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Applying PLS-SEM in Finding Factors Affecting Customer's Purchase Decision of Truck: The Case at Karuto Trading Service Co., Ltd

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Abstract
The main objective of this study is to identify factors affecting the customers' decisions to buy trucks at Karuto Trading Service Co., Ltd. Research methodology uses a combination of two methods of quantitative research and qualitative research. Quantitative research was conducted after summarizing results from qualitative research, then surveyed by distributing questionnaires to 200 customers who intend to buy trucks at Karuto Trading Service Co., Ltd. The Structural Equation Modeling (SEM) Smart PLS software is used in this study to determine the factors that affect customers' decisions to buy trucks. The results showed that 5 factors affect Perceived Value and Perceived Value affects Customer Purchase Decisions. The total 7 factors in this study are Information sources, Brand, Price, Product characteristics, Distribution agent, Perceived Value, and Purchase Decision.
The study also gives some recommendations for managers to help the company retain customers and increase the number of customers

Keywords: Purchase Decision; Information sources; Brand; Price; Product characteristics; Distribution agent; Perceived value.

1. Introduction
In recent times, since the covid 19 epidemic showed signs of decline, the truck market is growing strongly. According to the report of VAMA (Vietnam Automobile Manufacturers Association) in May 2020, sales volume (automotive industry) of the whole market reached 19,081 units, including 13,009 passenger cars; 5,810 commercial vehicles, and 262 specialized vehicles.
More in-depth analysis of the truck line to see more clearly the Vietnamese market trend for this model. Minivans (tonnage of fewer than 5 tons) accounted for a fairly high proportion with sales of 2071 out of a total of 5454 of all commercial vehicles. In the first 5 months of the year, minivans accounted for 40.05% of commercial vehicle sales. This line of vehicles is followed by pick-ups and trucks with a tonnage of 5-10 tons. Total sales from the beginning of 2020 to May 2020 have a marked decline compared to 2019. Again, trucks fell by 19% over the same period but that was the lowest of the vehicles when buses had a huge reduction of 75%. Thus, we can be seen that the demand for trucks of Vietnamese consumers is very large, even the covid 19 pandemic does not affect too much. The demand for trucks is also mainly concentrated in the South and the North, where the population is densely populated, densely populated areas, so the demand for small-ton trucks is quite large.
In recent times, dealers have also begun to place more emphasis on activities to increase attractiveness, sales and market share by region. High market demand has created a great opportunity for businesses to increase sales as well as gain market share. However, this is also a challenge for businesses and businesses must understand what influences customers' decisions to buy trucks.
Understanding the factors influencing customers' decisions to buy trucks will serve as a basis to help businesses operating in the automotive and truck sectors have the right business strategies to help businesses maintain their current customer base as well as expand the customer list. However, to date, there have been no research studies on truck items as well as

truck buying behavior. Stemming from the above reasons, the author conducted "Researching the factors affecting customers' decisions to buy trucks at Karuto Trading Service Co., Ltd" to determine the factors affecting the decision to buy a truck in Karuto Trading Service Co., Ltd, analyzing the influnce of those factors from that can apply for other company in the same field.

2. Literature Review

In order to build up the research framwork and propose research hypotheses, this section will briefly review previous studies that conducted to research the customer's purchase decision in the similar or same field such as purchasing car decision, purchasing truck or van decision.

Dr. Ronald Mani and Mrs. Laxmi Singh (2016) proposed a study in which he discovered that mileage is crucial. A structured questionnaire was employed to obtain primary data from people who owned little automobiles in Allahabad for this study. A sample of 100 owners was chosen using convenience sampling, and the relevant information was gathered using a personal interviewing method to reduce inaccuracies. Males made up a large share of the respondents (83%) and the majority of them were from the service class. The findings demonstrated that people had differing viewpoints on several qualities. However, a deeper examination indicated that for the majority of respondents (56 percent), mileage was the most important consideration, followed by car price and engine power, with elements such as financing schemes and resale value having less influence on decision-making.

