



Exploring service quality influence on customer satisfaction among micro and small metal welding enterprises in Southern Ghana

Emmanuel Baffour-Awuah *

Department of Mechanical Engineering, School of Engineering, Cape Coast Technical University, PO Box AD 50, Cape Coast, Ghana

Abstract

The study aimed at determining the influence of service quality on customer satisfaction among micro and small metal-welding enterprises in Southern Ghana. It focused on maintenance and repair service within the welding industry. Multistep sampling technique was utilized. The purposive sampling technique was employed to select three regional capitals namely Accra, Cape Coast and Sekondi-Takoradi. Employing a quantitative approach a total of 295 questionnaires, at a response rate of 78.6 percent were analyzed. Cronbach alpha, Variance Inflation Factor (VIF) and Durbin-Watson factor were used to determine the reliability, colinearity and serial correlation of results respectively. Descriptive statistics, Pearson's correlation coefficient, regression and Chi square statistical tools were used to analyze the data. The study revealed strong and positive relationship between tangibles, empathy, responsiveness, assurance and reliability and customer satisfaction; though the relationship between reliability and customer satisfaction was not significant among the enterprises. The study also revealed that the relationship between overall service quality and customer satisfaction is strong, positive and significant. It was further revealed that there is no significant difference in customer satisfaction among metal-welding maintenance and repair enterprises in southern Ghana. Generally, the result of the study has confirmed the alternative hypothesis that service quality is an influencer of customer satisfaction. The study again confirmed the use of SERVPERF scale as a reliable and valid scale for measuring service quality and as a useful tool used to determine the relationship between service quality and customer satisfaction. The study recommends more attention to be given to tangibility by welding enterprises in southern Ghana as the most important dimension of service quality.

Keywords: Customer Satisfaction; Metal-Welding Enterprises; SERVPERF; SERVQUAL

Published by ISDS LLC, Japan | Copyright © 2018 by the Author(s) | This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



Cite this article as: Baffour-Awuah, E. (2018), "Exploring service quality influence on customer satisfaction among micro and small metal welding enterprises in Southern Ghana", *International Journal of Development and Sustainability*, Vol. 7 No. 7, pp. 2139-2155.

* Corresponding author. E-mail address: emmanuelbaffourawuah37@yahoo.com

1. Introduction

The concept of quality and its implication to businesses has become very important to both providers and customer (Osman and Omar, 2007). This fact is acknowledged by many welding industries, that their survival in the competitive business environment profoundly relies on the extent to which high quality products and services one brought to the doorsteps of consumers. The competitive business world has further challenged organizations to recognize the proper place of quality by making it an integral part of business management in product and services delivery in order to complete favorable in the global and domestic markets. Indeed the success of business could be achieved through adaptation of culture of quality. But proper culture of quality is achieved by introducing high quality management policies through the sustenance of continuous improvement culture in the area of human, financial and other managerial capacities to meet customer demands. Quality has therefore relevantly been considered as a prominent management tool used to propel customer satisfaction and not exposition to exploitation (ElistinaandNaemah, 2011; Baidoo et al., 2015; Grzinic, 2007).

According to Parasuraman et al. (1988) service quality is determined by the customer according to their judgment of a products overall performance in terms of deeds, processes and performance of products and services. From the legal posit of view a quality product or service should be produced with reasonable care and skill (Howell and Weathart, 2005). In the welding and fabrication industry quality of repair and maintenance service delivered is very important for the survival of the industry. In order for the industry to succeed grow and develop, customer satisfaction need to be taken into serious consideration (Grzinic, 2007).

In Ghana, there are two classifications of welding and fabrication activities: the formal and informal sectors. The formal sector companies' deal with metal production and manufacturing referred to as medium and large enterprises (MLEs). The informal sector is however, considered not to operate as metal production and manufacturing industries and referred to as micro and small scale enterprises (MSES) (Edusah, 2013). The application of the welding process is however found in almost all branches of industry. Various industries employ a combination of the various welding categories such as repair and maintenance, manufacturing and constructional welding (Akpakpavi, 2015), the largest number of firms and employees being found in the repair and maintenance subsector of this group is found in the fabricated metal product subsector (64.5% welding in Ghana) whole main products include, but not limited to, the production of classroom metal desks, metal gate, block making machines, metal container, coal pot, burglar protection shield, fabrication of agro-processing, environmental and sanitation equipment, ice- breaker machines, metal storage tanks, plat forms, hoist stands, concrete mixers, corn shearer, funeral pavilions, metal vehicle garages, etc. the repair and maintenance activities is also found in the motor vehicle and equipment and auto repairs. This category comprises of about 14 percent of welders in Ghana. In the machinery subsector which employs about 18 percent of welders in Ghana, repair and maintenance is also carried out by welders.

Ardent search through literature has shown that many studies have been carried out about weld quality in Ghana though these studies suggest that the level of weld quality in Ghana is rather low and abysmal (Akpakpavi, 2015; Gyasi, 2013; Adu, 2011). Nevertheless, it appears studies relating service quality has rather been disproportionately carried out. In order to ensure total quality management service quality

requires to be given the needed attention. In an environment where the formal sector is more competitive and intense relative to the informal sector, MSEs in the industry need to be aggressively competitive to be sustained in the existing market place. Service quality ensures long term success and it is an element in the provision of competitive advantage in fulfilling customer expectations and organizational performance (Aktar, 2011).

