

Deferred Maintenance of Public University Buildings in Malaysia: A Preliminary Study

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Abstract: In most developing countries, deferred maintenance has become a common problem that negatively impacts the administration of an organization. A building must be effectively maintained in order to provide optimal service functioning, and this is crucial because it affects the building's performance. Public university produce future leaders, managers, engineers, and industry players. Thus, the purpose of this study is to investigate the issues and challenge, causes and effects of deferred maintenance for public university buildings at Malaysia. In order to accomplish this, a preliminary interview with an expert was held in order to identify rich information and to discuss the issue in depth with participants, as well as to acquire initial information and understanding before further study is continued. Preliminary expert interviews are required to assist the researcher in refining, rephrasing, and confirming the literature-derived criteria. In order to identify the important issues, challenges, causes and effects of deferred maintenance for public university buildings at Malaysia, interviews were conducted with a sample of experienced individuals in order to obtain their expert opinions. Seven professionals and academics working in building maintenance management were selected as respondents. The study will show the issues and barriers as well as the causes and effects and provide valuable information and a deeper understanding of deferred maintenance.

Keywords: Deferred maintenance, preliminary expert interview, issues and challenges, causes and effects, public university

1. Introduction

The purpose of the preliminary interview with an expert is to obtain preliminary knowledge and provide guidance for future research requirements. The purpose of the preliminary expert interview is to develop research ideas, and it is crucial for researchers to more precisely define the challenges and focus on establishing study objectives or requirements [1]. These research methodologies frequently involve qualitative data collection methods, including discussions with users, organizations and stakeholders [2], [4]. It is also stated that some of the primary data would inform the process of collecting quantitative data. According to Sekaran and Bougie [2], interviews are frequently conducted because the issue is rarely discussed, ambiguous, or constrained by a lack of theory.

Due to the lack of prior research, the objective of this study was to interview the expert maintenance practitioner to evaluate and report the issues, challenges, causes and effects of deferred maintenance for public university buildings in Malaysia. In this study, interviews were done because the literature review generated insufficient findings. Maintenance is a crucial element of any structure, and it is always necessary for any structure to keep and maintain its serviceability and prevent deterioration that could reduce the service life to an acceptable standard [5], [6]. In order to provide a conducive environment, university buildings must be maintained and preserved so that they may serve their intended function [7], and they must also promote and encourage teaching, learning, creativity, research, and other academic endeavours. Under the autonomous system, it is believed that building maintenance management will be more efficient, since universities may not have to wait too long to promptly implement maintenance service. A failure in the performance of the buildings would result in a loss of value for the university, its users, and its stakeholders. Upgrading educational facilities by constructing a new building may help in improving the quality of education, but if structures are maintained throughout their design life, it could help to preserve the building's worth.

2. Issues and Challenges

For many developing countries, deferred maintenance has become a significant issue with negative effects on the quality and performance of buildings, users, and stakeholders [8], demonstrating that these issues and challenges have become a worldwide phenomenon, including in Malaysia. The stakeholder may be at risk if this issue is not managed. Hence, public universities must determine the root cause of deferred maintenance issues and apply potential maintenance measures to reduce deferred maintenance [9]. Additionally, it is essential to minimize the deterioration of facilities and preserve their usability in support of the institution's objective and mission. According to Yasin et al. [7] in his study, deferred maintenance issues can be attributed to a lack of communication between strategy and operational level in terms of planning, particularly budgeting, poor planning of resources, improper regulation and procedures of operational implementation, interference with internal politics, lack of appropriate methods and tools for evaluation, and insufficient performance indicators.

3. Causes and Effects

Building maintenance must be performed effectively and precisely, however most present maintenance management practices in Malaysia do not clearly and consistently consider these requirements [10]. In addition, the government has mandated that all its institutions conduct maintenance on all its buildings at an early stage to reduce operational costs and prevent the risk of increased maintenance costs due to time neglect. This, however, did not take place as expected due to the continued existence of deferred maintenance in most departments and public universities. There is no way to put an end to this deferred maintenance, as it is something that happens frequently across all departments. This could be attributable to several factors or causes, whether they are known. It cannot be stated that deferred maintenance is the essence of the problem. This scenario was sparked by a variety of reasons, and it is crucial to identify them. As a result, Yasin et al. [7] correlate a variety of factors with the causes and consequences of deferred maintenance. The causes are insufficient funding, inefficient management, a lack of knowledge, a lack of training, a lack of planning, a disregard for the importance of maintenance, a lack of expertise, building age, a lack of building maintenance rules, standards, guidelines, and implementation mechanisms, a lack of qualified and professional maintenance/facility managers, a poor maintenance culture, a deferred maintenance attitude, a low priority on maintenance financial planning and capital expenditure. Nonetheless, the effects are deterioration of the building, degradation of the aesthetic View, safety and health, poor building performance and energy efficiency, and a dilapidated, abandoned, and dysfunctional building.

