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A FRAMEWORK OF CRITICAL SUCCESS FACTORS FOR THE IMPLEMENTATION OF MAINTENANCE MANAGEMENT PRACTICES AT PUBLIC UNIVERSITIES (CASE STUDY: UITM PERAK CAMPUS SERI ISKANDAR)

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ABSTRACT

Maintenance management is defined as the process of maintaining the assets and resources of a company, which has as main objective to control and reduce costs, times, and resources. Critical Success Factor (CSFs) has been significantly used to present or identify a few key factors that organizations should focus on to be successful. This paper presents a Framework of Critical Success Factors for The Implementation of Maintenance Management Practices at UiTM Perak Campus Seri Iskandar. Aim and objective has been set in order to achieve the study. The purpose of this research is studying critical success factors (CSFs) for the implementation of maintenance management practices at UiTM Seri Iskandar. The objectives for this research is to identify and develop a framework of Critical Success Factors (CSFs) for the maintenance management practice in UiTM Seri Iskandar. the result and findings of the research was carried out by using quantitative data collection. The distribution of questionnaire was sent to maintenance department in UiTM Seri Iskandar. The result based on the analysis and finding in chapter 4 had given the conclusion that most of the respondents know that the implementation CSFs of maintenance management practices in UiTM Seri Iskandar. In the nutshell, the findings of the research study on this topic lead to the best framework for maintenance management at UiTM Seri Iskandar at the same time can have a good impact in the maintenance work.

Keywords: *Maintenance Management, Critical Success Factor*

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INTRODUCTION

Every public university relies on well-maintained assets to keep their organization going. Maintenance management is an important, yet seldom discussed, aspect of managing an organization. People unfamiliar with working in university environments may not understand what is meant by maintenance management (Amiri, 2017).

Maintenance management is defined as the process of maintaining the assets and resources of a company, which has as main objective to control and reduce costs, times, and resources. It goes through the regular monitoring of the functioning of equipment, facilities, and tools. The maintenance is a procedure where is to find the faults in any equipment as well as to remove of faults. It may help to maintain and increase the operational efficiency of the building itself (Alshehri, 2015).

Critical Success Factor (CSFs) has been significantly used to present or identify a few key factors that organizations should focus on to be successful. According to O' Brien 2018, The phrase "critical success factors" describes a limited number of areas where success will assure that an individual, department, or organisation performs successfully in the competitive environment. The Critical Success Factors (CSFs) are developed from organisational goals and objectives where specific elements and procedures must be in place.

LITERATURE REVIEW

After a facility is finished, maintenance is the process used to make sure everything is operating and working as it should (Abdul Lateef et al., 2013). To meet the needs of their residents, maintenance involves both technical and administrative tasks (Wahab & Basari, 2013). The three categories of maintenance are service, rectification, and replacement (Seeley, 2015). Buildings must be maintained in order to be used effectively and to have a sufficient safety and security system for consumers (Cobbinah, 2012).

The state of the buildings and services in order for them to satisfy the criteria necessary to be used as desired is related to maintenance management (Zulkarnain, 2012). Researchers claim that a wide range of activities covered by maintenance management can be viewed as an effective use of resources to ensure that systems and facilities meet customer expectations. By selecting the best maintenance method for each component of the structure, maintenance management aims to determine the ideal mix of building maintenance methods (Al-Khatam, 2013).

Critical Success Factor (CSFs)

Critical success factors (CSFs) have been widely utilised to highlight or pinpoint a few crucial elements that organisations should pay attention to in order to succeed. According to O' Brien 2018, critical success factors relate to the small number of areas where achievement will ensure that the person, department, or organisation performs successfully in the competitive environment. The Critical Success Factors (CSFs) are developed from organisational goals and objectives where specific elements and procedures must be in place. In those circumstances, elements and processes are crucial for the organisation to achieve breakthrough performance.

The Critical Success Factor (CSF) is developed from organisational goals and objectives where certain elements and procedures must be in place. In certain circumstances, factors and processes are crucial for the organisation to achieve breakthrough performance. When adopting performance measurement systems within their businesses, the majority of managers make a mistake of failing to link measurements to strategy (Zawawi, 2017).

