

A Case For The Inclusion Of Value Management To Building Refurbishment Projects

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Abstract: A majority of the buildings that will be standing in year 2050 are the existing buildings of today. Refurbishment will be required to ensure that these buildings are up to par with the comfort standard, technological advancement, and legislation of that time. Regardless of the benefits of building refurbishment, it is filled with a lot of risks and uncertainties that makes the process difficult to manage. Value management has been a great improvement to the construction industry because it ensures new buildings performs at optimum level at the least possible cost. Although the refurbishment process is a part of the construction process, the challenges faced are different. This necessitates the need for an investigation into the building refurbishment process.

Index Terms: Building refurbishment, value management framework,

1 INTRODUCTION

The construction industry is vital in the socio-economic development of any country because of its contribution to the gross domestic product. This is why researchers are constantly looking for ways to enhance the construction process. But while attention is given to new building development, the existing buildings should not be ignored. Buildings are regarded as significant assets that require constant maintenance and occasional restoration for value preservation. This is because in the long run, buildings face the risk of being unable to perform according to their intended purpose. With the change in the comfort standards, technological advancement, and new legislations, buildings require a considerable amount of improvement to meet up [1]. There is also the inevitable case of obsolescence or the need for an adaptive change due to the new demand for their services. Every building gets to the point in its lifecycle where it begins to fade and utilise energy, the only options at this point are demolish to rebuild or refurbish. The long-term changes in expectations of a building have led to building professionals shifting their focus from new building development to the refurbishment of existing buildings [2]. Although refurbishment is a part of the construction process, the complications and risks are very distinct from new building development [3]. Refurbishment projects also contain higher elements of risks and uncertainty than new building projects. A common problem with refurbishment is the lack of adequate information on buildings operation [4]. This might be due to lack of accurate design plans of the building and lack of recorded information. Due to the uncertainties that are faced in refurbished projects, its approach should be different from that of the construction of new buildings. One of the shortcomings about building refurbishment projects is that in spite of its complexities, construction companies still use mainstream management practices [5]. This leads to poor project performance because of management practices that do not suite the refurbishment projects [6].

This makes it important to implement a management technique tailored to suit refurbished projects. Value management is a systematic process that is used by multi-disciplinary teams to ensure the improvement of the value of projects by analysing functions [7]. It was first introduced in the United States of America during the Second World War when a shortage was discovered with materials in the manufacturing sector. Lawrence Miles was compelled to use alternative materials and discovered that the alternatives were cheaper and be performed better than the original choice. The practice of VM remained in use after the war to eliminate unnecessary cost and improve design, it was introduced to the building development industry in the early 1960s [8]. Existing value management studies that pertain to the construction industry have mostly focused on new building projects [9], [10]. These studies have looked into the implementation of value management to new building development. Since the building refurbishment process is different from the new building construction process, a different strategy is needed for its inclusion. Therefore, the purpose of this study is to review the refurbishment process, and identify how value management can be included. For the purpose of this study, refurbishment refers to the improvements, major repair works, alterations, renovations, extensions, conversions, and modernisation of buildings [3]. This excludes cleaning and routine maintenance. The remaining sections include Methods (Section 2), The Review (Section 3) and Conclusions and Recommendations (Section 4).

2 METHODS

The literature review (literature survey, content analysis, thematic coding and inductive reasoning) [30] has been used to the inclusion of value management to building refurbishment projects. The keywords for the search for articles were 'value management in refurbishment', 'value management in refurbishment projects', 'value management in construction'. The searches were conducted using Google scholars, Science Direct Journal, Emerald Scopus and SpringerLink Journals. These methods have also been used previously by researchers in this field of study, i.e. real estate [31], [32], [33], [34] and facility management [35], [36], [37], [38], [39], [40]

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3 THE REVIEW

2.1 Building Refurbishment

As buildings age, there is a decline in the economic and functional performance [11]. This long term depreciation has forced building professionals to shift their focus from new building development to the refurbishment of buildings. This is why refurbishment has become a major aspect of the construction industry [2]. Building refurbishment is a subject that has been investigated in details by so many researchers. It has been addressed from various points of view like building stock and its importance [2], cost implications [23], cost modeling [24], user perspective [25], information technology [26], waste management [27], and knowledge management [28]. Furthermore, its role in promoting sustainability has motivated researchers to find ways to improve its procurement, design, building process [4],[5],[29]. Improvement of energy efficiency in refurbishment projects is another factor that has been looked into extensively [12], [14]. This is in line with retrofitting and adaptability [11], [13].

