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TOTAL ASSET MANAGEMENT IN THE PUBLIC CLIENT: A CRITICAL ANALYSIS OF BUILDING MAINTENANCE BUDGET DETERMINATION

Norehan @ Norlida Binti Haji Mohd Noor and Md Yusof Bin Hamid

ABSTRACT

This paper draws on an exploratory study of determination of the maintenance budget of the government-owned buildings. Today's situation witnesses drastic developments in government policy direction with the establishment of a strategic and effective asset management. The Government's main focus is to establish a robust guideline in determining budget allocations for maintenance of government building projects. The purpose of this study is to investigate the current and various practices used in the management of the maintenance budget determination by the Government of Malaysia in particular by the Public Works Department or the local authorities and the challenges faced by the maintenance contractors in the project. Discussions will lead to a critical analysis of the current scenario, the gap in knowledge and challenges. Scientific surveys and reviews will also focus on effective practice models that have been implemented by other governments throughout the world.

Keywords: determination, building maintenance, budget, model, government-owned building

Correspondence Author: Norehan @ Norlida Binti Haji Mohd Noor, Faculty of Architecture Planning & Surveying, Universiti Teknologi MARA (Perak).

Md Yusof Bin Hamid, Faculty of Architecture Planning & Surveying, Universiti Teknologi MARA (Perak).

INTRODUCTION

In facing today's competitive world, the public sector in many countries began to move into more dynamic approach. The focus on quality asset management in Malaysia began when the nation enters an era of 'Brand Malaysia' that is based on a holistic approach and sustainability (Hai, 2009). It is known that the public sector is the managing authorities and the owner of most government buildings, thus the building management should be the main agenda of this party. To maintain quality and good level of functioning, buildings should be well maintained. Seeley (1976) described the building maintenance as "Cinderella" activities within the construction industry (Wood, 2005).

The scenario in the UK clearly demonstrates the importance of building maintenance which is translated into the increased percentage of maintenance cost in the construction activities. In 1969, the construction industry on maintenance work was reported to represent 28 per cent of the total construction output (Seeley, 1976 cited by Wood, 2005). 30 years later, market for maintenance, repair and improvement was worth £28 billion, compared with £10 billion for new-build (the Barbour Index, 1998 cited by Wood, 2005). Analysis by Lam et.al (2010) found that starting from the year 2002, 50% of all annual construction activities are solely for building maintenance. Hong Kong recorded an increase in the cost of maintenance work over the past 5 years. While El-Haram & Horner (2002) say, UK scenario shows rapid increase in building maintenance cost. (BM1, 1996a) reported that in the last 10 years, building maintenance increased about 66% and between 1989 and 2000, its made about 43.6% increase (University of Reading, 1990 cited by El-Haram & Horner, 2002)

This situation proves that maintenance is now clearly a big and important business (Wood, 2005). However, these maintenance interventions can only be justified by the monetary expenditures spent on. Research and review of the literature (Lam, Chan & Chan, 2010; Douglas, 1996; Wood, 2005; Watson, 2009) recorded building was considered the main physical asset and as one of the most valuable properties of a nation – they are created for the sole purpose of providing the needed services to people and enhancing people's quality of life. If the buildings are not properly planned and maintained, they will become liabilities. Today's view of a building is, no longer as a passive product but as a marketing product that needs management, control and redirection.

According to Ar-Arjani (2002), CIOB (1999) and Straub (2002); governments all over the world must considerable expenditure directed towards building maintenance and operation (M&O). Maintenance management should also be enriched with technical knowledge, site experience and satisfactory maintenance needs. Study on maintenance project should also appraise the

performance approach towards cost improvement, risk and quality management of the property concerned in long run. Building maintenance management can be divided into two categories - first, the building itself as tangible assets and secondly, in terms of facility management as an intangible asset (Abu Bakar, 2009; Omar, 2009; Ottoman, Nixon & Lofgren, 1999). Both of these elements require a holistic management, proper planning and budget to realize the government requirement and to create a conducive working environment. Stated by Watson (2009) many facility investment strategies lack a baseline facility annualized cost of ownership.

