An Open Access Journal
• ISSN: 2315-8638

Arabian Journal of Business and Management Review (Nigerian Chapter)

Research Article | Homepage: www.arabianjbmr.com | AGJ

ASSESSING THE INFLUENCE OF TQM ON SUSTAINABILITY PRACTICES OF CONSTRUCTION ORGANISATIONS IN NIGERIA

Yetunde Olanike Olaleye
Department of Quantity Surveying, Kaduna Polytechnic, Kaduna, Nigeria
Corresponding Email: yettynike@gmail.com

Dr. Abdulhakeem Garba
Department of Quantity Surveying, Kaduna Polytechnic, Kaduna, Nigeria
Email: hakeemgarba@gmail.com

ABSTRACT

Sustainability concept has evolved over the years. In recent times, several sustainability standard and practices have been developed that covers a wide range of issues. These standards are influenced by Total Quality Management (TQM). Since the development of the standards, TQM has been identified as suitable for the integration of sustainability practices since TQM focuses on meeting and exceeding customer expectations. The concept of co value creation bridges TQM and Sustainability practices. However, the influence of TQM on Sustainability practices is yet to be empirically investigated in the construction industry. This study is aimed at assessing the influence of TQM on sustainability practices in the Nigerian Construction Industry. This will be achieved by examining the relationship between each TQM and Sustainability practices. The population of this study will constitute site managers and quality control managers of selected construction organisations in Nigeria. Radom sampling technique was used to select the respondents. A structured questionnaire was designed based on five-point likert scale to answer the research question. Structural Equation Modelling using Smart Pls version 3 was used to establish the relationship between TQM and sustainability practices. The results show that strategic planning has the highest number of significant relationships with Sustainability practices and strengthening the strategic planning practice will support improved sustainability practices. The study recommends enforcement of standards that will ensure sustainability practices in Nigerian construction Organisations.

KEYWORDS: Construction, Sustainability, Sustainable Development, Total Quality Management Practices

1. INTRODUCTION

Sustainable Development (SD) can be defined as a development that meets the needs of the present generation, without compromising the ability of future generations to meet their own needs" (WCED, 1987). SD could be seen as a global concern that relates to individuals, organisations and Nations (Bryane, 2003). The increased demand by stakeholders for a cleaner environment globally has put pressure on construction firms to implement environmental practices (EP) within their own organization (Norulaini, Omar & AbKadir, 2018). The EP of a construction firm can be classified into three major activities: energy efficiency, waste management, and involvement in EP efforts (Diegani, 2017). Although both organizational and external factors may influence firms' EP Aaronson, 2003. According to Peters (2002) the main challenge for the wider implementation of EP in the construction sector lies in how to encourage the various firms with different operations and systems to be responsible to the environment (Hinze, Godfrey, & Sullivan, 2013).

Sustainability considers the success of firms and the environment it operates as closely interrelated (Narashiman & Schornherr, 2012); this has brought about the issue of value co-creation (Weingarten & Pagell, 2012). The concept of value creation assumes that values are not created for the firms but for all stakeholders (Rusinko, 2005). Thus, value co-creation

can sustain sustainability (Curkovic, Sroufe & Landeros, 2008; Nyirendda, 2014). To ensure sustainability through value creation process, TQM practices must be included (Saad, Su, Marsh & Wu, 2015; Todorut, 2012). TQM supports value creation by ensuring customer satisfaction. Identifying TQM practices that are most suitable to achieve sustainability has become necessary.

The most suited approach in the context of this paper is the value creation approach. Value creation assumes that firms creates values not only for themselves but also for other stakeholders. Value co creation is a joint creation or evolution of value that involves concepts and stakeholders, its sees TQM and sustainability as a new full philosophy of customer satisfaction (Vargo, Maglio, Akaka, 2008) To achieves sustainability, TQM has been identified as a co-value creator (Desousa, Jabbour, Latan, Teixeira, Olivera, 2014; Torodorut, 2014; Zink, 2007). following a strategic perspective, it proposes as TQM/Sustainability relationship as a new philosophy. TQM is about value creation, sustainability is also about value creation, bridging the sustainability and co-value creation literature, it is necessary to identify the TQM practices that are likely to ensure the quality experience make in the value creation process to ensure sustainability (Zink, 2007, Edgeman, 2000). Previous researches have looked into the relationship between sustainability practices and other co-value creation practices but not TQM. This study intends to fill the gap.