The aim of the study was therefore to investigate the nature of service quality and its relationship with customer satisfaction in the welding industry in southern Ghana, using the service performance (SERVPERF) model as propounded by Cronin and Taylor (1992), in order to advance suggestions that could ensure better protection to the consumer and consequential improved customer satisfaction. Southern Ghana over two couple of years has gained much popularity due to its economic prominence in the country as a result of oil and gas find in the region. The metal-welding industry therefore appears to be commensurately expanding to meet the demands of the oil and gas industry in this part of the country. The study thus emphasized on the repair and maintenance sector of the industry within three capital cities in the region, viz. Accra, Cape Coast and Sekondi-Takoradi. Three null hypotheses were tested as follows:

H₁: There is no positive relationship between the dimensions of service quality and customer satisfaction in the metal-welding maintenance and repair industry in southern Ghana.

H₂: There is no positive relationship between overall service quality and customer satisfaction in the metal-welding maintenance and repair industry in southern Ghana.

H₃: There is no difference in customer satisfaction among metal-welding maintenance and repair enterprises in southern Ghana.

2. Literature review

2.1. State of metal-welding activities in Ghana

In manufacturing, metal welding in a fabrication or structural process of joining metals together through fusion at high temperatures which melts the base metal with the application of a filler metal, which when cools, solidifies to create a strong or stronger joint than the base metal. High pressure may be introduced during the process.

The role of the metal-welding industry in proving basic services and infrastructure to improve the standard of living and welfare of people in developed countries such as the United States, Canada and Australia cannot be over emphasized (Ericsson, 2012). The welding industry has contributed in the area of shelter, energy supply, transportation, food and water supply, construction, education, communication, sewage treatment and variegated human developmental needs. In developing countries such as Ghana the welding industry has helped in both the informal and informal welding subsectors to provide various items for both industrial and household needs (Gyasi, 2013).

According to Gyasi (2013) welding activities can be classified into industrial and non-industrial. The major industrial sector operations are found in the construction industrial sector, the heavy manufacturing industrial sector, the light manufacturing industrial sector, the capitalize repair and maintenance industrial sector and the automotive industrial sector. Specific Products include ship building and repairs, bridge and tunnel construction, structure steel erection, etc. The non-industrial sector operators also referred to as informal welding sector apply welding in the manufacturing of burglar proof doors and windows, cement block making machines, metal gates, car seats, wheel barrows, vehicle chassis and wagons, bill boards, coal pots, containers, metallic chairs, buckets, etc.

The practice of welding in Ghana is accompanied by many deficiencies and challenges. Akpakpavi (2016) observes that the low weld quality assurance in Ghana is due to scarcity of weld quality assurance personnel, non-availability of welding standards, absence of weld quality assessment equipment's and materials in welding industries and also technical training capacities of welding capacities of welders. Akpakpavi (2016) also attributes the situation to welding equipment supplier/dealers incapacity to provide relevant technical suggestions, advice and guidelines on weld quality assurance practices to welders due to lack of training. In a business environment where both suppliers and customers lack technical knowhow, the quality of work would have to suffer to the disadvantage of the customer.

According to Akpakpavi (2015), welders in Ghana lack simple quality assurance devices such as magnifying glasses, rules, dye penetrants, try square, depth gauges, radiographic equipment, magnetic particle sets, reference weld samples, fixtures etc. due to unavailability at prospective dealerships (oval inspection mirrors, pocket telescopic inspection mirrors, welding profile gauges). For these reasons, Akpakpavi (2016) concludes that weld quality assurance in the country in many organizations where welding is practiced has relegated to the background. From the foregoing it is evident that much has been written on weld quality in Ghana (Akpakpavi, 2015; Gyasi, 2013; Adu, 2011) and that there is scarcely any decision which explicitly concurs with quality and satisfactory services in the welding repair and maintenance industry. In order to protect customers, product quality alone should not be the only concern but services as well in the welding industry to compete well and favorably. It must be emphasized that the Ghanaian economy highly depends on the activities performed by the services sector and consumers, and attention. The welding repair and maintenance mostly is no exception.

Deductions from the work of Akpakpavi (2015), Gyasi (2013), and Adu (2011), indicate that one particular industrial sector that demands particular attention in terms of quality is the welding industry. According to Archer and Wesolowsky (1996), quality with reference to competition is total quality, which is far more than just product quantity but after sales warranty and maintenance and repair services. The importance of service quality measurement in the maintenance and repair industry could help improve customer satisfaction, make businesses competitive and boost enterprise net returns. Unfortunately and again it appears no empirical research has been conducted concerning service quality in the metal-welding repair and maintenance industry in Ghana in general and southern Ghana in particular. The study purposes to fill this gap.

2.2. Service quality

One of the most hotly researched and a debated topic in recent times is service quality (Ananth et al.,2010). Aktar (2011) has shown that the performance of businesses, success of organizations and survival of industry largely depends on quality of service provided. According to Culiberg and Rojsek (2010) various researchers' interpret service quality on perceived quality and an indication of customers' judgment of service delivered. Service quality may also be defined on a long-term attitude formed resulting from overall evaluation of an organizations performance in a continual manner (Hoffman and Batesan, (2010). Lovelock, Wirtzand Chatterjee (2011) relate service quality with customer expectation through consistent meetings between the two. Early researchers in the area including Gronroos (1992), Parasuraman et al.(1988) and Cronin and Taylor (1992). According to Gronroos, service quality is the resulting evaluation process by comparing customer expectations of delivered and expected service. Parasuraman et al.(1985) viewed service quality in terms of global evaluation process with respect to overall service excellence. Operationally, however, they defined service quality as the degree of gap between customer expectations and desired perceptions.

