PRINCIPLE OF BENCHMARKING AS A MEANS FOR IMPROVING QUALITY IN THE NIGERIA CONSTRUCTION INDUSTRY

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ABSTRACT

The key focus of the construction industry is to ensure that projects are completed within minimum cost possible at the stated period yet achieving best quality. Hence, the need to conduct a study to evaluate the impacts of the principle of benchmarking as a means of improving quality in the Nigerian construction industry. The study identified the factors responsible for poor quality in the construction industry, assessed the level of importance attached to benchmarking and studied the scenario of the application of the principle of benchmarking in the construction industry. Data were gathered via questionnaires distributed to professionals in construction organisations and these were analysed. The research findings showed that the principle of benchmarking can enhance the image and reputation of an organisation, improve organisations performance and increase customers' satisfaction as benchmarking is a versatile and flexible tool that an organisation can use to improve quality, thus achieving their goals. It was concluded that, The principle of benchmarking is an important tool that would ensure quality improvement in the Nigerian Construction industry yet most construction organisations are not aware of the benefits and workings of the principle of benchmarking.

Keywords: Benchmarking, Construction Industry, Quality.

INTRODUCTION

Benchmarking study was first conducted within the manufacturing environment, and evolved from the work done by Camp (1989). The popularity of benchmarking has since increased, and companies are working hard to improve by comparing themselves against other organisations within the same industry, either nationally or globally. Benchmarking which initially started as a business-type comparative metrics (for example Dollar per barrel of oil produced), has since extended into the Construction industry. In order to understand what benchmarking in general is and to clarify the activities that are involved, a number of definitions have been highlighted.

"The Benchmarking Network" (2006) defines benchmarking as being "a performance measurement tool used in conjunction with improvement initiatives to measure comparative operating performance and identify Best Practices". Spendolini (1992) defines benchmarking as "a continuous, systematic process for evaluating the products, services, and work processes of organisations that are recognized as representing best

practices for the purpose of organisational improvement." Slater (1997) defines benchmarking as "comparing corporate products and practices with the world's best and then borrowing the work processes that will help close the gaps."

Considering all these definitions, "benchmarking" can be summarized as being the search for industry best practices that can direct an organisation towards obtaining improved or even superior performance. It is the ongoing process of identifying best practices, the measurement of oneself against those practices, and the implementation of such practices to improve performance. These performance measures relate to the process of construction, the performance of the organisation, the translation of the client's or the end user's need to product specifications and the performance of the facility. The construction industry is seen as one with poor quality emphasis compared to other sectors, such as the manufacturing and service sectors (Kubal, 1994; Kanji & Wong, 1998; Wong & Fung, 1999). Rowlinson and Walker (1995) pointed out that one of the basic characteristics of the construction industry is its non-standardization of its processes. Production processes are to some extent different from one another. Hence, no universal standard or specification can be applied to the product, which leads to difficulties in quality assurance. Furthermore, there are excessive changes to the details of the design of a project. As a result of these excessive changes, quality is often at risk (Kanji and Wong, 1998).

Reports from various sources indicate that construction organisations have been failing at a rate that calls for the need to develop a pragmatic strategy to forestall the severe implications in terms of liabilities resulting from the failure (Koksal and Arditi, 2004; Startups, 2005). The most important issue facing organisations in the construction industry is their inability to become quality focused, thus resulting to the delivery of sub-standard products and services. In many ways, the process and outcomes of benchmarking represent an important exercise in learning, understanding and appreciating the many factors that contribute to the environment in which an organisation operates. Benchmarking also allows interested parties that are external to the organisation itself to derive a level of confidence that the organisation is efficient or is in a position to embrace opportunities for continuous improvement.

Benchmarking is shown to have strong influence on organisation's performance and can be shaped and developed to improve organisational performance. It seems it could be an answer to the enhancement of construction industry's performance and reduced rework occurrences. The study will serve as a spring board for exploring the potentials of benchmarking to improve quality in the construction industry.