Another important gap that emerges from the literature is apparent when there is a growing concern on the emergence of important organizational stakeholders (Garvare, ISkasson, 2001). The stakeholders could be as diverse as any related interested parties, but three vital groups; customer, employee and community, recognized by TQM literature have mostly been mentioned. Failing to fulfil their requirements and needs will hinder organizations from achieving their objectives (Mehra, Hoffman, Sirias, 2001). TQM focuses on customer satisfaction that influences standards suitable for integration of sustainability practices. Therefore, it is imperative that businesses must acquire the managerial knowledge and skills through a right blend of strategies and practices, related to the needs and requirements of these important stakeholders such as neighbors to the sites. The synergy between TQM and sustainability practices is yet to be examined in construction firms. Specifically, the objective of this study is to examine TQM practices and how the effect they have on sustainability practices

2. LITERATURE REVIEW

2.1 Sustainability Practices

The sustainability practices on construction sites based on the global best practices contributed by the Building Research Establishment Environmental Assessment Methodology (BREEAM) and the leadership in energy and environmental design (LEEDS). The global best practices identified in the assessment methodology are listed as follows:

a. Resource consumptions
b. Emission and solid waste
c. Interface with external environment
d. Quality of health and safety
e. Temporary installations on construction sites

2.1.1 Resource Consumption

Reduce material losses during the carrying out of services, deliveries, internal transport, storage, and handling of materials on construction sites, Development of materials, products and construction systems selection criterion from responsible sources that include life cycle analysis information (origin, processing, maintenance, durability disposal) and material properties like technical performance, Improvements of temporary installations with the aim of reducing potable water and electric energy consumption, as also in equipment, lighting and air conditioning systems on construction sites, Reduction of electric energy consumption during the production activities on construction sites, Development of a supplier analysis system formalizing aspects related to federal revenues, use of environmental operating licenses, social responsibility, correct use of codes and standards, Rainwater use on construction sites, Use of alternative energy sources including renewable energy.

2.1.2 Emission and Solid Waste

Control of generation, quantification, separation, storage and disposal of construction waste on construction sites including Take-back scheme (return of waste products to manufacturers), Development of decontamination technologies and disposal solutions for dangerous construction waste products such as paints, solvents, oils or other contaminated waste products arising from demolition, renovations, radiological clinical repairs, industrial installations among others,

Exploitation and use of construction waste on construction sites, Development of technologies and economically viable applications of construction waste materials that still have no recycling or recuperation solutions Vegetation preservation methods in construction site areas, Sewage catchment and treatment systems and minimization of risks resulting from drainage on construction sites, Identification of risks of particle emissions arising from production activities on construction sites and towards the neighbourhood, Control of groundwater levels, contamination and minimization of risks resulting from its management. Characterization, monitoring e control of particle material emissions

2.1.3 Interface with External Environment

Reduce the erosive processes and risks of collapse/subsidence, Characterization of sound emitting activities and plans to mitigating noise nuisance, Management of site access, pedestrian flow, equipment, loading and loading on construction sites, Reduction of the site interferences with local traffic, street conservation and pavements to guarantee accessibility, Identification of risks of particle emissions derived from production activities on the neighborhood, Definition of demolition processes and contingency plans

2.1.4 Quality of Health and Safety

Collective protection equipment against falling from heights on construction sites, Protections against people handling equipment, Protections against electric shocks, Safeguards for material handling equipment, Machine and equipment protection, Protection of excavations, Industrialized Collective Protection Equipment, similar to existing certification system for Personal Protective Equipment (PPE) on construction sites.

