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**Influence of Product Quality on Customer Satisfaction in
the Mobile Smartphones Industry**

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Abstract

The purpose of this study was to determine the influence of product quality dimensions (conformance, performance, durability, features, aesthetics, reliability, serviceability and perceived quality) on customer satisfaction. The study used a sample size of 384 and 231 questionnaires were successfully completed and returned. The research used regression analysis to analyze the results. The results revealed that product quality dimensions had significant positive influence on customer satisfaction. It was, therefore, concluded that poor product quality in the mobile smartphone market causes customer dissatisfaction and leads to lower profitability and poor sales volumes for companies. Based on the findings, it was recommended that smartphones companies or manufacturers strive to raise the quality standards of their products to

ensure customer satisfaction. Further research was also recommended in order to address the limitation of this study. Further research can be conducted using different customers in order to increase the validity of its findings.

Key words: *Product quality; customer; customer satisfaction; mobile smartphone; perceived quality*

1. Introduction

Organisations today are operating in a complex dynamic environment where business is centered on the taste and preferences of customers. This has caused customer satisfaction, which is usually achieved through product quality and has become a major determinant of today's business performance. Product quality is vital because it increases the competitiveness of products which, in turn, is critical to customer satisfaction (Raharjo, 2013; Grace *et al.*, 2021). Product quality is closely related to the product's ability to meet its functions, which include reliability, accuracy, simple to use and repair and many other valuable attributes (Kotler & Armstrong, 2012). Product quality reveals all dimensions that deliver benefits that warrant customer satisfaction (Tjiptono, 2015). Usually, customers can effortlessly distinguish high quality products and make enhanced decisions linked to their purchase. Quality is taken as the most fundamental part of the business' competitive marketing strategy for its survival and success (Ishaq *et al.*, 2014). Product quality, according to Sitanggang (2019), are efforts made by manufacturers to meet or surpass customer satisfaction. Superior quality is usually used to differentiate competitors but it also helps authenticate the value of a company to compete (Ling & Mansori, 2018). Hakim (2021) posits that product quality has eight indicators or multiple components comprising of reliability, performance, durability, features, perceived quality conformance, serviceability and aesthetic. Ling and Mansori (2018) offer a firm understanding of each of these eight indicators as they define performance as the primary functional characteristics of a product, features as product add-ons that enhance appeal to the customer. Reliability is an indicator that a product will not flop within a particular time period when put in use. Conformance relates to the extent to which the product or service conforms to specified standards. Durability measures how long a product lasts in use. Serviceability is the timeliness, easiness and costs with which the product

can be repaired or maintain upon breaking down. Aesthetics relates to product appearance, how it sounds or feels etc. (depends on individual judgments and preferences). Perceived quality is a product attribute based on customer deduction and subjective as it may not always be a reality.as a quality attributed by the customer, noting that perception is not always reality". Customer satisfaction has been defined by Sitanggang (2019) as the level of one's feeling after matching the performance perceived in the expectation. Satisfaction is when someone responds physiologically, by feeling content or disappointed by the performance of a product after making an evaluation of the results after and before testing the product. Most devoted customers prefer high quality products (Albari, 2020). If the product fails to meet customers' needs, the company can diversify in order to retain customer satisfaction (Zhao *et al.*, 2019). Due to the impact of new entrants in business, globalization, new technology, increase in rivalry, lower purchase intentions, new products emerging and decline in market share which negatively affects sales volume, organisations have started concentrating on product quality and customer satisfaction so that they may remain competitive and survive in business. If customers' preferences and expectations are not met, they switch to other competitors (Sambo *et al.*, 2022).

2. Literature Review

2.1 Theoretical framework

According to Swanson (2013), the theoretical framework categorizes and explains the key factors, components or concepts that govern how research is organized. Theoretical frameworks are important in research because they enhance comprehending, speculating about or interpreting the variables interactions that predict, impact or affect the evens or outcomes. For the purposes of this study, the researchers employed two theories: the "Expectancy-Disconfirmation Theory" and "Kano Model". Expectancy-Disconfirmation Theory was propounded by Oliver (1980). Oliver developed the theory to clarify how consumers gauge the products' worth and services, and pass judgment on their level of satisfaction, based on their expectations and views of how well the products or services performed. However, the emergency of artificial intelligence has had a bearing on customer expectations which ultimately affects satisfaction. The Kano model, on the other hand, was developed to clarify how product features stimulate satisfaction and how

organisations can make use of the information to improve their products and remain competitive. While the Kano model emphasizes on the, must features, performance features, delight features, indifferent features and reverse feature, it is the habitual effect, a theory that underlies the Kano model that Zacarias (2018) calls, the natural decay of delight. It specifies that technical products like smart-phones also move from being attractive to becoming the must-haves, although it depends on the target market or customer category. Thus, the Kano model is imperative for understanding how product features elicit satisfaction.