Kowang et al., (2018) conducted a study to find out the factors that affect car purchase intention of undergraduated students at at the University of Technology Malaysia (UTM). 81 students was ramdomly selected as the sample of the research. The findings indicated that four factors namely Price, Aesthetic, Features, and Interpersonal Influence fount to have significant influnce on the car purchase intention of respondents. Among those four driven factors, aesthetics was the most important factor that influences car purchase intention and while price had the least effect on student's intention.

Regarding the same research topic, the study Dhanabalan et al., (2018) investigating the factors affecting Indian consumer's car purchase intention with a sample size of 547 people. In this research, the authors assumes that perceived value is the mediators between six independent variables namely (1) brand, (2) price, (3) quality, (4) design, (5) utility, (6) technical consideration and the dependent variable-purchase decision. The results exhibit that brand, price, quality, design, utility, and technical consideration are playing an important role in influencing customers' perceived value and encouraging them to have purchase decisions over a particular car. The customer perceived value is an important factor that influences customer's purchase decisions.

In terms of Vietnamese customer's car purchase intention, the study of Hoang Yen Nhi (2015) with a sample size of 286 samples indicated that seven factors: (1) Source of information, (2) Products, (4) Prices, (5) Brand, (5) Express social values, (6) Distribution agents, and (7) external impact factors were found to have significant influnce on car purchase intention of Vietnamese customers in which Brand, Price, Product, External Factors are top 4 most important factors.

Siddharth Sengar conducted a study in 2019 in the Pune Region to find out the factors affecting customer's purchase intention toward commercial vehicles. The study was conducted in the Pune region with a sample size of 355 people. The research model consists of seven factors: (1) Availability of spare parts, (2) Technology, (3) Loading Capacity, (4) After-sale service, (5) Mileage of vehicle, (6) Down payment, (7) Recommendation from known, (8) Service Life, (9) Brand. The results of the study showed that factors like availability of spare parts, loading capacity, down payment and brand, mileage of the vehicle, and after-sale service are the important contributors to the buyers when making purchasing decisions on the vehicle. Similarly, ord of mouth and banners, and flex are advertisement channel components that majorly influence factors in the decision against the purchase of the vehicle.

Based on the literature review, tha authors proposed below research framework and research hypotheses.

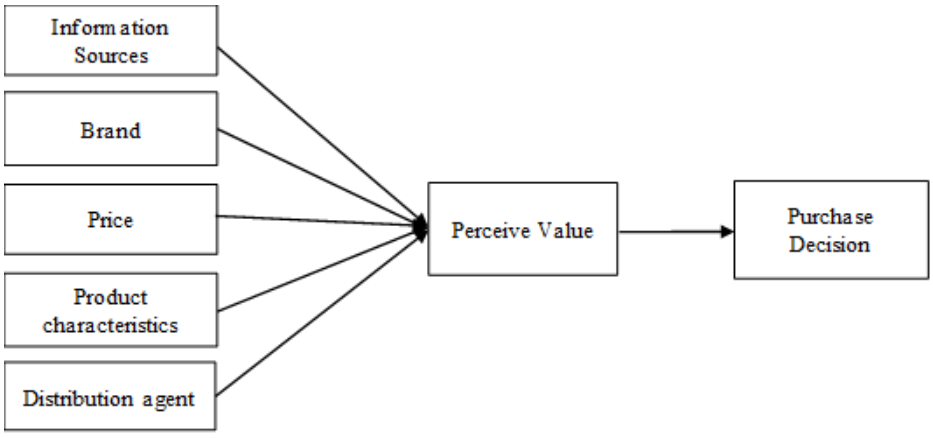

Fig. 1: Proposed Research Model.

Hypothesis H1: Information Sources has a significant influence on customers' perceived value.

Hypothesis H2: Brand has a significant influence on customers' perceived value.

Hypothesis H3: Price has a significant influence on customers' perceived value.

Hypothesis H4: Product characteristics have a significant influence on customers' perceived value.

Hypothesis H5: Distribution agent have a significant influence on customers' perceived value.

