

CONFIRMING THE FACTORS FOR PRODUCT QUALITY: A STUDY ON TWO WHEELER USERS IN INDIA

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ABSTRACT

Purpose: The Study purposes to confirm the factors for Product Quality for Two wheeler buyers in Indian context. With the arrival of latest technologies, it the need of the hour to identify the various factors that are considered by buyer.

Method: The study was exploratory in nature, using survey for data Collection. Sample size for the study was of 150 respondents including both male and female exclusively in Gwalior region. Non probability purposive sampling technique was used. Standardised questionnaire with five point likert scale was used. Test like Reliability, Confirmatory Factor Analysis and Correlation were applied to achieve the purpose of the study

Results: Performance, Reliability, Durability, Conformance, Perceived quality, Special features were the factors that are confirmed using CFA, further Performance, Reliability, Durability were found to be strongly correlated and Conformance, Perceived quality, Special features were found to be strongly correlated with each other. Serviceability and aesthetics were factors that were dropped in the CFA. The Fitness statistics reflected that the Value of χ^2 was 173.407 along with $DF= 155$ & $\chi^2/df=1.119$ that shows high fitness of the data RMSEA was found to be .028. GFI was .898 & AGFI was .862. The incremental fit measures i.e. NFI= .791, RFI= .744, IFI= .973, TLI= .965, CFI=.971 were found to be as per threshold limit. The value of PRATIO, PNFI & PCFI was .816, .645 and .816 respectively. These GOF statistics reflects that the model fitted the data. The Construct reliability for Performance, Reliability, Durability, Conformance, Perceived quality, Special features was .707, .750, .636, .373, .590 and .536 respectively.

Originality Value: the study is an unique attempt to identify the leading factors that are perceived and considered for a product to be of high quality. Along with this the factors are correlated in a unique combination also which implies that the manufacturers must not consider these factors in isolation but always in presence of the combination i.e. Performance, Reliability, Durability should be considered together and Conformance, Perceived quality, Special features should be considered together to achieve high benefits.

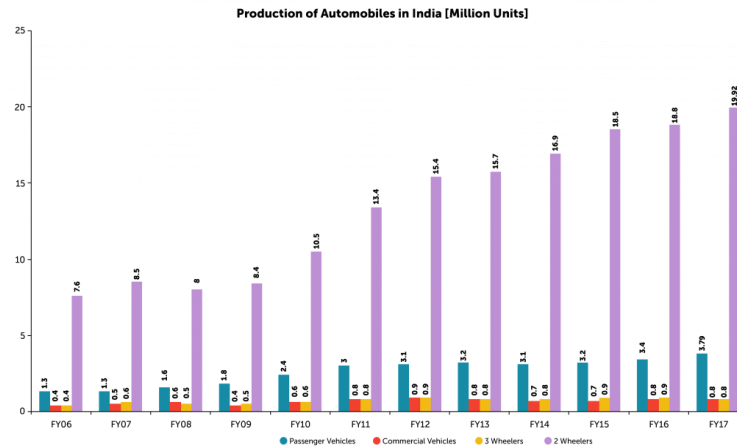
Keywords: Product Quality, Two wheeler, Performance, Reliability, Durability.

INTRODUCTION

Indian two wheeler markets is one of the largest two wheeler market in the world, contributing 7.1% to GDP and providing jobs to millions. This industry also generates excise revenue of 13%. 25.12 million Units were produced during financial year 2017 of total automobile out of which 79% is the share of two wheelers. Indian automobile sector is able to grab 15.79 billion dollar FDIs from April 2000 to September 2016. Out of the above figure, replacing China, India sold 19.91 million units in year 2017 of two wheelers. Two wheeler sale included Mopeds, Scooter, Motorcycles, Electric two wheelers mainly. The major players in India

Scooter segment are Hero Motocorp, Honda Motorcycle and Scooter India (HMSI), TVS motors, . HMSI is the leader in the segment holding 60 % of the market share.

In case of Motorcycle Royal Enfield and Bajaj is added wherein Hero motocorp is the leader with 50% of the market share.