2.2 Product quality

Product quality has been the main focus for enhancing organisational competitiveness (Grace *et al.*, 2021). According to Raharjo (2013), product quality remains the key to customer satisfaction. As proposed by Kotler and Armstrong (2004), product quality is the extent to which a product meets its functional capabilities in use. It incorporates the product's general accuracy, dependability, easiness in usage and in repairing, as well as other highly considered qualities. These attributes according to Kotler and Armstrong (2012), are sources of value to customers. Likewise, Tjiptono (2015) supports that product quality entails all dimensions that proffer need satisfying attributes to the customers. Product quality is composed of eight elements: features, reliability, performance, aesthetics, conformance, durability, perceived quality and serviceability (Mahsyar & Sarupati, 2020). As for Hidayat (2009), product quality is a major determinant of customer satisfaction or dissatisfaction. Businesses should therefore, strive to offer differentiated products with unique attributes from those of competitor organisations in order to achieve market dominance.

2.3 Customer satisfaction

Customer satisfaction is common term in marketing and Kotler and Keller (2009) affirm that it is positive feeling that arises in a customer after comparing the expected product performance in relation to the actual benefits derived after using the product. If the performance surpasses expectations, customers feel satisfied. Customer satisfaction or discontent is a customer's reaction to the difference experienced between earlier perception and the apparent performance of the product (Tjiptono, 2008). Customer satisfaction can be measured by customer

loss rate, periodic surveys, suggestions and recommendations as well as mystery shoppers (Kotler & Keller, 2012). Moradi (2019) has posited that product quality (especially as far as durability and reliability are concerned) significantly determines customer satisfaction. The perceived value of a customer is a key factor of their satisfaction (Ishaq *et al.*, 2014). There are three indicators of customer satisfaction which includes, fulfilment of desires, fulfilment of needs and fulfilment of expectations (Lina, 2022).

2.4 Conceptual Framework

The diagram below details the conceptual framework for this research:

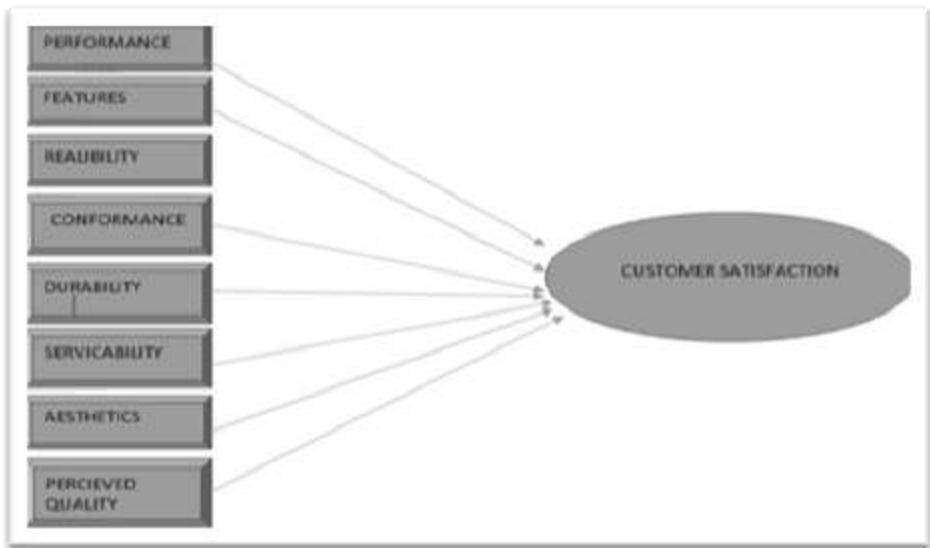


Figure 1 Study model

2.5 Hypotheses

H₁: There is a statistically significant positive relationship between product performance and customer satisfaction.

H₂: There is a statistically significant positive relationship between product features and customer satisfaction.