In spite of these definitions, there has been the difficulty to evaluate service quality by customers due to its simultaneous production and consumptive nature as well as intangible and perishable attributes (Zeithaml et al., 2006). The situation has given rise to several models which have been used to measure service quality from customer perception, point of view. The proposed model of Gronroos (1992; 1994) related service quality to depend on both customer perceived service and expected service; though the definition of Parasuraman et al. (1985) (SERVQUAL) which measures the gap between customer expectations of service and perceptions of actual delivered service is quite popular. A more recent model by Brady and Cronin (2001) suggested three primary dimensions of service quality as interaction quality, physical environment quality and outcome quality. Each dimension has three sub dimensions making nine in all. The model is hierarchical and not as relatively popular as the Parasuraman et al. (1988) model.

The SERVQUAL model was a breakthrough contribution by Parasuraman et al. (1985) as a quantitative tool to assess the quality of an organizations service by customers. As a multi-dimensional tool, it originally had ten dimensions which was collapsed into five namely tangibles, reliability, responsiveness, assurance and empathy (Parasuraman et al, 1988). The first dimension, tangibles, deals with the appearance of physical facilities, equipment, personnel and materials. In the welding repair and maintenance industry, physical facilities include the physical appearance of workshop, forecourt and entrance and these should be appealing; equipment's are up to date and these include oxygen-acetylene gas welding equipment, spraying gum and fixtures, shielded metal arc welding equipment for both formal and informal sectors and Tungsten InertGas (TIG) and Metal Inert Gas/Metal Active Gas (MIG/MAG) welding equipment's for the formal sector. Others including testing equipment such as hammer, press brakes, gauges and magnifying glasses should also be appealing. Personnel appearance suitability to the job means working gear appearance such as boots, overall, apron, welding helmets, protective long-sleeve jackets as well as welding curtains to protect customers and by standers. Materials such as metal plates, paints, etc. should also be appealing.

The second dimension, reliability also deals with the ability to perform the promised service accurately and dependably. This means when something is promised it is done; that employees/workshops could be trusted to do a good job; job is performed correctly the first time; service is completed at the designated time and that records are correctly maintained. In the welding, repair and maintenance industry reliability means that reasonable nature and quality of services should be expected as much as possible. Responsiveness, as the third dimension, is defined as the willingness of the workshop to help customers and provide prompt services by responding to customers' requests and complaint. The workshop in this regard, should not be too busy to respond to customer requests and complaints and be able to finish jobs within a reasonable time. Assurance, the fourth service quality dimension, is concerned with the ability of workshop to instill confidence in customers; let customers feel safe in their transactions; being consistently courteous and having knowledge to answer questions. In other words it is the knowledge of and courtesy from the employee to the customer and the ability to instill trust and confidence with respect to skills, expertise and safety of gadgets to be repaired and maintained. The fifth dimension is empathy. It is defined as the ability of the workshop to care and provide individual attention to customers; have best interest of customers; understanding the needs of customers; and operating at convenient hours. SERVQUAL is made of 22 items based on the five dimensions.

In spite of its popularity, SERVQUAL choice as the most reliable service quality measuring tool is an issue to contend with in many circles. Carman (1990) argued that the model is based on affirmative arrangement instead of arrangement of understanding and that it is not evidenced from statistical, economical and psychological theories. It is further argued that little evidence exists to show that customer service quality assessment is related to perception expectation gaps. There are also criticisms, according to Carman (1990) that SERVQUAL is rather related to service delivery process and not to service experience results. In the view of Cronin and Taylor (1992), the term expectation has multiple meanings. Consumers therefore use standards in place of expectations to evaluate the quality of service. The conclusion was that absolute expectations of service quality could not be measured using SERVQUAL and that the attributes in the five dimensions of SEQUAL when used to measure service quality does not embody the variability of each dimension. Other criticisms include the inconsistencies of consumer ratings from one moment to another moment of truth. Cronin and Taylor also argued that SERVQUAL cannot be used as a universal tool while Carman (1990) and Cui Lewis and Park (2003) corroborated with the fact that it cannot be applicable in different cultural settings except on service delivery processes. Finally, it has been criticized that there is confusion and boredom among customers in rating service quality through two sets of administration instruments to determine the gap between customer expectations and perceptions.

The criticism of Cronin and Taylor (1992, 1994) of the gap analysis appears to be the most pertinent, among the lot. Thus Measuring service quality from the point of view of perception only, was argued to be satisfactory. Hence, the service performance model (SERVPERF) developed by Cronin and Taylor (1992) as a measurement tool for evaluating service quality. Though SERVPERF aims at circumventing some of the major criticisms of SERVQUAL it is identical to the latter in terms of dimensions and structure. One major advantage is that it automatically rates by measuring perceptions only through comparison of performance perceptions and expectations. It does not directly measure expectations. SERVPERF empirically, has been

found to out-class the SERVQUAL model (Jain and Gupta, 2004; Wang and Shieh, 2006) and preferred to SERVQUAL, according to Gotlieb et al. (1994) and Babakus and Boller (1992).