In the public sector, it is known that among the biggest obstacle is the 'resistance to change'. Traditionally public agencies often consider the budget as the primary planning document and will then be implemented in the budget preparation (James, 2006). So it is a significant loophole in asset management in Malaysia. According to Kasmin (2009), Malaysia is developed by the National Physical Plan (NPP), which includes policies and programs to drive national development. Under the NPP, the development framework is carried out by the Five Year Malaysia Plan (FYMP) which is named as the Malaysian Plan.

Focus will be given to the investigation on the preparation of annual budget for the maintenance of government-own buildings. This study will also review and identify current practices in building maintenance management, with the focus on the methods, procedure practice and the format of the model currently in use, to determine the strengths and weaknesses. The aim of the study is to promote innovative model that will become a framework or guideline for improvision and as an added value to the existing procedure. This model will also consider some adaptation from the existing model that has been implemented by other countries. These have been proven to be effective and successful in their implementation. However it should take into account our local culture and environment. It is hoped that this building maintenance budget assessment will benefit the largest owner, that is the public authorities such as (i) The Ministry of Work (MoW) and Public Work Department (PWD); (ii) Financial agency and (iii) the stake holders of the property.

The methodology that will be used in this study is qualitative method. Case study method will be used to view the overall situation in more detail. This study will use research techniques that involve interviewing and observation from the top to the bottom hierarchy, covering all aspects of management, procedure and policies.

GENERAL BACKGROUND OF THE STUDY

Building maintenance management is often being related to innovative strategy and future sustainability. Various working methods have been introduced in the performance of building maintenance management works. There are two things that will be highlighted here which are asset management and building maintenance management. How these two elements needs cost assessment and budget allocation in the success of their activities. Asset management is a 'process' of guiding the initiation, acquisition, use and maintenance and disposal of assets, to make the most of their service delivery potential and manage the related risks and costs over the full life of the assets. Asset life cycle behavior is divided into two key parameters which are as follows (Leong, 2004; Hamid, 2007; Manual Total Asset Management (TAM), 2009);

1. Functionality→(function)→obsolescence→ upgrade
2. Utilization(use)→deterioration→maintenance→ demolition

Asset life cycle undergoes four main phrases which are mentioned below;

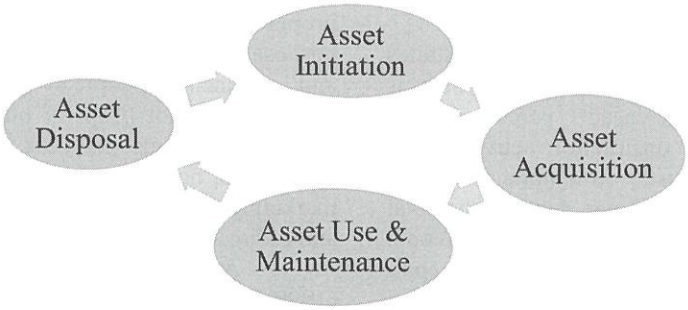

Figure 1: Asset life cycle
(Source: Leong, 2004; Hamid, 2007; TAM, 2009)

Building maintenance is defined as 'work,' in order to keep, restore or improve every part of a building, soon to maintain the performance of building fabric and its services and surrounds, to a currently accepted standard and to sustain the utility and value of the building. It includes improvement, refurbishment, upgrading and repair works to the existing facilities. (Horner, El-Haram & Munns, 1997; BS 8210; the RICS, 1990).

Classification and Objectives of Building Maintenance (BM).

Maintenance (Bon & Pietroforte, 1993; Kherun et al, 2002; Seeley, 2003; British Standard 3811:1984 and BS 4478; Ali, 2009; Wood, 2003) is a combination of all technical and associated administrative actions intended to retain an item in, or restore it to a state in which it can perform its required function. Classification of maintenance regimes can be divided into two parts; (i) Response maintenance and (ii) Programmed maintenance. Boussabaine & Kirkham (2004 cited by Hamid, 2007) listed Maintenance Whole Life-cycle Cost as the method which is widely used in many countries. This method is practiced in three ways, as follows;

- Building Maintenance Whole Life-cycle Cost
- Engineering Maintenance Whole Life-cycle Cost
- External Works Maintenance Whole Life-cycle Cost

While Maintenance Management Framework (MMF Queensland, 2009) classified maintenance as work on existing buildings undertaken with the intention of:-

- Re-instating physical condition to a specified standard
- Preventing further deterioration of failure
- Restoring correct operation within specified parameters
- Replacing components at the end of their useful/economic life with modern engineering equivalents
- Making temporary repairs for immediate health, safety and security reasons.