H₃: There is a statistically significant positive relationship between product reliability and customer satisfaction.

H₄: There is a statistically significant positive relationship between product conformance and customer satisfaction.

H₅: There is a statistically significant positive relationship between product durability and customer satisfaction.

H₆: There is a statistically significant positive relationship between product serviceability and customer satisfaction.

H₇: There is a statistically significant positive relationship between product aesthetics and customer satisfaction.

H₈: There is a statistically significant positive relationship between product perceived quality and customer satisfaction.

3. Methodology

According to Beullens and Loosveldt (2014), research methodology refers to an approach to identifying the best tools, techniques and procedures for problem-solving when doing research. This research adopted the positivism research philosophy. Saunders *et al.* (2019:144) affirm that “positivism relates to the philosophical stance of the natural scientist and entails working with an observable social reality to produce law-like generalisations.” Positivism is objective as it does not depend on individuals’ subjective reasoning and personal values (Park *et al.* 2020). Positivism relies on structured or closed questions (Bradburn, 2016). As per the positivism ideology, the researcher’s focus should be on facts (Crowther & Lancaster, 2018). The positivist philosophy remains critical because it produces valid and dependable knowledge which is vital for decision-making as well as for policy formulation. The researchers adopted a deductive approach which is linked to the positivist philosophy. The deductive approach was deemed ideal for this study because it starts by formulating theory and hypothesis and later verifies them through empirical testing (Magomo, 2023). Based on the approach, a quantitative method was chosen for this study. The quantitative research design is used when a researcher has to collect and analyse the data set given in numerical format (Creswell, 2014). According to Gill and Johnson (2010), one major advantage of using quantitative methods for data collection is that replicability can be assured. Besides that, quantitative methods make data analysis simple. Groves *et al.* (2009) have defined a survey as a research method where individuals are nominated from a pool of the targeted population to participate in answering standard questions with preconceived answers, in order to collect data on their behaviors, attitudes and beliefs or other characteristics. A self-

administered survey strategy was used in which structured self-completion questionnaires were dropped at selected mobile smart-phone agents for onward distribution to prospective mobile smart-phone users. Self-administered surveys were used because they are faster to obtain information from larger samples. Bhattacharjee (2021) defines research design as full strategy for collecting data in research project with the desire to respond to established research questions or to test hypothesis. A cross-sectional study which sought to gather data from a sample of smart-phone users was employed. Burns *et al.* (2017:99) indicate that, “cross-sectional studies are designed to measure a sample of the population of interest at one point in time.” Polit and Hungler (2020) refer to population as the totality of individuals who belong to a particular group or elements, objects or cases that a research might be interested to investigate. The targeted population was infinity (unknown) and constituted the smart phone users in Masvingo province. Since the researchers could not establish the exact population size and did not know the variations in the proportion, they used Glen’s (1992) method which assumes a maximum threshold of variability ($p=5$) and the desired confidence level of 95% with a $\pm 5\%$ degree of precision, thereby yielding a significant sample size of 384, which suffices for quantitative studies. Thus, the sample was computed as illustrated in the formula below:

$$n_0 = \frac{Z^2 pq}{e^2} = \frac{(1.96)^2 (.5)(.5)}{(.05)^2} = \mathbf{384}$$

A simple random sampling method was employed to pick the participants since all smart-phone users in the province had an equal and a known opportunity to be picked as representative subjects for the targeted group. According to Sekaran and Bourgie (2016), this random sampling method offers the least bias and guarantees more generalizability of results. From the 384 targeted participants, only two hundred and thirty-one (231) were valid as some questionnaires were not returned after completion while others were discarded during the editing process. The questionnaire which was used as the tool for data collection for this study has been defined by Leedy and Ormrod (2020) as a set of questions with optional answers, developed for a survey research. For this study, a structured questionnaire solicited data from the targeted

smart phone users and vendors. Section A of the survey questionnaire included demographic profiles like sex, age and educational levels. Section B, on the other hand, encompassed question items on the dimensions of product quality and customer satisfaction. A five point Likert scale was used to direct respondents to choose their answers regarding the extent to which they agreed or disagreed with the statements. The validity and reliability tests were done to establish both the rationality and consistence of the measurement device. The researchers made use of a standardized instrument to ensure that the responses address the objectives of the study so as to enable efficiency during data analysis. The data were analysed using the statistical package for social sciences (SPSS) version 25. The methods of analysis were basically the univariate descriptive statistics, namely: frequencies, mean and standard deviation and the bivariate statistics i.e. regression and correlations.

