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A STUDY ON ATTRIBUTES OF SERVICE AUTOMATION AND THEIR IMPACT ON CUSTOMER SATISFACTION AND RETENTION: AN EMPIRICAL STUDY CONDUCTED AT BANGALORE METRO RAIL TRANSPORTATION

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ABSTRACT

Public transportation helps the people to move from one place to another for employment, education, institutional resources, medical help, recreational opportunities etc. Public transportation always helped in enhancing business opportunities. However, the Bangalore city is developing so fast that each one of them are able to have their own vehicle. This has increased the number of vehicles and become one of the main reasons for the air pollution. To overcome this heavy traffic Namma Metro ("Our Metro" in Kannada), also known as Bengaluru Metro has come up to serve the city of Bengaluru. This study is going to help the government in getting some practical insights in improving the automated service in Metro project in future. The findings of the study show that the automated service attributes convenience and customization contribute towards the service encounter satisfaction which then leads to customer retention. It was also found that service attribute convenience play an important role in determining the technological acceptance and customer retention.

Keywords—Automation Attributes, Automation Reliability, Automation Convenience, Satisfaction, Customer retention, Service attributes.

INTRODUCTION

Public transportation assists the people to move from one place to another for seeking employment, education, hospital and entertainment purpose. Bangalore city is developing very fast. Employment opportunities and income levels of the people have increased in the city. This made most of the people to have their own vehicle. This has worsened the inadequate parking spaces. Air pollution problem is also yet another cause for concern. In this regard it has become the duty of the concerned organisation to look into the issues of growing city. Public transportation facilities should be improved in future to cater the requirement of rising population.

Namma Metro also known as Bengaluru Metro is a public transportation system helping the city of Bengaluru. It is the fourth longest operational metro network in India after the Delhi Metro, Hyderabad Metro and Chennai Metro. Namma metro also contains the first underground metro line in South India.

The Namma metro operation consists of two colour-coded lines, with a total distance of 42.3 kilometres serving 40 metro stations. The Metro journey consists of underground, road level, and high stations using standard-gauge tracks. It is estimated that there is on an average daily traveller of 400,000 passengers. By 2023, the metro is expected to complete its phase 2 network and provide connectivity to the city's important areas like Electronics City and Whitefield.

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The BMRCL (Bangalore Metro Rail Corporation Ltd), is a joint venture of Government of India and Government of Karnataka. Namma Metro. Services operate daily between 05:00 and 23:00. Each train includes of three to six cars.

Metro Lines

Purple Line

The first 6-station 6.7-kilometre, Purple line between Baiyappanahalli and Mahatma Gandhi road was opened on 20th October 2011..The next 6.4-kilometre , 6-station between Mysore Road and Magadi Road opened on 16th November 2015. The first underground section, 4.8 km stretch from Cubbon Park to Bengaluru City Railway Station opened on 29th April 2016. This completed the 18.22 km Purple Line.

Green Line

The first 10-station, 9.9-kilometre, Green Line was opened on 1st March 2014. It connected Sampige Road to Peenya Industry. The second 3-station 2.5-kilometre, Green Line, operating between Peenya Industry and Nagasandra, opened on 1st May 2015. Sampige Road to Yelachenahalli was inaugurated on 17th June 2017 thereby completing the entire 1st Phase.

At present there are 40 stations, each metro train has 3-6 coaches and total lines are two.

RESEARCH PROBLEM

As the Bangalore is one of the fastest growing city. Urbanization is growing at rapid rate. It had attracted both skilled and unskilled worker, who will be travelling within the city. Not only working class even general public due to the heavy traffic and busy roads depend on public transport. Metro rail is one of the better option compared to any other public transport. In other transport there will be human intervention which might lead to customer dissatisfaction and complaints. Considering this metro rail transportation has made an effort to bring automation in the service.

Automated service system is one which tries to give service automatically through the use of electronic control system. Smart cards, automatic entry and exit systems, lifts, escalators, balance enquiry machines security cameras, display boards are the few examples of automated services in Metro rail transport. This study is intended to get important insights to help the concerned authorities in improving the automated service in Bangalore Metro rail transportation. This study examines the responses of customer towards the attributes of automated service quality.

RESEARCH OBJECTIVES

Following are the objectives of the study.

