

Analysis of Building Performance Evaluation and Value Management as Tools in Building Facilities Management

Kevin Chuks Okolie^{1*} and Charles Yemi Adedeji²

1. Faculty of Environmental Sciences, Nnamdi Azikiwe University, Awka Anambra State Nigeria
 2. Department of Industrial Engineering Nelson Mandela Metropolitan University Port Elizabeth South Africa
- *E-mail: kevchuks@yahoo.com , kc.okolie@unizik.edu.ng.

Abstract

The purpose of this paper was to establish the relationship/utility of building performance evaluation and value management to building facilities management. The full potentials of building performance evaluation and value management are under-utilised by building/facilities managers in many organisations/institutions involved in the procurement of building facilities. This has led to unapprised facilities management decisions in the wider organisational learning cycle. The objectives of the study were achieved through a review of current literature and associated web sources. This methodology was designed to identify and evaluate the utility of building performance evaluation and value management as tools for improving facilities management functions. The study suggests that the maximum effectiveness of building facilities management decisions can be realised if performance evaluation data/information are integrated into the value management studies. The study clarifies the links that exist and gaps that need to be addressed when taking a building facilities management decision and raised a number of methodological and performance evaluation issues that must be explored in further studies. The study provides a better understanding of the use of building performance evaluation and value management Constructs/concepts in facilities management.

Keywords: Building facilities management, learning cycles, Performance evaluation, performance data, value management

1 Introduction

Modern organisational environment is characterised by rapid and constant changes. As the environment change, so too do the demands which they place on building facilities (Green and Moss, 2000). This implies that organisations/institutions must improve in the provision, management and performance of their building infrastructure on a continuous basis. To meet this challenge, many institutions seek a greater involvement in the design and building delivery processes. This is to ensure that building performance requirements are fully understood by the design and construction teams.

In their quest for greater efficiency and optimal value on investment, organisations are also recognising the importance of effective building performance on the work environment (Buys, 2009). Building performance evaluation and value management are some of the tools that can be adopted to improve the operational performance and value of building facilities in organisations.

This paper is concerned with improving the understanding and ability of building facilities managers to identify strategic performance evaluation requirements in building procurement. It also explores the use of value management in establishing clear objectives at the early building design process. These skills will help the facilities manager to provide buildings that satisfy performance requirements at optimum value. This study relies on current literature to provide a clear understanding of the concepts and application of building performance evaluation and value management to the design and management of building facilities in organisations. It attempts to highlight the relative importance of various other issues raised in the review; the most significant being the utility of building performance evaluation data/information in value management studies.

The study further provides a considerable insight into the basic issues in performance evaluation and value management studies and by disseminating the knowledge; it helps to construct a practical tool that will benefit facilities management as a discipline. The study is designed and carried out by describing the meaning of the above concepts, providing different dimensions of meaning, current development and debates bearing in mind the purpose

of the study. The literature sources include the most relevant and current within the construction and facilities management disciplines from books, articles and websites. The key variable studied in this paper is the nexus or link between performance evaluation, value management and building facilities management. The paper initially introduces the concepts of building performance evaluation and value management, the application of these concepts to facilities management and the nexus between building performance evaluation and value management. It also analysis qualitatively the role of performance data in value management studies and then argues that the utility of these tools in the wider context of facilities management is essential for progressive improvement policies in building procurement.

2 Building performance evaluation in facilities management.

Building performance evaluation is a diagnostic tool which allows facilities managers to identify and evaluate critical aspects of a building facility in order to develop design guidance and criteria for future facilities (Preiser, 1995; Obiegbo, 2004). It is part of a wider field of knowledge referred to as facilities management. Building performance evaluation also refers to an extension of what was formerly called post occupancy evaluation (POE). The concept deals with the continuous process of systematically evaluating the performance and effectiveness of one or more aspects of buildings in terms of accessibility, aesthetics, cost effectiveness, productivity, functionality, safety, security and sustainability (Zimring, 2001).

In an analysis of the relevance of building performance to facilities management, Douglas (1996) asserts that building facilities are key functional as well as economic resources and should therefore be regarded as assets rather than liabilities. The objective of performance evaluation is to improve design practice and create a more functional facility that better supports service delivery. Douglas (1996) opines that a basic tool for the realization of this objective is building performance evaluation. As a facilities management function, the role of building performance evaluation in facilitating organizational performance is widely acknowledged. Amaratunga and Baldry (2000) state that performance evaluation is a key factor in ensuring the successful implementation of organizational strategy in facilities management. Building performance evaluation allows an organization to establish its position through the careful and consistent evaluation of building performance; it stimulates action through identifying what is to be done, who is required to act and in what manner (Amaratunga, Baldry and Sarchar, 2001). This suggests that the objective of performance evaluation is not limited to optimizing the running costs of buildings; though that is important, but encompasses other strategic management issues in an organization.