4. Analysis and Interpretations

4.1 Demographics

Table 1 shows the demographic profiles of participants.

Table 1 Demographic profiles of respondents

Gender	Frequency	Percentage %
Male	107	46.3
Female	124	53.7
Total	231	100
Age	Frequency	Percentage %
18-23 years	41	17.7
24-29 years	54	23.4
30-36 years	56	24.2
37-42 years	44	19.0
43 years and above	36	15.6
Total	231	100
Academic qualifications	Frequency	Percentage %
Ordinary level	45	19.5
Advanced level	26	11.3
Undergraduate	80	34.6
Post graduate	27	11.7
Others	53	22.9
Totals	231	100

It is evident in the table above that women were more willing to participate in the survey compared to their male counterparts, with a response rate of 53.7% against 46.3% respectively. A greater number of participants were drawn from the ages of between twenty-four (24) and thirty-six (36) years, indicating the possibility that this age range has more users of the smartphones. Regarding academic qualifications, most participants had first degrees (80 or 34.6%) and this proved that the targeted users were literate enough to give credible answers during the survey.

4.2 Reliability tests for product quality constructs

Table 2 indicates the reliability test that was done of all product quality constructs

Table 2 Product quality

Product quality attributes	Alpha	Number of items
Performance	.795	5
Features	.819	3
Reliability	.742	5
Conformance	.832	5
Durability	.754	3
Aesthetics	.707	5
Serviceability	.807	5
Perceived quality	.846	5

Table 2 shows the reliability test of all product quality constructs with Alpha and number of items. The main reason was to measure if the data was reliable using the SPSS software for Cronbach's Alpha. The acceptable measure for the constructs should be 0.7 (Copper & Schindler, 2014). As per the results from SPSS on the entire measure scale, the Cronbach's Alpha value exceeded 0.7 with Cronbach's Alpha of 0.941, which shows that the data was reliable for the study. The findings revealed that 41 out of 45 items scales had Cronbach's Alpha that exceeds 0.7. However, in a bid to increase reliability on the other 2 constructs, 4 items which were causing 2 of the constructs to have Cronbach's Alpha values below 0.7 were removed. Before the deletion of the 4 items, the Cronbach's Alpha value was 0.937 which is very good. This confirms the high degree of consistency and stability of the measures. There should be high level of consistency in the study so that it contributes valid and effective knowledge in the body of knowledge. This is why the reliability test was conducted in the study.

4.3 Descriptive statistics

4.3.1 Product quality attributes on customer satisfaction

Table 3 displays the descriptive statistics (mean and standard deviation) for product quality dimensions. This is the summary of responses regarding respondents' opinions on the extent they agreed or disagreed with the statements concerning influence of product performance on customer satisfaction. The results (mean values above 3) showed that participants agreed and strongly agreed that performance had significant relationship with customer satisfaction. The standard deviations 0.815, 0.818, 0.817, 0.710 and 0.815 showed moderate variability in the data.

Table 3 Descriptive statistics

Product quality Dimension	No. of participants	Overall mean	Overall standard deviation
Performance	321	4.14	.0795
Features	231	3.95	0.837
Reliability	231	3.56	0.9536
Conformance	231	3.95	0.726
Durability	231	3.89	0.823
Aesthetics	231	3.92	0.857
Serviceability	231	3.41	1.073
Perceived quality	231	3.50	0.932

The participants generally agreed that the performance of the product determines customer contentment as reflected by an overall response rate of 4. 14 and standard deviation of 0. 795. As for the features, the results indicated a mean of 3.95 which is evident that the participants concurred that features are vital dominants of smartphones' abilities to satisfy users is by value of variability which is 0.837 depicting a minimum variation in the responses given during the summary. Customers often rely on the product's reliability when they want to make choices that are self-gratifying. The results prove that reliable smartphone brands influence customer delight as evidenced by an average response of 3.56, reflecting that participants confirmed that a reliable project causes customer satisfaction. Most responses fell in the same category as evidenced by the small value of the standard deviation. The more a product conforms to the user requirements, the more it can meet or