This research is therefore aimed at evaluating the impact of the principle of benchmarking as a means of improving quality in the Nigerian construction industry with a view to reducing poor project delivery methods. The objective of this study is to identify the factors responsible for poor quality in the Construction industry, to assess the level of importance attached to benchmarking in the construction industry and to study the scenario of the application of the principle of benchmarking towards improving quality in the construction industry.

LITERATURE REVIEW

Construction Quality Performance

The construction industry tends to define quality as the ability of products and processes to conform to the established requirements. These requirements are established characteristics of a product, process or service as specified in the contractual agreement. Quality is a persuasive concern throughout the entire project process, as the performance of each phase in the process will affect the performance of subsequent phases (Willis, 1996). Both Marr (2001) and Latham (1994) have suggested the consideration of quality as a major criterion in construction procurement systems in order to enhance the level of competitiveness and facilitate the production of higher quality construction. Yet, quality remains an elusive attribute that has been defined in many different ways. Ogleby et al (1989) consider quality as a subset of performance, in conjunction with productivity, safety and timeliness, while others seem to think of it in terms of "conformity to established requirements" or "fitness for purpose" (Kaydos, 1991) a
1995). ISO 8402 defined quality as the degree of excellence in a competitive sense, such as reliability, serviceability, maintainability or even individual characteristics. Similarly, the term 'performance' can also take on different meanings depending on the context in which it is being used. Traditionally, it has been used to measure the effectiveness (doing the right thing) and efficiency (doing the right thing right). Various researchers have attributed numerous dimensions to performance, such as quality, productivity, profitability, safety, timeliness, growth, satisfaction, etc.

Yasamis et al (2002) stated that quality performance in construction is results oriented, and seeks evidence of quality awareness within the operations and output of a project organisation. They added also that quality performance is defined over a long term for the effects to be permanent, and its improvement are expected to increase the productivity and profitability of contractors as well as increasing client and end-user satisfaction. Quality performance, diagnoses construction from both corporate level (where corporate strategies concerning how to perform the construction operations are formulated) and project level (where the design and construction systems produce a physical facility and provide contracting and consulting services).

Quality performance of a construction project at the site level includes the quality of the constructed facility as well as the quality of services. A mix of product and service quality dimensions would therefore be very instrumental to the achievement of site-level quality performance. In specific terms, Project level is where the project process is carried out in order to produce a physical facility and provide a contracting service. The foundations of the quality orientation of a company are defined at the corporate level. Quality orientation is recognized by an organisational commitment to developing and maintaining core competence based upon a quality focus (Miles et al, 1995). Core competence is what a company does better than anyone else. It should be noted that core competence should be enhanced in line with the business environment, to provide more value to the customer, otherwise it risks becoming obsolete (Russell & Taylor, 1998). Other factors contributing to quality orientation include the business performance and social responsiveness of the organisations.

Evans and Lindsay (2005) asserts that quality-conscious companies adopt quality management systems that focus on creating and sustaining performance improvement in the areas of management involvement and leadership, product and process design, product control, customer and supplier communications, quality improvement programmes, employee participation, education and training, and quality information. The corporate-level quality of a contractor can be experienced through the corporate quality culture, which comprise of the organisational value system that encourages a quality conscious work environment. It establishes and promotes quality and continuous improvement through values, traditions and procedures (Goetsch & Davis, 2000).

Benchmarking and its Benefits

The term benchmarking can be defined in many different ways and will most certainly mean different things to different audience. Benchmarking is a business concept applied to fields of strategic planning, marketing, restructuring, financial management and a practice to "learn from the best". Under conditions of growing competition, the benchmarking became very popular as a tool which supports making and sustaining of a competitive advantage. Data obtained from a benchmarking process contribute to:

1. Identification of company's strengths and weaknesses,
2. Identification of the current and potential comparative advantage in relation to other participants in the commercial business operations,
3. Evaluation of risks by using the alternative action lines.

Benchmarking relies on determination of factors critical for success of the company. Processes, which determine these factors, are analysed. The best attributes of key parameters used for target improvements are defined. Only understanding of internal processes enables recognition and integration of differences, improvements and innovations which exist in companies with the best practice.

