

Analysis of the Determinant Factors Development of Maintenance Culture in Malaysian Local Authorities

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Abstract. Malaysia is a fast growing developing country and its vision is becoming a developed country with a first class infrastructure. Towards this vision, the assets and facilities were developed, owned or leased by public sector especially buildings, constructions and infrastructures to fulfill administrative and social needs as well as economic responsibilities to general public. In Malaysia, public asset and facilities is owned by three major levels of government, which are the federal government, state government and the local government also known as local authority. Between these three forms of government, Local Authorities hold a large number of facilities that place demands on resources. They have a responsibility to use and maintain a wide range of property assets including classified and heritage buildings, single purpose facilities and state of the art multipurpose facilities. Over the years, the local authorities in Malaysia currently have been soundly criticized by public caused poor maintenance culture. The assets especially public buildings and infrastructures are not maintained properly. Thus, developing the maintenance culture is essential to increase the awareness about maintenance activity on public facilities and assets in Malaysian Local Authorities. Regarding this scenario, the purpose of this study is to determine the determinant factors affecting development of maintenance culture identified based on the review of previous research. As a guide to achieve the research objective, a questionnaire survey was conducted to investigate the significance of ten determinant factors identified in the research study and their related affecting to development of maintenance culture in local authority as a respondent in this research. The collected data was then analyzed using quantitative approaches such as mean analysis, relative important index as well as others.

1 Introduction

Malaysia is a fast growing developing country and its vision is becoming a developed country with a first class infrastructure. Towards this vision, the assets and facilities were developed, owned or leased by public sector especially buildings, constructions and infrastructures to fulfil administrative and social needs as well as economic responsibilities to general public. In implementing the national development of the First Malaysia Plan up to the Ninth Malaysia Plan an amount of RM416 billion from the total amount of RM694 billion dollars provided for the development programme was used to build the physical infrastructure/facilities [1]. Similarly, in the 2010 budget an estimated 16-20 billion

dollars was allocated for infrastructure and basic facilities, including buildings, in the interests of the community [1]. Physical infrastructure is also considered as a public facility that serves as a facility available to the public. In addition, public facilities are a major part of investment in national development programmes, and therefore, they are a national asset that must be maintained and their physical condition preserved. The process to preserve and maintain an asset/facility requires maintenance work as an effective tool in functionality and prolongs life and assets due to the nature that is prone to deterioration caused by time and weather. Maintenance is an important aspect affecting the development of the country. According to Lee [2], maintenance is responsible for the harmonious environment of the whole country, and reflects the well-being of the country.

The environment depends on the quality of facilities, which must be in good condition because they reflect the social values held by society, the level of national prosperity and attitude towards care of public facilities. Furthermore, the development of a country is not regarded as successful if the awareness and focus on the maintenance of public facilities is inadequate and not properly implemented. In contrast, a country's development is considered successful when the importance of maintenance is understood by the entire communities [3]. According to Homer et. al. [4], maintenance is a major activity in many countries. In addition, facilities/assets have a life like a human life cycle. Therefore, they are susceptible to deterioration and damage if the measures of prevention, protection and conservation are not undertaken, and hence, need maintenance work for a longer shelf life. Improvements need to be taken immediately as well as from time to time to prevent damage and reduce maintenance costs [5].

In Malaysia, three levels of government which are the federal government, the state government and the local government also known as local authority have responsible toward providing facilities to the community. Every year the various types of facilities which encompasses buildings and infrastructure such as office buildings, roads, bridges and others were developed by the government has proved that the government is really committed in executing its responsibility of providing all the facilities for community and social to achieve the Malaysia vision to become a developed country by the year 2020 [6]. Between these three forms of government, local authorities hold a large number of facilities that place demands on resources. Between these three forms of government, local authorities hold a large number of facilities that place demands on resources [7]. They have a responsibility to maintain its public infrastructure facilities to ensure performing well up to public satisfaction level [8]. However the local authorities in Malaysia have been soundly criticized for poor maintenance of public infrastructure. Numerous comment and argument from various parties in daily barrage of questions and complaints directly in the press about poor and incompetent condition performance of local authorities facilities. For example, the Ministry of Housing and Local Government has received between 2400 and 4500 maintenance complaints each year over the last five years [9]. Insufficient attention to maintenance has resulted in public facilities being in poor condition in terms of the physical structure that have suffered damage and deterioration through lack of repair [10,11]. This tarnished of local authorities' image as delivery public service provider service delivery to the community. Many factors contribute to the poor maintenance of asset and facilities but the critical factor is the lack of awareness among the local authorities' staffs in Malaysia. In other words, this problem is due to the lack of maintenance culture of assets and facilities. Thus, developing the maintenance culture is essential to increase the awareness about maintenance activity on public facilities and assets in Malaysia local authority. The developing a strong of maintenance culture in Malaysia as one of the many issues that has been concerned by public to enhance and provide the public safety and convenience. Malaysia is known as a country that prides itself in the provision of First World infrastructure but not in terms of its maintenance of these facilities [12]. The maintenance culture is necessary to improve the skills, tenacity, and diligence in maintenance work.