RESEARCH PURPOSE

The Study has been conducted to confirm the underlying factors for Product Quality in case of two wheeler buyers in Indian context. With the arrival of latest technologies, it the need of the hour to identify the various factors that are considered by any buyer before buying the same at the same time it is utmost important even for the manufactures for to consider the findings of the study. This research contributed to the product quality study on two wheelers. Quality of a product is very important for the customer satisfaction and loyalty for purchasing two wheelers. At examining personal satisfaction one must think as of design, production, and administration. Most of the people concern the price, mileage, brand of the two wheelers, design and style, after sales service when purchasing a vehicle. Therefore, the current study is focused in confirming the factors of product quality in two wheeler segment.

REVIEW OF LITERATURE

Product quality is not a new concept in marketing although it has been revised with some new proposition by various authors. It is a concept which prevails in all sort of products be it perishable, durable etc. The current study reviews the work done on the concept irrespective of product /industry. Atiyah (2016) reviewed the definition given by Parasurman (1990) and Tener (1995). Parasurman (1990) defined quality as “the interaction between the customer and the service provider, since the customer sees the service quality through comparing his expectations of this service with the actual performance” and Tener (1995) defined it as “ an essential working strategy largely understood in the consumers expectations in and outside whether these expectations are explicit or implied”.

Atiyah (2016) mentioned quality “as the source basic and important as it leads to pleasing the customer and increase loyalty and increase the degree of profitability in the medium and long term in the organization”. He found in dairy products that complacency comes from quality and

that generates loyalty to earn more profits. The study also mentioned that the customer confidence comes from services provided to them and they are more loyal in case of favorable services.

Although there are studies which do not mention any contribution of variables like Technological updated, Antique, Joint venture on customer satisfaction however it is safety and CSR which affects customer satisfaction (Khan and Rao, 2018). Perceived product quality is another strong variable that affects customer satisfaction as well as purchase intention for any product (Saleem, Ghafar, Ibrahim, Yousuf, & Ahmed, 2015). Jahanshahi, Gashti, Mirdamadi, Nawaser, & Khaksar (2011) studied automotive industry wherein Customer service quality and product quality influences customer satisfaction and Customer satisfaction influences customer loyalty. In FMCG industry it is the functional value and price of the product that leads to customer satisfaction. However customer value also equally affects customer satisfaction as a mediating variable (Razak, Nirwanto, & Triatmanto, 2016) leading to customer commitment specially in Auto industry (Ehsani & Ehsani, 2015). Similar kind of study in Retail marts wherein the impact of Service as well as product quality on customer satisfaction (Sutanto, Hongdiyanto, & Minantyo, 2014), customer retention in Grocery Store (Hussain and Ranabhat, 2013), along with product quality and service quality, contextual experience have a major influence on customer perceived value in case of retails (Sam & Dhanya, 2012).

Alfin, Alhabsji, & Nimran (2013), discussed the significant impact of service quality on corporate image and customer satisfaction, however product quality affected only customer value as well as corporate image and not customer satisfaction. At times corporate image and customer satisfaction plays a mediating role in maintaining significant effect of service quality on customer trust and in reverse corporate image plays a mediating role in maintaining significant effect of service quality on customer satisfaction.

Industry like airlines where Hasniaty (2015), confirmed that product affects trust, customer satisfaction and loyalty, but no effect is seen on commitment. Similarly price affects trust, commitment, satisfaction, but not loyalty. In the same study Service quality affects trust, commitment, satisfaction but not loyalty and trust affects satisfaction and loyalty. Commitment affect loyalty and Satisfaction has significant positive effect on satisfaction and loyalty too. Quality is also one of the major variable to be studied in other service industry like hotels and restaurants, where quality of service positive and significant influences purchasing decisions, brand image positive and significant impact on purchasing decisions, product quality positive and significant impact on purchasing decisions, and service quality, brand image and product quality jointly influence positively and significantly the purchasing decision (Priyono, 2017) and customer satisfaction (Abdullah & Rozario, 2009). Moreover Mohaydin, Chand, Aziz, Bashir, & Irfan (2017) mentioned that food safety has mediating effect on food quality and customers satisfaction. Even packaging quality has a critical role to play in building profitable consumer-brand relationships and consumer loyalty like the quality of bottle in water bottles (Jeffrey, Singh, Metcalf & Danes, 2014).