exceed the user's expectations. The results in the table portray that users of the smartphone brands agreed that performance (mean=3.95) is an evidence of user satisfaction. This is also supported by an overall value of variation from minimum of 0.726, demonstrating that participants' answers were almost similar. With regards to durability, this study's results indicate that more durable smartphone brands are preferred over non-durable ones. Participants generally concluded that customers derived more satisfaction from products that last longer and this is shown by an average answer of 3.89. Thus, there was general consensus amongst participants regarding the ability of durability to influence customer satisfaction. This is also indicated by a smaller value of the standard deviation of 0.823. Apart from that, beauty is also a very vital influencer of customer pride and satisfaction. Aesthetic appeal plays a significant role in causing customer satisfaction and this is evidenced by an average response of agree 3.92 and a standard deviation of 0.897. Customers are more gratified by products that portray their culture and personal orientations. Serviceability is one such attribute that consumers revere when they choose which brands of smartphones to buy. In this study, participants confirmed that smartphone serviceability brands meet four needs and this is demonstrated by the main response of 3.41 and a standard deviation of 1.073, showing that the answers generally varied on this attribute. Clearly, perceived quality is key in making choices and most product users often choose a product that they perceive to be of the quality and that it can satisfy their needs. Participants' views generally agreed that perceived quality leads to customer satisfaction with an average response rate of 3.5 and 0.932 variation from the mean response.

4.4 Regression Analysis

4.4.1 Regression analyses on product quality dimensions and customer satisfaction

Table 4 indicates the association between constructs of product quality and customer satisfaction. When making regression statistical analyses, if the p-value relates to t is smaller than predetermined threshold (e.g. $\alpha = .05$) then the null hypothesis should be overruled and confirm that statistically significant association subsists between the causal variable and the effect variable.

Table 4 Association between dimension of product quality and customer satisfaction

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.539	.271		5.681	.000
Performance	.571	.069	.481	8.295	.000
1 (Constant)	2.154	.314		6.854	.000
Features	.399	.077	.325	5.203	.000
1 (Constant)	2.540	.260		9.756	.000
Reliability	.318	.066	.303	4.811	.000
1 (Constant)	1.719	.256		6.716	.000
Conformance	.571	.070	.475	8.161	.000
1 (Constant)	2.081	.233		8.915	.000
Durability	.466	.063	.439	7.401	.000
1 (Constant)	1.688	.292		5.785	.000
Aesthetics	.529	.073	.431	7.238	.000
1 (Constant)	2.378	.224		10.629	.000
Serviceability	.406	.064	.389	6.384	.000
1 (Constant)	1.672	.288		5.803	.000
Perceived Quality	.535	.072	.438	7.381	.000

Dependent Variable: Customer Satisfaction

Source: Fieldwork (2024)

Performance showed positive significant association with customer satisfaction that meaning that H_1 was accepted and the null hypothesis was rejected ($t = 8.295$, $B = 0.571$, $p = 0.000$). The association between features and customer satisfaction reflects that features posed positive significant association with customer satisfaction and as such H_2 was accepted and the null hypothesis ($t = 5.203$, $B = 0.399$, $p = 0.000$) was disconfirmed. The results are in sync with Ling and Mansori (2018) who affirm that features boost the appearance of merchandise customers.

Results of the coefficient in the table above indicate a positive β coefficient and a significant ($p < 0.05$), thereby calling for the rejection of H_0 and accepting H_3 . Thus, reliability is positively correlated to customer satisfaction. According to Abdullah *et al.* (2022), reliability is ranked as the most crucial element that influences customer satisfaction. Similarly, Sirgy *et al.* (2013) assert that customers who perceive a product as dependable, have a higher propensity for satisfaction and are likely to engage in repeat purchases. The p-value of 0.000 on conformance and customer satisfaction confirm a significant positive association between the variables and therefore H_4 is accepted and the H_0 is negated. This also means that features positively affect customer satisfaction. When there is conformance to standard measurements, customer satisfaction is highly likely to be achieved.

Durability has been found to inflict a positive causal effect on customer satisfaction as shown by a t-test value of 0.7401 and a p-value of 0.000. Therefore, H_5 was confirmed and H_0 rejected. It is evident that durable products warrant customer contentment. That is why Garvin (1987) has said that, economically the consumer equates the price to personal inconveniences associated with the product, including the as well as the timeline needed to replace. Regarding the association between aesthetics and customer satisfaction, results indicated a positive β of 0.529 and a p-value of 0.000, proving that aesthetics drive customer gratification positively. H_6 was, therefore, confirmed at the expense of H_0 and reject null hypothesis. This result aligns well with Ganguly *et al.* (2021) who concur that smartphone users are attracted to aesthetically pleasing designs and this attribute can induce repeat purchase.