The majority of organisations must have a list of outcome measures, also known as lag indicators, of what they want to accomplish, such as increased profitability, improved market share, improved employee retention, or increased customer satisfaction, but they lack a strategy to accomplish those goals. The key is finding the optimal balance between performance drivers and outcome measures. This will make it easier to determine and assess how well the existing strategy is being implemented (Zawawi, 2017).

Building Maintenance Performance In University Sector

Students, who serve as both users and operators of the university's many instructional facilities, as well as employees, have access to these resources. In addition to the physical development, such as buildings and infrastructure, it will also include transit, lodging, and other elements.

It should be a resource that property managers prioritise highly due to the cost of the asset, as well as the costs of procuring, operating, and maintaining it. All organisations, including universities, must comply to this. It was discovered that the organization's vision and objectives were to deliver distinctive service while also being cost-effective, to react quickly to changes in customer needs, to achieve consistently better services, to develop the skills of all employees, and finally to praise their performance through opportunities for advancement (Zulkarnain, 2012). Clearly, a critical success factor for use by building maintenance organization must represent the objectives listed in Table 1, 2, 3, and 4.

Table 1: Customer Perspective Critical Success Factor and Measure

Critical Success Factors	Possible Measures / Measurement Instrument
Customer satisfaction	Customer satisfaction surveys
Service quality	Post occupancy evaluation
Customer complaints	
Range of services offered	
Reaction to customer's needs	

Customer satisfaction, service quality, customer complaints, the range of services offered, and responses to customers' needs are at the focus of the customer perspective. Satisfaction will always rank first among all other considerations. A phrase that translates complaints made to the provider is "customer is always right." As a result, opinions vary greatly depending on how well the building and services were provided. However, some restrictions will prevent us from discovering more advantages. Sometimes it's impossible to completely satisfy everyone, but we do our best to do so (Rahman, 2012).

Table 2: Internal Processes Perspective: Critical Success Factor and Measures

Critical Success Factors	Possible Measures
Service excellent	Service standards, service quality survey
Technology capability	Equipment costs, post-occupancy evaluation
Understand the customers	Customer satisfaction surveys
Employee competence	Employee qualifications, training hours per employee, employee satisfaction index.
Process efficiency	Output/cost ratio
Teamwork and coordination	Interdependent meetings, interdependent training courses
Staff development	Courses completed, number of multiskilled staff

One of the factors listed in the internal process's perspective mentioned the technology capability. The maintenance management should keep up with the latest developments in the equipment, machinery, and software utilised in maintenance procedures. For example, the use of gondolas in high rise buildings enables maintenance workers to complete various exterior building repair work. Work can be done on a highly safe working platform while painting. Having the newest technology available is insufficient. The technical expert is needed to run and keep an eye on those facilities. A number of frequently used maintenance software is also available. This software has the ability to record and evaluate data for future use in maintenance (Rahman, 2012).

The five critical success factors are also influenced by financial perspective. When a company is in strong financial standing, variables like managerial expectations, financial growth, cost reduction, improved productivity, asset utilisation, and working capital management are viewed as being the most crucial and significant in upkeep. The goal is to make sure that spending is worthwhile and that income and expenses are balanced (Rahman, 2012).

Table 3: Financial Perspective: Critical Success Factor and Measures

Critical Success Factors	Possible Measures
Management expectations	Cash flow, cost reduction rates, costs per unit of output, new business development
Financial growth	Balance income and expenditure financial reporting
Cost reduction, productivity improvement	Cost per unit, reduction of indirect costs, services sharing with other business units
Asset utilisation	Reduction of working capital
Management of working capital	Average rate of return

As stated in the learning and growth perspective, it is highly justified to develop new processes at the appropriate time. To enable continuing service development, people should be both physically and mentally prepared for any changes at work. Mission and vision statements must be precise and quantifiable (Rahman, 2012).