2.3. Customer satisfaction

Customer satisfaction may be defined as the degree to which a firm's products or services meets or exceeds the expectations of the customers. It may also be defined as the proportion of customers whose declared encounter with an organization's products or services surpasses specific satisfaction expectations (Farris et al., 2010). In business organizations it is a key indicator of performance, differentiation and business strategy (Gitman and McDaniel, 2005). It is a measure of fulfillment of customer expectations, sales and profitability, and customer experience (Farris et al., 2010). Customer satisfaction and service quality are unequally very important in achieving business goals (Sureschander et al., 2002). They are the epitome of marketing theory and practice (Spreng and Mackey, 1996) and the crux of achieving sustainable competitive advantage (Shemwell et al., 1998). Customer satisfaction helps in the realization of economic goals such as return of investment, profitability and improved market share, (Scheuing, 1999; Hackl and Westlung, 2000) thus resulting in economic success (Shemwell et al., 1998).

Though there is a difference between service quality and customer satisfaction, high correlations exist between the two, showing some relationships (Ushanta et al., 2014; Bahia and Nantel, 2000; Parasuraman et al., 1988). Indeed there is a high dependency between customer satisfaction and service quality. Hence, a respective decrease or increase in one is likely to respectively decrease or increase the other (Sureshchandar et al., 2002). According to Brady and Cronin (2001), service quality and customer satisfaction have some commonalities. In the observation of Zeithaml et al. (2009), perceived service quality is an element of customer satisfaction while Taylor (1992) and Wang, Lo and Hui (2009) found that perceived service quality is a determinant of customer satisfaction.

Several studies have indicated various multi-item instruments used to measure customer satisfaction (Wirtz et al., 2003; Eroglu and Machleit, 1990; Westbrook, 1980). However, recent studies have shown that single-item customer satisfaction scales used by organizations in conducting surveys have equally proved competitive (Drolet and Moris, 2001). Customer satisfaction researchers have usually used surveys (Kessler, 2003). Single-item scales have been preferred, particularly when relatively large scale studies have to be made to deal with large number of customers, since it tends to reduce total survey errors (Salant and Dillman, 1995). In the present study the sample chosen was relatively large in terms of total size of the metal welding industry as indicated in the pilot study.

3. Study design and instrument

A multi-step non-probability sampling procedure was adopted for the study. Though southern Ghana was targeted for the study, the study judgmentally selected the three southern regional capitals which include Accra (capital of Greater Accra Region), Sekondi-Takoradi (capital of Western Region) and Cape Coast (capital of Central Region). Three general reasons influenced the choice (Ghana Statistical Service, 2012). One, the regional capitals are the most populous localities in the three regions. Two, they are the localities most

bustling with economic, commercial and industrial activities. Finally, they are the regional capitals closest to, and most influenced by the oil and gas find in Ghana. Specifically, Accra was selected due to its position as the capital city of Ghana with a large majority of metal welding workshops. Sekondi-Takoradi, the oil and gas metropolis is expanding at a very fast rate due to discovery of oil and gas in the region. Cape Coast, the former capital of Ghana is located between the present capital and the oil and gas city of Ghana. It is gaining much prominence by virtue of proximity between the two cities.

Micro and small enterprise welding workshops were also purposively selected. These are shops with less than 10 employees (Ghana Statistical Service (GSS), 2012). Non-proportionate convenience and purposive sampling were used to select 15 welding shops from Cape Coast, 25 from Sekondi-Takoradi and 35 from Accra, making a total of 75. Only shops willing to be part of the questionnaire-collection process were involved in the study. Five customers each were conveniently and accidentally sampled from each workshop and administered with a questionnaire. Questionnaires were administered on one-on-one basis. A total of 375 took part in the study. However, 295 (response rate of 78.7%) questionnaires were free from errors and missing data and therefore used for the analysis. Individual response rate for Cape Coast, Sekondi-Takoradi and Accra were 93.3% (70 respondents), 80.8% (101 respondents) and 70% (124 respondents) respectively. Literature has shown that a sample size of 225 is adequate for a study of this nature in Ghana. The overall response rate was thus 78%. Customers who had transacted with the workshops on more than one, but not more than three occasions were sampled. The assumption was that those who frequently patronized the workshops more than three occasions were more likely to be automatically satisfied with the quality of service rendered. Though questionnaire was worded in English subjects who could not read and understand English were assisted through translation into vernacular. Only customers who were willing to respond to the questionnaire were allowed to do so. Those who could not respond immediately were allowed to deposit completed questionnaires with the workshop at their convenience. Researcher then collected completed questionnaire on the next time of visit. Data was collected in the months of February and March, 2015 during working hours.

The Cronin and Taylor's (1992) SERVPERF approach was used for the data collection. It is a 22-items tool but restated to suit the demands of the industry. The questionnaire was however of two parts. Part one comprised customer demographics, while the second part was made of 22-items (refer Table 1) in addition to a single-item question that dealt with customer satisfaction. A seven-point Likert scale ranging from "strongly disagree = 1" to "strongly agree = 7" was employed in scoring service quality and customer satisfaction. The statistical package for the social science software (SPSS) programme, version 21, was used to analyze data. Descriptive, regression and chi-square statistical tools were employed for the data analysis.

4. Results and discussion

4.1. Demographic profile

Thirty of the respondents (10.9%) were female with majority, 245 (89.1%) being male. Customer age ranged between 26 years and 67 years. The mean and median ages were 44.0 and 46.4 respectively. Monthly income

was between GH¢650 and GH¢ 4500. The respective mean and median income were GH¢1955.24 and GH¢2180.66. Majority of respondents (67.0%) had Basic school as the highest educational attainment; 7.2 percent had Sec/Tech/Voc; and 25.8percent had tertiary education as the highest educational attainment. Fifty-eight percent of the respondents had visited workshops on three occasions while 42 percent had done so twice.

