



UNIVERSITY OF AGDER
SCHOOL OF BUSINESS AND LAW

**PASSENGER SATISFACTION WITH HYBRID ELECTRIC BUS
SERVICE IN NORWAY**

-A PLS Structural Equation Modelling Approach

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Word of Gratitude

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List of Abbreviations

HEB- Hybrid electric Bus

AVE- Average Variance Extracted

CR- Composite Reliability

SPPS- Statistical Package for Social Science

SEM- Structural Equation Model

WOM- Word of Mouth

GHG- Greenhouse Gas Emission

CA- Cronbach Alpha

CFA- Confirmatory Factor Analysis

NFI- Normed Fit Index

Abstract

The use of hybrid electric buses (HEBs) in public transit is one of the global attention received topics in this 21st century because of its environment friendly nature. This study focusses on effect of bus service quality dimensions such as bus driver's quality, bus tangible and empathy to determine customer satisfaction level of bus service in Kristiansand region. Structural equation model is used for an empirical investigation to find out the association of perceived bus service quality dimensions with word of mouth mediated by perceived value and customer satisfaction. A total of 276 valid university student responses were used for data analysis in this study. Customer satisfaction is one of the crucial elements which was acknowledged in every service sector in this modern era. Customer satisfaction level with the use of electric buses is studied in this paper. This is one of the global topics where most of the world global transport companies are researching to promote the use of the electric vehicle to decrease the environmental impact of fossils fuels and global warming. The parliament of Norway targets to sold zero-emission electric vehicles by 2025. The structural modeling equation analysis results depict that except bus driver's quality other bus service quality dimension (bus tangible and empathy) leads to higher satisfaction to a customer while using HEBs which is also positively associated with word of mouth. This means there is a high adaption of HEBs among the users or commuters in Norway. The finding of this study may be practical for bus operators, Kristiansand kommune, Ruter Norge, Boreal Norge AS and other all companies related to transport.

Keywords: Hybrid electric bus, Bus tangible, Bus driver's quality, Empathy, Customer satisfaction, Word of mouth, Bus service, Structural equation modelling

1. Introduction

Transport is one of the necessary infrastructures and stands as a backbone for country development in this era of globalization. The developments in public transport sector services change the concept of services from production-oriented to customer-oriented (Mouwen & Rietveld, 2013). Public transport plays a vital role in an urban setting. The primary reasons that make the public transport more valuable are competing for limited space, increasing urbanization, environmental issue, longer commuting distance as well as for equity and equality of society and country. The public transport is used mostly due to long term experiences over the decades, and the provided services are cheap, reliable, and fast mobility (Stelzer, Englert, Hörold, & Mayas, 2016). To investigate satisfied public transport users the increase in the number of bus departures, a new metro line, or new vehicles, etc. can be done to fill the gap about the satisfaction levels reported by travelers (Friman & Felleson, 2009).

Customer retention is all about customer satisfaction, which can be achieved by improving the services of public transportation (Abenzoaa, Cats, & Susilo, 2017). Public transport service quality has been an important research topic in developed countries because of urbanization in the present context (Sam, Daniels, & Hamid, 2018). Lots of investment are being made in public transport system in many countries to make them more competitive in terms of private cars (Fellesson & Friman, 2012, February) Many studies are carried on to measures the passenger's satisfaction while using urban public transport services. For instance, (Le-Klähn, Michael, & Gerike, 2014) researched about passenger satisfaction with public transport in Munich and research about the best way to improve the service quality of public transport to obtaining possible daily information from a passenger for service quality improvement by management team and transport operator team. Previous studies have grouped public transport service quality attributes into "soft quality" and "functionality quality" (Budiono, 2009). For example, Budinono (2009) define soft quality as quality items related to passenger security and comfort.

In contrast, functionality quality items related to service frequency, travel time, reliability, and punctuality. Transport operators should play a vital role to provide these services to passengers. On the other hand, service frequency, vehicle cleanliness, and comfort, waiting time and network coverage are also highly prioritized by most public transport commuters or travelers (Le-Klähn, Michael, & Gerike, 2014).

Past studies focused too much on non- core users (e.g. tourist and students) ((Ojo, 2019)) whereas service quality perception and expectation is a significant difference from core users (the person using bus transport at least thrice weekly) (Krizek, El-Geneidy, & Thompson, 2007). Past research has used methodologies such as structural equation modelling, service performance (SERVPERF), (see (Cronin Jr & Taylor, SERVPERF versus SERVQUAL: reconciling performance-based and perceptions-minus-expectations measurement of service quality. *Journal of marketing*, 58(1), 1994)), discrete choice models (see (Lovreglio, Borri, dell'Olio, & Ibeas, 2014)) and Importance-Performance Analysis (see (Machado-León, de Oña, Baouni, & de Oña, 2017)). However, the Structural Equation Modelling approach applied in this study because of its broad application in measuring service quality. Also, public transport stakeholder can implement its finding quickly (Barabino et al., 2012). The public transport management company, transport operators, boreal.no and people who are working on this related field might be benefited with this research.