As external and internal environmental factors place more demands upon building facilities in an organization, resources must be suitably combined for efficiency and cost. Performance evaluation explicitly focuses attention on feedback loops and this influences the behaviour and managements decisions. For facilities management organisations/institutions, this feedback loop influences the overall project design decisions for improved performance and flexibility. Building performance evaluation provides a mechanism to learn from the past and evaluate contemporary future trends in the use of building facilities (Cots, 1990; Lackney, 2001). It is therefore believed that the collection, interpretation and analysis of information about the performance of buildings provide the key to better planning and design for the future.

2.1 Performance evaluation data/information

Essentially, Building performance evaluation is a method for data gathering on facilities performance. It is useful for analysing data and making recommendations for facilities improvements. The application of performance evaluation information to the building delivery process assist in closing the information loop in facilities management (Preiser, 2003). This is particularly useful when the evaluation results are fed into data bases focusing on building performance from the perspective of the user. An important feature of building performance evaluation is its emphasis on the ultimate customer/user and usable space. Facilities management applies the building performance evaluation measures as a tool for spatial efficiency. For example, space, as a performance measure can be used for

measuring the functional worth of a building. Amaratunga (2000) states that three aspects of space must be considered when evaluating the spatial efficiency of a building facility. These include:

- Amount; in terms of area and volume;
- Quality; in relation to fit for purpose, visual and environmental attributes; and
- Shape; with respect to spatial configuration and layout.

A number of indicators can be applied to space from the building performance evaluation perspective. For example, the amount of usable space per employee which is useful for effective space planning and management. According to Palm (2007), space planning, budgeting and management are key components of any facilities management system. The space budget is established by determining the demand for space in a particular organization based on the requirements of the client and the projected number of staff. In this context, the values of building spaces even have precedence over physical building performance.

2.2 Value management in facilities management

Yu, Shen, Kelly and Hunter (2005) define value management as a structured and analytical process which seeks to achieve value for money by providing all the necessary functions at the lowest cost consistent with the required levels of quality and performance. It is a very effective tool for meeting the increasing demand for value enhancement by clients. Advocates of value management argue that it ensures the provision of the required functions at a minimum cost without sacrifice to either quality or performance. Green and Moss (2000) agree that the value management approach to the building facilities management facilitates a systematic identification and clear definition of client requirements, increased understanding of the various stakeholders' objectives and effective accomplishment of building functions. Thus, the value management approach creates a learning environment in which stakeholders in the building delivery process can reach a shared understanding of the wider strategic objectives of a building project.

In order to improve the value of constructed building facilities, the value management studies maintain significant links with building performance evaluation. To understand the nature of this link or relationship, it is necessary to explain the concept of value. The word value is derived from the French word 'valoir' which means worth, usefulness or importance of a thing (Lomash, 1997). Value is established by comparison and for anything to have value, it must satisfy some desire or be conducive to some purpose. Value therefore can be viewed from different perspectives depending on the context. Value management primarily focuses on economic value which can be classified into four major categories. These include cost value which is the amount of money required to produce a product or provide a service; exchange value which is a product demand at a given time against its availability; aesthetic value which occurs when a product is in high demand due to beauty, social custom or rarity; and use value which is when a product is needed due to a particular or group of desired functions it can perform (Lomash, 1997; Onyeador, 2007).

Green and Moss (2000) state that the value management approach to building evaluation lays emphasis on cost and function. This implies that it does not only analyse the cost of a product or service but also the need for a product or service due to a particular or group of functions it can perform. A major function of value management is to develop the sensitivity of the building designer towards functions and costs. This can be achieved through design decisions based on data/information from performance evaluation. Atkin and Brookes (2005) argue that the focus of value management is value for money as it relates to buildings in use. Its role is to aid design decision making in general and the briefing process in particular. Atkin and Brookes (2005) maintain that the application of performance evaluation to value management studies promotes a systematic search for solutions that provide greater cost effectiveness without compromising function or service. Through the evaluation of buildings in use and feedback of data into value management studies, it is possible to establish a cycle of learning within an organization. This cycle of learning, which is a long term on-going process, enables an organization to implement policies for progressive improvement of building performance (Barton, 2000).