Serviceability and customer satisfaction have to positively correlate as depicted by a p-value of 0.000. Based on the regression analysis, the study accepted H_7 and disconfirmed H_0 . The implication is that a substantial pivotal relationship exists between serviceability and customer satisfaction. Cordella *et al.* (2021) contend that repairs and maintenance ought to be economically viable in the event that failures arise when the product is in use. A value of $p < 0.05$ showcases a positive link between perceived quality and customer satisfaction. As a result, the study confirmed H_8 and rejected H_0 . This finding is in tandem with Islam *et al.* (2021) who affirm that perceived quality focuses on how customers feel about a product's overall quality. Thus, when customers have a

conviction that their smartphones are of a higher grade, they are thrilled by their purchase.

4.5 Summary of inferential analysis

Table 7 Summary of confirmation of hypotheses

	Research hypothesis	Result
H ₁	Product performance bears positive influence on customer satisfaction.	Confirmed
H ₂	Product features positively influence satisfaction.	Confirmed
H ₃	A significant positive relationship exist between product reliability and customer satisfaction.	Confirmed
H ₄	Product conformance and customer satisfaction have a strong positive correlation.	Confirmed
H ₅	Product durability has a strong causal influence on and customer satisfaction.	Confirmed
H ₆	A significant positive association subsists between product aesthetics and customer satisfaction.	Confirmed
H ₇	Product serviceability poses a strong causal effect on customer satisfaction.	Confirmed
H ₈	The product's perceived quality is a significant predictor of customer satisfaction.	Confirmed

5 Conclusions and Recommendations

5.1 Conclusions

Based on the findings of the study, it can be concluded that there is positive relationship between product quality and customer satisfaction. The findings revealed that performance is the strongest aspect of product quality that influences customer satisfaction the most. Therefore, manufacturers need to focus on the performance of their products. Based on the overall findings of this study in which all p-values fell below the threshold of $p < 0.05$, it was concluded that all product quality constructs influence customer satisfaction positively.

5.2 Recommendations for manufacturers

Drawing from the findings of this study, manufacturers of smartphones are encouraged to continuously aim at improving the performance of their products through continual upgrading of the features, aesthetics, perceived quality, reliability in use, durability and the ability to be serviceable as well as increasing the product image as all these lead to customer satisfaction. It is recommended that companies in smartphone industry implement collaborative metrics with customers such as having constant surveys in order to get information from customers on what they want rather than designing what the company wants. Manufacturers of smartphones are recommended to work on improving the reliability of smartphones by designing gadgets which have long lasting batteries, can adapt to future use and also cannot be easily affected mechanically. The study also recommends improving conformance through effective process control, employee training and quality management systems. To achieve all this, companies are recommended to hire innovative personnel who can come up with new ideas in order to improve processes. Companies are recommended to make use of quality material in assembling their products and consistently revamp their processes. Furthermore, manufacturers are recommended to consider cultural and regional variances, continual innovation and also material quality since product aesthetics attracts customers the most. Companies are also recommended to produce more and quality spare parts as well as make service or maintenance information readily available so that customers can repair their smartphones if they are malfunctioning. Continuous product improvement is critical since “the natural decay of delight” is a reality in this highly competitive smart-phone market coupled with emerging trends in technology such as artificial intelligence which affects customer expectations and ultimately their satisfactions. To that end, companies are recommended to concentrate on continuous monitoring and improvement of their product designs, after-sales services, manufacturing processes and customer satisfaction.

5.3 Recommendations for further study

This study was done in a specific context given that it was carried out in one particular province in a country that has ten provinces. In this regard, the findings of the study, therefore, cannot be generalizable. Thus, the researchers recommend future studies to seek to address the

limitations of this study by using the proportionate representative number of provinces in the country as this will improve the reliability of the results. Also, use of a single philosophical stance, i.e. positivism, was a methodological weakness of the study. It is against this backdrop that the researchers recommend future researchers to embrace pragmatist research philosophies that allow for the triangulation of research approaches, methods, strategies, designs and data analysis techniques so as to neutralize the weaknesses associated with the use of a one-sided research philosophy.

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