2.2 Refurbish or Demolish

Apart from the physical depreciation of a building, the constantly changing market demands is another factor that lowers building value [12]. This forces the decision on if to demolish for a new construction or refurbish. There are certain factors that influence the choice between new construction and refurbishment. Refurbishment has been determined to be better suited than demolition and building afresh from an economic, environmental, and social point of view. From an economic stand, refurbishment improves the building from its actual state to an acceptable standard and increases the building value and performance without the bearing the economic and environmental cost of new construction [1]. Socially, building demolitions causes disruption and displaces communities. Refurbishment gives a sociological advantage, and adds to the aesthetics of the community [13]. A major environmental disadvantage with demolition is the waste that leads to carbon emission and heavy pollution [1]. It also places a high demand on the already depleted resources. Refurbishment decreases energy consumption and reduces environmental impact through building recycling. In addition, refurbished buildings can efficiently and effectively function like a new building. The United Kingdom Green Building Council stated that come 2050, eighty percent (80%) of the buildings still standing will be the existing buildings [14]. This makes it important to not only refurbish buildings to a sustainable state, but to also improve the standard of the building to make it suitable for the present and future occupiers. While the numbers of aging/aged buildings are on the rise, the finances available for new development are not sufficient to rebuild all of them [1]. Refurbishment can prove to be a cost effective alternative. However, it will be unwise to refurbish if the cost will be higher than rebuilding.

2.3 Challenges with Refurbishment Projects

In spite of the many advantages to refurbishment over demolition and redevelopment, there are many challenges associated with it [15]. Refurbishment is the most uncertain of all construction projects. It is a very challenging process because not only does it encompass the general building problems, it also faces unexpected ones [1]. The work done on existing buildings reveal many sources of uncertainties, risks,

and technical challenges which affect the entire refurbishment process. This is because the full problems are not revealed till the work begins [15]. Insufficient information is another plague that affects the refurbishment process. The building plans are usually unavailable or inaccurate [29]. There is also the problem of miscommunication and insufficient communication among the refurbishment team [4]. This complicates the design process and makes it difficult to fully assess the work scope, thus leading to refurbishment projects exceeding time and budget [3]. A management problem about the refurbishment process is finding a balance between the refurbishment process, building operations, occupants, neighbours, maintenance, and refurbishment team [29]. The refurbishment process consists of many small labour operations which are intensive and spread across the building [15]. There are instances when the buildings will have residents and be in operation [22]. The refurbishment team has to be careful to neither bring harm to the occupants nor interfere with the building operations. The occupation and operation of a building constrains the time on the refurbishment process. There is also a constrain on space and access. Refurbishment is one that can be dangerous as it pertains to health and safety. The refurbishment team may be exposed to hazardous substances like asbestos as they commence work on the building [3]. There are also safety issues when the building is in operation. Other factors that should be analysed for a smooth refurbishment process are change in use, investment decision, technological advancement, economic and social change, legal and sustainability factors. They play a major role in building obsolescence thus affecting the refreshment process [13]. The risks and uncertainties tied to building refurbishment, it is very difficult to manage [3]. Therefore, more management practices are needed to forecast, plan, and analyse the risk and uncertainties of refurbished projects. According to Kemmer and Koskela [21], researchers have tried to tag the early research work on refurbishment as outdated stating that the refurbishment process has improved since the nineties. However, Henrich [6] analyzed the current process concluded that improvements are still needed. Despite the many studies on building refurbishment, the management aspect of it has not been adequately assessed [4]. Studies have revealed that refurbishment projects have mostly utilised the traditional construction management practices [3], [22], [6]. These management practices are not suitable to handle the complexities of building refurbishment [5].