2.1.5 Temporary Installations on Construction Sites

Improvements of work safety conditions inside the temporary installations, Improvements of the health and hygiene conditions inside the temporary installations, Reuse of temporary installation components and construction systems. Improvements in the lighting, ventilation and air quality conditions of temporary installations, External visual communication and signaling.

2.2 TQM practices

Based on the review of literature it is necessary to identify factors that contribute to the success of TQM implementation. These factors are considered as critical to the implementation and are often stressed by researchers in TQM researches (Makhodoomi, 2018; Flynn & Saladeen, 2016). Quality practitioners and researchers have put considerable efforts to identify TQM factors that influence the quality of products and services provided by the firms. Recently, concepts in the TQM studies are based on subjective indications and recommendations of the quality gurus. Thus, there is a little consensus on the factors that are critical to the success of the concept.

The practices identified and adopted for this study are:

a. Top management support
b. Customer focus
c. Workforce management
d. Strategic planning
e. Process management
f. Measurement analysis

2.2.1 Top management support

Literature places emphasis on the vital role of top management in TQM implementation as a prerequisite for effective and successful implementation (Kantardhieva, 2015; Merih, 2016). This evidence is provided in previous researches who agreed that the role of leadership in TQM cannot be over emphasized in the successful implementation. Top management takes the center stage and must show strong evidence of commitment for the initiative to be successful (Isaac, & Thomas, 2018; Valmohammadi & Roshamir, 2015). Leadership must emphasize that quality initiatives are not just programmes of the year but a life long commitment by the firms to ensuring quality is attained in the products and processes of the firms (Tablib, Rahaman & Quresh, 2012).

2.2.2 Customer focus

Quality is defined by the customer, it starts with the customer and also ends with the customer, Emphasis on meeting and exceeding customer satisfaction as one of the most important features of TQM and that is also the focus of TQM definition (Talib, Rahaman & Qures, 2012). In any production process, customer is an important element. Any effective production process is aimed at meeting the needs and expectations of customers, this comes via, listening to them and obtaining feedback for improvement (Migayawa &Yosahida, 2010). On a continuous basis, customer satisfaction must be stressed (Nasar et al, 2012). The major aim of TQM implementation in any organisation must be to satisfy the needs of the customers and this must emphasized in the mindset of the entire workforce.

2.2.3 Workforce management

Workforce management can be defined as a systematic and planned activities to enhance an individual's performance. Success of TQM depends on people orientation that can be exhibited through initiatives such as team work, training and development (Sumukadas, 2016). Workforce management involves empowering the workforce to solve problems and make decisions at levels appropriate (Isaac & Thomas, 2016), this step is of great importance as workforce is closest to problems identified and are in the best position to take decisions that will solve the problem improve production process. Workforce management begins with a personal commitment to quality.

2.2.4 Strategic planning

Strategic planning is a necessary foundation in the success of TQM, specifically, strategic plans on quality issues should be based on strength, weakness, opportunity and threats analysis (Hokoma et al, 2010; Talib et al, 2010). Substantial attention has been paid to quality planning that are customer based by quality gurus though the attention they give to strategic planning vary. Planning is a vital stepping stone to accomplishing any task, TQM cannot be accomplished without strategic planning (Zu et al, 2010).

2.2.5 Process management

In any organisation, processes especially those that involve quality initiatives should include all functions and departments as the central focus of production (Albayak &Albyak, 2014). A combination of process understanding and process improvement is the lifeline of any organisation seeking to implement TQM. Process is what transform the input (actions, methods and operations) into output and should be error proof to minimize chances of errors (Das et al, 2011).

2.2.6 Measurement analysis

Measurement analysis is a detailed assessment of a measurement process that basically include research that is specially designed to identify variations that occur in the production process (Yasin et al, 2007). similar to the production process that varies, the process of data collection and analysis also varies and can generate wrong results. Measurement analysis checks the method used to conduct the test, the instrument used to conduct the test and the process of collecting the data to ensure the integrity of the data for analysis (Jaca et al, 2015). A careful assessment of the implication of errors is dome prior to decision making about the product or process. measurement analysis is vital for quality management and six sigma methodology.