There is a high acceptance of Indian two wheeler in other Asian countries too. For Instance in Sri Lankan Market, Indian two wheelers are accepted because of their product related factors like Price, Technology and Design, Spare Parts Availability, After Sales Services and Product Awareness and Economic Conditions are found to be consumer related factors. Other consumer related factors were age, gender, income level, education level which undoubtedly affects purchasing decisions(Weerasiri & Mendis, 2015)

In mobile phones. perceived product quality affects brand loyalty whereas customer satisfaction is found to partially mediate the relationship between perceived product quality and brand loyalty (Kassim, Igau, Swidi, Tahajuddin, Neezm, 2013). However there are certain studies which do not reveal any impact of Product Quality, Quality of Service and Trust on neither Customer Satisfaction nor Customer Loyalty(Rimawan, Mustofa, & Mulyanto, 2017)

Cruz(2015), mentioned a significant statistical relationship between product quality and customer satisfaction. He mentioned that nothing mediates this relationship be it product safety or its cost. Undoubtedly high quality vehicles leads to fewer injuries and deaths associated with vehicular accidents. Indian recorded at least 4,80,652 accidents in 2016, leading to 1,50,785 deaths. 413 people died everyday in 1,317 road accidents which reveals that 17 deaths occurred in road accidents in 55 accidents every hour in the given time period(The Indian express, 2016), however a this figure came down by 3% in 2017(Dash, 2018)

Ackaradejruangsri (2015), conducted a demographic based study using gender, age, income and education as main variable for evaluating product quality. He found Men and women both consider function of the product, reliability, durability, and design for the purchase of automobile. In case of age, Various age groups consider dimensions of product quality differently. For instance, young generation considers function, design, and reliability, 21-25 years considers durability, 26-30 years of age considers reliability, durability, and design for automobiles; 31-35 years of age considers function, durability, and reliability. 36-40 years old considers function, reliability, and durability in their buying decision of automobile. 41-45 years old considers reliability, customer satisfaction, and function. Going to Upper age group eco-friendliness, customer satisfaction, and durability are considered as the most important attributes when deciding to buy a car/automobile. Those at 51 years of age and above ranked reliability, durability, and ease of use as their most influential attribute dimensions in buying automobiles. He also mentioned that people with high education considers eco friendliness whereas slightly less educated considers reliability, durability, and design as the most important attributes. At times product's positive or negative externality and customers of different involvement types perceive quality differently in intrinsic and extrinsic products (Liaw, Zhu & Lee, 2004)

OBJECTIVES OF THE STUDY

The goal of this study is to explore the factors of product quality that encourages any buyer to make his/her final purchase. Other objectives were to restandardize the questionnaires to measure product quality, along with evaluation and confirming factors of product quality. The study was also undertaken to find out the correlation between various confirmed factors

METHOD

Study- The study was exploratory in nature with survey method used as a tool for data Collection.

Participants: Population- The Population for the study was included all the customers of all two wheeler users both male and female respondents included. **Sample Size-** Sampling size for the study was 150 respondents. **Sample techniques-** Non probability sampling technique was used to select sample. **Tools used for data collection** -For product quality standardised questionnaire (Shaharudin , Mansor, Hassan, Omar, & Harun, 2011) based on liker type scale from 1 to 5 where 1 shows the minimum agreement and 5 indicates maximum agreement **Tools use for data analysis-** Reliability test was used for checking the reliability of the questionnaire, Confirmatory Factor analysis was used for analyzing the confirmed factors of product quality. Correlation was applied between the confirmed factors.

FINDINGS AND DISCUSSION

For this research purpose in total 200 questionnaires were distributed out of which only 185 were received back. However 35 respondents did not completely filled the questionnaire. Therefore, these 35 incomplete questionnaires were removed from the analysis at all the levels. Response rate was 81% and finally 150 completely filled questionnaires were used for further data analysis. The Mean in case of ‘age’ was found to be 1.533 and in case of ‘Gender’ it was 1.526. Three age groups were used for the study i.e. 15-25, 25-35, 35-45. In ‘15-25’ years of age group 86 respondents participated that makes it 57.3 %, in ‘25-35’ years of age group 48 respondents filled the questionnaire that makes it 32% of the total respondents, in ‘35-45, years of age group only 16 respondents participated that makes it 10.7 % of the total respondents .

