Available online at www.iujtl.com

Journal of Transportation and Logistics

1 (2), 2016

Received : July 12, 2016 Accepted : October 21, 2016

http://dx.doi.org/10.22532/jtl.267842

Manufacturers' perceived quality of electricity service and organizational performance in Nigeria

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Keywords :

Electricity,
Service quality,
Organizational performance

ABSTRACT

This paper investigated the impact of electricity service quality on the performance of manufacturing companies in Nigeria. Members of the Manufacturers Association of Nigeria (MAN) are the target participants. Data was collected using questionnaire survey from managers, owner-managers and the CEOs of manufacturing companies. Out of 600 distributed questionnaires, 319 were returned and 313 were found useful for analysis. The data was analyzed using PLS-SEM and the result shows positive effect for all the exogenous latent variables (electricity service quality) on endogenous latent variable (organizational performance) with exception of one factor (tangibility). This study contributes to literature on the use of service quality dimensions on electricity service. It also serves as guides for policy makers to pursue policies that enhance electricity service. The research limits itself to manufacturing firms that depend on service companies for electricity supply.

Nijerya'daki İmalat Firmalarının Örgütsel Performans ve Elektrik Hizmet Kalitesi Algıları

Anahtar Sözcükler :

Elektrik,
Hizmet kalitesi,
Organizasyonel performans

ÖZ

Bu çalışmada, Nijerya'da faaliyet gösteren imalat firmalarının elektrik hizmet kalitesinin performanslarına olan etkisinin ölçülmesi hedeflenmiştir. Çalışma, Nijerya İmalatçılar Derneği üyeleri üzerinde gerçekleştirilmiştir. Çalışma verileri, imalat işletmelerinin yöneticileri, sahip-yöneticileri ve CEO'larına iletilen anket formları ile toplanmıştır. Dağıtılan 600 adet anket formunun 319 tanesi geri dönmüş; analizler açısından 313 tanesi kullanılabilir bulunmuştur. Veriler PLS – SEM ile analiz edilmiş ve dışsal değişken olarak alınan elektrik hizmet kalitesinin, içsel değişken olarak alınan ("fiziki / somut özellikler" kısmı hariç) örgütsel performans üzerinde pozitif etkisi olduğunu ortaya koymuştur. Bu çalışma, hizmet kalitesi boyutlarının elektrik servis hizmeti üzerindeki kullanımına ilişkin katkı sağlamaktadır. Bu anlamda, elektrik hizmetini geliştirecek politikalar izlemek isteyen politika yapıcılar için rehber niteliği de taşımaktadır. Çalışma, elektrik arzı sunan hizmet işletmelerine bağlı biçimde hareket eden imalat firmaları ile sınırlıdır.

1. Introduction

Manufacturing is an important sector of every nation's economy that plays major roles in shaping and defining the core path to industrialization the world over. The sector has the reputation of being an important engine of growth, solution to unemployment, a source of wealth creation as well as a reliable driver of sustainable development (Mike, 2010). Unfortunately in most developing countries, the sector has been experiencing poor performance for many decades. For example, recent reports indicates that the average manufacturing value added to GDP of 10 selected developing countries from Asia between 2010 and 2013 is estimated at 17.82% compared to 10 selected African countries with average of 8.45% within the same period (World Bank, 2014). This implies that even among the developing countries, African countries are worst affected by the poor performance in the sector.

Investigations into the causes of poor performance in this sector indicate that the sector is facing serious challenges related to service inputs as one of the main obstacles. These services include; transportation services (Datta, 2012), banking and financial services, (Sherazi, Iqbal, & Asif, 2013). Others are electricity and communication services. However, this paper pays specific attention to electricity service quality because it is a major challenge to manufacturing organizations in sub Saharan Africa including Nigeria (Gado & Nmadu, 2012). Electricity supply challenge in Nigeria is such that the per capita electricity consumption is estimated at 125kwh compared to 4500kwh and 1934kwh in South Africa and Brazil respectively. Moreover, a survey conducted indicated that over 93% of manufacturing firms in Nigeria use other independent sources of energy to supplement electricity grid. It also revealed that power outages accounted for between 20% and 49% of capacity underutilization in the country (Adenikinju, 2005).

There appears inadequate attention in this context. This paper intends to fill this vacuum using seven service quality dimensions as measures of electricity service quality.