The rapid increase in number of vehicles raises concern for substitutes for fossils fuels (63.8% accounted for total oil consumption, and terminal energy consumption is 27.6% globally) because of its impact in the environment due to greenhouse gas emission (GHG) which shows 250% increase in consumption of fossils fuel by global transport between 1970 and 2010 (Song, et al., 2018) which is enormous in comparison to other sector. The tremendous increase in fossils fuels tends global transport authority to replace conventional diesel-powered buses to hybrid-fuel-powered buses (Nanaki et al., 2017). The many countries implemented to use Hybrid electric buses (HEBs) or alternative-fuel-powered bus because of its environment friendly nature. Norway is an environment friendly country which shows an increasing number of hybrid electric vehicles in all region. It is interesting to investigate if higher satisfaction with HEBs service quality is positively associated with word of mouth (WOM), meaning a higher degree of HEBs adaptation among the users. The purpose/research question of this study is

- Does service quality effect perceive value?
- Does service quality effect customer satisfaction?
- Does perceive value effect customer satisfaction?
- Do perceive value and customer satisfaction effect word of mouth?

The paper is organized as follows. Section 2: literature review, Section 3: a theoretical framework that describes the relationship between service quality, perceived value, customer satisfaction, and word of mouth. Section 4: methodology, Section 5: Results from data analysis, Section 6: Discussion of result whether the result is useful or not, Section 7 Conclusion which includes a recommendation, limitation of the study and future research and its implication if any.

2. Literature review and hypothesis

Satisfaction is defined as the customer's fulfillment (Oliver, Rust, & Varki, 1997). Researchers explain the traveler's satisfaction with the traveler's expectation and fulfillment (Tyrinopoulos & Aifadopoulou, 2008). The study done in Italy measured nine service aspects which measure the degree of satisfaction of multimodal travelers with public transport that shows the satisfaction and frequency of use of urban transit are not correlated (Diana, 2012). A research done in Switzerland about switching travel mode shows that satisfaction and attitudes were related to the behavior of users and study shows that people who turned to public transportation are more satisfied than who did not switch (Abou-Zeid, Witter, Bierlaire, Kaufmann, & Ben-Akiva, 2012).

The next most crucial factor that influences public transport satisfaction is travel time, whereas longer travel time leads to lower satisfaction and vice versa (Gorter, Nijkamp, & Vork, 2000)). Furthermore, unreliable services, long waiting times, poor cleanliness, poor schedule, bad driver behavior etcetera often made customers less satisfied (Cantwell, Caulfield, & O'Mahony, 2009). Therefore, service frequency, vehicle cleanliness, waiting conditions, transfer distance, and network coverage are the essential satisfaction attributes in public transportation (Le-Klähn D. T., 2013)

Service quality has been an important, exciting topic for many studies over the last two decades (Caruana, Money, & Berthon, 2000). Service quality is defined as an expectation of service (Parasuraman et al. (23). Transit user needs and expectation is viewed as customer satisfaction with the quality of services (Imam, 2014). Past research shows that four service quality factors which are identified as onboard amenity, crews' attitude, station performance, and operational performance) are essential factors that represent all service quality items (Wen, C. H., Lan, L. W.,

& Cheng, H. L. 2005) which also shows that passenger loyalty has indirect effects on service quality, sacrifice, and service. The quality of public transport systems has been directly observing through user surveys by collecting ratings given by the users to specific aspects of the system. Many studies use user surveys by collecting rating provided by a passenger to each element of the transportation system. (Del Castillo & Benitez, 2013). In the modern context, SERVPERF, SERVQUAL, and Structure equation model are quite popular to measure customer satisfaction and service quality (Abdullah, Jan, & Manaf, 2012). About bus service quality, service quality is divided into bus tangible, bus driver's quality and empathy.

The link between customer satisfaction and service quality is a subject to deserve more attention in the literature (Mouwen & Rietveld, 2013)The five service quality dimensions are defined as reliability, assurance, tangibility, empathy, and responsiveness (Sam, Hamidu, & Daniels, 2018)) which are part of customer satisfaction. Customer satisfaction will depend on customer's perception of service quality, product quality, price, and also sometimes personal and situational factor of the customer (Arokiasamy & Abdullah, 2013).

Customer Satisfaction is related to the confirmation and disconfirmation of the expectation (Smith & Houston, 1983), and their study based on the disconfirmation model. As per the report of (Churchill Jr & Surprenant, 1982), satisfaction always related with the way and size of disconfirmed experience while disconfirmation directly connected with the initial expectation of the customer and people.

From the different finding of the different researcher, we can say that there is a significant relationship between customer satisfaction and service quality. From the report of Cronin Jr & Taylor service quality is an important component for the customer satisfaction and customer satisfaction always leads purchasing intention of the buyer.

According to the report of (Bonaventura, 2015), in proposing quality influences satisfaction level, it is compulsory to endorse the perspective that quality encompasses the satisfaction at the counter-specific level. Service quality and customer satisfaction have a mutual relationship where quality is hypothesized in one dimension in which the satisfaction is based as well as satisfaction has one constant impact on global service quality perception. There are other finding that the effect of service quality dimension is high followed by empathy and responsiveness of service quality (Bonaventura, 2015).