GENDER

Descriptive Statistics				
		age	Gen	
N	Valid	150	150	
	Missing	0	0	
Mean		1.5333	1.5267	
Std. Deviation		.68215	.50096	
Skewness		.907	-.108	
Std. Error of Skewness		.198	.198	

Age analysis					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15-25	86	57.3	57.3	57.3
	25-35	48	32.0	32.0	89.3
	35-45	16	10.7	10.7	100.0
	Total	150	100.0	100.0	

Gender Analysis					
		Frequenc y	Percent	Valid Percent	Cumulative Percent
Valid	Male	71	47.3	47.3	47.3
	female	79	52.7	52.7	100.0
	Total	150	100.0	100.0	

RESULTS OF RELIABILITY TEST

Reliability test was applied by using PASW software on questionnaire and reliability test values of all questionnaire is given in Table 1. Overall 41 items were used in the tool to measure Product Quality.

Table 1. Reliability Statistics

Cronbachs Alpha	No. of Items
.866	41

The reliability value from the above table indicated that the reliability coefficient cronbachs alpha value is more than 0.866 which is far above the threshold value of .7, indicating that the reliability of the questionnaire was high and it is suitable for further analysis.

CONFIRMATORY FACTOR ANALYSIS (CFA) (INITIAL)

Confirmatory Factor Analysis (CFA) was applied using AMOS (analysis of moments structures (18.0 Version). Standardised questionnaire from shahrudin(2011) was adopted wherein the tool has already been processed with EFA. Therefore in the current study first order CFA has been applied to Product Quality (Figure 1) .

Model specification and CFA Results of Product Quality (PQ)

CFA was performed on PQ to evaluate unidimensionality, reliability, and Validity of measure. In this Goodness of Fit (GOF) and Validity & Reliability of PQ was evaluated (Table 2).

Goodness of fit Indices: CFA was carried out on PQ model containing eight factors including performance (PR), reliability (RE), durability (DU), conformance (CO), perceived quality (PQ), serviceability (SE), aesthetics (AE), and special features (SF). Overall 41 statements resulting from EFA were used.

The model was evaluated by maximum likelihood (ML) estimation using AMOS 18. Table presents summarized findings of preliminary CFA where the results revealed that Chi square value ($\chi^2= 1207.701$, DF= 751) was significant at $p < 0.000$ indicating that data fit to the model was not good. Since CMIN/DF value should be < 3 for high fit. Therefore, further other techniques were used to assess the same.

RMR (Root Mean Square Residual) and GFI (Goodness of Fit Index): The First set of GOF Indices shows the value of GFI and AGFI (Adjusted Goodness of Fit Index) should range between 0 to 1, with a cut off value of .9 or in other words it should be $> .9$. Here GFI=.738

and AGFI = .700. The outcome specify for more improvement of model as value received are not suggested values.

Incremental / Comparative GOF: Here the Value of all five fit indices should be > .9. Results revealed that the value of NFI (Normated fit Index) = .565, RFI (Relative Fit Indices) = .525 the outcome specify for more improvement of model as value received are not suggested values but IFI (Incremental Fit Index) = .775 TLI (Tucker-Lewis coefficient) = .745, CFI (Comparative Fit Indices) = .767 the outcome specify for more improvement of model as value received are not suggested values.

Parsimony –Adjusted Measures: All values should be > .5 for high GOF. Here PRATIO= .916, PNFI=.517 and PCFI=.702. The outcome specify for more improvement of model as value received are not suggested values.

RMSEA (Root Mean Square Error of approximation): It reflects Comparative badness of fit Index it should be < .5 , in other words when we are improving the RMSEA the track of RMR should be kept that it should also be low. “Through RMSEA sample size issue can be resolved as any differences present between the hypothesized models.” In case of smaller values indicating better model fit and can range from zero to one. Here RMSEA was .064, which was still required to be improved.