Hypothesis H6: Perceived value has a significant influence on customers' truck purchase decisions.

3. Research Methodology

The research is conducted based on the following qualitative and quantitative research methods:

Qualitative research: used to explore and perfect the research model. The qualitative research was carried out in two phases. Research the theoretical basis and previous studies to propose preliminary research models and scales. Then, the author will use the Pilot study for experienced employees in the trucking business to test whether the research model is suitable for the specifics of the industry. Based on the research model, the author proposes a quantitative research model.

Quantitative research: is used to measure the influence of factors on the customers' decisions to buy trucks at Karuto Trading Service Co., Ltd. Data for quantitative research based on a questionnaire survey of customers who intend to buy a truck at Karuto Trading Service Co., Ltd. Convenient sampling method with a sample size of 200 people. Based on the data collected, the author used SMART PLS software to perform statistical analysis measures the factors that influence a customer's purchasing decision.

4. Empirical Results

4.1. Pilot Study

In order to make sure that all factors included in the research model are suitable, the author conducted a pilot study in which 5 experts were interviewed to give their opinion about the selected factors. The results of pilot study were presented in Table 1.

Table 1: Result of Pilot Study.

	Category	Frequency	Percent
In your opinion, Information Sources are a factor that affects the perceived value, thereby affecting the customer's decision to buy a truck	Totally disagree	0	0
	Disagree	0	0
	Neutral	2	40%
	Agree	2	20%
	Totally agree	1	20%
In your opinion, Brand is a factor that affects the perceived value, thereby affecting the customer's decision to buy a truck	Totally disagree	0	0
	Disagree	0	0
	Neutral	0	0
	Agree	2	40%
	Totally agree	3	60%
In your opinion, Price is a factor that affects the perceived value, thereby affecting the customer's decision to buy a truck	Totally disagree	0	0
	Disagree	0	0
	Neutral	0	0
	Agree	0	0
	Totally agree	5	100%
In your opinion, Product Characteristics are a factor that affects the perceived value, thereby affecting the customer's decision to buy a truck	Totally disagree	0	0
	Disagree	0	0
	Neutral	0	0
	Agree	1	20%
	Totally agree	4	80%
In your opinion, the Distribution agent is a factor that affects the perceived value, thereby affecting the customer's decision to buy a truck	Totally disagree	0	0
	Disagree	0	0
	Neutral	1	20%
	Agree	1	20%
	Totally agree	3	60%
In your opinion, perceived value is a factor affecting customers' purchasing decisions	Totally disagree	0	0
	Disagree	0	0
	Neutral	1	20%
	Agree	2	40%
	Totally agree	2	40%
In your opinion, are there any other factors that affect the customer's perceived value and decision to buy a truck?	Yes	0	0
	No	5	100%

From Table 1, we can see that most of the survey results agree and totally agree with the factors affecting the perceived value, thereby affecting the customer's decision to buy a truck. In addition, there are no other factors that affect the perceived value as well as the customer's decision to buy a car. Therefore, it is possible to determine that all 6 factors are suitable and the proposed model is accepted.

4.2. Descriptive statistics

The survey lasted from 20th March to 10th April, 2022. In this research, the initial sample size was 219 people around Da Nang city. At the end of the survey, after conducting checking and eliminating the error surveys, 200 tables were collected. Some responses were eliminated because the customer gave the same answer to all the questions, conflicting answers, etc. Therefore, 200 questionnaires were valid. Where consumer volume was 219 and the number of respondent answers was 200 with the filling-in rate of 91.32%. The following includes a brief overview of the demographic data collected based on the results provided by respondents and analyzed by SPSS software. The background information on the subject included: gender, age, occupation, income, marital status, and purpose of buying trucks. The table shows the complete description of consumers' characteristics. The following paragraphs analyze each item.

Table 2: Respondent's Demographic Statistics.