2.4 Effective Management Techniques for Building Refurbishment

In an effort to improve the building refurbishment process, few authors have looked into vital management practices that should be employed. Sanvido and Riggs [29] identified pre-planning and an important strategic and operational technique. The right project team who are skilled and can work well together, flexible, and able to expected changes of the refurbishment process. It is crucial that the team remain together from the beginning to the end the project. In addition, other factors like scope management, communication, partnering strategies, project knowledge, contract incentives, and management support. Egbu [5] stated that special management techniques are needed to control the complex issues associated with refurbishment. Issues like the changes to the work scope, site organization, cost control, site safety,

team welfare, and programming schedules. However, refurbishment managers are mostly challenged by dust control, work pricing, cost control, building occupation, and changes to work order. Management techniques required are forecasting, tendering, planning, analysis of risk and uncertainty.

2.5 Value Management

Value is the relationship between cost and functionality. A product is said to be of value if these factors are met: reduction of cost-in-use and satisfies customer requirements [7]. Value management is a systematic, organised team oriented approach that optimizes projects, processes, and products for the purpose of decreasing cost, increasing profits, and improving performance and quality and enhancing customer satisfaction [7]. For value management to be a success, five components are needed. They are job plan, function-cost approach, functional approach, team approach, and environment for creative thinking. Job plan represents the systematic approach to implementation of core value management elements. It highlights the steps needed to analyse a product and develop alternatives to it. This approach is what distinguishes value management from every other cost cutting technique. The functional approach is a vital part of value management that is made up of methods that differentiates it from the traditional cost cutting methods. This approach puts the products in its current state aside, and focuses on what the client wants. This is to clearly define the client requirements and a better understanding of the problem. The function-cost approach ascertains the lowest cost to function without considering any criteria or code. Function-cost is compared to function worth to enable study teams identify sectors with the highest potential for improvement. Although monetary parameters are usually used, it is also allowed to use other parameters like life cycle. Organised team approach requires a group of various disciplines to explore the enhancement of the system from a holistic point of view. This approach enables the group to think and work on the project as a whole. The clients and end users are also important for the approach. Finally, there must be an environment for creativity. In value management, the idea of ever team member can be stimulated by other members in a specially crafted environment for idea creation. A multi-disciplinary group gains 65% to 93% of their ideas more than an individual working alone. Better ideas emerge from large number of ideas generated.

2.6 Value management in the Construction Industry

The construction industry has been challenged to increase efficiency and cut down on construction costs [9]. Since VM has gained recognition as a driver that improves productivity and gives optimum value for money, it has been deemed relevant to the construction process [10]. While there are other cost cutting techniques available, what distinguishes VM is that it focuses on attaining value without trading quality and performance. VM is important because it is a structured analytical process that takes a holistic look to the solutions [7]. In new building developments, VM is needed to give best value to the design and construction process to meets the client's needs [11]. VM should not only be added to the planning stage of the building, but after the project has been completed [10]. There are various value management job plans like the standard 40-hour workshop, Charette job plan,