2. Literature Review

The concept of service quality is very popular in marketing and it is based on behaviors of customers on how they determine the gaps between their expectations and their perceived actual service quality (Grönroos, 2001). Researchers have used the concept to determine the customer perception of various services. For instance, Rasoolimanesh, Dahalan, and Jaafar, (2016) investigated tourists' perceived value and satisfaction. Health care services was the focus of some researchers (Kim & Han, 2012; Senarat & Gunawardena, 2011). While others paid attention to educational services (Dado, Petrovicova, Riznic, & Rajic, 2011; Ramaiyah, Md. Zain, & Ahmad, 2007).

There is indication that application of service quality concept to electricity service is just gaining grounds among researchers. Available literature in the area indicates high concentration of efforts on instrument development which were mostly tested in Asia (Achchuthan, Sivathaasan, & Jayasundara, 2014; Zhang, Liu, Chen, Wang, & Zeng, 2009). Moreover, a positive relationship between electricity customer satisfaction and their willingness to pay for the service among residential customers in Hungary

was found (Rekettye & Pinter, 2006). Gilbert, Harry and Gombachika (2013) have found poor electricity service quality in Malawi among industrial customers regardless of their demographic differences. However, 92 customers used as sample size may reduce the inference power to generalize the findings.

Between 2007 and 2008 over 55% of the textile industries operating in the North-west zone in Nigeria were closed down due to poor performance partly orchestrated by power failure (Gado & Nmadu, 2012). As such more research efforts are needed in Africa bearing in mind the performance implication caused by poor electricity service in the region. This paper therefore aimed at filling this gap by conducting the research in Nigeria.

Electricity service quality perception have been measured using seven dimensions of service quality from the instrument developed in India for that purpose (Satapathy, 2014). The dimensions are as follows;

Assurance - It is conceptualized as the ability of service organizations' employees to inspire trust and confidence in their customers through exhibition of knowledge and courtesy while delivering the service (Jager & Plooy, 2007).

Empathy - This has to do with the ability of service organizations to offer their customers individualized service attention at convenient operating hours based on understanding of customers service needs and wishes (Jager & Plooy, 2007).

Reliability - Reliability in electricity service is simply defined as the extent to which electricity service providers perform the service accurately such that customers can consistently depend on them (Satapathy, 2014). Electricity customers including manufacturers attach serious importance to reliability of electricity service provided in terms of both the frequency and duration of outages. They detest long duration and high frequency of outages (Hensher, Shore, & Train, 2014). It was found that business customers of electricity service companies suffer loses generally due to interruption in power supply and the extent of loses vary based on their investment on the alternative sources electricity (Dzobo & Herman, 2012).

Responsiveness - It is described as the extent to which electricity service companies are able to give prompt attention to customer request and complains partly determines the customer perception of electricity service quality (Satapathy, 2014).

Security- It is concerned with the extent to which the safety and security of customers and their belonging are generally secured (Geetika, 2010). Security and safety is very important considering the nature of electricity service and the dangers associated with its use, in terms of electric shock and fire out brake.

Stability - The degree to which electricity service companies can consistently provide quality standard supply with little or no interruption and fluctuation (Satapathy, 2014).

Tangibility- Tangibility is described as the extent to which services reflect their clear and physical image (Panda & Das, 2014). Electricity challenges in Nigeria are associated with inadequate and poor maintenance of transformers and other equipment which are tangible resources of power supply companies (Joseph, 2014). In that wise electricity service company with visible transformers and other tangible

facilities tend to attract positive perception in terms of expected service delivery. This is corroborated by Moon, (2013) in which it was found that improvement in the tangibility aspect of services can result in positive perception.

Organizational performance which is the dependent variable (DV) in this study has been conceptualized using two dimensions. The first is the financial dimension or objective fulfillment. This is considered based on the reasons that measure of financial performance such as profitability, measures the entire objectives of many organizations (Murphy, Trailer, & Hill, 1996). Non-financial performance regarded as the operational measure of performance which measures how the stated objectives of firms are achieved (Hoque, 2005). It is a measure that helps managers in determining business progress. This study employed the two dimensions in order to maintain a balance between objective and subjective measures of performance.

This study has therefore put up seven hypothesizes that are to be examined empirically:

- H1. Assurance in electricity service is positively related to organizational performance of manufacturing companies in Nigeria.
- H2. Empathy in electricity service quality is positively related organizational performance of manufacturing companies in Nigeria
- H3. Reliability in electricity service is positively related to organization performance of manufacturing companies in Nigeria.
- H4. Responsiveness in electricity service quality is positively related to organizational performance of manufacturing companies in Nigeria.
- H5. Security in electricity service is positively related to organizational performance of manufacturing companies in Nigeria.
- H6. Stability in electricity service is positively related to organizational performance of manufacturing companies in Nigeria.
- H7.Tangibility in electricity service is positively related to organizational performance of manufacturing companies in Nigeria.