It is logical to argue that the role of value management and building performance evaluation towards an effective facilities/building delivery system is complementary. The full potential of these fields of knowledge lie in their integration into a wider on-going organizational learning cycle. This approach encourages organizations that procure new buildings on a regular basis (for example, higher educational institutions) to think more carefully about their accommodation needs and take well informed facilities management decisions (Okolie, Emoh and Ogunoh, 2011).

2.3 Measurement of value in building facilities management

The value added to an organization through decisions on physical facilities may sometimes be difficult to measure/determine. They may be direct and immediate or indirect and lagged (Green and Moss, 2000). The direct value impact, for example, may be the selling of a building which results in cash inflow to the organization, while the indirect or lagged value added may be the selection of a workplace that increases employee morale, satisfaction and productivity. The metrics used to determine the contribution of building facilities to an organization are primarily based on cost reduction or capital minimization. Often, organizations do not recognize the fact that buildings can help to improve revenues. Buildings contribute to improved revenue by avoiding costs and enabling people in the organization to improve their services and consequently increase revenues (Moss and Alexander, 2007).

The balanced scorecard developed by Kaplan and Norton 1996 clearly explains how building facilities add value to an organization. The model shows how organizations can increase economic value through revenue growth and/or productivity. The revenue growth comes from new markets, new products, new customers and expanded sales to existing customers. The productivity comes from reduction in expenses and efficient use of resources. The balanced scorecard's view demonstrates that building facilities can add value through growth and profitability (Burns, 2002).

However, measuring the value of building facilities' contribution to the organization is much more difficult than calculating the financial return. Burns (2002) argues that the output or contributions of buildings are internal; usually from one part to another part of an overall process. Furthermore, different organizations demand different results or outputs from their building facilities. This makes it difficult to have one indicator of good performance due to its subjectivity. This call for the development of appropriate methodology or evaluation system that is not only valid but reliable enough to match the organizations' objectives. That methodology must be chosen within the limits of available data and resources.

Organisations/institutions involved in facilities management functions must choose potential measures and strategies that are practical and appropriate to their core business objectives and within available information. This will provide the facilities manager with the appropriate framework that is easily explainable to top level management as well as justify the potential of building facilities to add value to the organization. The facilities strategies chosen by the organization depend on the broad core business strategies and objectives. Core business strategies and objectives such as revenue growth and productivity require the development of an evaluation system that evaluates how well each strategy is adding value to the organization (Lindholm, Gibler and Levainen 2006).

Lindholm *et al.* (2006) suggest that a measurement system that focuses on the stakeholders' needs and a balance of financial and non-financial measures should be developed by the organization. The measures must be valid, reliable, practical and relevant. For example, in the measurement of employee satisfaction with the workplace; such measures as space per employee, physical condition of the building and client satisfaction with services are commonly evaluated. This will facilitate a proper identification of solutions in the value management process.

In a study on how building facilities/property decisions can create or add value to the core business in an organization, Moss and Alexander (2007) report that building facilities can add value through the provision of a pleasant and productive physical workplace. Another is by providing a responsive and high quality property services to the internal staff/customers. To facilitate the creation of value, organizations must formulate building facilities strategies capable of increasing revenue growth and productivity. Moss and Alexander (2007) suggest that such strategies must consider:

- Increase in the value of assets;
- Increase in employee/user satisfaction;
- Increase in productivity/marketing sales;

- Increase in flexibility; and
- Reduction of costs.

In formulating these strategies, the organization must balance the tangible and intangible contributions of buildings to the organization. For example, facilities strategies such as cost reduction must be balanced with such less recognized strategies as increasing innovation and flexible workplaces. Most organizations rely on the traditional cost per square meter for performance measures. This is inadequate; the modern trend is to consider the evaluation of intangible measures such as employee/user satisfaction with the workplace to supplement the tangible measures such as costs (Groome, 2009; Okolie, 2011).

This provides a holistic view of the contribution of building facilities to the value chain of the organization.