Table 4: Learning and Growth Perspective: Critical Success Factors and Measures

Critical Success Factors	Possible Measures
Technology leadership	Time to develop new processes
Continuous service improvement	Service innovation cycle time, employee turnover, staff attitude survey, number of employee/customer suggestions, development area identified, new facilities/ service introduced
Upgrading staff competencies	Employee satisfaction, staff development programmes, courses completed, internal promotions made. Reduction of working capital

Regarding the views that had been underlined, the internal process, financial, and learning and growth perspectives should be committed to and integrated. The results of the internal procedure will prove the benefit from a financial standpoint. Staff must possess technical expertise in order to efficiently fulfil all of their duties. To consistently uphold work quality, it is imperative that all levels of coordination and teamwork are strong. Communication and servicing equipment should always be in good working order to guarantee that all procedures are followed appropriately (Rahman, 2012).

METHODOLOGY

This research project is using a quantitative survey method for data collection and analysis. Quantitative research survey method is a type of research design that involves collecting numerical data through standardized and structured methods, such as self-administered questionnaires, standardized interviews, or online surveys. The aim of this research method is to gather numerical data that can be analyzed using statistical techniques to describe patterns, relationships, and trends in the data. This method is commonly used to study topics that are well-defined, quantifiable, and generalizable, and to test hypotheses or establish cause-and-effect relationships between variables. The data will be collected through questionnaires distributed via Email, WhatsApp, and Facebook groups, with clear and understandable questions. The questionnaire will be given to 60 respondents from different levels of position and department in each building.

Instrument of Data Collection

The instrument used in data collection of this research study is questionnaire. The questionnaire was designed in English and Malay language. The use of the translated version improved the readability of the respondents in the questionnaire. The type of questionnaire of this research use Likert-type scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree), dichotomous scale (Yes and No) and multiple question. The questionnaire survey will be included with a few parts of question which is part A, part B and part C. The total number of questions consists of 18 items.

Table 5: Research Question Instrument

Parts	Description	Total Question
A	Respondents' Background	6
B	Identification of Critical Success Factors (CSFs) for the maintenance management practices in UiTM Seri Iskandar.	5
C	CSFs implementation of Maintenance Management Practices in UiTM Seri Iskandar.	7

DATA ANALYSIS AND FINDINGS

The aim of the research is to identify Critical Success Factors (CSFs) for the maintenance management practice in UiTM Seri Iskandar. Other than that, to develop framework of CSFs for maintenance management practise implementation in UiTM Seri Iskandar. The question is divided in 3 sections started with demographic part which include respondent's background in section A. For the next question is include, identification of Critical Success Factors (CSFs) for maintenance management practices in UiTM Seri Iskandar in section B and the last question is CSFs implementation of maintenance management practices in UiTM Seri Iskandar in section C.

Case Study

Department of Facilities Management UiTM Seri Iskandar

The Development and Facility Management Office (BPPF) has the duty to improve the university's service delivery system as a support service organization. in keeping with UiTM's objective to become a leading institution of higher learning, to enhance teaching and learning growth.

In order to achieve a high level of capability to support teaching and learning activities of the university as well as creating a sustainable campus environment, Development

and Facility Management's policy to conduct a comprehensive service delivery system and competitiveness is in line with current technological developments.

Case Research And Data Analysis

The question is divided in 3 sections started with demographic part which include respondent's background in section A. For the next question is include, identification of Critical Success Factors (CSFs) for maintenance management practices in UiTM Seri Iskandar in section B and the last question is CSFs implementation of maintenance management practices in UiTM Seri Iskandar in section C.

RESULT AND FINDINGS

From the analysis of Section A, the total number of respondents for UiTM Seri Iskandar, Perak responded and return the questionnaire is 53 people. The total target respondents are 50 respondents and the total returned are 53 out of 50. At the demographic information for UiTM Seri Iskandar, most of the respondents are male, Malay and their ages are 21 to 30 years old.

The majority of the respondents from this university are on the maintenance team. Majority of them are work full-time. Since the majority of responders had worked in the building for five years or longer, it can be inferred that both buildings contain senior staff who are already familiar with the building. Furthermore, most of the respondents are staying in the building are just in office hour which is 7 to 8 hours every day.