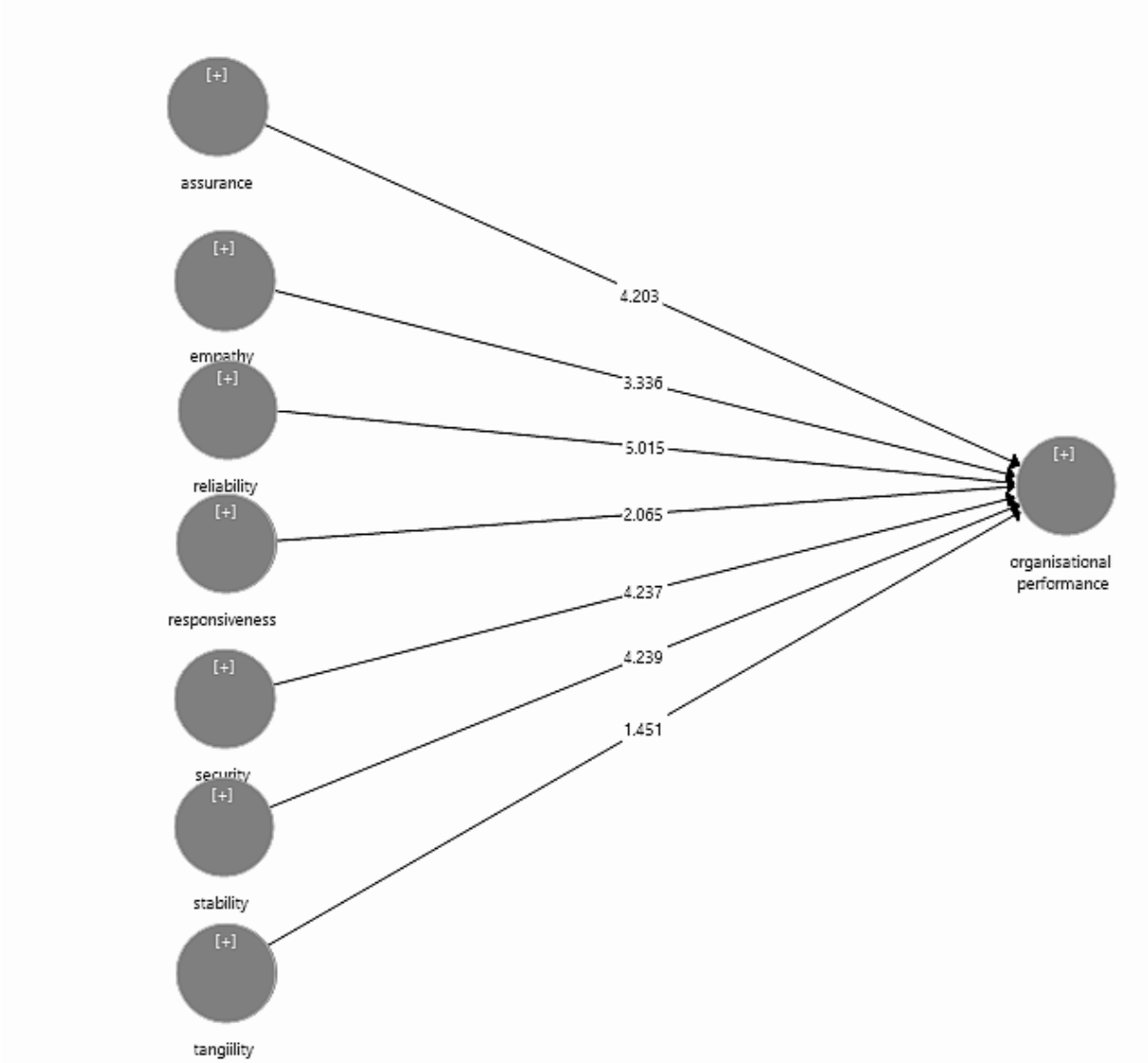

Figure 1. Research Framework

3. Research Methodology

A quantitative survey was conducted among manufacturing companies that are members of Manufacturers Association of Nigeria (MAN) within the south-west geopolitical zone of Nigeria. The questionnaire was adapted from two sources. Questions used to test electricity service quality which is the independent variable was derived from Satapathy, (2014). It has seven dimensions which include assurance, empathy, reliability and responsiveness. Others are security stability and tangibility. The second aspect that concern the dependent variable that is organizational performance was adopted from the work of Nandakumar, Ghobadian, & O'Regan, (2010). The questionnaire was categorized into three sections: The respondents' demographic data, the electricity service quality dimensions and the organizational performance. All the questions related to electricity service quality and organizational performance were asked based on 7-point Likert scale in which starts with 1 representing strongly disagree to 7 strongly agree.