4. Research Method

A planned questionnaire interview is a guided, purposeful discussion between two or more individuals conducted in person, over the phone, or online to fulfil the preliminary expert interview [2], [11]. The semi-structured interview questions were developed with the research objective. When conducting interviews, several considerations need to be emphasized, such as the type of interview, the design of the interview guide, and the methods for analyzing data. The interview instrument in this study is a semi-structured interview form, and data collection takes about four weeks. The researcher will have a list of discussion topics and questions prepared for a semi-structured interview. However, the

interview sessions may vary slightly from participant to participant in terms of their suitability [12]. Furthermore, the preliminary expert interview data was recorded using the methods outlined by Saunders et al. [13]. Fig. 1 illustrates an overview of the data reporting procedure.

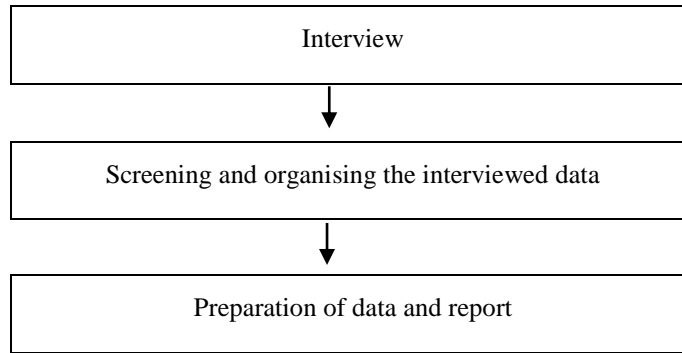


Fig. 1 - Flow chart of the data reporting procedure

Initially, the main ideas for each topic were recognized, and then the most significant aspects were determined, before being classified more accurately [14]. This is intended to provide a means of explaining the phenomenon, so enhancing comprehension and generating knowledge [15]. Lastly, the analysis was conducted using the table/framework to summarize the characteristics that demonstrated the relationship and were associated with specific research questions [16]. According to Hamid, Alexander, and Baldry [9], sampling procedures for the interview do not need to correspond to standard regulations; however, the researcher must develop a question for structured interviews. In addition, the determination of sample size adequacy is not only based on the participant number but was determined by the quality of the data itself [17]. Research should serve its intended purpose, and outcomes frequently rely on direct participant statements and descriptive rather than statistical explanations [18]. There is no defined sample size for interviews; it depends on the objective of the study and the data collection method. Therefore, it is important in this study to select a sample size using purposive sampling [19]-[21]. This sampling method is a non-probability sampling method commonly used in qualitative research. It involves selecting interviewees based on the interviewer's knowledge of the sample's suitability and typicality [22], [23]. Consequently, seven building maintenance specialists with a minimum of a bachelor's degree and 10 years of experience will be interviewed individually for this study, which will include all types of public universities. A portion of the remaining respondents, however, will be explored in future publications. Table 1 provides a summary of expert information.

Table 1 - Information on expert background

Expert Interviewed	Post	Qualification	Experience	Experienced in Maintenance (Yes/ No)
1	Director/ Engineer	Master's degree	23 years	Yes
2	Director/ Engineer	Master's degree	32 years	Yes
3	Professor	PhD degree	10 years	Yes
4	Professor	PhD degree	More than 10 years	Yes
5	Professor	PhD degree	More than 10 years	Yes
6	Senior Engineer	Master's degree	More than 20 years	Yes
7	Professor/ Director	PhD degree	10 years	Yes

5. Findings and Discussions

The information provided by the expert was recorded for future analysis and research. It is critical to ensure that the experts give the necessary details based on their experiences and expertise. Table 2 contains the opinion on issues and challenges of deferred maintenance.