3. METHODOLOGY

3.1 Sampling and data collection

An investigation in the form of questionnaire survey and interviews was conducted to identify the main impacts of construction site activities on the environment and the causes and effects of public nuisance arising from construction site activities. The convenience purposive sampling method was used (Mugenda and Mugenda, 1999; Patton, 1990) to select construction sites for the study. The method used in this research work is the survey research method. The relevant information was obtained through the field survey such as questionnaire of customers. The population of the survey constituted of the management and non-management staff of selected construction firms in Kaduna. The respondents drawn from the selected sites were in four categories – contractors, site workers, consultants, and nearby residents. The contactor and consultant-respondents targeted in the study were mainly senior management personnel who are relevant to decision making in their firms. The site worker respondents were those considered technically competent to address issues raised, whilst nearby residents who lived within 500 meters radius or distance from the selected sites were targeted. The research used the purposive sampling techniques. This research used a sample size of 120 and 87 were returned representing 72.5%.

3.2 Scale Measurement

The instrument used for data collection was structured questionnaire, design by the researcher, the respondent is limited to a list of options and the answers are restricted to those available in the option. The questionnaire was divided into 2 sections A, B and C section A contained respondent information and B questions on sustainability management they adopt on construction sites and section C identifies the TQM practices adopted by the firms. For the purpose of this research, questions on sustainability management were asked and placed on a 5 points likert scale ranging from strongly agreed (5) to strongly disagree (1) in form of statements. The Cronbach alpha was used to assess the reliability of the data, the values were over 0.70 which is the acceptable.

4. RESULTS AND ANALYSIS

SmartPls 3 was used to establish the relationship between TQM and sustainability practices to establish the TQM practice that support sustainability practices

Steps in assessing PLSSEM

1. Assessment of measurement model
    a. Loadings
    b. Internal consistency (Composite reliability)
    c. Path coefficients
    d. Convergent validity (AVE)
    e. Discriminant validity
2. Assessment of structural model
    a. Coefficient of determination R^2
    b. f^2 effect size
    c. Size and significance of path coefficient
    d. Predictive relevance Q^2

4.1 Assessment of the measurement model

The "outer model" is also known as the measurement model. The measurement model comprises of the indicators and the paths that connects them to their respective constructs. Output for reflective models are referred to as loadings.

4.1.1 Loadings

Measurement loadings are the standardized path weights connecting the constructs to the indicator variables. PLS automatically standardizes data. The implication of this is that loadings vary from 0 to 1. Indicators that did not meet the minimum loading of 0.6 were deleted from the model. Thus, all the indicators achieved minimum loadings. The loadings of all the constructs in this research meets the benchmark required for validity and reliability

4.1.2 Internal consistency reliability (Composite Reliability)

Hair et al (2014) asserts that after specifying the inner and outer model, the next step is to run the PLS algorithm that will assist in evaluating the validity and reliability of the constructs in the outer model. The PLSSEM uses composite reliability which is more preferable than Cronbach alpha values because it gives a more suitable measure of internal consistency. Values above 0.70 are acceptable. Result of internal consistency reliability is shown in table 01. The results show that all the constructs are above the 0.70 benchmark

4.1.3 Path Coefficient

This represents the hypothesized relationships between the constructs. The path coefficients value ranges between 0 and 1. Path coefficients with estimates closer to 1 represents a strong positive relationship and vice versa for negative values. To determine if a path coefficient is significant, the bootstrapping procedure must be run. The results of the path coefficient of the model is presented in table 02.

4.1.4 Convergent validity

This is the extent to which a measure correlates positively with alternative measures of the same construct. i.e. the extent of agreement between two or more indicators of the same latent constructs (Hensler & Fassot, 2010).

4.1.5 Discriminant validity

This is the extent to which a construct is unique and captures phenomena not covered by other constructs in a model. This paper used the fornel larker criterion to establish the discriminant validity of the model. The criterion specifies that the square of the AVE should be grater than the construct.