2.1 Bus Tangible:

Tangible refers to the physical appearance of product, equipment, employees, and communication materials (Agyapong, May 2011). Bus tangible is related to maintenance, cleanliness, and safety of coaches, as well as bus, stops with a perfect signboard which makes travelers safe and comfortable during travel (Verma, Verma, Ajith, & Sindhe, 2014). Customer cannot rank the service because service is invisible, so they always measure service with tangible features like physical appearance or outlook, accessibility, comfortability, cleanliness, internal entertainment equipment, service time and other facilities (Yu & Tung, 2013). As per the study of (Ratanavaraha V., Jomnonkwao, Khampirat, Watthanaklang, & Iamtrakul, 2016), the new commuters examine the vehicle with the vehicle's outlook, safety, and appearance. Likewise, (Goh, Currie, Sarvi, & Logan, 2014) found that older vehicle over 25 years has more appeared in accidental cases for bus service customer will evaluate their satisfaction with the outlook of the bus, comfortable level of a bus seat, facilities of toilet, emergency exit and cleanliness of bus floor. So, with all the physical appearance customer can satisfy themselves. Bus stop availability, frequency, Bus stop furniture, cleanliness, safety on board, personnel, environmental protection, bus stop maintenance, and cost for service will affect the customers travel satisfaction (Eboli & Mazzulla, 2007). With studying the different research from a different writer, we can assume that the visible quality of bus can profoundly impact on customer satisfaction and customers perceived value. Therefore, bus tangible also can impact on customer's perceived value and satisfaction level we hypothesized the following statements:

H1 a: Bus tangible related quality is positively associated with perceived value

H1 b: Bus tangible related quality is positively associated with customer satisfaction

2.2 Bus Drivers quality:

Bus driver quality is associated with driver's knowledge, skill, and pleasant personality to communicate with passenger and capability to manage problems for instance traffic light signal, transit problems, passenger queries related to travel, safe driving, passenger satisfaction during travel, etc. (Rohani, Wijeyesekera, & Karim, 2013). Bus crews' quality highly influences customer satisfaction. Bus driver's personality, politeness, driver appearance, driving skill, communication

skill, etc. are the primary elements which will impact the customer satisfaction level (Jomnonkwao & Ratanavaraha, 2016).

According to (Wen et al., 2005), among four service quality bus, driver's quality is an essential factor which has a direct impact on customer satisfaction, and there is a positive relationship between crew's behavior and customer satisfaction. (Ratanavaraha & Jomnonkwao, 2014) Defined some indicator of passenger's expectation in a sightseeing bus service are bus drivers experience, driver expression, driving license, bus drivers' skills, smoking and drinking habit, etc. The survey and interview were done on Sweden about bus drivers quality with public transport passengers show that drivers should be more customer oriented and interactive through professional training to improve customer satisfaction and service value (Edvardsson, 1998) and (Wen et al., 2005). Therefore, a good driver's quality has a direct impact on customer satisfaction and perceived value, which is shown below by creating a hypothesis.

H2 a: Bus Drivers' related quality is positively associated with perceived value

H2 b: Bus Drivers' related quality is positively associated with customer satisfaction

2.3 Empathy:

Empathy refers to the attention given to the individual customer so that the customer will feel unique and important one for an organization (Siddiqi, 2011). It is about the cognitive and affective aspect of the customer which include affective empathy (feeling of something for other), emotional contagion (experiencing something as different) and perspective-taking (knowing other's emotions and thought) from (Johnson, 2012). Nowadays, consumers are more educated than before, so they want a quality product with individual attention and treatment from an employee (Suki, 2014). Thus, through the personal attention experience customer can feel positive or might be they can negative as well. All measurements items such as punctual departure and arrival, availability of bus routes within and outside city, provision of compensation schemes in case of losses or hazard, attention paid while passengers are boarding from on-an-off a bus and availability of bus routes between town and airport adopted from (Parasuraman, 1998; and Suki 2014). By studying (Siddiqi, 2011) and (Suki, 2014), we can conclude that there is a relationship between empathy and customer satisfaction level, so we create the following hypothesis:

H3 a: Empathy is positively associated with perceived value

H3 b: Empathy is positively associated with customer satisfaction

2.4 Perceived value:

Perceived value is all the service and benefits customer receive with the total cost (McDougall, G. H, & Levesque, 2000). Here total cost includes price and all the cost related to service. When a customer spends less time, money, energy compared to the service they get, then they will receive a high perceived value of service (Hapsari, Clemes, & Dean, 2016). Money, quality product, benefit from the product, and social psychology is a significant determinant of customer's perceived value. It is the difference between the highest amount the customer wants to pay for the product and the original amount they paid (Kuo, Wu, & Deng, 2009). Also, when the customer receives more service quality than they expected, it will lead towards more satisfaction. Also, from the report of (Hapsari, Clemes, & Dean, 2016), perceived value is mediating construct for the service quality and customer satisfaction. Likewise, word of mouth is another of communication. Through word of mouth, the organization can retain and increase their customer because after getting a service, everyone wants to share their experience with the product or service (Suki, 2014).

Value of service represents the net perceived value between service quality benefit and the transaction cost. So, when the price is high customer might have very less or no perceived value however if there is perceived benefit than perceived value is likely to be high (Wen, Lan, & Cheng, 2005). By studying (Kuo, Wu, & Deng, 2009), (Suki, 2014) and, and (Hapsari, Clemes, & Dean, 2016) we can say that high perceived benefit leads towards the positive word of mouth and high customer satisfaction.

By analyzing the perceived value, we are creating some of the hypothesis:

H4: Perceived value is positively associated with word-of-mouth

H5: Perceived value is positively associated with customer satisfaction

2.5 Customer satisfaction and word of mouth:

High customer satisfaction always leads to long-term customer retention. Word of mouth is like a chain because if one customer properly satisfies with all the service of an organization that he/she spread all information towards society and customer dissatisfy with service than also it spreads

more faster (Suki, 2014). Also, with the study of Suki, we can say that word of mouth is the best advertising because people believe it faster than any other means of advertisement.