2.4 The nexus between building performance evaluation, value management and facilities management

Building performance evaluation emerged as a result of the search for a systematic evaluation of the performance of buildings after they have been completed and occupied. The overall aim of using building performance evaluation is to generate feedback and to provide knowledge of how to improve both the building process and the management process. The result of this process has led to a better understanding of what the occupant really needs and more about how the buildings perform. Building performance evaluation therefore finds expression within the ambit of facilities management. Facilities management encompasses a vast spectrum of perspectives about people, organizations and change processes to realize organizational goals and value. Integral to this is the field of value management which is concerned with achieving value for money as it relates to buildings in use (investment). Value management therefore looks at the ways in which value can be added to an organization and suggests that if building facilities are utilized effectively, they can help meet business objectives and enhance organisational growth.

Different users within an organization have different perceptions of what should be the function of buildings. These perceptions, according to Green and Moss (2000) may be poorly defined and can change over time. The development of value management studies addresses these poorly defined perceptions which characterize the early building design processes. Performance data play a vital role in framing these perceptions into the value chain of organizations.

However, the availability and use of performance data further helps to reduce performance failures that occur repeatedly but could be fixed at the planning and design stages (Green and Moss, 2000). This can be achieved through data generated from performance evaluation and integrated into the value management studies. Yu et al. (2005) report that although value management studies provide a framework within which user needs are made explicit at the early stages of the design process, it is important to recognize that design objectives/functions are only as reliable as the information on which they are based. This implies that the quality of value management studies depends on the degree of reliability of performance data from building evaluations. The value management studies provide a platform for resolving competing interests by relying on performance data derived from evaluated buildings. In some cases, it may establish priorities among a number of contentious items. Thus, providing participants with a better understanding of the perceptions of other stakeholders and the organization as a whole.

Atkin and Brooks (2005) agree that value management studies address design complexities and provide potential solutions. Atkin and Brooks (2005) maintain that when the value management process is conducted at an early stage of the building life cycle, maximum opportunity for value improvement is available. An added advantage is that the client, end user, designer and other key stakeholders participate in a facilitated problem sharing exercise; sharing knowledge and understanding of performance and best value. The primary audiences for data generated from building metrics are value management consultants and project cost decision makers. The availability of these data provides them with greater control over the overall cost control of the building facility. This implies that the best time to try and improve value is at the conceptual stage of the building delivery process.

These fields of knowledge are very important to the construction and management of building facilities in any organization. For example, the learning cycle of facilities management is facilitated through a systematic programme

of building evaluation. Building performance evaluation therefore is a key facilities management issue; it helps organizations to establish whether their facilities are supporting organizational goals and user requirements. This implies that an effective facilities management system is founded upon a robust building performance evaluation programme. Similarly, since the term evaluation includes the notion of value, it is necessary to establish whose values are involved and what should be done in comparing or benchmarking outcomes. This is very important for effective facilities management and organizational growth. The key issue here is how to optimize value (in terms of contribution to bottom line) and at the same time maintain a high level of organizational effectiveness. This requires an optimum balance between people, physical assets and technology within the organizational environment. The full potential of these tools can only be realised by integrating them into a wider organisational learning cycle which results in well-informed facilities management decisions.

3 Conclusion and recommendations

This paper has provided a greater understanding of the concepts and relationship between building performance evaluation and value management within the wider frame of facilities management. It identifies building performance evaluation and value management as important tools aimed at improving the performance of buildings in facilities management. The study therefore suggests that the maximum effectiveness of building facilities management decisions can be realised if performance evaluation data/information are integrated into the value management studies. It is further argued that the use of these tools by building/facilities managers would facilitate a proper understanding of user requirements in the procurement of new buildings. The study has established that performance evaluation information and value management studies make explicit the changing needs of building users and demonstrate the ability of the organisations' buildings to meet those needs. However, the authors are of the view that the full potential of performance evaluation and value management lie in their proper integration into the wider organisational learning cycle. This calls for the acquisition of skills by building and facilities managers to effectively apply the tools in their service delivery. The study therefore recommends building performance evaluation and value management as useful tools needed by institutions/organizations to navigate to future competitive success in the built asset/facilities management