4.2. Perception of service quality

The Cronbach's Alpha coefficient was considered in determining the reliability of internal consistency of the scale since it is the most popular reliability measure. As the Cronbach's Alpha coefficient for all dimensions were greater than 0.7 that is, between 0.779 and 0.921, the measure used could be considered consistent for the analysis to be pursued. (Refer table 1).In addition to this, internal validity was proven as the study met the conceptual and scientific methods and requirements employed by reliable and valid studies and researchers (Payne and Payne, 2004; Bailey, 1994).

Table 1. Service quality dimensions and items/attributes

Dimension	Items/attributes	Cronbach's Alpha
Tangibles	<ol style="list-style-type: none"> 1. Welder has modern-looking equipment 2. Shops physical facilities are visually appealing 3. Welder is neatly dressed. 4. Welding materials are visually appealing 	0.921
Reliability	<ol style="list-style-type: none"> 1. Welding is performed in within the promised time. 2. Welder should be sincere interest in solving problems. 3. Welder performs the service right the very first time. 4. Welder provides service right the first time. 5. Welder maintains records. 	0.834
Responsiveness	<ol style="list-style-type: none"> 1. I do not spend much time waiting at the welding shop. 2. Welder is always willing to help. 3. Welder is quick in correcting errors. 4. Welder is quick to respond to my requests. 	0.779
Assurance	<ol style="list-style-type: none"> 1. Welders are trustworthy. 2. I feel safe in leaving jobs with welders. 3. Welder is consistently courteous to me. 4. Welder has the knowledge to answer all my questions. 	0.786
Empathy	<ol style="list-style-type: none"> 1. Welder provides me individual attention. 2. Welder has convenient operating hours. 3. Welder gives me personal attention. 4. Welder considers my wishes and needs. 5. Welder shows understanding of my specific work. 	0.875

Sources: Study data

Table 2 indicates the mean scores and standard deviations of the dimensional attributes of service quality. The highest dimension score was 5.552 (Responsiveness); followed by 5.439 (Assurance); 5.25 (Empathy);

4.985(Tangibles) and 4.956 (Reliability). This shows that the industry is generally performing satisfactorily. In relative terms, however the welding industry repairs and maintenance service sector are best in promptly providing service to customers, willing to help customers, ready to respond to customer's request and truthful as when service will be completed. On the other hand providers in the industry relatively lack the ability to provide service as promised, provides service at the promised time, are not dependable in handling services problems, do not perform service right the first time and do not maintain records. According to Berry et al. (1994), this does not augur well for the industry since Reliability is the most important service quality dimension in the maintenance and repair industry. This is because Reliability is the fabric of service quality, indicating how dependable and accurate services are. In the view of the authors, nothing, such as friendliness from employees, and genuine apologies can be exchanged for unreliable service and that thousand apologies cannot compensate for the memory of bad service. Results from this study corroborates with Berry et al., (1994) that most organizations are more ineffective on reliability than the other service quality dimensions thus performing best in the less important dimensions such as tangibles and responsiveness. Providers in the welding industry therefore need to be re-strategized to improve service reliability.

Table 2. Mean score and standard deviation of service quality dimensions

Service quality dimension	Mean score (M)	Standard deviation (SD)
Tangibles	4.985	0.866
Reliability	4.956	0.913
Responsiveness	5.552	0.774
Assurance	5.439	0.780
Empathy	5.25	0.921

Source: Study data

4.3. Service quality and customer satisfaction relationship

The study sought to find the linear relationship between the five dimensions of service quality and customer satisfaction employing Pearson's product moment correlation. The results are shown in table 3. The correlation coefficients from the strongest to the weakest are Empathy (0.783); Assurance (0.705); Tangibility (0.628); Responsiveness (0.566) Reliability (0.539). Since all coefficients were greater than 0.05, (Cohen, 1988) and significant levels less than 0.0005, it can be concluded that the relationship between each dimension and customer satisfaction are significantly strong and positive. This supports empirical findings that improved Tangibility, Reliability, Responsiveness, Assurance and Empathy could increase customer satisfaction (Ushanta et al., 2014; Bahia and Nantel, 2000; Wang et al., 2003).

Table 3. Pearson correction coefficients between service quality dimensions and customer satisfaction

Dimension	Correction coefficient	Sig (p)
Tangibles	0.628	0.000
Reliability	0.539	0.000
Responsiveness	0.566	0.000
Assurance	0.705	0.000
Empathy	0.783	0.000

Source: Study data

Table 4. Regression model summary between service quality dimensions and customer satisfaction

Model R	R square	Adjusted R ²	Standard error of the estimate	Durbin-Watson
0902	0.814	0.809	0.281	1.963

a. Predictors: (Constant), Empathy, Responsiveness, Tangibles, Assurance

b. Dependent variable: Customer satisfaction (Source: Study data)

Table 5. Analysis of variance (Anova) of multiple linear regression analysis

Model	Sum of squares	df.	Mean square	Frequency	Significant
Regression	66.161	5	13.232	167.622	0.0006
1. Residual	15.157	290	0.079		
Total	81.318	295	-	-	-

a. Dependent variable: Customer satisfaction

b. Predictors: (Constant), Empathy, Responsiveness, Tangibles, Reliability, Assurance (Source: Study data)

Table 6. Coefficients of multiple linear regression analysis between service quality dimension and customer satisfaction