Word of Mouth is the process where after using the product or service customer passes their information and experience to new people who want to use the same service (Kuo, Wu, & Deng, 2009). People who have less knowledge about a product they often use word of mouth as original information, so positive word of mouth or satisfied customer always spread positive information. Also, WOM gives solution to the intangibility problem of the services because the customer may not understand the service thoroughly before they used (Bansal & Voyer, 2000). Usually, the unsatisfied customer will more active after post-purchase as compare to satisfied one, but according to (Suki, 2014), satisfied customer spread more positive information about the service as compared to the dissatisfied customer. So with studying (Suki, 2014), (Kuo, Wu, & Deng, 2009) and (Bansal & Voyer, 2000) another author, we can hypothesize that

H6: Customer satisfaction is positively associated with the word of mouth

3. Theoretical framework:

Based on the literature review, we can show the relationship between variable through a hypothesis. In this case, customer satisfaction and word of mouth is the endogenous variable and Service Quality Dimension (Bus tangibility, Bus drivers quality, and empathy) is the exogenous variable. Here, perceived value is act as a mediator between bus tangible customer satisfaction and word of mouth. Likewise, to test the relationship between the hypothesis, the following framework is developed.

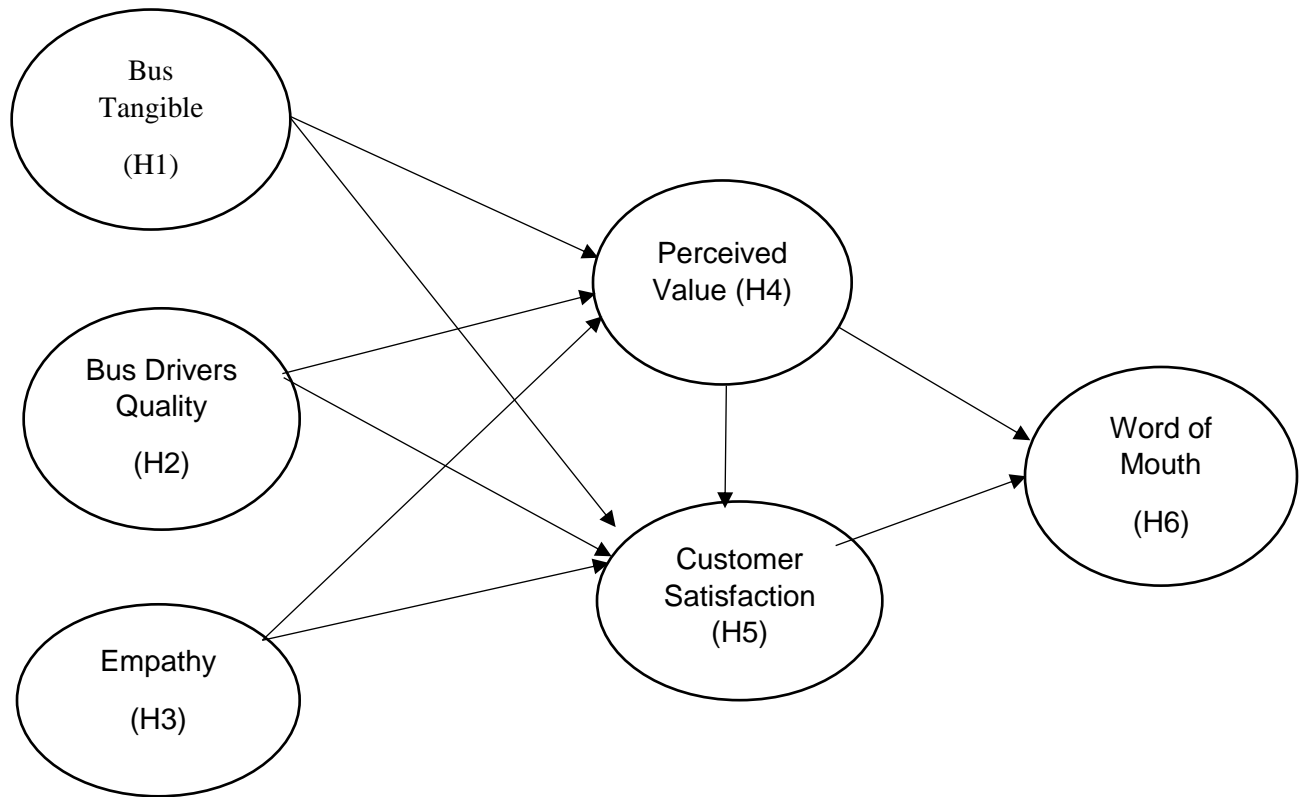


Figure 1: Theoretical Framework.

4. Methodology:

The data used in this study were obtained from the students of University of Agder. This study used quantitative method using a self-structured survey questionnaire in order to test the proposed hypothesis and to develop the conceptual model. A total of 322 respondents' responses were collected out of them 276 respondents' responses are used for the data analysis purpose. The criteria for inclusion in survey are:

- Practical experience of riding hybrid electric public bus in Kristiansand.
- Respondents' age must be between 16 and 34 years.
- Complete response with no missing questionnaire answer is required.