Best Value Report of Building Maintenance by Central Management Support Unit (CMSU, England, 2001) stated that; "the main objective of building maintenance is to create a safe, comfortable and conducive working environment to the occupants." According to CMSU (2001) a practical maintenance system must involve the elements of "challenge, compare, consult and complete". The failure of defending the life cycle of building is a result of series of weakness especially on the weakness of managing the distribution of maintenance fund. Alner & Fellows (1990) stated that the purposes of building maintenance are as follows;

- to ensure that the buildings and their associated services are in a safe condition;
- to ensure that the buildings are fit for use;
- to ensure that the condition of the building meets all statutory requirements;
- to carry out the maintenance work necessary to maintain the value of the physical assets of the building stock; and
- to carry out the work necessary to maintain the quality of the building.

In taking the same initiative as countries that practice building maintenance, Malaysia took the approach of learning from others experience without making the same mistakes. (Dombkins, 2009). The government of Malaysia has started to take steps in making drastic changes in management aiming to develop innovative emergent strategy and new economic model gives emphasis on the services sector as the main driver of the economic growth. Since 2007, the Government Asset Management Policy has been formed as a new approach to ascertain the, principle and strategy (Hai, 2009). Their objectives of building maintenance are as follows:

- The creation of assets to meet delivery systems.
- The creation of asset management system.
- Documentation of asset information.
- Adoption and monitoring of Total Asset Management.

Budget Method for Building Maintenance Measures

It has always been a headache to make building maintenance cost assessment. In current practices, whether based on planned or unplanned maintenance, budget becomes the main topic of discussion and constraints. Most research findings show that maintenance is not carried out according to actual need, but are based on the allocated budget without making a careful evaluation of the actual needs of the maintenance work. (Spedding, 1987; Horner et al, 1997). Budget should be determined based on the type and implementation of the strategy of maintenance. In principle, strategies of building maintenance can be divided into three parts; (i) Corrective; (ii) Preventive and (iii) Condition-based. According to Bahr and Lennerts (2010) who conducted a special investigation in the building maintenance budget in Europe found a variety of common budgeting method that was used from 1952 to 1984 which can be divided into four fundamentally different methods of budgeting for the maintenance measures;

1. Key figure-oriented budgeting
2. Value-oriented budgeting
3. The analytical calculation of maintenance measures
4. Budgeting by condition description.

Bahr and Lennerts (2010) also introduced the new findings called adaptive practical budgeting of maintenance measures (PABI).The new approach leads to the development of a new budgeting method. In view of some similarity of our research context, the study by Bahr et.al and the approach by the Queensland Department of Public Works will be taken as the main reference of our research. Starting from 1999, Queensland Department of Public Works has been implementing the Maintenance Management Framework (MMF) as guidelines for the Queensland Government Departments on relevant asset management principles and practices. This was later improved in 2007. It provides guidance on the development of the annual building maintenance budget. This policy stated that a maintenance budget should identify the quantum of funding a department requires to adequately address the key maintenance needs of its buildings, to ensure that they continue to support the delivery of government services. The determination of an adequate building maintenance budget can be done by a series of procedure namely as Select or Standing Lists and Equality of Opportunity. The MMF manual, emphasizes on human resource management; staffing, communication and information management as a crucial medium to execute and to determine the budget and the effective cost of maintenance.

BUILDING MAINTENANCE BUDGET IN MALAYSIA SCENARIO AND CHALLENGES

The history of building maintenance initiatives in Malaysia only began in the year 1971 (Second Malaysian Plan, 1971 - 1975). It can be summarized as in Figure 2.:

<table>
<tr><td colspan="3"></td><td></td><td>(2001) PWD planning to set up the department of Operation & Maintenance (O&P)</td><td>(2006) Improve Public Facility Maintenance Program - with special allocation.</td><td rowspan="6">Implementation of Total Asset Management</td></tr>
<tr><td colspan="3"></td><td></td><td>(2003) Upgrading & repair of existing hospital & medical facilities</td><td></td></tr>
<tr><td colspan="3"></td><td></td><td>(2004) Refurbishment & upgrading work of educational buildings</td><td>(2007) Strengthening the Maintenance Unit of MoW - divide to 2: Road & Building</td></tr>
<tr><td colspan="3"></td><td></td><td>(2004) Focus to Maintenance & Facility Management</td><td>NAFAM Conference 2007 - set up National Asset Management</td></tr>
<tr><td colspan="3"></td><td>(1991) Fund for Building Maintenance is increased.