Model	Unstandardized Coefficients		Standardized coefficient s	T	Sig	Correction		Collinearity Statistics	
	B	Std. Error				Partial	Part	Total	VIF
1 constant	0.443	0.179		2.476	0.014	-	-	-	-
Tangibility	0.216	0.027	0.292	8.145	0.000	0.507	0.254	0.758	1.319
Reliability	0.043	0.027	0.061	1.579	0.116	0.113	0.049	0.658	1.520
Responsiveness	0.171	0.030	0.206	5.751	0.000	0.383	0.179	0.756	1.322
Assurance	0.170	0.035	0.206	4.870	0.000	0.332	0.152	0.542	1.846
Empathy	0.303	0.029	0.434	10.45	0.000	0.602	0.326	0.562	1.778

Source: Study data (2015)

The study attempted to establish whether there is a linear relationship between service quality and customer satisfaction using multiple linear regression analysis to confirm the results of the Pearson's product moment correlation test. The Durbin-Watson value was 1.963 showing the absence of the serial correlation. With all of tolerance values below unity and Variance Inflation Factors below 10 there were no multi-collinearity among independent variables (table 4 and table 6), indicating support for the analytical tool. Table 5 shows that the model is significant ($\rho < 0.0005$). Analyzing which of the dimensions contributes most to the model the study found Empathy as such; followed by Tangibles, Assurance and Responsiveness; the least being Reliability. This is shown as Beta values in table 6. Service quality dimensions contributed

positively to customer satisfaction, all contributions being significant except ($p=0.116$), confirming the results using the mean score descriptive analysis that customers were least satisfied in terms of reliability. The model summary of the relationship also revealed that the model as a whole, explains 80.9% of the variance in customer satisfaction, and that the contribution is statistically significant [$F(5,192) = 167.622, p < 0.0005$] (Refer Table 5).

The study further explored the relationship between overall service quality and customer satisfaction using simple linear regression analysis. Table 7 exhibits the descriptive mean scores of overall service quality and customer satisfaction as 5.2 and 5.234 respectively, both showing satisfactory levels since they are greater than 4. The Pearson's correlation coefficient between the two variables was strong, positive (0.88) and statistically significant ($p < 0.0005$) (Table 8). There was no serial correlation with Durbin-Watson factor of 1.997 (Table 9); and no multi-collinearity with Tolerance value = 0.83 and VIF=1.205 (Table 11). Table 11 revealed that overall service quality contributes positively to customer satisfaction (Beta = 0.882) and the relationship significant, $p < 0.0005$. The model summary and ANOVA analysis (Table 9 and Table 10) shows that the overall service quality, singularly as a predictor, explains 77.8% of the variance in customer satisfaction. Table 10 also show that contribution is statistically significant [$F(1,196) = 688.216, p < 0.005$]. This revelation further supports empirical findings that there is a positive relationship between overall service quality, service quality dimensions and customer satisfaction. Thus improved service quality has a positive effect on customer satisfaction.

The study finally assessed customer satisfaction in terms of the three regional capitals: Accra, Sekondi-Takoradi and Cape Coast. Using Chi square analysis (Table 12) it was observed that there is no statistical difference among the three metropolises (Accra, Cape Coast and Sekondi-Takoradi) in terms of customer satisfaction. Pearson Chi square value was 0.94. The minimum expected count was 7.58 while 0% cells had expected count less than 5 indicating that assumptions of Chi square were not violated. The study therefore concludes that within the metal-welding maintenance and repair service industry customer satisfaction among customers is not statistically different in southern Ghana.

Table 7. Mean scores and standard deviation of customer satisfaction and overall service quality

Variable	Mean	Deviation
Customer satisfaction	5.20	0.642
Overall service quantity	5.234	0.624

Source: Study data

Table 8. Pearson's correlation co-efficient between overall service quality and customer satisfaction

	Overall service quality	Sig
Customer satisfaction	0.882	0.000

Source: Study data

Table 9. Model summary of regression analysis between overall service quality and customer satisfaction

Model	R square	Adjusted R square	Standard error of the estimate	Durbin-Watson
1) 0.882	0.778	0.777	0.303	1.998

a. Predictor : (constant), overall service quality

b. Department variable : customer satisfaction (Source: Study data)

Table 10. Analysis of variance (Anova) of simple linear regression analysis

Model	Sum of squares	df	Mean square	F	Sig
1					
Regression	63.293	1	63.293	688.216	0.000 ^b
Residual	18.025	294	0.092		
Total	81.318	295	-	-	-

a. Department variable: Customer satisfaction

b. Predictor: (Constant), Overall service quality (Source: Study data)

Table 11. Coefficients of simple linear regression between overall service quality and customer satisfaction table not complete

Model	Unstandardized coefficient		Standardized coefficient		Sig	Correlation	
	B	Std error	t	Beta		Partial	Part
1) constant	0.441	0.183	2.414	0.017	0.017		
Overall service quality	0.909	0.035	26.234	0.000	0.000	0.882	0.882

a. Department variable: Customer satisfaction

b. Predictors (Constant): Overall service quality (Source: Study data)

5. Conclusion

The study aimed at measuring the relationship between service quality of customers and customers' satisfaction of macro and small enterprise metal welding industries in southern Ghana. Welders in the industry were observed to excel in terms of Assurance, Empathy, Tangibility and Responsiveness and least with reliability. Though the relationship between reliability and customer satisfaction was strong and positive, it was not significant. Service providers in the industry need to improve upon the following: provide service as promised; provide service at the right time; be dependable in handling services problems and challenges; perform service right at the first time; and maintain records that can be beneficial to customers. They also need to improve on the following: respond to customer requests, be willing to help customers, be prompt in providing service to customers; and tell customers when services will be performed to help in providing competitiveness towards medium and large enterprises in the industry. Since the relationship between tangibles, reliability, responsiveness, assurance and empathy and customer satisfaction was strong

and positive; the provision of quality service could be a measure of satisfying customers within the industry. The extension of the assertion among the three metropolises further corroborates other findings that there exists a strong and positive relationship between service quality and customer satisfaction. Service providers in the industry within the study area should improve services in general and more with regards to reliability in particular. Delivering service within the promised time, showing interest in solving customers' problems, performing service right the very first time and maintaining maintenance records could go a long way to enhance customer satisfaction.