The questionnaire is divided into two parts. The first part of the questionnaire includes demographic profile of respondents on the basis of gender, age, education level, and nationality while the final part comprised of questionnaire which measures items related to bus service quality.

using structural equation model guided by approach adopted from (Ratanavaraha V. , Jomnonkwao, Khampirat, Watthanaklang, & Iamtrakul, 2016) and (Parasuraman, 1998) modified for bus industry; similar modification for airline industry was done by (Suki, 2014).The measurement scale comprised of 4-items for bus driver’s quality, 5-items for bus tangibles, 5-items for empathy whereas other dimensions include each 3-items; perceived value adopted from (Wen & Ding, 2005)), customer satisfaction and word-of-mouth adopted from (Davidow, 2000) similar adaptations can be seen in (Karatepe & Ekiz, 2004) and (Suki, 2014). The multi items used mean value for analysis which are measured using instrument Seven-point Likert scale which was range from (1=strongly disagree) and (7=Strongly agree).

The completed questionnaire from university students are checked and entered in SPSS (Statistical Package for Social Science) and Smart PLS 3.0 software as for structural equation modelling approach. The study also include various statistical tools and technique to analyze data. The Smart PLS 3.0 program is primarily used for all type of result except to calculate demographic profile of respondents.

5. Result:

The result part includes measurement of the overall variables and their relations with each other. To find output and summarize data we use SPSS and SMARTPLS 3 software. In this study reliability and validity test is done to find the convergent validity among all constructs likewise to find the relationship between variables, discriminant validity test is done.

Table 1: Demographic profile of respondents

Variable	Categories	Frequency/Statistics	Percentage
gender	Male	135	48.9
	female	141	51.1
Age	mean	21.71	-
	Standard Deviation	2.892	-
	Maximum age	34	-
	Minimum age	18	-
Education	Bachelor’s degree	192	69.3
	Current education	1	0.4

	Fagbrev	1	0.4
	High school	25	9
	Master's degree	57	20.6
	PhD degree	1	0.4
Nationality	Norwegian	261	94.6
	International	15	5.4

Table 1 illustrates the total demographic profile of total 276 respondents. In above table we can see that there are 51% of female respondent where age 20 has the highest and followed by 19 with 21% and 20.3%. Accordingly, out of 276 respondents 261 are norwegian people and almost 70% of respondents are doing there bachelor's degree followed by 20.6% of masters degree. Also, above table 1 showed that in age group 18 was the younger respondent however 34 was older one and same table explained that mean for age group was 21.71 followed by the 2.892 standard deviation.

Table 2: Reliability and Validity

Construct items	Standardized loading	CA	Rho-A	CR	AVE
Bus Driver quality		0.859	0.862	0.904	0.702
BD1 Bus driver with good driving skills	0.830				
BD2 Good appearance of bus driver (i.e. neat, clean and meets uniform standards)	0.825				
BD3 Friendly, helpful and polite customer service of driver	0.864				
BD4 Effective and correct emergency management	0.832				
Bus Tangible		0.83	0.832	0.88	0.595
BT1 Physical facilities of a bus are modern looking	0.789				
BT2 Neat and clean inside a bus	0.807				
BT3 Good condition of air cooling and heating system	0.758				
BT4 Good working condition of bus audio system	0.769				
BT5 Visibility of a complete set of safety equipment (i.e. glass breaking device, emergency door, etc.) with instruction signs	0.733				
Empathy		0.829	0.838	0.879	0.593
EMP1 Punctual departure and arrival schedule	0.779				
EMP2 Availability of bus routes within and outside city	0.802				
EMP3 Availability of bus routes between city and airport	0.712				
EMP4 Provision of compensation scheme in cases of loss or hazard	0.801				
EMP5 Attention paid when passengers are boarding on-and-off a bus	0.754				
Perceived Value		0.887	0.891	0.93	0.817
PV1 This bus provides value for the money I pay.	0.930				
PV2 Considering the price, I pay, the bus service is acceptable.	0.942				
PV3 It is worth taking this bus service rather than choosing other modes of transport	0.836				
Customer Satisfaction		0.942	0.943	0.963	0.897
CS1 My satisfaction with this bus service has increased.	0.944				
CS2 My impression of this bus service has improved	0.960				
CS3 I now have a more positive attitude towards this bus service	0.937				

Word of Mouth		0.871	0.891	0.92	0.793
WOM1 My satisfaction with this bus service has increased.	0.911				
WOM2 My impression of this bus service has improved	0.904				
WOM3 I now have a more positive attitude towards this bus service	0.856				

CA= Cronbach's Alpha, CR= Composite Reliability, AVE= Average variance Extracted

Reliability:

Reliability is the consistency of the given indicators. In table 2 we can see that there is higher reliability on Cronbach's Alpha and composite Reliability because data in Alpha and composite reliability is higher than 0.5 and 0.6 continuously (Bagozzi & Yi, 1988), so we can expect the higher reliability among all the variables. In above table 2 we can see that customer satisfaction has highest reliability(0.942) followed by perceived value and word of mouth.

Convergent Validity:

In the above table 2 we can see that the value of rho-A is greater than 0.5 which is significant and continuously, Average Variance Extracted(AVE) is range from 0.593 to 0.897 and all the data of standardized loading also higher than base value 0.5 so there is higher convergent validity among all the data of variables .