Provide guide line & responsibilities to the agency.</td><td>(2005) large fund for Public Facility Maintenance Program including buildings.</td><td>(2009) Additional expenditure for maintenance management (schools)</td></tr>
<tr><td>No Initiative</td><td colspan="2">Upgrading works, expansion and operating cost of educational facilities in rural areas and defense equipment</td><td>(1995) Reported about complaints being raised due to malpractice of building maintenance management</td><td>(2005) The formation of Maintenance Regulation Division.</td><td>(2009) New approach in Government Total Asset management - NAFAM Conference 2009</td></tr>
<tr><td>1950 - 1970</td><td>1971 - 1975</td><td>1976 - 1980</td><td>1991 - 1995</td><td>2001 - 2005</td><td>2006 - 2010</td><td>2011</td></tr>
<tr><td></td><td colspan="2">NEW ECONOMYC POLICY (NEP)</td><td>NATIONAL DEVELOPMENT POLICY (NDP)</td><td colspan="3">NATIONAL VISION POLICY (NVP)</td></tr>
</table>

Figure 2: Malaysia Maintenance Initiates

Some instructions are articulated through the formal circulars indicates that the government is getting more serious on the issue of BM, such as;

1. *Pekeliling Am Kerajaan Bab E, Perkara 25(a) and Pekeliling Perbendaharaan Bil 2 Tahun 1991* - the fund for maintenance has been increased from year to year.
2. *Pekeliling Am Kerajaan Bil 2 Tahun 1995* reported 'there are complains being raised about accidents, damages and losses due to malpractice of building maintenance management and negligence.'
3. *Pekeliling Am Bil 1 Tahun 2003, Arahan Penyelenggaraan Bangunan Kerajaan Di Putrajaya* dated February 11th 2003; "Building Maintenances must be efficiently and properly executed. These wonderful buildings are indication that we are entering into a new dimension; the image to the Government therefore must be best maintained." The Government also has given instructions to all its agencies that they are to carry out the maintenances of their building in the very early stage so as to reduce the cost of maintenances and to avoid bigger risk from the higher maintenance cost due to negligence through time.
4. In 2005 The National Budget - The Prime Minister of Malaysia said, that "The Government would give attention to the Maintenance Works of the Infrastructure and would promote maintenance as a culture. To ensure the safety of government asset, to prolong their lifespan and to beautify the environment, a systematic maintenance scheme would be introduced". The Government also increased the budget for maintenance from RM 50 Million for the year 2005 to RM 4.3 Billion for the year 2006.

A series of National Budget presentation shows more attention has been given to the building maintenance work especially beginning 2000s. National Budget 2003 - fund allocation was RM 289.7 million; National Budget 2004 - RM 83.78 million; National Budget 2005 - RM 500 million plus special allocation RM 4.1billion; National Budget 2006 - RM 4.3 million; National Budget 2007 - special allocation for RM 1.0 billion; Ist Economic Stimulus Package Project 2009; RM 151.62 million. Through the National Asset and Facility Management conference (NAFAM) in 2007 and 2009, the Government Total Asset Management Manual (TAM) was set up.

This manual aims to improve the current procedure which is one of the items in the strategic planning and direction of 10th Malaysia Plan for "Quality of Life of An Advanced Nation". This initiative gives aspiration to another dimension that leads to asset management to the psychosomatic well-being of citizens through proper management of the built. It is well understood that the subject of maintenance can be considered as juvenile in Malaysia. There are a few researches that have been carried out to determine what building maintenance really means especially on the scope of maintenance, management and the element of maintenance which in the contrary, has been given very minimal attention. In fact, very rare to see research carried out on the subject of maintenance expenditure, funding or financial budget of maintenance work.