A very general definition describes benchmarking as representing a process of identifying an organisation's key cost drivers and performance indicators, documenting past performances, making informed comparisons amongst peer organisations and establishing baselines for gauging achievable improvements in the future.

Benchmarking is a continuous process of identification, understanding and adjustment of products, services, equipment and processes of the company with the best practice aiming at improvement of its own business. This process includes:

1. Comparison of the company and its sectors with the best ones but not limited to the activity or the country where the activity is performed,
2. Comparison of production activities or some other company's activities with the corresponding activities of other companies doing same business in order to define the best ones,
3. Comparison of company's products and services with services of the competitors having the best results,

4. Comparison of company's technical solutions in order to choose the best special purpose equipment,
5. Application of the best defined business process,
6. Planning future development directions and active adjustment to new trends, satisfying and exceeding the consumer expectations (www.benchmarkingnetwork.com).

Benchmarking is a search for the best industry practices that lead to more superior performance. First of all, it is research and observation of the best practice of competitors and/or search for the best industry practice leading to producing the more superior performance (Camp, 1989). In many ways, the process and outcomes of benchmarking represent an important exercise in learning, understanding and appreciating the many factors that contribute to the environment in which an organisation operates. Benchmarking also allows interested parties that are external to the organisation itself to derive a level of confidence that the organisation is efficient or is in a position to embrace opportunities for continuous improvement.

Apart from providing the comparative information to understand past and current performance levels by a comparison with peer organisations, an appropriate benchmarking exercise will also provide:

1. Identification of potential opportunities for improvement in the future the prospective value, in terms of both cost and service levels, to be gained from the potential improvement opportunities
2. Identification of any underlying factors that could impede potential improvement opportunities or the realisation of the full value of making the improvements
3. Prioritisation of potential improvement opportunities
4. Realistic timelines and costs involved in achieving any potential improvement.

To stay competitive, leading organisations regularly compare their own products, services and business processes against the best from within or outside their industry by seeking to implement best practice from whatever source. Organisations world-wide have found that there are significant gains to be made from benchmarking their activities, and that the amount of time and effort involved is repaid many times over. The benefits include:

1. Better performance in meeting customer needs & requirements.
2. Establishing effective business goals and objectives.
3. Measuring true productivity.
4. Becoming competitive
5. Identifying & implementing best practice in business processes

In practice, for benchmarking to be successful, the main requirements are as follows:

1. A strong and active commitment from senior management to lead and implement the benchmarking process
2. A willingness to change and adapt based on the benchmarking findings.
3. A realisation that the competition is constantly changing.

4. Openness to new ideas, creativity and innovativeness in their application to existing processes.
5. A willingness to share information with benchmarking partners (e.g. other organisations)

RESEARCH METHODS

The research adopted a survey approach and adopting the use of questionnaires. The design is not aimed at discovering new phenomena, but is concerned with conditions or relationships that exists, practices that prevail, beliefs, points of view, or attitudes that are being felt, or trends that are developing in the world of modern construction in Nigeria.

For the purpose of this study, the population was based on medium and large sized building construction companies and specialized contractors and consultants operating within Kaduna metropolis in Kaduna state and Abuja Nigeria Federal Capital City. The target populations were selected construction professionals (Quantity Surveyors, Architects, Engineers and Builders) in the construction industry. The method of data collection for the study was through administration of well-structured questionnaire to some selected companies. The questionnaire was divided into five sections targeted at assessing the demographic response of the respondents, factors responsible for poor quality, the level of importance attached to benchmarking, the advantages of the principle of benchmarking and the problems encountered by organisations in the implementation of benchmarking.

In analysing data for the study, statistical tools were employed. The scale of measurement used was ordinal, because data obtained were enumerated in whole numbers. The following procedures and methods were adopted in ensuring meaningful result:

Frequency Analysis

Frequency analysis was use to analyse the data gathered for through questionnaire survey. The results were tabulated to display the background information about the respondents, such as educational qualification, level of experience, etc.