Discriminant Validity

To find the result in the table we use Fornell-Larcker criterion technique. Discriminant validity examines whether the different construct in the model are highly correlate with each other or not. Discriminant Validity compare the square root AVE of particular construct with correlation between that construct with other construct. Fornell and Larcker (1981) suggest to use the Average Variance Extracted(AVE) to find the Discriminant Validity (Hulland, 1999). In table of discriminant validity we can see that all the value are less than the value of square root of AVE (Average Variance Extracted) and in table we can see that all the result of construct are different with each other . We can find the value of discriminant validity from the square root of AVE So in above table the diagonal values(with bold) are the square root of AVE while other values are correlation between the constructs.

In HTMT file we found the highest HTMT value is 0.726 which is less than 0.85 so discriminant validity is established.

Table 3: Discriminant Validity

	Bus Driver	Bus Tangible	Customer Satisfaction	Empathy	Perceived Value	Word of Mouth
Bus Driver	0.838					
Bus Tangible	0.586	0.772				
Customer Satisfaction	0.518	0.511	0.947			
Empathy	0.530	0.422	0.549	0.770		
Perceived Value	0.398	0.389	0.499	0.456	0.904	
Word of Mouth	0.402	0.399	0.650	0.524	0.644	0.891

Here correlation is significant At 0.05 and in above table all the bold data shows the square root of AVE

In above table 3 we can see that word of mouth has the higher correlation with customer satisfaction ($r=0.65$, $P<0.05$) and followed by perceived value ($r= 0.644$, $p<0.05$).

Table 4 Model fit

	Saturated Model	Estimated Model
SRMR	0.062	0.063
d_ULS	1.055	1.102
d_G	0.426	0.431
Chi-Square	697.016	704.642
NFI	0.836	0.834

SRMR is the difference between observed correlation and model implied correlation matrix. According to (Henseler, Ringle, & Sarstedt, 2015), when SRMR data is less than 0.08 than it fits the model. So here SRMR is 0.062 which fits the model. Accordingly chi square model does not give enough information to judge the model fit but NFI (Normed Fit Index) use chi square value to test the model fit. We can say that the model is fit when the NFI result is less than 0.9 and there

the result of NFI is 0.836 which means the model is fit. So we can say that the hypothesized model was good fit and acceptable.

Structural Equation Modeling(SEM)

SEM combines a different number of multivariate technique into a single model fitting framework. It integrates a different techniques like factor analysis, path analysis, simulation equation, regression, and different correlations (Ringle, Wende, & Becker, 2015). Here we are using the PLS Algorithms to find the validity and reliability test as well as before checking the reliability and validity test we did factor analysis for all the variables that we have.