The questionnaires were administered through drop-off and collect method. The method requires the researcher and the research assistants to travel to various locations of the manufacturing companies selected for participation in the research for the delivery of the questionnaires and collection of same as soon as they are completed. Out of 600 distributed questionnaires, 319 were completed and returned and 6 were found to be unusable. The remaining 313 copies have been used for further analysis.

Partial least squares-structural equation model (PLS-SEM) was employed for the analysis to assess both the measurements as well as the structural models. PLS-SEM was used due to the failure of the data to pass the normality test. Many researchers have suggested the use of PLS-SEM especially when data have failed the normality test (Cassel, Hackl, & Westlund, 1999; Reinartz, Haenlein, & Henseler, 2009; Wetzels, Odekerken-Schröder, & van Oppen, 2009).

3.1. Findings and discussions

3.1.1. Demographic profiles of the participants

Most of the participants in this research were male (82.7%) and majority (45.2%) of them have degrees and professional qualifications depicting the requirement for their offices as managers, senior managers and chief executives officers of their companies. The age group of the participating companies shows that majority (46.6%) of them fall within the age bracket of 20 and 29 years. Considering the size these companies, the data shows that more than 80% (261) of them fall into Small-medium enterprises SMEs. While on the other hand less than 20% (52) are large manufacturing organizations.

3.1.2. Measurement model assessment

Electricity service quality has seven latent variables that tend to predict organizational performance. All the constructs in this study are reflective. In order to assess the measurement model, the criteria for assessment of reflective model should be considered. The assessment of measurement model for reflective constructs to determine reliability and validity are measured by Composite Reliability (CR), items loading and Average Variance Extracted (AVE) (Gholami, Sulaiman, Ramayah, & Molla, 2013).

Indicator reliability and constructs reliability test have been conducted to determine the reliability of reflective measurement models. In ascertaining indicator reliability, the loading of each indicator on its related latent construct should be at least 0.7 (Hair, Ringle, & Sarstedt, 2011). A loading between 0.4 and 0.7 can however be acceptable provided the CR and AVE of the associated construct higher than the threshold (Hair et al., 2011). Table 1 below shows that all the indicator loadings are higher than 0.7. Two coefficients are mostly taking into consideration for the assessment of construct reliability: Cronbach's' alpha and Composite reliability coefficients (Bagozzi & Yi, 1988). Composite reliability is however most suitable for PLS-SEM (Hair et al., 2011). Table 1 indicates that in all the latent variables in measurement models, both Cronbach's' alpha and CR are above 0.7. This result therefore shows that the measurement model is reliable and internally consistent.

The AVE values for the latent variables should be higher than 0.5 for their convergent validity to be acceptable (Bagozzi & Yi, 1988; Hair et al., 2011). Since the construct validity of the reflective measurement model is a function of the convergent and discriminant validity (Hair et al., 2011). AVE is employed to determine the amount of variance in the independent variables (IV) as a product of their indicators. Table 1 indicates that all the constructs in this study have AVE values that exceed 0.5. Therefore, the measurement model's convergent validity is highly acceptable.

Table 1. Assessment of measurement model

Constructs	Items	Factor loading	Composite reliability	Cronbach's alpha	AVE
Assurance			0.903	0.839	0.757
	ass1	0.876			
	ass2	0.86			
	ass3	0.874			
Empathy			0.868	0.695	0.766
	empa1	0.88			
	empa2	0.87			
Organizational performance			0.921	0.893	0.701
	Orgpf1	0.904			
	Orgapf2	0.902			
	Orgpf3	0.858			
	Orgpf4	0.862			
	Orgpf5	0.869			
Reliability			0.901	0.782	0.821
	Reli3	0.92			
	Reli4	0.891			
Responsiveness			0.901	0.781	0.821
	resp3	0.902			
	resp4	0.91			
Security			0.894	0.822	0.738
	secu1	0.871			
	secu2	0.852			
	secu3	0.854			
Stability			0.887	0.809	0.724
	stab1	0.836			
	stab2	0.86			
	stab3	0.856			
Tangibility			0.911	0.805	0.836
	tang1	0.925			
	tang2	0.904			

Discriminant validity measures the extent to which each construct is distinct from other constructs in the model (Chin, 2010). In order to determine discriminant validity, two conditions must be fulfilled; the values of AVE for reflective constructs should be higher than the squared inter-construct correlation and should be higher than their cross loadings (Fornell & Larcker, 1981; Hair et al., 2011). Table 2 below compares the

square root of the AVE for each construct with the correlation of the remaining constructs and it is an indication of the acceptability of validity for all constructs in this framework.