References

- Adu, M. (2011), *Research survey of current welding practices in selected metal welding industries in Ghana*, Thesis submitted to the School of Graduate Studies, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.
- Akpakpavi, M. (2015), "Weld quality assurance practices in the metal welding industry in Ghana", *International Journal of Science, Technology and Society*, Vol. 3 No. 4, pp. 111-119.
- Aktar, J. (2011), "Determinants of service quality and their relationship with behavioral outcomes: Empirical study of the private commercial banks in Bangladesh", *International Journal of Business and Management*, Vol. 6 No. 11, pp. 146-156.
- Ananth, A., Ramesh, R. and Prabakaran, B. (2010), "A service gap analysis in private sector banks - An empirical study of customers' expectations vs. perceptions", *Sri Lankan Journal of Management*, Vol. 15 No. 2,3,4, pp. 44-53.
- Archer, N.P. and Wesolowsky, G.O. (1996), "Consumer response to service and product quality: A study of motor vehicle owners", *Journal of Operations Management*, No. 14, pp. 103-118.
- Babakus, E. and Boller, G.W. (1992), "An empirical assessment of the SERVQUAL scale", *Journal of Business Research*, Vol. 24 No. 3, pp. 253-268.
- Bahia, K. and Nantel, J. (2000), "A reliable and valid measurement scale for the perceived service quality of banks", *The International Journal of Bank Marketing*, Vol. 18 No. 2, pp. 84-98.
- Baidoo, F. Oduro-Awuakye, G.A. and Oduro-Okyere, T. (2015), "Influence of service quality delivery in the SMES of the motor vehicle repair service industry in Ghana", *Africa Journal of Applied Research (ATAR)*, Vol. 1 No. 1, pp. 2408-7920.
- Berry, L.L. Parasuraman, A., and Zeithaml, V.A. (1994), "Improving service quality in America: Lessons learned", *Academy of Management Executive*, Vol. 8 No. 2, pp. 32-46.
- Brady, M.K. and Cronim, J.J. (2001) "Some new thoughts on conceptualizing perceived service quality: A hierarchical approach", *The Journal of Marketing*, Vol. 65 No. 3, pp. 34-49.
- Carman, J.M. (1990), "Consumer perception of service quality: an assessment of the SERVQUAL dimensions", *Journal of Retailing*, Vol. 66 No. 1, pp. 33-35

- Cronin J.J. Taylor, S.A. (1992), "Measuring service quality: a reexamination and extension", *Journal of Marketing*, Vol. 56 No. 3, pp. 55-68.
- Cui, C.C., Lewis, B.R. and Park, W. (2003), "Service quality measurement in banking sector in Korea", *International Journal of Bank Marketing*, No. 21, pp. 191-201.
- Culiberg, B. and Rojsek, J. (2010), "Identifying service quality dimensions as antecedents to customer satisfaction in retail banking", *Economic and Business Review*, Vol. 12 No. 3, pp. 151-166.
- Drolet, A.L. and Morrison, D.G. (2001), "Do we really need multiple-item measures in service research?" *Journal of Service Research*, Vol. 3 No. 3, pp. 196-204.
- Edusah, S.E. (2013), "The informal sector, micro-enterprise and small-scale industries: The conceptual quandary", *Journal of Economics and Sustainable Development*, Vol. 4 No. 20, pp. 117-185.
- Elistina, A.B. and Naemah, A. (2011), "Consumers' perceptions on the service quality in the motor vehicle repair and service industry: An exploratory study in Klang Valley, Malaysia", *Pertanika K. Soc. Sci and Hum.* Vol. 19 No. 2, pp. 409- 422.
- Eroglu, S.A. and Machleit, K.A. (1990), "An empirical study of retail crowding: Antecedents of consequences", *Journal of Retailing*, No. 66 (Summer), pp. 201-221.
- Farris, P.W., Bendle, N.T.P., Feifer, P.E. and Reibstein, D.J. (2010), *Marketing metrics: The definitive guide to measuring marketing performance*, Pearson Education, Inc., Upper Saddle River, New Jersey.
- Gitman, L.J. and McDaniel, C.D. (2005), *The future of business: The essentials*, Thompson South Western, Mason, Ohio.
- Gotlieb, J.B., Grewal, D. and Brown, S.W. (1994), "Consumer satisfaction and perceived quality: complementary or divergent constructs", *Journal of Applied Psychology*, Vol. 79 No. 6, pp. 875-885.
- Grönroos, C. (1992), Quo Vadis, Marketing? Towards a Neo-Classical Marketing Theory, in: *Economics and Marketing*, Essays in Honour of Gösta Mickwitz, ed. by Hans Blomqvist – Christian Grönroos – Lars-Johan Lindqvist, pp. 109–123, Publications of the Swedish School of Economics and Business Administration. *Series Economy and Society*, No. 48, Helsinki.
- Gronroos, C. (1994), "From marketing mix to relationship marketing: towards a paradigm shift in marketing", *Management Decision*, Vol. 32 No. 2, pp. 4-20.
- Gržnic, J. (2007), *Concepts of service quality measurement in the hotel industry*, Pula: University of Jurja Dobrota.
- Gyasi, E.A. (2013), *Quality, Productivity and Economy in Welding Manufacturing–Case Study: West Africa*. Master's Thesis, Lappeenranta University of Technology, Faculty of Technology, Mechanical Engineering.
- Hackl, P. and Westlung, A.H. (2000), "On structural equation modeling for customer satisfaction measurement", *Total Quality Management*, Vol. 11 No. 4/5/6, pp. 5820-5825.
- Hoffman, K.D. and Batesan, J.E.G. (2002), *Essentials of services marketing: concepts, strategies and cases* (2nd ed.), Eastern Press (Bangalore) Pvt. Ltd. Bangalore.