2 Objective of Study

The objective of this study is to develop and validate the determinant factors development of maintenance culture identified based on previous research. As a guide to achieve the research

objective, a questionnaire survey was conducted to investigate the significance of 10 determinant factors identified from previous research and to identify the key determinant factors development of maintenance culture from the perspective respondents from Malaysian Local Authorities. Therefore, this finding can contribute the endeavours for improving the quality of maintenance activities to the public assets and facilities in Malaysian Local Authorities through developing of maintenance culture.

3 The Need for Maintenance Culture Development in Sustaining Malaysian Local Authorities Asset/facilities

Sustainability of capital investments of any nation has been a major and global dialogue most especially in developing countries where infrastructural development is still at the infancy. This is because most of governments' expenditures and investments focus on infrastructural development even though the challenges in developed nations are sustainability [13]. Malaysia is faced with the challenges of sustaining and maintaining inadequate infrastructure especially for the local authority. The local authority ownership and operation of public utilities does not have to result in inefficient operation and low level of service, but it's always been. Local authority is faced with the challenges of sustaining and maintaining infrastructure. The challenges faced by the local authority are inefficient operation of public utilities and low level of service delivery. According Odediran et. al. [13] one of the ways for sustainability is the maintenance of existing stock of infrastructural facilities and services. Maintenance according to BS 3811 is the all technical and associated administrative actions intended to retain items in or restore it to a state in which it can perform its required function. Maintenance also defined work undertaken in order to keep, restore or improve every facility, to an acceptable standard and to sustain the utility and value of the facility. The existing maintenance failure indicates the need for a paradigm shift/change to the adoption of a maintenance culture in Malaysia to reduce the maintenance problems and improve the performance of maintenance. It is time that maintenance became a practice/way of life/culture and that the importance of maintaining the facilities/assets is realized to improve the skills, hard work and diligence in maintenance. Culture is what is contained in the individual results of the experience through social interaction with the surrounding community. This is because the culture is basically a set of unwritten rules that guide human behaviour through belief in the interpretation of data received and then translated by the action. Maintenance culture is defined the values, way of thinking, behaviour, perception, and the underlying assumptions of any person or group or society that considers maintenance is a matter that is important (priority) and practices it in their life. When a person or group has maintenance culture, they would have the attitude to maintain, preserve and protect public facilities. The attitude in question is that towards maintenance work, which is embedded in each individual or group, although, in practice, maintenance tasks have been programmed, planned and scheduled, it is only when one understands the responsibility entrusted to implement it that creates a proper awareness of maintenance work and whereby it is done automatically, spontaneously without direction and thought [14]. According to Misnan and Samlawi [15], maintenance culture began with the formation attitude, a change in mind set and the way the work of an organization. Although practically maintenance and renovation planned, programmable been allocated and scheduled, organizations involved in the implementation of maintenance work should strive to show a strong commitment to keeping the asset and government facilities..

4 The Determinant Factors Affecting Development of Maintenance Culture Briefing

Ten determinant factors have an impact on the developing of maintenance culture were identified from the previous research. The ten determinant factors of maintenance culture are leadership; communication; motivation, reward systems and recognition; empowerment; involvement; policy system, strategy and work planning; teamwork; training and education, organizational culture [14, 16]. The ten determinant factors are explained in the following sections:-

a. Leadership

Leadership as “the process of influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objectives”. Leadership is based on the commitment of the top management acting as internal resources to expedite the attitude a person has to perform and understand the maintenance tasks very well.

b. Communication

Communication is the transfer of information from one person to another that involves the exchange of facts, ideas, suggestions and emotions with two or more people. Additionally, it also involves the interaction of stimulus meanings through giving and receiving messages.

c. Rewards and Recognition

The rewards and recognition would only be effective if it is meaningful and given an acknowledgment to the work produced. It is what is received by an employee as a reward for the work they have done. The recognition is defined as some sort of public acknowledgement for superior performance on quality activities and rewards are benefits such as salary increases, bonuses and promotions due to an individual’s performance on improving the quality aspects of his or her job.

d. Teamwork

Team work may conceive a team to be a distinguishable set of two or more people who interact dynamically, interdependently, and adaptively toward a common and valued mission, who have each been assigned specific roles or functions to perform, and those who have a limited life-span membership’

e. Training and Education

Training is the development of attitudes, knowledge and specialized skills required by the employees to perform their duties properly. Education was for the promotion of learning and as an added value to the generic knowledge to the development of individuals and organizations

f. Motivation

Motivation is considered as the process of shaping a person’s personality can be encouraged to act in a certain goal. Motivation can be created such as recognition, reward systems, and support by management commitment, individual motivation. The motivation can be given in terms of training and education, the involvement of top management, performance measurement and the encouragement, and support.