Table 2. Discriminant validity assessment.

		1	2	3	4	5	6	7	8	9
1	Assurance	**0.87**								
2	Empathy	0.748	**0.875**							
3	Objective fulfillment	0.821	0.79	**0.903**						
4	Relative performance	0.858	0.778	0.809	**0.863**					
5	Reliability	0.815	0.768	0.8	0.861	**0.906**				
6	Responsiveness	0.786	0.769	0.803	0.791	0.806	**0.906**			
7	Security	0.824	0.777	0.817	0.85	0.817	0.773	**0.859**		
8	Stability	0.84	0.77	0.824	0.834	0.787	0.783	0.803	**0.851**	
9	Tangibility	0.854	0.728	0.818	0.826	0.824	0.808	0.834	0.817	**0.915**

3.1.2.1. Assessment of structural model

In order to complete the assessment of the structural model and conceptual framework, three tests are required. The first is the R-square (R2) which measures the predictive accuracy of the model, path coefficients and the corresponding t-values (Hair et al., 2011; Hair Jr, Sarstedt, Hopkins, & Kuppelwieser, 2014). The path coefficient should be significant. However, the significance level of R2 is categorized into three; 0.75, 0.5 and 0.25 described as substantial, moderate and weak respectively (Hair et al., 2011). The value of R2 for the endogenous construct in this study is 0.90 which is therefore considered substantial and acceptable.

In order to obtain t-values and standard error, bootstrapping procedure with resamples of 5000 was used. From Table 3 below, we first look at the hypothesis one H1 which states the existence of appositive relationship between Assurance and organizational performance is supported (β = 0.203, t-value = 4.21, p-value = 0.000). H2 which states the existence appositive relationship between Empathy and organizational performance is also supported (β = 0.116, t-value =3.38, p-value = 0.001). The outcome of hypothesis three H3 is equally supported (β = 0.209, t-value = 5.09, p-value = 0.000). Moreover, hypothesis 4, 5 and 6 are supported as well with β values of; (0.078, 0.192, 0.181), t-values of; (2.07, 4.25, 4.23) and p-values of; 0.047, 0.000, 0.000) respectively. However, H7 which states a positive relationship between Tangibility and organizational performance is not supported (β = 0.062, t-value = 1.47, p-value = 0.138). This is line with the works of Rasoolimanesh et al., (2016); Yeap, T., & Soto-Acosta, (2016).

Table 3. Results of hypotheses testing

Relationships	Path coefficients	Std dev.	t-value	P-value	Decision
Assurance -> Organizational performance	0.203	0.05	4.21	0.000	Supported
Empathy -> Organizational performance	0.116	0.03	3.38	0.001	Supported
Reliability -> Organizational performance	0.209	0.04	5.09	0.000	Supported
Responsiveness -> Organizational performance	0.078	0.04	2.07	0.047	Supported
Security -> Organizational performance	0.192	0.05	4.25	0.000	Supported
Stability -> Organizational performance	0.181	0.04	4.23	0.000	Supported
Tangibility -> Organizational performance	0.062	0.04	1.47	0.138	Not supported

4. Conclusion and Implication

These results show that Nigerian manufacturers perceived six service quality dimensions (assurance, empathy reliability responsiveness, security and stability) out of the seven being investigated as the electricity service quality factors capable of having positive impacts on their performance. It expresses their beliefs that reliability in electricity service, ability of the providers to make such service available based on the manufacturers' needs and prompt response to their complains on damaged facilities can actually boost their performance.

Their rejection of tangibility however indicates that Nigerian manufacturers care less about the physical appearance of electricity service organizations in as much as such physical installations will not pose any danger to them.

This paper is a contribution to the literature on the application of service quality dimensions on electricity service and how it can impact on the performance of manufacturing organizations. It is also a pointer to the policy makers in developing countries such as Nigeria that quality electricity service can boost manufacturing performance and they should therefore pursue policies that enhance the quality of electricity services.

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