, while on customer engagement (0.674) has a high influence.

The next stage is to evaluate the SRMR (Standardized Root Mean Square) and GoF (Goodness of Fit Index), the test results are shown in Table 10.

**Table 10: SRMR and GoF Index test results**

	Estimated model	GoF Index
SRMR	0.081	
GoF Index		0.600

The SRMR value is a measure of model fit, namely the difference between the data correlation matrix and the estimated model correlation matrix. According to Schermelleh-Engel et al. (2003) the SRMR value between 0.08 - 0.10 indicates a fit model. In this study, the SRMR value is 0.081, which means that the model has an acceptable fit. The interpretation of the GoF index refers to Wetzels et al. (2009) show that the GoF index is 0.600 including high GoF. The overall level of fit of the measurement model and structural model is in the high category.

To ensure that the research has a suitable or good model, the researchers also conducted PLS Predict testing. The test is shown in Table 11 which shows the comparison of the RMSE and MAE values of the PLS model with linear regression.

**Table 11: PLS Predict test results.**

	Q <sup>2</sup> predict	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE
CSD1	0.278	0.483	0.335	0.495	0.339
CSK1	0.298	0.489	0.356	0.505	0.354
CSP1	0.297	0.614	0.454	0.628	0.443
CSQ1	0.282	0.433	0.301	0.451	0.313
CSR1	0.290	0.474	0.329	0.491	0.328
CSU1	0.241	0.465	0.322	0.480	0.328
CEF1	0.243	0.766	0.565	0.788	0.592
CEF2	0.550	0.739	0.567	0.737	0.547
CEF3	0.287	0.732	0.528	0.745	0.538
CEF4	0.455	0.756	0.562	0.760	0.561
CEG1	0.563	0.571	0.418	0.567	0.387
CEG2	0.527	0.660	0.473	0.657	0.449
CEK1	0.480	0.733	0.556	0.734	0.530
CEL1	0.283	0.529	0.382	0.551	0.396
CEL2	0.437	0.643	0.448	0.644	0.441
CEL3	0.478	0.700	0.489	0.704	0.484
CER1	0.378	0.559	0.383	0.577	0.407
CER2	0.343	0.572	0.387	0.588	0.405
CER3	0.411	0.715	0.529	0.732	0.528
CRB1	0.211	0.528	0.396	0.542	0.382
CRE1	0.086	0.645	0.529	0.660	0.535
CRG1	0.243	0.577	0.435	0.588	0.414
CRW1	0.081	0.515	0.407	0.513	0.402

PLS Predict is a form of model validation to describe the extent to which the proposed PLS model has good predictive power. In Hair et al. (2019), first is to look at the  $q^2$  prediction value at the PLS model indicator level where overall most of the PLS model indicators have a higher  $Q^2$  prediction than the LM model. Meanwhile, the lower RMSE and MAE values indicate that the model has better predictive power.

## 5. DISCUSSION AND IMPLICATION

Gamification in automotive after-sales service has a direct effect on customer retention and an indirect effect on customer retention through the mediation of customer satisfaction and engagement. Gamification has a direct effect on customer retention with a moderate effect size ( $R^2$ : 0.553). Gamification has an indirect effect through the mediation of customer satisfaction and customer engagement with a moderate effect size (Upsilon ( $v$ ): 0.01-0.175). This research provides important insights for the automotive industry in improving customer retention through the implementation of gamification.

The findings confirm that gamification increases customer engagement and satisfaction, positively impacting retention. Automotive dealers can utilize gamification to strengthen loyalty, improve customer relationships, and support positive promotion through recommendations.

The research implications focus on the theoretical and practical contributions of the research on the effect of gamification on customer retention in automotive after-sales service.

### • Theory Implications

Research on the influence of gamification on customer retention in automotive after-sales service has significant theoretical implications. The findings that the use of gamification has a direct and indirect impact on customer retention through the mediation of customer satisfaction and the mediation of customer engagement provide empirical support for theories on consumer behavior and customer retention.

These implications enrich the understanding of how customer interaction and engagement in the context of automotive after-sales service can be enhanced using gamification strategies. The novelty in this study also provides an in-depth look at the factors that influence customer retention in the automotive industry, which can make a valuable contribution to the development of theories on customer retention and customer experience.

### • Practical Implications

The practical implication of this research is to provide guidance for automotive companies in designing effective gamification strategies to improve customer retention. The results of this study show that the use of gamification can increase customer engagement, customer satisfaction, and ultimately affect retention rates. Therefore, automotive companies can utilize these findings to develop gamification features that are engaging, relevant, and in line with their customers' preferences and needs.

This research is highly relevant to the automotive industry and after-sales service providers, especially automotive dealers who serve end customers. The fact that the use of gamification has a positive impact on customer retention suggests that this

strategy can be used as a tool to increase customer loyalty. By focusing on improving customer satisfaction and engagement through gamification elements, automotive companies can strengthen their relationships with customers, increase the probability of customers returning for after-sales service, and even contribute to positive promotion through recommendations. These implications suggest that investments in the development of gamification platforms and interactive customer experiences can yield long-term benefits in the form of higher customer retention, better customer satisfaction, and greater competitiveness in the automotive market. This implication is important given the importance of customer retention in maintaining business sustainability and building long-term relationships with customers.

## 6. FUTURE RESEARCH

In terms of further research development directions, several suggestions can be made to pave the way for knowledge expansion on the impact of gamification on customer retention in automotive after-sales service. By engaging these steps, the research will deepen and contribute more meaningfully to our understanding of how gamification strategies can improve customer retention and generate sustainable business growth in the automotive industry.

- Exploration of additional variables: Future research could extend the analysis by considering additional variables such as demographic characteristics and customer preferences, as well as environmental factors that might influence the relationship between gamification, customer satisfaction, customer engagement, and customer retention in automotive after-sales service.
- Cross-industry and other context analysis: By comparing the impact of gamification on customer retention across different industries or service contexts, future research can provide greater insight into the effectiveness of gamification strategies and the potential for adaptation to different sectors.
- Longitudinal research: Studies conducted over a longer period can reveal trends and changes in customer retention that may be related to the use of gamification, providing greater insight into the durability of the impact.

With further research, it is hoped that the understanding of the influence of gamification on customer retention in automotive after-sales service will become more comprehensive and can provide stronger practical guidance for the automotive industry in implementing gamification strategies to create sustainable business growth.

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