1. To study the attributes of automated service in Metro transport.
2. To analyse the impact of automated service attributes like reliability, convenience and customization on customer satisfaction and customer retention.
3. To give further insights in improving the attributes of automated services in Metro transport.

REVIEW OF LITERATURE ON ATTRIBUTES OF SERVICE AUTOMATION

Service is an intangible thing that the public needs such as transport, communication facilities, hospital or any other activity offered in planned and organized way. Service is defined by its attributes. Some attributes are common to all service. Other attributes are

specific to a service instances and must be set in the service order. Previously many studies have been conducted and found out the relationship between customer satisfaction and service attributes. The service attributes depend on the form of service delivery. Development of service delivery alternatives is the result of improvement in technology. Previous study stressed the importance of service attributes and relation between service attribution and overall satisfaction. Mittal et al.,(1). Beatson et al.(2),Meuter et al.(3 & 4), conducted study on different attributes of automation and identified reliability, customization and convenience of technology as the major attributes of service automation.

Reliability

Reliability is one of the very important attribute of automated service. It determines the repeated use of the given service. Clements et al., (5) defines reliability as the capacity of the system to keep using it again and again. Parasuraman et al, (6) defined reliability is the capacity to attain the promised service constantly and more accurately. Whenever customer experiences poor performance during the first customer will not visit for the second time. So there is a necessity to provide trustworthy service which will boost the customer satisfaction it is very much essential that Metro transport should provide reliable and trustworthy service to retain the customer.

Convenience

Customer convenience is one of the key factor in determining customer retention. Convenience reduces the customer time. Convenience can be stated as location, time saving and any other service quality which makes the customer feel easy. Amoriom et.al (7) in their study states that the attribute of convenience is also another important factor which forms customer perceptions of service quality. It is also stated in the study that progression in convenience disclose a influential effect to the user of service to use the service again and again.

Customization

Another dimension of automated service is customization. Customization is the process of delivering wide variety of service as per specific needs of customer. Customization attribute has become very much popular in the service industry. Anderson et al. (8) in their study defined customization as the degree at which the service provider has designed the service to meet different kind of customers' requirements.

Service Encounter Satisfaction

Consumer satisfaction is the difference between expected and perceived attributes of service quality. Satisfaction is a psychological outcome emerging from an experience. Zeithaml, et al(9) defined satisfaction as an effort of fulfilment of something or making something adequate. Customer satisfaction is a buyer's cognitive situation on gap between the results obtained and sacrifice made. Ranaweera and Prabhu,(10) concluded in their study that customer satisfaction is a feeling resulting from an evaluation process about what is received on what to expect including the purchase decision of the goods itself, as well as the needs and desires associated with the purchase.

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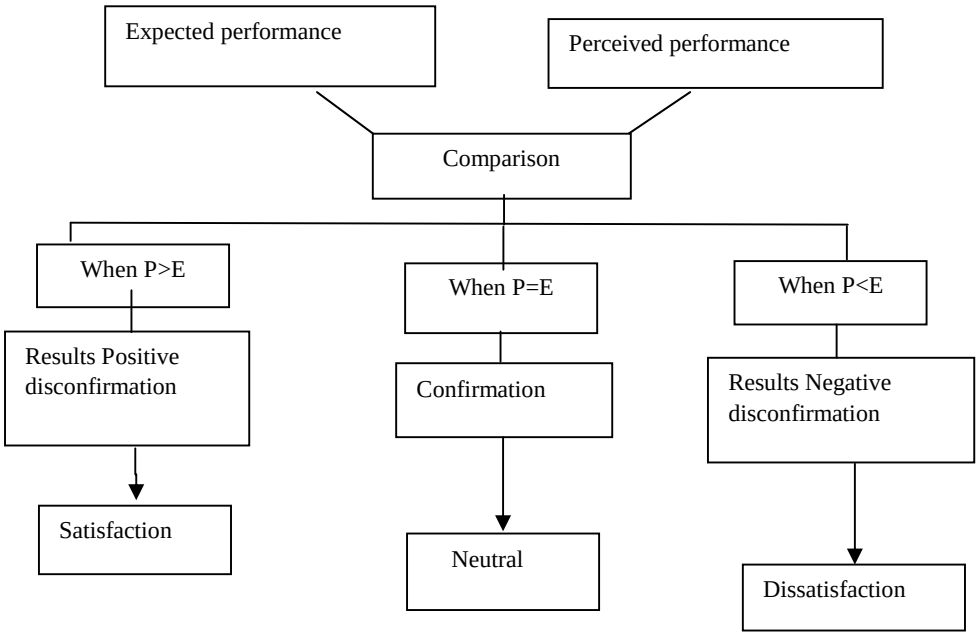
The disconfirmation model described below is based on this Woodruff et al.(11)