VE audit, and contractor's change proposal. The 40-hour workshop is the most accepted format in the construction industry. It is an organised and systematic plan which lays emphasis on the value management methodology. The job plan is divided into a number of phases [9] namely; pre-workshop, information, function analysis, creativity, evaluation, development, presentation, and post-workshop phase. The pre-workshop phase serves as an avenue to gather information on the project. At this phase, roles and duties are assigned to the various participants [16]. At the information phase, detailed description on the project is shared for stakeholders to be knowledgeable about the background, objectives, functions, shortcomings, and limitations of the project [9]. Activities like site visitation and client involvement also happens at this phase. The function analysis phase identifies and analyses the function of a project [7]. The functions are hierarchically presented in a diagram, and key questions like "what is it?", "what does it do?" "what is it supposed to do?", "what is the life cycle cost", and "what is the functional value?" are asked. The creativity space is also called the speculation phases. It is the segment where ideas are developed and assessed to know if it fulfils a desired function of the project [16]. This phase encourages outside the box thinking away from the habits, traditions, and all other types of restrictions. Every idea generated in the creativity phase is critically examined in the evaluation phase. The generated ideas are assessed from the economic and non-economic stand points that have been defined according to project's objectives [19]. The development phase selects and prepares ideas which have been deemed feasible and viable as potential solutions. The accepted ideas are presented as actions plans at the presentation phase [10]. To successfully implement value management, certain factors are needed.

- A multi-disciplinary team with the right amount of skill mix.
- A skilled facilitator.
- A structured value management approach.
- Participants who are knowledgeable in value management.
- Participation of decision makers.
- Client's participation.
- Adequate preparation for value management workshop.
- Functional analysis application.
- Support of the participant and senior management for value management.
- An implementation of the outcomes.

2.7 Shortcomings of Value Management in the Construction Industry

Despite the fact that value management is not new to the construction industry, there are still certain critiques to the process. Kelly and Male [20] highlighted some of the problems with value management. A major problem with value management is that it is time consuming. The 40-hour workshop that is needed might be a challenge, especially with a large group of people. Assembling the key players for such a long period of time will be difficult. There is also the extra time needed for the generated ideas to be reviewed. The pressure to present tangible savings on the project to the client might force VM to revert back to the cost cutting technique instead of generating value. The value management practice lacks a standard cost model. Although it has been suggested that the cost should be broken by function, confusion might arise when a component provides more than one function. Project

contractors are usually worried about delays in construction schedules, this might force them to change the standard approach to value management and concoct a superficial proposal. Function analysis is regarded as a key stage of value management [8]. However, there are no clear guidelines on how to go about it. There is also the problem of liability. It is not certain who takes responsibility for the implementation of the outcome. Whether the value management team who proposed it, or the designer that implemented it.

2.8 The Need for Value Management in the Refurbishment Process

A general fact that has been agreed upon is that there are uncertainties and risks that come with the refurbishment of buildings [3], [15]. There is need for a management practice to ensure the refurbishment process goes smoothly. Lack of sufficient communication and inadequate information are major problems that have been noticed with the refurbishment process [14]. Value management can be used to rectify this because it involves the various professionals working together as a unit to bring innovation and improve the overall performance of the project [7]. There is an ambiguity to the refurbishment process. The contractors are never fully sure of what is needed to be done till the actual work commences. This ambiguity makes it difficult to estimate cost and time required to complete the project. The systematic nature of value management makes it easy for the unexpected surprises during refurbishment to be addressed immediately. This makes it important to have a systematic process to implement value management for the refurbishment process. A problem that has been noticed with existing buildings is that they do not meet up with the client's requirements, and they are also not suitable for end-users [14]. Existing buildings can be commissioned to be refurbished to correct these shortcomings. One of the advantages of value management is that the clients' requirement is a priority [10]. By implementing value management to the refurbishment process, buildings will be enhanced to suit clients who commission the project and suit the end-users of building.

4 CONCLUSION

A case was briefly made on the need for value management in building refurbishment projects. It highlighted some of the challenges faced in the refurbishment of buildings, and proposed the systematic implementation of value management for a smooth process. The objectives needed to gain insight were listed, and methodology to be used in achieving them was explained. It is hoped that by the end of the research, a framework for the systematic implementation of value management will be developed.

5 ACKNOWLEDGMENT

We would like to express our appreciation to the Ministry of Education, Malaysia (MOE) and Universiti Teknologi Malaysia (UTM) for providing research grants and supporting this study (Fundamental Research Grant Scheme (FRGS)-Vot No.: R.J1300000.7852.5F163).

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