Table 2 illustrates that the selections made by experts are comparable. There were some issues and challenges that were highlighted by the expert including limited resources, unrealistic finances to run the maintenance, inaccurate performance measurement, policies and practices including politics interfere and limited funding (constraints of the budget). The resource is a crucial aspect for the success of any maintenance project or work that has a substantial impact on productivity, resulting in a deferred performance measurement of the building operation. The reason why it may occur is due to unreliable finances to run the maintenance. policies and practices including politics interfere can lead to various

maintenance projects or task issues. There will be losses in every aspect of the project and works management due to the incompetent administration of maintenance projects or works, which may also result in postponed completion dates. In the end, this will impact the budget and funding. If these issues and challenges are not effectively managed, they will become a major difficulty for the management of building maintenance.

Table 2- Expert opinion on issues and challenges

Issues and Challenges	Opinion 1	Opinion 2	Opinion 3	Opinion 4	Opinion 5	Opinion 6	Opinion 7
Planned maintenance execution activities	/						
Maintenance execution activities due to insufficient budget	/						
Operation of the system (risk/ failure)	/						
Lack of planning	/						
Communication (linkages) of strategic and operational	/	/	/	/			
Limited of resources	/	/	/	/	/	/	/
Policies and practices including politics interfere	/	/	/	/	/	/	
Financial to run the maintenance	/	/	/	/	/	/	/
Misunderstood and misapplied methodologies and tools	/	/			/	/	
Limited funding (constraints of the budget)		/	/	/		/	/
Prioritization of maintenance determination		/					
Insufficient of compliance		/					
Maintenance staff competency		/					
Inaccurate performance measure.		/	/	/	/	/	/
No condition assessment of the physical of the building			/				
The commitment of top management			/				
Lack of attitude				/			
Insufficient knowledge of strategic and operation				/			
Insufficient and inaccurate training				/			/
Limitation of technology				/			
Restoration and renovation cost of the existing building and system					/		
The stabilization of the organizational structure						/	
Period of the procurement process							/

Table 3- Deferred maintenance causes and effects of public university buildings

Expert	Causes	Effects
1	Building structure failure (external and internal) Building engineering system failure Facilities services failure	The harm to the environment and human life Teaching and learning interruption activities Risk to facility users' (health and safety)
2	Technology changed The usage/operation of assets changed The efficiency of decision-making	Stakeholder/ organization/ users' productivities Public Financial/ economy

Organizations conflict		
3	Finance Skills Top management commitment	A shortage of resources No maintenance priorities training No strategic planning, just do the routine
4	Building age. Safety & health Physical condition	Cost (how much?) Defects (how many?) Time (how long?) Breakdowns (how many?) Complaints (how many?)
5	Building services and system failure Insufficient budget allocation Delay operation and maintenance work	Malfunction of the building (systems and services) Increase maintenance cost Deteriorates of the building
6	No responsibilities No commitment No teamwork Not adhere the standard Lack of planning	Future cost Physical of building The building's functionality Users' productivity Health, safety and environment The university's reputation The university's rating
7	Not enough budget Delay of work (planning stage) The delay in the procurement process Limited employees to perform the tasks	The inconvenience of users The user assumes that the work performed fails by the responsible party

The comparison presented in Table 3 compares the expert-reported causes and effects of public university buildings in Malaysia for the research of deferred maintenance. Each expert has a different opinion, but they all agree that it is essential to control and manage the deferred maintenance of university buildings in Malaysia before it becomes a serious epidemic. Given the lack of information from earlier studies, researchers will be able to collect extra information for future research with the aid of expert interviews.

6. Conclusion

The overview of issues and challenges, as well as causes and effects, indicates that Malaysian public university deferred maintenance needs more attention. The studies have demonstrated that there are issues and challenges with deferred, and it would be a major concern if it were not controlled immediately. The results of the preliminary expert interviews aid in gathering further data for future studies. By identifying twenty-six (26) issues and challenges, twenty-five (25) causes, and twenty-seven (27) effects of deferred maintenance of public university buildings in Malaysia, the initial expert interviews achieved their objectives. These findings may have a significant impact on the satisfaction of maintenance players, given these aspects have not been well addressed in previous studies. Therefore, a more extensive implementation is required to reduce and regulate deferred maintenance. Effective management of deferred maintenance of public university facilities in Malaysia requires significant assistance from stakeholders, maintenance players, and government agencies. Otherwise, the deferred maintenance problems will not be effectively addressed.

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