The Model of Disconfirmation

There can be service gap when the expected service does not match with perceived service. The gap in the service quality can be positive or negative based on one's own experience. The service gap can be conceptualised based on the customer desire and customer imaginations about the what the service provide is capable of offering that service. Parasuraman (6) state that the expectations comprise two levels: desired and adequate. Desired expectation means the level of service a customer is willing to receive.

Customer Retention

Zineldin, (12) states retention is the situation of keep doing a business or receiving the service from a particular firm on continues basis. Ahmad and Butte (13) finds through his study that emotion of trust is stronger prediction for retention of customer than satisfaction..Hart and Johnson (14) states that customer retention should be worth considering as an important aspect for planned marketing goals, rather than being seen as a consequence of "superior" Marketing management.
Gustafsson (15) identifies three drivers for customer retention. They are affective commitment, calculative commitment and satisfaction. Gabarino and Johnson (16) and Morgan and Hunt (17) states in their study that personal involvement between customer and the service provider may happen when there is a high level of trust. This in turn makes affective commitment more emotional. Erikson and Lofmarck Vaghult,(18) states that many times customer retain to the product not because of satisfaction but because of non-availability of alternative product.

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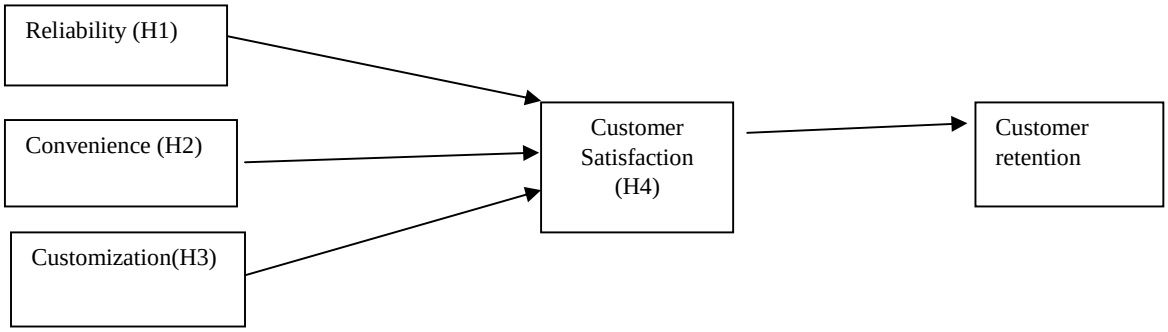
HYPOTHESIS

Hypothesis model



The above hypothesis model proposes the direct relationship that exists from the attributes of automated service quality with the customer satisfaction.

Based on three main attributes of automation in Metro service, following hypotheses are framed to determine the customer satisfaction.

H1: Service attribute Reliability has significant influences on customer satisfaction.
H2: Service attribute Convenience has significant influences on customer satisfaction.
H3: Service attribute Customization has significant influences on customer satisfaction.
H4: Customer satisfaction results in to customer retention in automated services.

METHODS AND MATERIALS USED FOR THE STUDY

Data was collected through primary sources by distributing the questionnaires on the site. The data was collected mainly from Banashankari metro station, Bayappanahalli metro station and Majestic metro station. Respondents were chosen randomly from both the purple line and green line from the above mentioned metro stations. Respondents were belonging to all age groups which includes student and employed using Metro service. Work force was from private as well as public sector. Sample size taken was 120 members.

The questionnaire was divided in to four parts. First part includes demographic profile of the respondents. Second part includes questions on automates service attributes to know traveller experience. Part third included general questions regarding satisfaction towards service automation in Bangalore metro transportation. Last fourth part includes retention of customer. Collected data was analysed by using SPSS software. Descriptive and inferential statistic were used interpret the data. Descriptive statistic was used to analyse the demographic variables. Percentage analysis was used in many places depending the requirement.

Inferential statistic was used to predict and make inferences about population. Reliability test, correlation, regression analysis, Anova test were used to make inferences about the sample data.