Relative Importance index and Mean Score Method

Weights were attached to individual scores. The mean score of the data from responses measure were calculated and the relative ranking of their significance were obtained in descending order. The weights were then used to multiply the number of response (frequency) in each category of response and the sum of the values is then calculated. Mean values are calculated by dividing the sum by the number of respondent. In this case, it is the mean values that are used to interpret the opinions commonly expressed by the respondents.

Relative importance index was derived using the following formula:

Importance index = $\sum_{1=i}^{5} (wi \times fxi) \times \frac{100}{5n}$

Where:

wi is weight given to ith response and i = 1, 2, 3, 4, or 5 is response frequency

fx1 = not important and fx5 = very important

n = total number of responses.

The rank value reveals the importance attached to the various variables.

The Mean Score was calculated using the formula;

Mean Score: ——

Where;

S = score given to each factor by the respondent

F = frequency of the response to each score

N = total number of responses in the respective score.

RESULTS AND DISCUSSIONS

Background of Respondents

Table 1, shows the highest professional qualification with Bachelor's Degree ranked as the highest (69.2%). Most of the professionals are Engineers (25.6%), Architects (28.2%) and Quantity Surveyors (38.5%) as shown in Table 2. Table 3 shows that the respondents experience in the construction industry is almost evenly spread, this indicates that the various professionals have various ranges of experience thus providing useful data for the research.

Table 1: Respondents Highest Educational Qualification

Qualification	Frequency	Percent (%)
Higher National Diploma	7	18.0
Bachelor Degree	27	69.2
Master's Degree	5	12.8
Total	39	100

Table 2: Respondents Professional Designation

Designation	Frequency	Percent (%)
Builder	2	5.1
Engineer	10	25.6
Architect	11	28.2
Quantity Surveyor	15	38.5
Others	1	2.6
Total	39	100

Table 3: Respondent's years of experience

Years of experience	Frequency	Percent (%)
Less than 5 years	9	23.1
5 - 10 years	8	20.5
11 - 15 years	10	25.6
16 - 20 years	4	10.3
Above 20 years	8	20.5
Total	39	100

Factors Responsible for Poor Quality and Performance

The significant factors that have a mean item score equal to or above 4.00 in decreasing order of significance are lack of proper supervision of workmen, affection for the use of low quality materials, lack of conformance to design standards and specification, lack of use of key processes and techniques of construction, inadequate or poor planning, mismanagement of funds, poor coordination and communication and contractor's lack of experience.

Table 4: The Ranking of Factors Responsible for Poor Quality Based on Mean Statistic

Ranking	**Factors**	**Mean**
1	Lack of proper supervision of workmen	4.54
2	Affection for the use of low quality materials	4.38
3	Lack of conformance to design standards and specification	4.36
4	Lack of use of key processes, techniques of construction	4.30
5	Inadequate or poor planning	4.28
6	Mismanagement of funds	4.28
7	Poor coordination and communication	4.10
8	Contractor's lack of experience	4.03
9	Low skill level among workers	3.90
10	Delay in making decisions and approval by owner	3.82
11	Client's emphasis on low construction cost	3.74
12	Lack of proper management of data/information	3.72

13	Lack of adequate mechanical equipment	3.62
14	Lack of senior executive commitment to quality through involvement and communication	3.62
15	Lack of process control	3.62
16	Lack of information dissemination	3.59
17	Lack of adequate incentives for employees	3.49
18	Lack of ability to comprehend the client's needs and requirement	3.46
19	Inadequate subcontractors	2.90
20	Lack of mobilization fee	2.69
21	Inadequacy to make claims and follow to a logical conclusion	2.44

Table 5, shows that the level of importance attached to benchmarking is high, thus having a mean score of 4.21 and an importance index of 84.10. This implies that benchmarking is recognised as an important principle that should be used in the construction industry.