4.2 Evaluation of the Structural (inner) Model

Assessment of the structural model results enables the determination of how well the empirical data support the theory/concept and therefore assist in deciding if the theory/concept has been empirically confirmed. Once the construct measures are reliable and valid the next step is to assess the structural model (Hair et al,2014). The structural model was analyzed by linking all the constructs in the inner model together

4.2.1 Co-efficient of determination R^2

The predictive strength of a structural model is evaluated by the R^2 of the endogenous constructs. The R^2 values of 0.25,0.50 and 0.75 are interpreted as weak, medium and substantial respectively (Hair et al, 2011). The R^2 result of the model show all the constructs have medium predictive strength.

4.2.2 F^2 Effect size

In addition to evaluating the predictive relevance of the endogenous constructs, the f^2 effect size is also analyzed. F^2 can be explained as the change in R^2 value when a specified exogenous construct is removed or omitted form the model. This can be used to determine if the omitted construct has an impact on the endogenous construct. F^2 can be interpreted as 0.02, 0.15 and 0.35 respectively represent small, medium and large effect of the exogenous latent variable

4.2.3 Size and Significance of Path Coefficient

Path coefficients are always standardized coefficients. They vary from -1 to +1. The closest to 1 reflects the strongest paths (Hair et al, 2012). Loadings are standardized path weights connecting the factor to the indicator variable. The results are presented in table 4

4.2.4 Predictive relevance Q2

To assess the predictive relevance of the path model, the blindfolding procedure is run. Blindfolding is a re-use technique. It starts with the first data point and omits every nth data point in the endogenous construct's indicators. The result is presented in table 05.

Table 01: Composite Reliability, Average Variance Extracted, R^2

CONSTRUCTS	CR	AVE	R2
Top Management	0.802	0.576	
Workforce Management	0.832	0.557	
Customer Focus	0.848	0.530	
Strategic Planning	0.825	0.588	
Process Management	0.782	0.552	
Measurement analysis	0.812	0.523	
Resource Consumption	0.841	0.534	0.556
Interface with External Environment	0.853	0.538	0.500
Quality of Health and Safety	0.867	0.523	0.560
Emission and Solid Waste	0.851	0.502	0.580
Temporary Installations	0.801	0.51	0.481

Source: Field study(2018)

The results of the path coefficient is presented in table 02. The findings show that customer focus has the highest relationship with resource control and the weakest relationship with interface with external environment, measurement analysis has the strongest relationship with health and safety and the weakest relationship resource control, process management has the strongest relationship with emission and solid waste and the weakest with temporary installation, strategic planning has the strongest relationship with health and safety and the weakest relationship with emission and solid waste, top management has the strongest relationship with interface with external environment and the weakest relationship with health and safety while workforce management has the strongest relationship with emission and solid waste and the weakest relationship with health and safety. The strongest relationship exists between top management and interface with external environment and the weakest between workforce management and health and safety. All the relationships are positive except the relationship between workforce management and health and safety and temporary installation.

Table 02: Path coefficients

	RC	EX	HS	SW	TP
Customer Focus	0.096	0.001	0.017	0.002	0.016
Measurement Analysis	0.007	0.057	0.073	0.159	0.032
Process Management	0.211	0.239	0.256	0.395	0.148
Strategic Planning	0.012	0.017	0.364	0.001	0.050
Top Management	0.351	0.715	0.014	0.077	0.460
Workforce Management	0.392	0.262	-0.061	0.501	-0.11

Source Field Study (2018) RC= Resource Control, EX= Interface with external Environment, HS= Environmental Health and Safety, SW= Emission and Solid Waste, TP= Temporary Installations

The AVE of each construct should be higher than the squared correlations with other constructs to achieve discriminant validity.