Howells, G. and Weatherill, S. (2005), *Consumers protection law* (2nded), Ashgate Publishing Limited, United Kingdom.

Jain, S.K. and Gupta, G. (2004), "Measuring service quality: SERQUAL VS. SERVPERF scales", *VIKALPA*, Vol. 29 No. 2, pp. 25-37.

Kessler, S. (2003), *Customer satisfaction tool kit for 150 9001: 2000*, Milwaukee, Wis: ASQ Quanti Press

Lovelock, C. Wirtz, J. and Chatterjee, J. (2011), *Services marketing: People, technology, strategy*, 7th ed., New Delhi, Pearson Education in South Africa.

Mangold, G.W. and Babakus, E. (1991), "Service quality; the front-stage perspective VS. the back-stage perspective", *Journal of Services Marketing*, Vol. 5 No. 4, pp. 59-70.

Osman, H.A. and Omar, E. (2007), "The Relevance of total quality management in small and medium enterprises (SMES) of the automobile industry from the perspective of the employer", An unpublished report, University of Teknologi Mara, Malaysia.

Parasunamam, A, Zeithaml, V.A. and Berry, L.L. (1988), "SERVQUAL: A Multiple-Item Scale for Measuring Customer Perceptions of Service Quality", *Journal of Retailing*, Vol. 64 No. 1, pp. 12-40.

Parasuraman, A, Zeithaml, V.A. and Berry, L.L. (1985), "A conceptual model of service quality and its implications for future research", *Journal of Marketing*, Vol. 49 No. 4, pp. 41-50.

Salant, P. and Dillman, D.A (1995), *How to conduct your own survey: Leading professional give you proven techniques for getting reliable results*, available at: enhancedwiki.altervista.org/en.php.title=non-sampling-error. (accessed 23 August 2016).

Samantha, P.A.P. (2014), "Consumers' perceptions on service quality forwards satisfaction: An application of SERVPERF in state sector banks in Sri Lanka", *European Journal of Business and Management*, Vol. 6 No. 4, pp. 72-81.

Scheuing, E.E. (1999), *Creating customers for life, productivity*, Press, Portland OR: Reicheld, F.F. (1996), *The loyalty Effect*, Harvard Business School Press, Boston MA.

Shemwell, D.J. Yavas, U. and Bilgin, Z. (1998), "Customer service provider relationships: An empirical test of a model of service quality, satisfaction and relationship oriented outcome", *International Journal of Service Industry Management*, No. 9, pp. 155-168.

Spreng, R.A. and Mackoy, R.D. (1998), "Customer service provider relationships: An empirical examination of a model of perceived service quality and satisfaction", *Journal of Retailing*, No. 72, pp. 201-214.

Sureshchandar, G.S., Rajendran, C. and Anatharaman, R.N. (2002), "The relationship between service quality and customer satisfaction: A factor specific approach", *Journal of Service Marketing*, Vol. 16 No. 4, pp. 363-379.

Ushanta, R.A.C., and Wijeratne, A.W. (2002), *The relationship between service quality and customer satisfaction: A factor specific approach*, available at : [https://www.google.com.gh/search?q=Ushanta,+R.A.C.,+and+Wijeratne,+A.W.+\(2002\),+The+relationship+between+service+quality+and+customer+satisfaction:+A+factor+specific+approach.&dcr=0&tbm=isch&tbo=u](https://www.google.com.gh/search?q=Ushanta,+R.A.C.,+and+Wijeratne,+A.W.+(2002),+The+relationship+between+service+quality+and+customer+satisfaction:+A+factor+specific+approach.&dcr=0&tbm=isch&tbo=u)

&source=univ&sa=X&ved=0ahUKEwjR7t_XhcvZAhXKQ8AKHQDPCIoQ7AkIbg&biw=1440&bih=791available (accessed 6 April 2016).

Wang, I.M. and Shieh, C.J. (2006), "The relationship between service quality and consumer satisfaction: The example of CJCUC library", *Journal of Information and Sciences*, Vol. 27 No. 1, pp. 193-209.

Westbrook, R.A. (1950), "A rating scale for measuring product/ service satisfaction", *Journal of Marketing*, No. 44 (Fall), pp. 68-72.

Wirtz, J. and Lee, M.C. (2003), "An empirical study on the quality and context specific applicability used customer satisfaction measures", *Journal of Service Research*, Vol. 5 No. 4, pp. 345-355.

Zeithaml, V.A. Bitner, M.J. and Gremler, D.D. (2005), *Service marketing: Integral customers focus across the firm* (4th ed.), McGraw Hill /Irwin, New York.