g. Involvement

Employee participation in the organization is a process that demands the workers participating in actions and in the organization. Involving individuals in each maintenance activity is necessary to ensure that each individual clearly understand the maintenance tasks imposed upon them. The combination of employee involvement and top management is able to develop a maintenance culture.

h. Empowerment

Empowerment is the process of delegating decision-making authority to lower levels in the organization. Employees are encouraged to take the initiative and expand their scope. Empowering employees is essential in order to create commitment in the minds of the employees for this purpose, and also stated how to achieve the goals and targets which are set ambitious but realistic.

i. Policy systems, Strategy and Work Planning

The policies and strategies that comprised the mission statement and slogan must be used to promote communication media, for example posters, exhibitions, and other internet to every member in the organization. The role of this factor as a policy system to comply with all regulations due to work is a program of policies, standards and the belief that the rules must be followed by an individual in an organization to achieve goals.

j. Organization Structure

The organization structures is a framework of rules and power relations that exist formally to control and coordinating human action and motivate individuals to achieve the organization's goals. It typically hierarchical, which an organization arranges its lines of authority and communications, and allocates rights and duties and has been illustrated by the organizational chart.

5 Research Methodology

To achieve the objectives of this study, questionnaire form were used to gather data quantitative and also order to find opinions of determinant factors development of maintenance culture. The questionnaires contained three sections. The questionnaire contained 10 statements to be scored on a likert scale of 1-5 that are related to collects the respondents' opinion based on their level significance determinant factors development of maintenance culture. The proportionate stratified sampling random technique has been used in order to get the most efficient representation population of the local authority in Malaysia. Finally, the 660 questionnaires forms the questionnaire was designed were then distributed to the 22 local authorities in Malaysia in order to collect all the relevant data. The respondents who answer these questionnaires must be directly involved with the maintenance works or responsible for overseeing the execution of maintenance works, which are namely management level and the technical staffs. The data collected were analysed using statistical tool. The collected data from the completed questionnaires was analysed using various relevant methods such descriptive statistics was used to analyse the demographic data of the respondents and factors maintenance culture while Relative Importance Index (RII) was used to analyse the respondents' scores of the factors maintenance culture. In this study, an ordinal measurement scale 1 to 5 was used to determine the effect level. Respondents were asked to score factors affecting residential building according to the degree of importance; where 1 = least important; 2 = not important; 3 = neutral; 4= important; 5 = very important. The relative importance index (RII) is given by equation (1).

$$\text{Relative importance index (RII)} = \frac{\sum w}{AN}$$

Where w is the weighting given to each factor by the respondents and range from 1 to 5, 'A' is the highest weight (i.e. 5 in the study) and N is the total number of samples.

6 Result and Discussion

6.1 Demographic Respondents

6.1.1 Response Rate

From a total of six one hundred and sixty (660) questionnaires were sent to 22 local authority in Malaysia, three hundred sixty five (365) questionnaires were returned, making a total response rate 55%. This response rate was finally achieved after several efforts were made in terms of personal contacts and follow-up calls. All the questions were satisfactorily completed by respondents and usable for data analysis.

6.1.2 Working Experience

Based on the survey, the respondents for local authority in Malaysia had different experience in maintenance field. The 39.2% of the respondents have only 1 to 5 years working experience in maintenance field, followed by 23.8% respondents have 6 to 10 years working experience, 24.9% respondents have 11 to 15 years working experience and then 12% respondents have 15 to 20 above years working experience.

6.2 Analysis for Determinant Factors Development of Maintenance Culture

The study presents the analysis of the 10 determinant factors of development maintenance. These factors have been identified their significance with mean score and ranked according to their relative importance Index (RII). The result is presented in Table 1. Table 1 respondent response to the factor of maintenance culture scored on the degree of importance.

Table 1: Respondent response to the factor of maintenance culture scored on the degree of importance Name of the table

No.	Factors	Score Mean	Standard Deviation	RII	Rank	Level Important
						Very Important
						Very Important
1	Leadership	4.61	0.510	0.922	1	Very Important
2	Involvement	4.49	0.587	0.899	3	Very Important
3	Communication	4.50	0.582	0.899	3	Very Important
4	Training and Education	4.45	0.594	0.890	5	Somewhat
5	Teamwork	4.53	0.576	0.906	2	Important
6	Motivation	4.38	0.637	0.876	6	Very Important
7	Policy systems, Strategy and Work Planning	4.47	0.581	0.893	4	Somewhat
8	Rewards and Recognition	4.21	0.748	0.841	8	Important
9	Empowerment	4.19	0.710	0.837	9	Somewhat
10	Organization Structure	4.19	0.657	0.855	7	Important
						Somewhat
						Important