RESULTS OF CONFIRMATORY FACTOR ANALYSIS TEST (INITIAL)

Table 2 Goodness of Fit statistics for the initial CFA of PQ

			Absolute Fit Measures							
	χ^2	DF	χ^2/DF	GFI	AGFI	RMSEA				
Crt.			1 < X 3	≥0.90	≥0.90	< 0.05				
Obt.	1207.701	751	1.608	.738	.700	.064				
Incremental Fit Measures						Parsimony Fit Indices				
	NFI	RFI	IFI	TLI	CFI	PRATIO	PNFI	PCFI		
Crt.	≥0.90	≥0.90	≥0.90	≥0.90	≥0.90	≥0.50	≥0.50	≥0.50		
Obt.	0.565	0.525	0.775	0.745	0.971	0.916	0.517	0.702		
χ^2 = Chi Square; df =degree of freedom; GFI = Goodness of fit Index; AGFI = Adjusted goodness of fit index; RMSEA = Root Mean square error of approximation; NFI = Normated Fit Index; RFI = Relative fit Indices, IFI = Incremental Fit Index, TLI = Tucker-Lewis coefficient, CFI = Comparative fit index PRATIO = Parsimony Ratio; PNFI = Parsimony Adjustment to NFI; PCFI = Parsimony Adjustment to CFI.										

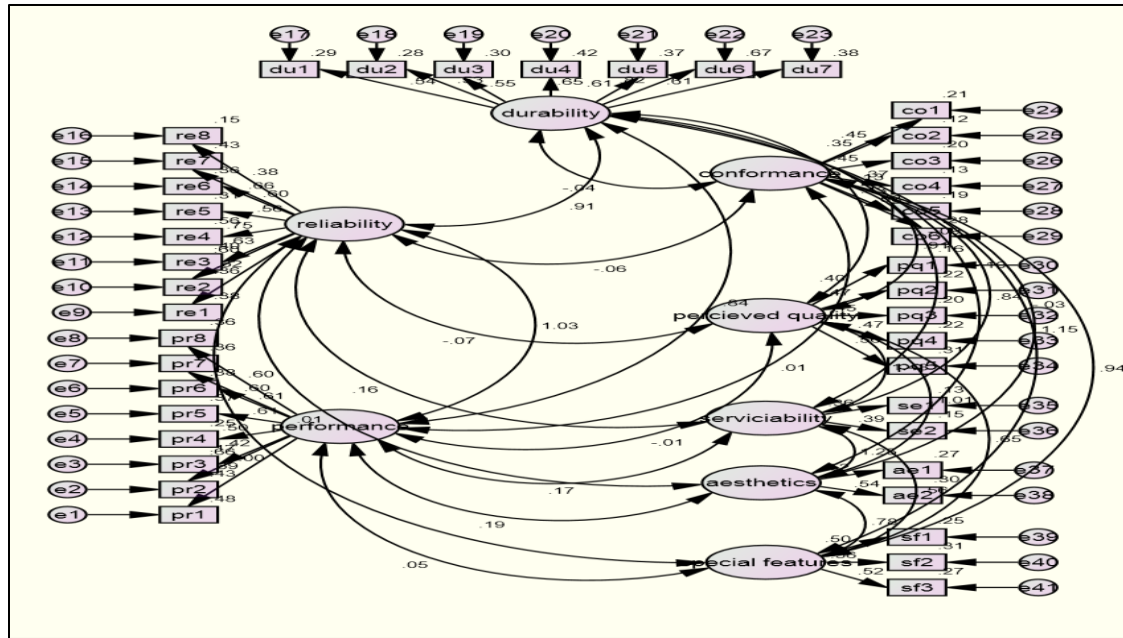


Table 3 Goodness of Fit statistics for the Initial CFA model of PQ

		Absolute Fit Measures							
	χ^2	DF	χ^2/DF	GFI	AGFI	RMSEA			
Crt.			1 < X 3	≥0.90	≥	< 0.05			
Obt.	173.407	155	1.119	.898	.862	.028			
		Incremental Fit Measures				Parsimony Fit Indices			
	NFI	RFI	IFI	TLI	CFI	PRATIO	PNFI	PCFI	
Crt.	≥0.90	≥0.90	≥0.90	≥0.90	≥0.90	≥0.50	≥0.50	≥0.50	
Obt.	0.791	0.744	0.973	0.965	0.971	0.816	0.645	0.792	