Table 5: Level of Importance Attached to Benchmarking

Level of Importance	Frequency	Percent (%)
Not Important	0	0
Not Necessarily Important	0	0
Somehow Important	3	7.7
Important	25	64.1
Very important	11	28.2
Total	39	100

Table 6 shows the ranking of the advantages of the principle of benchmarking, "Enhanced Image and Reputation of Organisation" topped the list followed by "Performance Improvement and Increased Customer Satisfaction". The respondent's result puts "Improvement in Quality of Service" as the third in the line-up, followed by "Establishing Clear Documented Procedures and instructions" and next "Prevention of Errors at the Earliest Stage of the Project".

Table 6: The Ranking of the Advantages of the Principle of Benchmarking Based on Mean Statistic

Ranking	**Advantages**	**Mean**
1	Enhanced image and reputation of organization	4.31
2	Performance improvement and increased customer satisfaction	4.13
3	Improvement in quality of service	4.13
4	Establishing clear documented procedures and instructions	4.05
5	Prevention of errors at the earliest stage of the project	4.00
6	Efficiency of operation in construction site	3.92
7	Project completion within stated period	3.82
8	Clear lines of duties	3.67

9	Increased chances to be awarded contract	3.62
10	Facilitates access to certain markets	3.33
11	Reduction in quality cost	3.00

From the findings, as shown in Table 7, most organisations in the Nigeria Construction Industry face four major problems, which are; are lack of understanding of the principle of benchmarking, lack of understanding of the process of benchmarking, lack of benchmarking exposure among workers, lack of awareness of the benefits of benchmarking. In order to ensure the success of implementing the principle of benchmarking in Nigeria Construction Industry, the management should work towards being focused and systematic.

Table 7: The Ranking of the Problems Encountered by Organisations in the Implementation of Benchmarking in the Nigeria Construction Industry Based on Mean Distribution

Ranking	**List of Problems**	**Mean**
1	Lack of understanding of the principle of benchmarking	4.26
2	Lack of understanding of the process of benchmarking	4.26
3	Lack of benchmarking exposure among workers	4.23
4	Lack of awareness of the benefits of benchmarking	4.03
5	Lack of planning to implement benchmarking	4.00
6	Lack of continuous professional development	3.97
7	Lack of support from top management to implement benchmarking	3.74
8	Difficulty in getting needed information from other organisations	3.36
9	Lack of available benchmarking system documentation	3.28
10	Lack of time to implement benchmarking	3.08

DISCUSSION OF RESULTS

In recent years, the principle of benchmarking has been introduced in the Construction Industry and it has brought about positive changes in the Construction Industry in UK (KPI, 2000), Chile (CDT, 2002) and USA (CII, 2000), thus indicating the importance of benchmarking and from the results, the level of importance attached to benchmarking is high, with an importance index of 84.10. Also, the results of the research identified four main advantages of benchmarking; organisation image and reputation enhancement, performance and customers' satisfaction improvement, constant quality service and documentation procedures & instructions establishment.

Costa and Formoso (2004) also states several barriers that affects the implementation of performance measurement systems in the construction industry, thus affecting the design and implementation of benchmarking systems and from this research, organisations in the Nigeria construction industry are faced with some serious problems that have hindered the implementation of the principle of benchmarking in the Nigeria construction industry. The problems are lack of understanding of the principle of benchmarking, lack of

understanding of the process of benchmarking, lack of benchmarking exposure among workers, lack of awareness of the benefits of benchmarking and more.

CONCLUSION

Based on the findings, the study showed that organisations in Nigerian construction industry need to improve on quality performance and the principle of benchmarking is an important tool that would enhance quality improvement in the Nigerian Construction industry yet most construction organisations in Nigeria are not aware of the benefits of the principle of benchmarking, neither do they understand how benchmarking works.

REFERENCES

Alarcon, L.F. and Serpell, A. (1996). Performance Measuring: Benchmarking and Modelling of Project Performance. 5th International Conference of International Group of Lean Construction. The University of Birmingham, UK.

Alarcón, L.F., Grillo, A., Freiré, J. and Diethelm, S. (2001). Learning from Collaborative Benchmarking in the Construction Industry. Ninth Annual Conference of the International Group for Lean Construction (IGLC 9), August, Singapore.