	Category	Frequency	Percentage (%)
Gender	Male	164	82%
	Female	36	18%
Age	From 21 to 30	34	17%
	From 31 to 40	101	50.5%
	From 41 to 50	61	30.5%
	More than 50	4	2%
Occupation	Self-employed	129	64.5%
	Office workers	41	20.5%
	Driver	18	9%
	Other	12	6%
Income	< 15 million	46	23%
	15 – 20 million	92	46%
	> 20 million	62	31%
Marital status	Married	125	62.5%
	Single	75	37.5%
Purpose of buying trucks	To drive a rental car	18	9%
	Serving the needs of families/individuals	111	55.5%
	For rent	30	15%
	Buy for the company	41	20.5%
Total		200	100%

4.3. Reliability Test

In this section, Cronbach's Alpha was applied to test the reliability of all constructs. The results of this analysis step are showed in table 3 indicating that Cronbach's alpha for all variables were higher than 0.7, which means that the reliability of all variables is accepted. Therefore, all variables of this study are suitable for next analysis.

Table 3: Cronbach's Alpha Reliability Analysis.

Factors	Cronbach's Alpha
Information sources	0.891
Brand	0.870
Price	0.868
Product characteristics	0.902
Distribution agent	0.857
Perceived value	0.789
Purchase decision	0.864

4.4. Convergent Validity

Convergent validity is the measure of the internal consistency. It is estimated to ensure that the items assumed to measure each latent variable measures them and not measuring another latent variable (Fornell & Larcker, 1981; Hulland, 1999). Convergent validity of the construct can be determined by calculating individual item reliability, Cronbach's alpha, Composite reliability (CR) and Average Variance Extracted (AVE) as suggested by (Aibinu, Ling & Ofori, 2011).

Table 4: Factor loading, AVE and CR results.

Factors	Items	Factor Loading	AVE	CR
Information sources	IS1	0.882	0.695	0.919
	IS2	0.898		
	IS3	0.743		
	IS4	0.793		
	IS5	0.843		
Brand	BR1	0.818	0.658	0.906
	BR2	0.849		
	BR3	0.788		
	BR4	0.822		
	BR5	0.776		
Price	PR1	0.738	0.647	0.901
	PR2	0.811		
	PR3	0.781		
	PR4	0.836		
Product characteristics	PC1	0.829	0.672	0.924
	PC2	0.899		
	PC3	0.815		
	PC4	0.730		
	PC5	0.787		
	PC6	0.848		
Distribution agent	DA1	0.809	0.637	0.898
	DA2	0.827		

	DA3	0.797		
	DA4	0.727		
	DA5	0.827		
Perceived value	PV1	0.791	0.613	0.864
	PV2	0.771		
	PV3	0.804		
	PV4	0.765		
Purchase decision	PD1	0.816	0.711	0.908
	PD2	0.883		
	PD3	0.865		
	PD4	0.807		

[Source: Smart PLS result & complied by author]

The result at table 4 indicated that convergent validity of this study measurement model can be proved as the factor loading of same construct of all 7 constructs are higher than 0.7, average variance extracted (AVE) of all constructs are higher than 0.5 and composite reliability (CR) of all constructs are higher than 0.7.

4.5. Assessment of The Structure Model

To make sure that we can safety ignore multicollinearity, the results of VIF- the variance inflation factor is present at table 5 in which the data prove that all VIF value is below 5 (Hair et al., 2014) which mean that multicollinearity can be ignore in this study.

Table 5: Inner VIF.

	Purchase decision	**Perceived Value**
Brand		1.127
Distribution agent		1.104
Information Sources		1.057
Product characteristics		1.085
Price		1.019
Perceived Value	1.000	

[Source: Smart PLS result & complied by author]

In the next step, the authors assess R square, F square and Model Fit to test the fit of the model.

Firstly, we examined the value of R square. As showed at table6, we find that 68.4% the changes in Perceived Value can be explained by Information sources, Brand, Price, Product characteristics, Distribution agent (R^2 = 0.684) which is relatively high considering that the model considers the effect of customer's purchase decision. In addition, which has R^2 value of 0.554, we also find that Perceived Value can explain up to 58.4% the variance in Purchase decision.