Survey results have shown that the listed ten factors are important to be implemented in developing a successful maintenance culture based on the mean score each factors are above 4.0. It's mean that the mean score are range between 4 point (important) and 5 point (very important) likert scale. However, the importance of each of these factors should be prioritized to identify the key determinant factors of maintenance culture. Based on this RII, the analysis outputs found that there are

6 factors that can be determined as the key determinant factors of development maintenance culture. These factors indicate are categorized a very important factors in developing of maintenance culture. The first most important factor is leadership with RII of 0.922. Teamwork was ranked second with RII of 0.906 followed by communication and involvement which was ranked third with RII of 0.899. The Policy systems, strategy and work Planning factor was ranked fourth with RII of 0.893, followed by training and education was ranked fifth with RII of 0.890. Figure 1.0 below shows level of importance and ranking for each of the factors maintenance culture:-

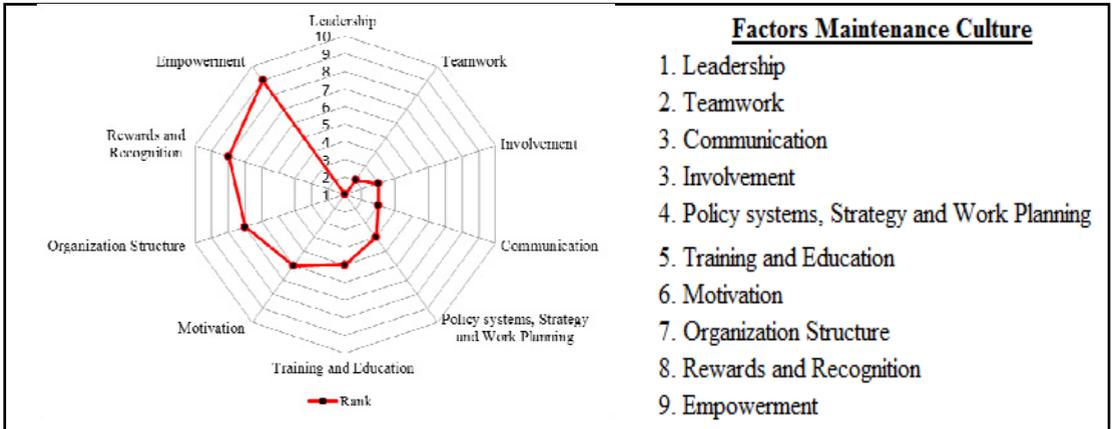


Figure 1: Ranking ten of the factors maintenance culture

The findings of this study indicate that leadership is most important factor in the successful development of maintenance culture. This finding was corroborated by other previous studies in safety culture field which the leadership as the main influential factor in developing culture. Leadership is an essential part of the process of management and it is also an integral part of the social structure and culture of the organization. Leadership is related to the commitment from top management as the most important in determining the direction of the organization to ensure that planned objectives were achieved successfully. Commitment from top management is based on those who act as internal resources influence the attitude a person has to perform and understand the maintenance tasks well. Leaders are the keepers and guardians of these attitudinal norms and the learning system. Leaders need to know that their response will be watched widely and closely, and will send a very powerful message within the organization about its maintenance culture. Therefore leader behave as role model to influence the behavior or motivate their followers; they become admired, respected, and trusted to work together to achieve organizational goals more effectively. When leaders are committed to maintenance aspects, it provide adequate resources which supports the development and implementation of maintenance activities and also provide a work plan that is easily understood and followed by everyone in organization.

7 Conclusion

In conclusion, the maintenance culture is important as a basis for reducing the maintenance problems that occur today. It is time that changes were made to the attitude and mindset in managing of public facilities in making maintenance as a way of life or practices to be implemented and its importance understood for the success of national development. Change the basis of the existing lack of maintenance culture by adjusting and changing the actions, beliefs, thought patterns, attitudes or behavior and values over time in each. This is because the culture is not something people are born with, but it should be learned from a young age. Each person will change because the culture does not exist naturally but is formed through a learning process as a result of interaction between individuals or groups and inherited from generation to generation. Effort to change the culture is something that is

difficult and takes a long time to implement, as culture is naturally resistant to change, however, when the culture is successfully established it will be a practice that is endorsed by the whole society and the culture will remain. Maintenance culture is needed in Malaysian Local Authority. The effectiveness of maintenance depends on human factors to increase knowledge and experience of workers in solving problems. Thus, the internal environment between management and staff must exist through sharing of ideas, beliefs, and values for each other. The development of maintenance culture can change traditional maintenance work based on reactive activity to productive activity. From this study six factors that contribute to successful developing maintenance culture, which include leadership, communication, teamwork, training and education, policy, strategy and work planning and involvement.

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