χ^2 = Chi Square; **df**=degree of freedom; **GFI**= Goodness of fit Index; **AGFI**= Adjusted goodness of fit index; **RMSEA**= Root Mean square error of approximation; **NFI**= Normated Fit Index; **RFI**= Relative fit Indices, **IFI**= Incremental Fit Index, **TLI**= Tucker-Lewis coefficient, **CFI**= Comparative fit index **PRATIO**= Parsimony Ratio; **PNFI**= Parsimony Adjustment to NFI; **PCFI**= Parsimony Adjustment to CFI.

Either covariance was attached or item was removed when it is related to more than one factor known as inter construct loadings where ever error variance are showing having high MI (Modification Indices) has to correlate between two items. The Final model resulted in to High Goodness of Fit (Table 3). PR3, PR4, PR6, PR7, PR8, RE1, RE6, RE7, RE8, DU2, DU4, DU5, DU7, CO2, CO3, CO4, CO5, SE1, SE2, AE1, AE2, AE3 were removed from the model to improve the results. After reducing these problematic statements, the measurement model was re-run. The Value of χ^2 was 173.407 along with DF= 155 & χ^2/df =1.119. RMSEA was .028

respectively. GFI was .898 & AGFI was .862. The incremental fit measures i.e. NFI= .791, RFI= .744, IFI= .973, TLI= .965, CFI=.971. The value of PRATIO, PNFI & PCFI was .816, .645 and .816 respectively. These GOF statistics reflects that the model fitted the data .(Figure 2)

Other evaluation criterion also shows that model sufficiently fit the data. In case of standard regression weights, all were greater than .5. The final outcome confirmed that model was fit to the data and hence no further improvement and modification was essential.

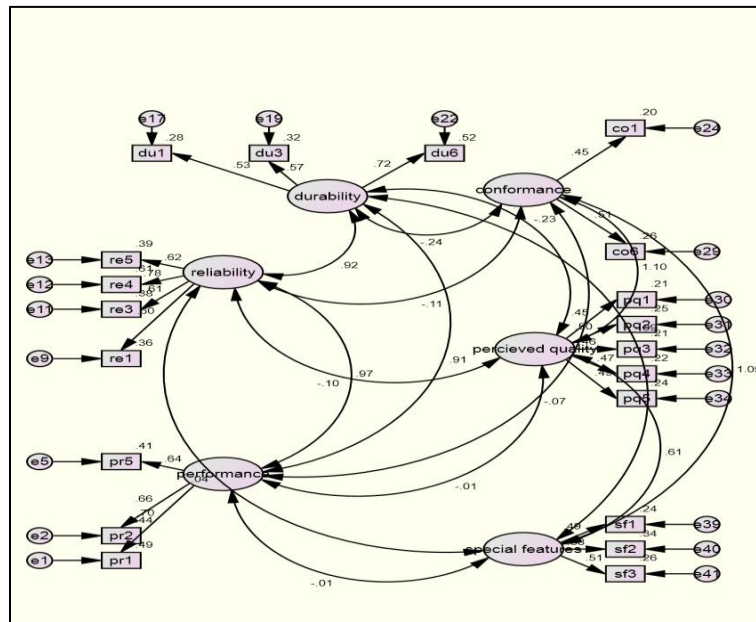


Figure 1 Final CFA

Description of factors: Shahrudin et al (2011) and Yogi (2016) have mentioned the contribution of the following factors in product quality enhancement. **Performance** had overly three manifest variables pr1(.698), pr2(.663), pr5(.643)and reliability is (.707). **Reliability** had overly four manifest variables re1(.599), re3(.613), re4(.779),re5(.624) and reliability is (.750). **Durability** had overly three manifest variables du1(.530), du3(.567), du6(.719) and reliability is (.636). **Conformance** had overly two manifest variables co1(.448) and co6(.510) and reliability is (.373). **Perceived quality** had overly five manifest variables pq1(.455), pq2(.496), pq3(.463), pq4(.466), pq5(.485) and reliability is (.590). **Special features** had overly three manifest variables sf1(.494), sf2(.582), sf3 (.506) and reliability is (.536).