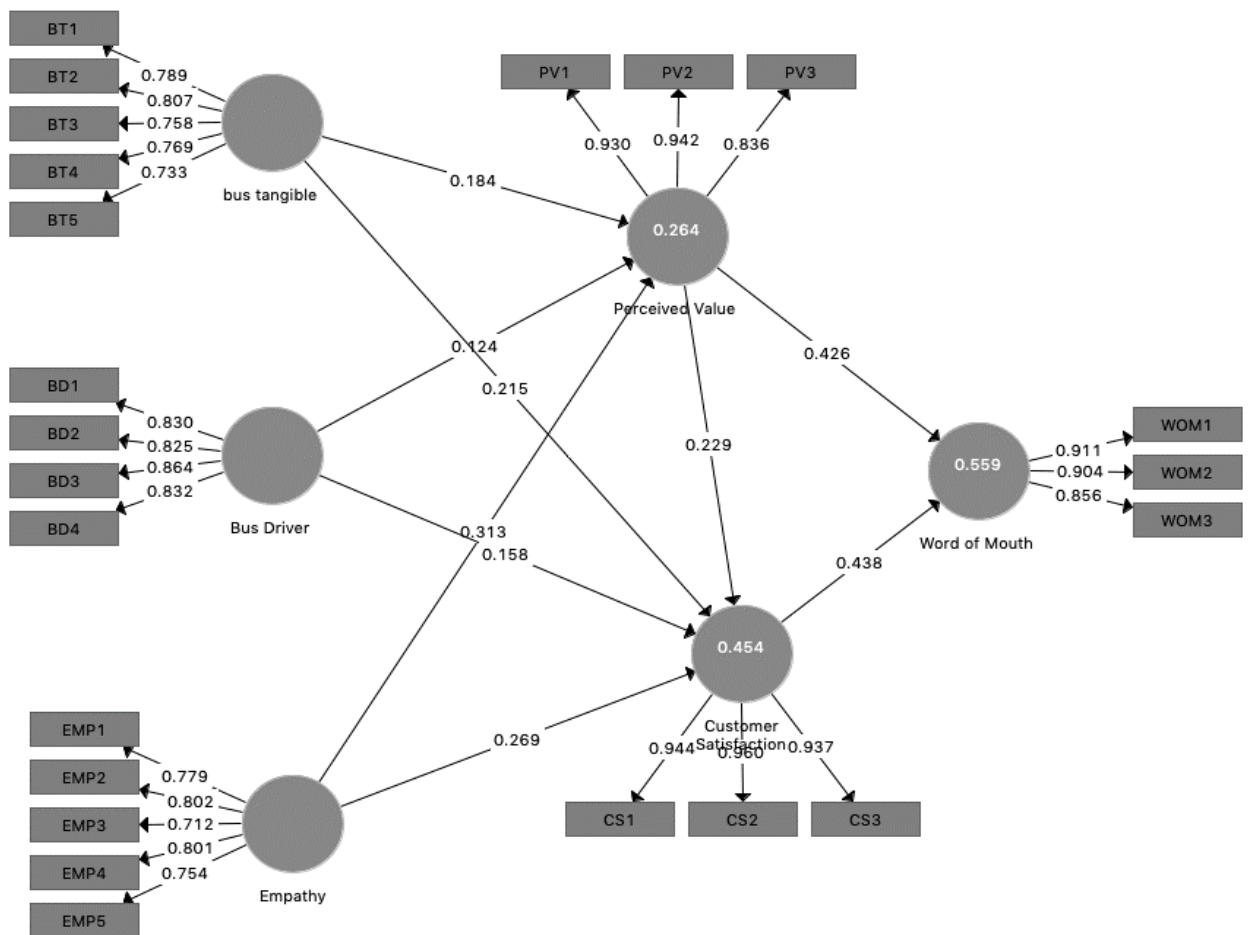


Figure 2: The results of structural model

In the above figure 2 we can see that factor analysis between all the latent variables. The structural model results shows the number in the circle about how much one latent variable is explained by other latent variables? So, values in above circle are R square.

Here, we can see that value of perceived value (R square) is 0.264 which means that perceived value is explained 26.4% by other three latent variables i.e: bus tangible, Bus driver, Empathy likewise customer satisfaction is explain 45.4% by same three latent variables. Continuously, perceived value and customer satisfaction is explain word of mouth with 55.9%.

Arrows in the above table explain the value of path coefficients whereas, Path coefficients explain strongness between two variables. The above figure shows that customer satisfaction has highest effect with word of mouth (0.438) followed by perceived value with the word of mouth(0.426). In figure, we can see that bus driver has lowest effect with customer satisfaction and perceived value with 0.158 and 0.184 with respectivley. In figure all path coefficients value of latent variable is higher than 0.1 so we can say that all the relationship is statistically significant. And also in table we can see that the standard loading(outer loading) for each latent variables.

Table 5: Path Coefficients

	Original Sample	Sample Mean	Standard Deviation	T statistics	P values
Bus Driver's quality→ customer satisfaction	0.115	0.107	0.104	1.105	0.135
Bus Driver's quality→ perceived value	0.076	0.069	0.118	0.646	0.259
Bus Tangible→ customer satisfaction	0.243	0.249	0.088	2.754	0.003
Bus Tangible→ perceived value	0.204	0.207	0.104	1.958	0.025
Empathy→ customer satisfaction	0.302	0.306	0.095	3.169	0.001
Empathy→ perceived value	0.375	0.382	0.095	3.952	0.000
customer satisfaction→ words of mouth	0.45	0.449	0.056	8.046	0.000
perceived value→ customer satisfaction	0.223	0.22	0.066	3.358	0.000
perceived value→ words of mouth	0.476	0.477	0.058	8.223	0.000

To illustrate table 5, it shows the path coefficients using Smart PLS 3 for structural model. It shows total of nine factor path coefficients between endogenous and exogeneous construct to explain structural model. After running the consistent bootstrapping technique,using sample of 2000 the result above shows the significant relationship with each other and support our all hypothesis except H1 & H2 at P-values 0.05 and t-values greater than or equal to 1.96. The above shows high

t values on (customer satisfaction→ word of mouth) which is 8.046 which means customer satisfaction has high impact on word of mouth of passenger. The relying on result effect on path shown on seven factor (Bus Tangible→ customer satisfaction, Bus Tangible→ perceived value, Empathy→ customer satisfaction, Empathy→ perceived value, customer satisfaction→ words of mouth, perceived value→ customer satisfaction and perceived value→ words of mouth) has positive impact on customer satisfaction and word of mouth whereas bus drivers quality doesn't have impact on customer satisfaction and perceived value because of p values greater than 0.05 or t values less than 1.96. Since, hypothesis H1 and H2 is not supported.

6 Discussion:

This study examines relationship between different exogenous and endogenous construct like bus tangible, bus driver, empathy, perceived value, customer satisfaction and word of mouth. The student from the University of Agder were asked to rate their satisfaction on the different topics. Structural Equation Model is using with SMARTPLS 3 software to analyze the data. We used demographic profile, Validity and reliability, Descriptive analysis, path coefficients and factor analysis to find relationship among those variables.

In above table of discriminant validity we can find that customer satisfaction is highly correlate with word of mouth and perceived value and also, all the value of AVE is higher than 0.5 so there is higher convergent validity among all the constructs. Higher word of mouth means customer will encourage other people like friends, relatives, family to use same kind service. Also in our study we can see that perceived value has great impact on the customer satisfaction where perceived value includes: benefit of using hybrid bus as compare to other mode of transportation, comparison of service with price that you pay and value of service that you pay.

But in table of path coefficients we can see that P-value between Bus driver with customer satisfaction and bus driver with perceived value is greater than 0.05 so H2 is not supported. In above table 2 we see that Visibility of a complete set of safety equipment has lowest standard loading and all the constructs of bus tangible variable has relatively lower standard loading so all the bus should more focus on that feature to satisfy customer.