Table 03: Discriminant validity

	TM	WF	CF	SP	PM	MA	RC	EX	HS	SW	TP
TM	0.759										
WF	0.766	0.676									
CF	0.620	0.630	0.728								
SP	0.731	0.525	0.678	0.698							
PM	0.679	0.556	0.609	0.558	0.743						
MA	0.570	0.616	0.656	0.636	0.618	0.651					
RC	0.595	0.625	0.626	0.654	0.703	0.583	0.658				
EX	0.665	0.508	0.645	0.686	0.686	0.560	0.515	0.733			
HS	0.556	0.567	0.682	0.643	0.600	0.442	0.666	0.630	0.723		
SW	0.635	0.422	0.658	0.628	0.687	0.409	0.622	0.589	0.710	0.708	
TP	0.655	0.553	0.523	0.619	0.591	0.532	0.529	0.523	0.693	0.659	0.655

TM= Top Management, WF= Workforce Management, CF= Customer Focus, SP= Strategic Planning, PM= Process Management, MA= Measurement Analysis, RC= Resource Control, EX= Interface with external Environment, HS= Environmental Health and Safety, SW= Emission and Solid Waste, TP= Temporary Installations

Table 4 shows the t statistics and p value results associated with each path results for the firms. a total number of 30 relationships exist between the six TQM practices and the 5 sustainability practices. Fourteen significant relationship and sixteen non-significant relationships exists between the endogenous and the exogeneous variables. Customer focus has 1significant relationship SP, top management has three significant relations with SP, workforce management has two significant relationships with SP, strategic planning has four significant relationships with SP, process management has two significant relationships with SP and measurement analysis has two significant relationships with SP. The empirical results of the path significance shows that TQM practices influence SP however, strengthening strategic planning will improve SP in Nigerian construction firms.

Table 04: T statistics and p value

	Standard Deviation (STDEV)	T Statistics (|O/STERR|	P	SIG
Customer Focus -> Resource Consumption	1.0064	0.6131	0.541	NS
Customer Focus -> Interface with External Environment	0.8276	0.2194	0.827	NS
Customer Focus -> Quality of Health and Safety	0.5869	1.6509	0.107	*
Customer Focus -> Emission and Solid Waste	1.22	1.3125	0.191	NS
Customer Focus -> Temporary Installations	0.5984	0.1387	0.89	NS
Top Management -> Resource Consumption	0.9631	0.6957	0.487	NS
Top Management -> Interface with External Environment	1.0093	1.2107	0.227	NS
Top Management -> Quality of Health and Safety	0.9045	1.6557	0.103	*
Top Management -> Emission and Solid Waste	0.514	1.6525	0.1	*
Top Management -> Temporary Installations	1.281	1.8071	0.072	*
Workforce Management -> Resource Consumption	0.5772	2.7976	0.006	***
Workforce Management -> Interface with External Environment	0.9096	0.2834	0.777	NS
Workforce Management -> Quality of Health and Safety	0.4711	1.4601	0.146	NS
Workforce Management -> Emission and Solid Waste	0.3334	1.6535	0.1	*
Workforce Management -> Temporary Installations	0.1906	0.7437	0.458	NS
Strategic Planning -> Resource Consumption	0.3171	1.7047	0.482	*
Strategic Planning -> Interface with External Environment	0.2794	1.4244	0.156	NS
Strategic Planning -> Quality of Health and Safety	0.3645	1.6527	0.122	*
Strategic Planning -> Emission and Solid Waste	0.2527	3.0472	0.003	***
Strategic Planning -> Temporary Installations	0.3471	1.6561	0.11	*
Process Management -> Resource Consumption	0.196	4.4319	0.00	***
Process Management -> Interface with External Environment	0.3314	1.2585	0.21	NS
Process Management -> Quality of Health and Safety	0.3523	1.8874	0.061	*
Process Management -> Emission and Solid Waste	0.2689	0.6069	0.545	NS
Process Management -> Temporary Installations	0.1383	1.5313	0.127	NS
Measurement Analysis -> Resource Consumption	0.133	0.3984	0.691	NS
Measurement Analysis -> Interface with External Environment	0.1399	0.7997	0.425	NS
Measurement Analysis -> Quality of Health and Safety	0.1358	1.9332	0.055	**
Measurement Analysis -> Emission and Solid Waste	0.1143	0.1039	0.917	NS
Measurement Analysis -> Temporary Installations	0.143	2.3663	0.019	***

Table 04 shows the predictive relevance of the model. The results show that all the constructs have medium predictive relevance.