From the analysis of Section B, respondents UiTM Seri Iskandar are well known about Critical Success Factors (CSFs) for maintenance management practices. The respondents for UiTM are know about an important to have a framework of Critical Success Factors (CSFs) for the implementation of maintenance management practices at public universities. They also agreed that having a Critical Success Factor (CSFs) framework can influence maintenance success for universities facility with result is 92.5% vote for yes. This result shows that respondents is aware about an important to have a framework of Critical Success Factors (CSFs) for the implementation of maintenance management practices at public universities.

Lastly, from analysis of Section C, which is the respondents from UiTM agreed that CSFs implementation of maintenance management practices in UiTM Seri Iskandar are important and need to take seriously. Majority the mean score from every statement that use to be value by Likert scale are above 4.20. This can be concluded that these criteria are important and should be implemented on every university.

NO	ITEM	MEANS SCORE
1.	Utilize maintenance management software to manage operations.	4.46
2.	Make a maintenance management strategy using condition-based maintenance, corrective maintenance, and maintenance schedules.	4.43
3.	Top management fully aware of the importance of Maintenance.	4.47
4.	Top management fully aware of the consequences of neglecting maintenance.	4.50
5.	Quality of maintenance work done is acceptable.	4.43
6.	Budget is allocated to carry out maintenance work.	4.43
7.	Maintenance management team identifying and assessing all compliance requirements.	4.46
AVERAGE MEAN RESULT		4.46

CONCLUSION

The literature review, previous research, and questionnaires were used to obtain the aim and data for this research. Furthermore, the research's research aims contributed to the achievement of the research questions. Following analysis that has been done on chapter 4, there are a number of recommendations that can be properly considered and utilised as a guide for next research purposes.

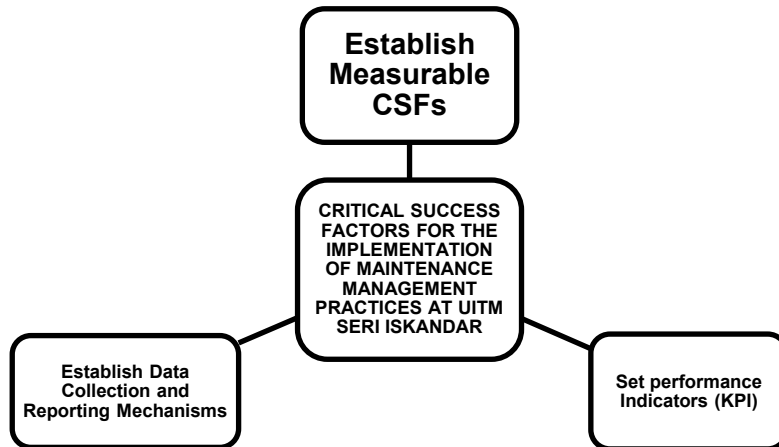


Figure 1: A Framework of Critical Success Factors for The Implementation of Maintenance Management Practices at UiTM Seri Iskandar

I. Establish Measurable CSFs

Determine a set of Critical Success Factors (CSFs) that are specific, measurable, attainable, relevant, and time-bound. CSFs can be developed for each critical area identified in the previous step. For example, a CSF for preventive maintenance could be the percentage of scheduled preventive maintenance tasks completed on time.

II. Set performance Indicators (KPI)

Define key performance indicators (KPI) that align with each CSF. These KPIs should provide quantifiable metrics to measure progress and success in achieving the CSFs. For example, a KPI for the CSF related to preventive maintenance could be the average time taken to complete a scheduled preventive maintenance task.

III. Establish Data Collection and Reporting Mechanisms

Implement systems to collect relevant data for measuring the identified KPIs. This may involve utilizing computerized maintenance management systems (CMMS) or other software tools to track and record maintenance activities. Establish a regular reporting mechanism to communicate the performance of each CSF and KPI to stakeholders.

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Setuju.

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