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DATA ANALYSIS

TABLE -I
Table showing the Demographic Profile of Respondents

Variables		Frequency	Percent
Gender	Female	59	49
	Male	61	51
Age	above 17	9	8
	18-24	15	12
	25-34	37	31
	35-44	42	35
	Above 45	17	14
Marital status	Single	64	53
	Married	56	47
Employment status	Employed	63	53
	Students	28	23
	Housewife	9	7
	Retired	6	5
	Others	14	12
Education status	School level	9	8
	Diploma/technical	85	71
	Graduates	26	21

Demographic Profile of Respondents

From the above table we can find that there are 51 male respondents and the rest are females. Majority respondents (35%) were of age group of 35-44 followed by 31%, who were age group of 25-34. Among the total respondents 53% of them are single, 47% are married. 53 % of the respondents are employed and 23 % were students. The minority of the respondents under employment status are Retired (5%). Finally, the highest education level was Diploma/Technical (71%) and the least majority of respondents are school level (8%)

Reliability test

Reliability test was done to check the reliability of each dimension of automated service and also on satisfaction and retention.

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Cronbach's Alpha for Each Variable
Service attributes
Reliability

Reliability Statistics

Cronbach's Alpha	N of Items
.963	5

Convenience

Reliability Statistics

Cronbach's Alpha	N of Items
.823	5

Customization

Reliability Statistics

Cronbach's Alpha	N of Items
.703	2

Customer Satisfaction

Reliability Statistics

Cronbach's Alpha	N of Items
.731	6

Customer Retention

Reliability Statistics

Cronbach's Alpha	N of Items
.778	3

Above table indicates Cronbach's alpha. Cronbach's alpha value which is higher than 0.5 is considered as acceptance level of reliability. All Five variables are tested for their reliability. The value of Cronbach's alpha for service attribute reliability was 0.963, convenience0.823, customization 0.703. Service encounter satisfaction was 0.731, and retention was 0.778. All these values indicate that they are reliable to adapt in this study.

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TABLE II
Table showing the result of correlation

Correlations					
		Satisfaction	**Reliability**	**Convenience**	**Customazitation**
Satisfaction	Pearson Correlation	1	.586**	.929**	.716**
	Sig. (2-tailed)		.000	.000	.000
	N	120	120	120	120
Reliability	Pearson Correlation	.586**	1	.747**	.398**
	Sig. (2-tailed)	.000		.000	.000
	N	120	120	120	120
Convenience	Pearson Correlation	.929**	.747**	1	.644**
	Sig. (2-tailed)	.000	.000		.000
	N	120	120	120	120
Customazitation	Pearson Correlation	.716**	.398**	.644**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	120	120	120	120
**. Correlation is significant at the 0.01 level (2-tailed).					

The above table explains about the co-relation between the dependent variable satisfaction and independent variables reliability, convenience and customisation. There is a partially positive correlation of 0.586 between reliability and satisfaction. There is a strong and positive co-relation of 0.929 between Convenience and satisfaction. A positive co-relation of 0.716 was found between customization and customer satisfaction.

A multiple regression analysis is held. Following table shows the un standardised coefficients extracted from the multiple linear regression analysis.

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TABLE III
Table showing the result of multiple linear regression analysis

	Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	4.718	.412		11.463	.000					
	Reliability	-.144	.029	-.213	-4.914	.000	.586	-.415	-.140	.430	2.325
	Convenience	.908	.048	.977	18.821	.000	.929	.868	.535	.299	3.340
	Customization	.422	.092	.172	4.566	.000	.716	.390	.130	.570	1.754

A.Dependent variable: Satisfaction

The above table shows the result of multiple linear regression analysis taken from SPSS.
Y=b0+b1x1+b2x2+b3x3.....

= -.144 + 0.908 + 0.422

The above equation states that when all variables remain constant, each unit increase in convenience or customization relating to service automation leads to an increase in customer satisfaction. On the other hand, if all variable remain constant increase in reliability will cause decrease in customer satisfaction.

The above given Coefficient Summary table, this study signified the result of hypothesis as given below:

H1: Service attribute Reliability has significant influences on customer satisfaction.

T statistic shown in the above table for reliability of automated service and customer satisfaction is -4.914 (p-value <0.05) and Beta is -0.213. As the p-value is greater than -4.914 and Beta value is negative so, H1 is rejected and concluded that there is no enough confirmation to signify that the reliability influences customer satisfaction.