References

- Amaratunga, D & Baldry, D. (2000). Assessment of Facilities Management Performance. *Facilities*, 18 (7/8): 293-301
- Amaratunga, D. (2000). *Building Performance Evaluation in Higher Education Properties: A Facilities Management Approach*. London. RICS Foundation.
- Amaratunga, D. Baldry, B. & Sarchar, M. (2001). Process Improvement through Performance Measurement: The Balanced Scorecard Methodology. *Facilities*, 50 (5); 179-189.
- Atkin, B. & Brooks, A. (2005). *Total Facilities Management*. Oxford: Blackwell.
- Barton, R. J. (2000). Soft Value Management Methodology for Use in Project Initiation: A Learning Journey. *Journal of Construction Research*. 1 (2); 109-122.
- Burns, C. M. (2002). Analysing the Contribution of Real Estate to the Strategic Competitive Advantage of Organizations. [Online]. Available: [www.fmlink.com/...](http://www.fmlink.com/) (18 March 2012).
- Buys, N.S. (2009). The Physical Learning Environment: A Path to Success or Not? Inaugural Lecture Delivered at Nelson Mandela Metropolitan University. Port Elizabeth, South Africa. 4th August.
- Cotts, D. (1990). Organizing the Department. Conference proceedings of Facilities Management International. Glasgow. United Kingdom

- Douglas, J. (1996). Building Performance and Its Relevance to Facilities Management. *Facilities*, 4 (3/4); 3-32.
- Green, S.D & Moss, G.W. (2000). Value Management and Post-Occupancy Evaluation: Closing the Loop. *Facilities*. 16 (1/2); 34-34.
- Groome, D. C. (2009). *Creating the Productive Workplace* (2nd Edition). India: Taylor and Francis Group.
- Kaplan, R. & Norton, D (1996). Using the Balanced Scorecard as a Strategic Management System. *Harvard Business Review*. January-February. p. 75-87.
- Lackney, J. (2001). Post-Occupancy Evaluation in the Practice of Educational Design. Paper presented at the Environmental Design Research Association. Edinburgh: Scotland
- Lindholm, A. L; Gibler, K. M. & Levainen, K. I. (2006). Modelling the Value Adding Attributes of Real Estate to the Wealth Maximization of the Firm. *Journal of Real Estate Research* 3 (1); 38-43.
- Lomash, S. (1997). *Value Management*. New Delhi. Sterling. p. 167-173.
- Moss, Q. S. & Alexander, K. (2007). Performance Measurement Action Research. *Journal of Facilities Management*. 5 (4); 290-300.
- Obiegbo, M. E. (2005). Overview of Total Performance Concept of Buildings: Focusing on Quality, Safety, and Durability. Paper presented at the 34th Annual Conference of the Nigerian Institute of Building held in Abeokuta. April 27-28. Pp 2-10.
- Onyeador, S. O. (2007). *Development of Facilities Maintenance and Management Strategies for Nigeria*. Enugu: Unpublished Facilities Management Course Manual. Centre for Academic Excellence.
- Okolie, K.C; Emoh, F. I. & Ogunoh, P.E (2011). Educational Facilities Management: Adopting Benchmarking Best Practice. *The Estate Surveyor and Valuer; Journal of the Nigerian Institution of Estate Surveyors and Valuers Abuja*. 35 (1); 114-121
- Okolie, K. C. (2011). *Performance Evaluation of Buildings in Educational Institutions: A Case of Universities in South-East Nigeria*. PhD Thesis. Port Elizabeth. Nelson Mandela Metropolitan University South Africa
- Palm, P. (2007). *Closing the Loop: The Use of Post-Occupancy Evaluations in Real Estate Management*. Stockholm: Kungliga Tekniska Hogskolan.
- Preiser, W. F. (1995). Post-Occupancy Evaluation; How to Make Buildings Work Better. *Facilities*. 13 (11); 19-28.
- Preiser, W.F. (2003). *Improving Building Performance*. NCARB monograph series. Washington, D.C.
- Yu, T. W; Shen, Q; Kelly, J. & Hunter, K. (2005). Application of Value Management on Project Briefing. *Facilities*. 23 (7/8); 330-342.
- Zimring, C. (2001). Post-Occupancy Evaluation and Organizational Learning. In: Council, F.F. (Ed). *Learning from Our Buildings: A State-of-the-Practice Summary of Post Occupancy Evaluation*. Washington: National Academy Press.

This academic article was published by The International Institute for Science, Technology and Education (IISTE). The IISTE is a pioneer in the Open Access Publishing service based in the U.S. and Europe. The aim of the institute is Accelerating Global Knowledge Sharing.

More information about the publisher can be found in the IISTE's homepage:

<http://www.iiste.org>

CALL FOR PAPERS

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. There's no deadline for submission. **Prospective authors of IISTE journals can find the submission instruction on the following page:** <http://www.iiste.org/Journals/>

The IISTE editorial team promises to review and publish all the qualified submissions in a **fast** manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request of readers and authors.

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