Camp, R.C. (1989). Benchmarking: The Search for Industry Best Practices that Lead to Superior Performance. Milwaukee: ASQC Press.

Consortium for Excellence in Higher Education. (2003). Benchmarking Methods and Experiences. Sheffield: Sheffield Hallam University.

Construction Industry Institute (2000), CII Benchmarking and Metrics Data Report 2000, CII, Texas, EUA.

Corporación de Desarrollo Tecnológico (CDT). (2002). National Benchmarking System for the Construction Industry. Report, 1st Ed., CDT, Santiago, Chile (in Spanish).

Costa, D. B., and Formoso, C. T. (2004). "A Set of Evaluation Criteria for Performance Measurement Systems in the Construction Industry." Journal for Financial Management and Property Construction.

Evans, J.R. and Lindsay, W.M. (2005). The Management and Control of Quality, 6th Edn. South-Western, Thompson Corporation.

Goetsch, D.L. and Davis, S.B. (2000). Introduction to Total Quality: Quality Management for Production, Processing and Services, Prentice- Hall, Englewood Cliffs, NJ.

Holloway, J.A., Hinton C.M., Mayle, D.T. and Francis G.A.T. (1997). Why Benchmark? Understanding the Process of Best Practice Benchmarking. Proceedings of Business Track, British Academy of Management Conference, London.

Ibrahim, A.D. and Sodangi, M. (2007). An Assessment of Quality Performance in Construction using Clients' Project- level quality Performance. The Information Manager Journal, Published by the Department of Library and Information Science (ABU, Zaria), Vol. 7 no. 1, pp. 22-31, ISSN: 1596-5422.

ISO10006:2003, International Standard: Quality Management Systems Guidelines for Quality Management in Projects. Second Edition, Geneva.

Kanji, G. and Wong, A. (1998). Business Excellence Model for Supply Chain Management, Total Quality Management, vol. 10, no.8, pp. 1147-1168.

Kaydos, W. (1991). Measuring, Managing and Maximising Performance, Productivity Press, Cambridge.

KPI Working Group. (2000). KPI Report for the Minister for Construction, Department of the Environment, Transport and the Regions, Norwich.

Kubal, M (1994). Engineered Quality in Construction: Partnering and TQM, McGraw-Hill, New York.

Latham, M. (1994). Constructing the Team, Final Report of the Government/Industry Review of Procurement and Contractual Arrangements in the UK Industry, HMSO, London

Marr, B. (2001) Scored for life, Financial Management, April, 30.

McCabe, S. (2001). Benchmarking in Construction. UK: Blackwell Science Ltd.

Milakovich, M.E. (1995). Improving Service Quality: Achieving High Performance in the Public and Private Sector. St. Lucie Press, Delray Beach, FL.

Miles, P., Russell, G.R. and Arnold, D.R. (1995). The Quality Orientation: An Emerging Business Philosophy? Review of Business, Jamaica.

Oglesby, C.H., Parker, H.W. and Howell, G.A. (1989). Productivity Improvement in Construction, McGraw- Hill, New York.

Rowlinson, S.M. and Walker, A. (1995). The Construction Industry in Hong Kong (Hong Kong, Longman).

Russell, R.S. and Taylor, B.W. (1998). Operations Management: Focusing on Quality and Competitiveness, Prentice-Hall, Englewood Cliffs, NJ.

Slater, D. (1997, November 15). Is Benchmarking Worth the Bother? CIO Magazine.

Spendolini, M. J. (1992). The Benchmarking Book. AMACOM.

Willis, T.H. and Willis, W.D. (1996). A Quality Performance Management System for Industrial Construction Engineering Projects. International Journal of Quality & Reliability Management. Vol 23, No. 9, pp. 38-48.

Wong, A. and Fung, P. (1999). Total Quality Management in the Construction Industry in Hong Kong: a Supply Chain Management Perspective, Total Quality Management, vol. 10, no.2, pp. 199-208.

Yasamis, F., Arditi, D. and Mohammadi, J. (2002). Assessing Contractor Quality Performance. Construction Management and Economics. Vol. 20, No. 3, pp. 211-223.