As for the federal government itself, there is no standard format or standard guideline to be called standard operating procedure (SOP) to be followed as a guide or a blueprint to the entire public clients in terms of building maintenance. The determination of the budget for the maintenance work in Government-owned buildings has led to the Federal Government's or The State Governments headache and conflicts between the maintenance contractors and the clients. Worsening the scenario, is the anability to determent the exact cost of maintenance works such as repair works, replacement or internal maintenance works, the estimated costs usually go haywire and far from the actual costs. The latest reveal shows that there is no uniformity in the procurement procedure or standard contract regulation that is being used by the public client.

Taking into account that the scenario and challenges related to building maintenance budget are still very new in Malaysia, this study is meant to contribute in finding the ways that can help strengthen the public sector in the assessment and determination of budget determination in either the annuall budget or lump sum by introducing a new approach or new model of budgeting methods. There are previous researches that examine the same topic and make analysis of these models on the basis of their study as follows in Table 1 and Table 2, as below;

Table 1: Building Maintenance Assessment Criteria

Author	Area of study (Focus)	Sub focus	Assessment method/model
Horner, El-Haram & Munns (1997)	New systematic framework for selecting a suitable maintenance strategy for building	Cost-effective maintenance strategy	• Corrective maintenance • Preventive maintenance • Condition-based maintenance
Ottoman et.al (1999)	Method to determine the appropriate level of investment to maintain facilities		• By computer models • Cost-per-unit formula • Facility-condition assessment/methodology • Life-cycle-cost analysis
El-Haram & Horner (2002)	Factors affecting housing maintenance cost		• Building characteristics • Tenant factors • Maintenance factors • Political factors
Maintenance Management Framework (MMF) Queensland, 2009	Policy & guideline on the development of an annual building maintenance budget		• Condition assessment • Statutory maintenance • Preventive maintenance • Condition-based maintenance • Unplanned maintenance • Agency maintenance management costs
Lam et.al (2010)	Project success index (Psi) - Benchmark of the performance for building maintenance		Key performance indicator (KPIs); time, cost, quality, functionality, safety & environmental friendly
Azlan Ali Shah (2009)	Cost decision making in building maintenance practice in Malaysia context	Factors considered in decision making (6 dominant variables)	
Bahr & Lennert (2010)	Quantitative validation of budgeting method for public building maintenance. Case study: Europe	• Key figure-oriented budgeting • Value-oriented budgeting • The analytical calculation of maintenance measures • Budgeting by condition description	Practical adaptive budgeting of maintenance measures (PABI)

Table 2: Building Maintenance Assessment Criteria In Malaysia Context

Author / Researcher	Area of study/scope	Assessment method/model
Rozana & Abdul Hakim (2007)	Investigate weaknesses and performance measurement in logistic management (FM) in PDRM	Model Balanced Scorecard (by Kaplan & Norton, 1992)
Zanariah Kadir (2007)	*Persepsi Pelanggan Ke Atas Aplikasi Perjanjian Tahap Perkhidmatan (Ptp/ Sla) Dalam Pengurusan Penyelenggaraan Fasiliti Di Institusi Pengajian Tinggi* - quality and systematic maintenance management	Service Level Agreement (SLA)
Hamed Golzarpoor (2010)	Building Information Modeling (BIM)	Residential New Construction (RNC) and Non-Residential New Construction (NRNC) based on the Autodesk Ecotect Analysis software and Autodesk Green Building Studio
Rozita Binti Aris (2006)	Maintenance Factors During Design Stage.	
Mohd Azreen Bin Mohd Ariffin (2007)	Maintenance management system for reinforced concrete structures of the buildings and to propose an efficient management system that could be adopted by the owner.	