The linear regression value for reliability and satisfaction 4.718 + (-.144) (Reliability). This means that for every unit increase in reliability, the satisfaction will be affected and increase by -.144.

H2: Service attribute Convenience has significant influences on customer satisfaction.

The t value for the convenience relating to automated services and customer satisfaction is 18.821 (p-value > 0.05). The beta value is .977. These values states that there is enough evidence that, convenience in using automated service in metro transportation is significance influence on customer satisfaction. As the p-value is 18.821 which is larger than 0.05, H2 is accepted. We can conclude that there is a positive relationship between convenience in using automated services and customer satisfaction.

The linear regression equation for the convenience of automated services and customer satisfaction = 4.718 + .908 (Convenience). So every unit increase in convenience, the satisfaction will be affected and increase by 0.908.

H3: Service attribute Customization has significant influences on customer satisfaction.

The t-statistics value for the customization of automated services in metro transport and customer satisfaction is 4.566 (p-value > 0.05). The Beta value is 172. So there is enough evidence to decide that the convenience in using automation service in railway transportation has significance influence on customer satisfaction. The p-value is 4.566,

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which is greater than 0.05, therefore H3 is accepted. So there is a positive relationship between customization in automated service and customer satisfaction.
The linear regression equation for the customisation of automated service and customer satisfaction = 4.718 + 0.422 (customization). It means that every unit increase in attitude, the purchase intention will be affected and it increase by 0.422.

TABLE IV
Table showing the model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.690[a]	.476	.471	1.65524

a. Predictors: (Constant),Satisfaction

The above table shows the R-square value 0.471. This indicates that 47.1% of the variation of customer satisfaction can be explained by reliability, convenience and customization. This value is somewhat significance to arrive to this conclusion.

CONCLUSION TO THE RESULT OF AUTOMATED SERVICE ATTRIBUTES.

After comparing all the three attributes of automated service, convenience 18.821 has the highest explanatory value as compared to the other independent variables. Customization has shown 4.566 as explanatory value, whereas reliability showed -4.914.
To conclude convenience and customization have shown positive relationship towards customer satisfaction as the p-value of both service attribute is less than 0.05.

Multiple regression analysis

Multiple regressions is used to test whether consumer's satisfaction correlate with customer retention in automated services in Bangalore Metro transportation. It is also used to predict dependent variable customer retention with independent variable customer satisfaction.

TABLE V
ANOVA Table

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	293.294	1	293.294	107.049	.000[b]
	Residual	323.298	118	2.740		
	Total	616.592	119			

a. Dependent Variable: Retention b. Predictors: (Constant), Satisfaction

According to the above Anova table F-value is 107.049 and the p-value is less than 0.05, this indicates that the variable of the study is significant.

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TABLE VI
Table showing the Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.607	.642		.947	.346
	Satisfaction	.397	.038	.690	10.346	.000

a. Dependent Variable: Retention

The table no-6 shows the coefficient results of the test. equation can be constructed based on above table.

$y = 0.607 + 0.397 x1$

The t-value for customer satisfaction is 10.346 ($p<0.05$) whereas the Beta is 0.690. H4 is accepted as p-values is less than 0.05. With this we can interpret that there is a significant relationship of customer satisfaction in influencing customer retention towards automated services in Metro transportation in Bangalore.

LIMITATIONS OF STUDY

Since there are no secondary sources available regarding automated service Metro Transportation, there are no proper evidence to support the direct relation between automated service and customer satisfaction.

This study has been done by taking sample size of 120 respondents. This small sample size may restrict our ability to generalise the outcomes as the people travelling in Metro is of large size.

FINDINGS AND CONCLUSION

The first part in data analysis is relationship between automated service attributes with customer satisfaction. As per the data analysed in the above table the result of reliability shows that there is no relationship between reliability and customer satisfaction. However, the reliability in automated service plays an important role in improving the customer satisfaction and customer retention.

The automation in automated service should be users friendly and it should be ease in use while operating it. The results from this study show that there is a relationship between convenience and customer satisfaction.

Another attribute used in the automated service attribute is customization. The results of this study shows that there is a relationship between customization and customer satisfaction.

Second part in data analysis is influence of customer satisfaction to customer retention. The data analysis reveals that the customer satisfaction has influenced in customer retention.

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