RESULT OF CORRELATION TEST

Table 4.CORRELATIONS

	PR	RE	DU	CO	PQ	SF
PR	1	.699**	.618**	-.034	-.002	.003
	Sig. (2-tailed)	.000	.000	.681	.977	.975
RE	.699**	1	.623**	-.049	-.055	.016
	Sig. (2-tailed)	.000	.000	.551	.501	.847

DU	Pearson Correlation	.618**	.623**	1	-.141	-.146	-.055
	Sig. (2-tailed)	.000	.000		.085	.074	.502
CC	Pearson Correlation	-.034	-.049	-.141	1	.516**	.480**
	Sig. (2-tailed)	.681	.551	.085		.000	.000
PQ	Pearson Correlation	-.002	-.055	-.146	.516**	1	.354**
	Sig. (2-tailed)	.977	.501	.074	.000		.000
SF	Pearson Correlation	.003	.016	-.055	.480**	.354**	1
	Sig. (2-tailed)	.975	.847	.502	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

a. List wise N=150

In current study, Correlation was applied on confirmed factors of product quality (Table 4). Here, Performance , reliability and durability were found to be significantly correlated and on the other hand Conformance , Perceived Quality and Special Feature were found to be correlated significantly .

SUGGESTIONS

The current study has been done by taking sample of 150 respondents only, therefore it is suggested to take bigger sample size in order to obtain more accurate results. This study has been done in Gwalior region only so it is suggested to take larger area or other region so that more appropriate results can be done. The study resulted in the fact that we can change the product as well as its segment. Another important suggestion in line can be adding on some more related variable to Product Quality. As the current is a more focused and limited by confirming the factors of product quality and does not explore its relationship with other variables, therefore it is suggested to identify the relationship of product quality i.e the dependency product quality on other variables and vice versa.

MANAGERIAL AND RESEARCH IMPLICATIONS

This study is a useful contribution towards two wheelers users for increasing product quality. More emphasis should be paid towards. Performance related aspect, reliability, durability, conformance, Perceived Quality and Special Feature related aspects. It must be noted that Performance, reliability and durability were found to be significantly correlated and on the other hand Conformance, Perceived Quality and Special Feature were found to be correlated significantly. Therefore due care must be taken to utilize this set of findings at the time of manufacturing and even after sales. From the buyer point, the buyers must pay adequate attention to the factors confirmed for the product quality wherein more weightage can be given to Performance, reliability and durability followed by Conformance, Perceived Quality and Special Features. Researcher can use this study as the base for further analysis in the field of two wheeler product quality. Same study can also act as guideline for the researches in the similar industry may be with different demographic. As the current study is a work done in semi urban city i.e. Gwalior (M.P.) but the work can also be extended to some developed and urban city/ states. The

scale that is confirmed here in this study for Product Quality can be re-used. The review done can also be studied for the better understanding of the subject and references provided can be further explored.

CONCLUSION

The study examined confirmation of the factors of product quality for two wheelers automobiles in Gwalior region. After getting the questionnaires filled by users of two wheelers in Gwalior and by applying test like reliability, confirmatory factor analysis and correlation the analysis has been done. The results of the study reflected high degree of correlation between on confirmed factors of product quality. out of eight factors used in the study Performance, Reliability, Durability, Conformance, Perceived quality, Special features were confirmed using CFA, further Performance, Reliability, Durability were found to be strongly correlated and Conformance, Perceived quality, Special features were found to be strongly correlated with each other. Serviceability and aesthetics were dropped in the CFA. The Fitness statistics reflected that the Value of χ^2/d was 1.119. GOF statistics reflects that the model fitted the data. The Construct reliability for Performance, Reliability, Durability, Conformance, Perceived quality, Special features was found to be as per threshold limits. The Study presented a unique proposition and two different sets of Product quality that are correlated i.e. Performance , reliability and durability were found to be significantly correlated and on the other hand Conformance , Perceived Quality and Special Feature were found to be correlated significantly .

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