To find proper result we are using the 0.05 level of significance as a confidence interval. By analyzing different data and tables we find that there is positive relationship between construct variables except bus drivers quality so except H2 all the hypothesis are significant. By analyzing data we can say that bus tangible and empathy are positive related with perceived value and customer satisfaction, perceived value significantly associated with word of mouth and customer satisfaction and customer satisfaction is positively associated with word of mouth. So from the analyzed data we find all the customers are happy with the physical appearance of bus ,neat and cleanliness of bus, individual attention from employee of bus, comfortability of bus seat and other service so we assume that they get value for their money. When perceived value is high than it leads for positive word of mouth.

7 Conclusion

The research highlights the bus service quality (Bus drivers quality, bus tangible and empathy) as one of the important factor to be considered while providing the service to the passenger. Passenger perceived value received from the service provided by bus service operators are the key elements for customer satisfaction. Customer satisfaction plays roles for publicity and marketing termed as word of mouth which encourage other people to use service again and again.

In this study bus drivers quality, bus tangible, empathy, perceived value, customer satisfaction and word of mouth has been adopted as comprehensive approach to find out customer satisfaction level using advanced structural equation model. Moreover, confirmatory factor analysis (CFA) is used to examine factor loading, convergent and discriminant validity. The paper use different measurement scale to find out customer satisfaction level .

However, impact of bus drivers quality dimension is not significant in this study but bus company operators should overlook this dimension such as drivers personality, skill knowledge and good communication elements should be considered for better service. To sum up, this study grows the interest to find out customer satisfaction level using other method and helps operators to provide ease access of service to passenger in bus service industry,

7.1 Recommendation:

This study will be really helpful to know the relationship about hybrid bus service and customer. To make the customer more loyal the bus driver of hybrid bus must be more loyal and helpful, polite with good skill, and good looking appearance. Also, it is recommended that in future studies can address the presence of moderating variables and its effects on customer satisfaction. Also there will be the good scope to collect data from different geographical location with including more variables like bus terminal, bus company and can find their role for customer satisfaction.

7.2 Limitation of the study

Here we are taking very few constructs and we are trying to find relationship among them so it is suggested to adopt more variables (including moderating and control variable) with more powerful method.

Here the study is conducted in one university with the limited respondents so the result of this study cannot generalize the whole Norway. It suggests future studies to collect data from wide area with large number of respondents.

Another limitation of this study is there is no any comparison of hybrid bus service with other mode of transportation. So for the future study they can compare the benefit of hybrid bus service with other transportation like fuel.

7.3 Future Research

There are many other factor or the variable which can influence the customer satisfaction. So in future research the researcher can include other variable with collecting wide range of data with including more depth interviews and brain-storming technique.

Also this study is only limited with bus passenger means here is lack of explanation of benefit of hybrid bus and reason to take the public hybrid bus as compare to other vehicle like car, motorbike etc., so future study can include relative advantage of hybrid bus service.

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Appendix

Reflection Note

Reflection note is one of the new concepts from the University of Agder with the purpose of introducing the new professional student with innovative ideas. This section will more focus on internationalization, innovation, and responsibility. In this study; we are finding the relationship between six latent variables (i.e., bus tangible, empathy, bus driver quality, perceived value, customer satisfaction and word mouth) by using the Structural Equation Modeling approach. We used SMART PLS3 and SPSS software to get the statistical result of correlation, path coefficient, mean, standard deviation, and discriminant validity. We created six hypothesis, and among them, all hypothesis are highly correlated with each other except second hypothesis (Bus Driver).

Globalization

Globalization is emerging topics itself. For every business sector internationalization is essential and it is growing as well. Hybrid Electric Vehicle is an emerging concept, and many countries are focusing on to apply this concept. Many companies and countries are focusing towards to produce HEB. All HEB companies are focusing on becoming a global company. Norwegian government already declared to become the zero-emission till 2025, so for many local and international companies; they have great possibilities and potential market. Likewise, many other countries also adopting HEB concept so Norwegian vehicle company also have a market to expand themselves. Many companies have the possibilities to adopt international modes to become a global company, and many vehicle companies are doing a joint venture, Licensing.

Innovation

Generally, Innovation is using new ideas to generate new things. HEB is one of the great innovations in recent time. Many countries are applying HEB concept with the purpose of zero-emission gas. Transport create $\frac{1}{4}$ GHG emission from fossil fuel, and also it creates a 2nd source of global energy-related co₂. So, HEB will be a great innovation for reducing emission gas. UK innovated the first-time HEB in around 1980. Many countries already adopted this concept, including China, USA, Sweden, Norway, and many more other countries. Especially in developed countries market are rapid growth in HEB and electric vehicle sector as compared to fossil fuel vehicle. HEB innovation is a groundbreaking invention of this century. There are many studies which focused on customer satisfaction, but in our study, we add how the different variables affect customer satisfaction. So with using statistical tools, we explained the relationship among different variables.

Responsibility

There are many countries who are still focusing on fossil fuel transportation. We know that global warming is world's biggest problem and the great cause of that problem is fuel transportation so all the people, organization and entire country's government should be responsible to minimize those transportation and increase the use of HEB. Norway is an example itself to promote the HEB. Every year they are growing rapidly. The Norwegian government is providing many incentives to HEB buyer related taxation, parking facilities and fees, road tax, and so on. There are many other options to promote the hybrid bus industry. Traffic is one of the major problems of big cities and bus service is one of the solutions so the Norwegian government can solve both problems at the same time with encouraging to use