Addressing the Issue

It is clear that the development of building maintenance is not inline with the growth of building developments in Malaysia. Actions and initiatives on this aspect only started around 1971. It was known as the upgrading, expansion and operation works for school buildings in rural areas. Fund allocation is randomly done without proper budgeting method. Total Asset Management Manual (TAM, 2009), commented that the existing procedures for building maintenance of Reactive Maintenance method has many disadvantages such as;

- No asset protection plan
- Decrease the life expectancy of assets
- Long term costs are not economical
- Slow refurbishment process
- Adding the burden of the agency

This issue is consistent with research that found that although theoretically the budget should be built up as a result of estimated needs, it is almost invariably based on previous years' figures, modified for changes in the number of buildings, specially agreed programmers of planned maintenance and inflation forecasts. Worsening the scenario, is always the problem and it is usually a very hard task to determine the exact cost of maintenance works such as repairs, replacement or internal maintenance works and the estimated costs usually go haywire and far from the actual costs. Unfortunately, there is no uniformity in the procurement procedure or standard contract regulation being used. There are also methods that are currently used for constructing a budget for estate-based management organizations; none is entirely satisfactory and each produces a different budget, such as:-

a) Basing this year's budget on last year's expenditure with an allowance for inflation.
b) The use the Department of Environment (DoE) or other formula for calculating the maintenance element of the estate budget.
c) The use a stock condition survey to quantify the size of the maintenance task.

Government agencies have created and have implemented various methods and contract procedures in their building maintenance work tenders. In most cases, the tendering contract will only list down the "Maintenance Work" which is required at that particular time, neglecting the future requirements and without any back-up plan or continuing maintenance plan. It is obvious that the Government has no and has never implemented any systematic procedure on building maintenance works. There are also problems being confronted by the contractors when participating in building maintenance job tendered by the public client. The tender document normally will not give adequate details and as a result, it often happens that the price/cost will be under estimated, resulting in

deteriorating in the work quality or even inability to execute the jobs required.

Reports by Paijan (1995), Isa (2001) and Basiron (2002) revealed that maintenance management in Malaysia has been very insufficient and inefficient. The contributing factors are identified as follows;

- Execution of work is not to the standard
- Insufficient Planning and control
- Insufficient Budget/ malpractice in the Financial Management

There a number of unpleasant incidents which occur due to the lack of maintenance and negligence of Government buildings. What would be more shameful than a leakage at the Malaysian Parliamentary building where all the ministers are discussing National Development! (Case in 2007), fungi infested hospitals in Kulim and Johor (2006). And to worsen the cases of maintenance negligence, a teacher at primary school was killed when the rotten wooden plank of the 1st floor balcony gave way and he fell to his death (2005). Thus, this study is meant to develop or to generate a model that will be created and planned based on the actual and the ultimate needs of the building maintenance in Malaysia. It is our hope that we will be able to create a framework or standard maintenance procedure, which is comprehensive and efficient to be implemented by the Government.

This research aims to identify the public sector practice in the aspect of building maintenance management and its relation in budgeting method determination. It is hoped to lead to a better understanding of the issues related to the budgeting matters in government-owned building maintenance and asset management in Malaysia. The objective of this research is to develop a new model of building maintenance budget practice. The methodology that will be used in this study is both qualitative and quantitative. The methods which will be employed in these studies are; a multiple case study – selecting government-owned building related to issues and problems raised. Case studies include current practice and procedure and how public sectors determine the budget or cost for building maintenance. The research techniques which will be used are; (1) investigation on format and formula in budget determination. How far the parties involved understand building maintenance management and their its in the future (2) Semi-structured interviews with participants: It will be conducted to gain further insight of what the participant says and thinks about the public building maintenance and the budget resolution in determining certain provision for maintenance project. (3) Document analysis – standard and management system of public building maintenance and budgeting method. Case study is used as the research design.

CONCLUSION

This study will focus on the current policy that is being implementing by the Government. This will include how the Government makes the estimation, planning and determines the final budget allocation. This study will present several calculation parameters and formulas. The same investigation will also be performed in the public client of other countries such as United Kingdom, Australia, Korea and Japan. The element of studies that will be put into consideration and to be analyzed are the process and procedure that are being used, the measurement level, establishing of adequate budget, policies, plan and program. The study is meant to help the public sector which forms the biggest part of the building managing authorities/owners in facing all the problems and hardship. There are buildings with special design characteristic and with special function. Unfortunately, these specialties are normally hard to maintain. These are normally due to deterioration and aging factors. Therefore it is urgent that a thorough study should be carried out to develop a guideline for the determination of maintenance cost on these special buildings. This will also include the determents of the yearly budget as to help the State Government make early planning and budget allocation. By using the method that will be proposed, it is hope that an efficient maintenance cost and management and planning can be performed thus lowering the maintenances cost, helping in the tendering process which ensures the quality of job done.

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