Table 04: Predictive Relevance of the model

	SSO	SSE	Q^2 (=1-SSE/SSO)
Resource Consumption	2,090.000	1,518.997	0.273
Interface with External Environment	2,508.000	2,023.663	0.193
Quality of Health and Safety	2,926.000	2,283.795	0.219
Emission and Solid Waste	2,090.000	1,488.257	0.288
Temporary Installations	2,508.000	1,930.044	0.230

5. DISCUSSIONS AND CONCLUSION

5.1 Discussion

The findings of the study show that strategic planning has the highest number of significant relationships with sustainability practices. Strategic planning is vital if any organisational goal is to be achieved,The findings substantiate the findings of Hokoma et al (2010) and Tablib et al (2010) who revealed that Iranian firms and Chinese firms carry out strategic plan to achieve organisational goals. Strategic planning is a necessary foundation in the success of TQM, specifically, strategic plans on quality issues should be based on strength, weakness, opportunity and threats analysis (Hokoma et al, 2010; Talib et al, 2010). Substantial attention has been paid to quality planning that are customer based by quality gurus though the attention they give to strategic planning vary. Planning is a vital stepping stone to accomplishing any task, TQM-sustainablilty co value philosophy cannot be accomplished without strategic planning (Zu et al, 2010).

5.2 Conclusion and recommendations

The empirical results of the path significance shows that TQM practices influence SP however, strengthening strategic planning will improve SP in Nigerian construction firms. top management also has three significant relationships with sustainability. Literature places emphasis on the vital role of top management in TQM implementation as a prerequisite for effective and successful implementation. This evidence is provided in previous researches who agreed that the role of leadership in TQM cannot be over emphasized in the successful implementation. Top management takes the center stage and must show strong evidence of commitment for the initiative to be successful. The study recommends that mangers of construction organisations should strengthen the strategic planning and top management practices to support the TQM sustainability synergy

REFERENCES

Aquilani, B., Silvestri, C. & Ruggieri, A. (2016). Sustainability, TQM and Value Co-Creation process. The role of crictical success factors. Sustinability 8 (10), 995

Bateh, J., Horner, D.H., Jr., Broadbent, A., Fish, D. (2014)Sustainability: A Literature Review and Suggested Way Forward. J. Sustain. Manag. 2014, 2, 35–42. 14.

Bayne, T, (2003) Sustainability in construction, issues and prospects. International journal of project management 1(5). Pp 233-353

Curkovic, S., Sroufe, R., Landeros, R. (2008) Measuring TQM returns from the application of quality frameworks. Bus. Strategy Environ. 2008, 17, 93–106.

De Sousa Jabbour, A.B.L., Jabbour, C.J.C., Latan, H., Teixeira, A.A., de Oliveira, J.H.C. (2014) Quality management, environmental management maturity, green supply chain practices and green performance of Brazilian companies with ISO 14001 certification: Direct and indirect effects. Transp. Res. Part. E Logist. Transp. Rev. 2014, 67, 39–51.

Diegani, B. (2007) An assessment of sustainability practices in construction. Journal of process management 6 vol 1. Pp 33-51

Durugbo, C. Pawar, K. A (2004) Unified Model of the Co-Creation Process. Expert. Syst. Appl. 2014, 41, 4373–4387.

Edgeman, R.L. (2000) BEST business excellence:: an expanded view. Meas. Bus. Excell. 2000, 4, 15–17.

Flyn B.B.& Saladin B (2006) Relevance of Balderige Construction in an International Context: A Study of National Culture. Journal of Operations Management volume 24 no 5 PP 583-603

Garvare, R., Isaksson, R. (2001) Sustainable development: Extending the scope of business excellence models. Meas. Bus. Excell. 2001, 5, 11–15.

Gazzola P. & Mishela, P. (2009) Sustainability Mangemant and Total Quality Management in public organisation with outsourcing.