Table 6: R – Square.

	R Square
Purchase decision	0.554
Perceived Value	0.684

[Source: Smart PLS result & complied by author]

Secondly, we asssess SRMR = 0.062< 0.08, the research model is considered a good fit. After being sure about the model fit, the path coeficient were examine with the results indicated in Table 7.

Table 7: Path Coefficients.

Hypothesis	Path	Path Coefficients	t -value	P -values
H1	Brand -> Perceived Value	0.506	11.559	0.000
H2	Distribution agent-> Perceived Value	0.332	7.991	0.000
H3	Information Sources-> Perceived Value	0.143	3.420	0.001
H4	Product characteristic -> Perceived Value	0.227	5.599	0.000
H5	Price-> Perceived Value	0.118	2.763	0.006
H6	Perceived Value -> Purchase decision	0.744	23.604	0.000

[Source: Smart PLS result & complied by author]

According to data showed in Table 7, we accepted all six research hypotheses as the p value of all path were found smaller than 0.05. However, we would like to test if the path coefficient of all original sample are within the condifent interval or not. Therefore, the bootstrapping testing was applied with 500 observations. Results of bootstrapping testing were presented in Table 8 indicating that the base weight is significant with the mean of bootstrapping because all weights are within the 95% confidence interval. Thus, the estimates in the model can be concluded to be reliable.

Table 8: Bootstrapping testing.

	Original Sample (O)	**Sample Mean (M)**	**2.5%**	**97.5%**
Brand -> Perceived Value	0.506	0.506	0.422	0.590
Distribution agent-> Perceived Value	0.332	0.334	0.261	0.413
Information Sources-> Perceived Value	0.143	0.141	0.061	0.225
Product characteristic -> Perceived Value	0.227	0.225	0.140	0.298
Price-> Perceived Value	0.118	0.121	0.034	0.198
Perceived Value -> Purchase decision	0.744	0.747	0.683	0.811

[Source: Smart PLS result & complied by author]

4.6. Relationship between Respondent's Demographic and Purchase Decision

In this section, SPSS version 20.0 was applied to test if the differences of respondent's demographic have any effects on the purchase decision. To achieve this objective, One-Way Anova in SPSS was employed. The reseults of 6 separate One-Way Anova testings were combined and presented in Table 9.

Table 9: Result of One – way Anova.

Category	Sig.
Gender	0.140
Age	0.636
Occupation	0.000
Income	0.452
Marital status	0.530
Purpose of buying trucks	0.001

[Source: Smart SPSS result & complied by author]

The results indicate that there is no significant difference was found in truck purchasing decisions by gender, age, monthly income and marital status However, the difference of occupation and the purpose of buying truck found to have signìicant influnce on customer purchase decision.

5. Findings and Discussions

The main purpose of this study is to find out the factors that significantly influence customer's truck purchase decision. From that find out the influnce level. The results of our study indicated that Information Sources, Brand, Price, Product Characteristics and Distribution agent significantly affect customer's perceived value of truck, from that mediate customer's purchase decision. The results of this study also show that the buying demand of the self-employed customer group of Karuto Trading Service Co., Ltd. is higher with a higher rate of 64.5%, the demand for the group of customers who are office workers will be lower with 20.5% while driver only accounts for 9.0% and other accounts for 6.0%. Therefore, the market for self-employed customers is very large. Regarding the demand to buy trucks for each target group, married customers account for a higher percentage than single customers. In addition, the customer's purpose of buying trucks is mainly to serve the needs of families/individuals with the rate of 55.5%, buying trucks for company accounts for 20.5%, buying trucks for rent accounted for 15.0% and buying cars for rental only accounted for 9.0%.

This study contributed to the truck market research by providing insight into the factors influencing the customer's truck-buying decisions in Da Nang City. The findings of this research also provided truck manufacturers and companies with insights into truck buyer behavior and what the truck market wants. Truck manufacturers and trucking dealers can use the results of this study as a criterion for planning further business development.

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