Hinze, J. Godfrey, R. Sullivan, J. (2013) integration of construction workers Safety and Health in Assessment of sustainable Construction. Journal of Construction Engineering and Management. Vol 13 no 6 pp 594-2013

Isaac C.A., Thomas T.S. (2018) Quality Begets Quantity Total Quality Management in Iranian Service Sector. Construction Management and Economics, 5 (3) pp 555-578

Isaksson, R. (2006) Total quality management for sustainable development: Process based system models. Bus. Process Manag. J. 2006, 12, 632–645.

Karuppusami, G., Gandhinathan, R. (2006) Pareto analysis of critical success factors of total quality management: A literature review and analysis. TQM Mag. 2006, 18, 372–385.

Khazinchi S., Lewis M.W., & Boyi K.K. (2007) Innovative Supportive Cache: The Impact of Organisational Values on Process Innovation. Journal of Operations Management 25(4), 871-884

Kokoma B. & Slade P. (2005) Formal Human Resource Management Practices in Small Growing Firms. Journal of Business Management volume 43 no 1 PP 16-40

Makhdoomi, U. M. (2018) top mangement commitment and diversity challenge in the telecom sector. Asian journal of mangerial science vol 7 issue 1. Pp 222-239

Mehra, S., Hoffman, J.M., Sirias, D. (2001) TQM as a management strategy for the next millennia. Int. J. Prod. Oper. Manag. 2001, 21, 855–876.

Merih A. (2016) Total Quality Management, Way to Achieve Excellence in Quality. Strategic Marketing Communication (5) (2)

Migayawa, A. & Yoshaida, T. (2010) Total quality management practices of japaneese owned manufacturers in the USA and China. International Journal of quality and reliability management. 27 (7). Pp 736-755

Narasimhan, R., Schoenherr, T. (2012) The effects of integrated supply management practices and environmental management practices on relative competitive quality advantage. Int. J. Prod. Res. 2012, 50, 1185–1201.

Nasar, T., Yahaya, H. & Shorun R. (2012) TQM and customer satisfaction in selected service industry in Ilorin, Nigeria. International journal of sustainable deveopment 17 (16)

Norulaini, N., Omar, F. M. & AbKadir, M. O. (2018) Environmental aspects and impact of the construction industry. International journal of construction Management 5(2) PP 111-131

Nyirenda, G., Ngwakwe, C.C. (2014) Environmental management practices for sustainable development: Agenda for harmonization. Ecol. Econ. 2014, 5, 76–85.

Rusinko, C.A. (2005) Using quality management as a bridge to environmental sustainability in organizations. SAM Adv. Manag. J. 2005, 70, 54–60.

Saad, A., Su, D., Marsh, P., Wu, Z. (2015) Investigating Environmental Management and Quality Management Issues in the Libyan Food Industry. Br. J. Econ. Manag. Trade 2015, 9, 1–16.

Sila, I., Ebrahimpour, M. (2002) An investigation of the total quality management survey based research published between 1989 and 2000: A literature review. Int. J. Qual. Reliab. Manag. 2002, 19, 902–970.

Sumukadas, N. (2016). Employee involvement. A hierarchial conceptualizaton of its effect on quality. International jounal of quality and reliabliyt management 23 (2). Pp 143-161

Talib, F., Rahman, Z. & Quresh, M. (2011). Analysis of interraction among TQM practices using MBNQA. An interantional journal 18 (4). Pp 563-587

Todorut, A.V. (2012) Sustainable development of organizations through total quality management. Proc. Soc. Behav. Sci. 2012, 62, 927–931.

Valmohammadi, C Roshamir, S. (2015). The guidelines of improvement: Relations among organizational culture, TQM and performance. International. Journal of Production Economics 164(2015) pp 167-178

Vargo, S. L., Maglio, P. P., Akaka, M. A. , 2008

Wiengarten, F., Pagell, M. (2012) The importance of quality management for the success of environmental management initiatives. Int. J. Prod. Econ. 2012, 140, 407–415.

Zink, K.J. (2007) From total quality management to corporate sustainability based on a stakeholder management. J. Manag. Hist. 2007, 13, 394–401.