



Integrating Resource-Based View and Performance Improvement Theory in Developing Maintenance Management Continuous Improvement Model: A Conceptual Framework

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ABSTRACT

The local authority in Malaysia is the giant holder of public assets and they are obligated in performing better management to ensure the assets are of prominent quality to serve the needs of the local people. The local authority should take initiatives in having the right systems in managing and maintaining their assets. Therefore, the purpose of this study is to explore the maintenance management practices and performance improvement techniques to be integrated into developing the continuous improvement model towards achieving a sustainable performance of public assets. The resource-based view (RBV) and performance improvement (PI) theory are integrated as the reference to develop the maintenance management framework. The RBV emphasizing the resources and capabilities to achieve the value of strategic management. While the PI provides a suitable tool which is the maturity model for improving the current practices. Nine key elements of maintenance management were identified which demonstrating the maintenance capabilities and resources. Grounded on the theory of RBV and PI, the conceptual framework was established as the foundation towards developing strategic maintenance practices for sustainable performance of public assets and continuous improvement in maintenance management by the local authority in Malaysia.

Keywords: maintenance management, resource-based view, performance improvement, local authority

JEL Classification: C1, L2

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1. Introduction

Nowadays, in most modern buildings, besides having the basic structure of the building, the components of the buildings are getting more sophisticated and complex services covering mechanical services and electrical equipment, advance and fancy design of civil and structural components, telecommunications facilities, etc. Different services and equipment in buildings are provided according to their sole purpose, comfort, and suitability for their users. In some cases where the equipment and components are provided in a building are not functioning as needed, it will be unable to deliver any advantages to the owners or users (Chanter & Swallow, 2007). Maintenance is multidimensional and consisting of many undertakings which until recently has alarmed a slight demand for improvement. Hence, the core challenge in maintenance management is to guarantee the maintenance works can be carried out effectively.

However, there are many issues of building maintenance related to local authorities in maintaining the public facilities under their area of administration. The issues were relating to facilities building performance (Suffian, 2013), the safety of users (Samsudin, Haron, & Bakar, 2012), and the growth of value in socio-economic (Lim, Abdul Malek, & Tahir, 2017). Many comments and arguments from various parties in the daily barrage of questions and complaints directly made in the media about poor condition and unsatisfactory performance of local authorities' facilities due to lack of maintenance culture (Islamiah et al., 2017). Moreover, according to Adnan *et al.* (2012) and Yunus *et al.* (2015), the local authorities in Malaysia are practicing reactive maintenance consisting of corrective maintenance and emergency maintenance. The whole idea of conducting the study is to provide a continuous improvement model as the guideline to recuperate the current maintenance management practices for public facilities by local authorities in Malaysia towards the sustainable performance of management and facilities. Therefore, as part of the study in examining the current maintenance practices and proposing better maintenance management practices, the primary concern of this paper is developing a continuous improvement model by integrating the resource-based view and performance improvement theory. These theories will be the foundation for developing the continuous improvement model of maintenance management by local authorities in Malaysia.

2. Theoretical Background

The local authorities act as the organization that delivering quality community services equally with the provision of the infrastructures and public facilities. They become the central-local public entity in the local area. The current concept of sustainable development has become the primary concern from various viewpoints. The mounting of issues concerning the overall quality of life of both present and future generations (Mong, Mohamed, & Misnan, 2019; Yilmaz, Beris, & Serrano-Berthet, 2008). This means that the local authorities need to encourage the economic wellbeing and social welfare of the society as they exercise significant influence by playing their roles. Hence, the local authorities must ensure that they are capable of performing effectively and efficiently. The progressive development of the urban and rural areas is demanding the local authorities to be more aware of the needs of the community (Vadeveloo & Singaravello, 2015). The development of the infrastructures and public facilities in an area is to enhance the standard of living of the community which includes increasing incomes, level of education, employment status, health level, and economic wellbeing. Therefore, the local authorities need to provide and deliver public facilities to increase the standard of living and enhance the social-economics wellbeing of the public. The provision of public facilities must be determined to provide the local people with a quality of life. The local authorities have to well-planned and taking into account various perspectives such as the design, the accommodation, the function, the location, and many other things, which means that the government must follow the specification and guideline that has set the standard of the provision for the facilities (Malaysia, 2006). The responsibilities carried out by the local authorities are essential to be determined to the effectiveness of their management on the public facilities.

Over the years, research on maintenance management has focused mainly on the maintenance optimization model, maintenance techniques, maintenance scheduling, maintenance performance measurement, maintenance information system, and maintenance policies (Chang, 2014; Duffuaa & Raouf, 2015; Garg & Deshmukh, 2006; Pačaiová & Ižaríková, 2019; Talamo & Bonanomi, 2015; Tam & Price, 2008; Vieira & Cardoso, 2014). However, there were not so much on and attempt to identify the value in the maintenance management according to its organisation capabilities (Lundgren, Skoogh, & Bokrantz, 2018; Marais & Saleh, 2009; Pačaiová & Ižaríková, 2019; Tam & Price, 2008; Velmurugan & Dhingra, 2015). Besides, previous studies had outlined the maintenance aspects that need to be emphasised to contribute to the value of maintenance. The studies claimed that the people, process, and technology were the pillars that support the sturdy business integration and in turn, firm performance (Crespo Marquez & Gupta, 2006; Pačaiová & Ižaríková, 2019; Vieira & Cardoso, 2014). However, most studies conclude that each organisation has different characteristics and cannot be accurately evaluated in regards to the maintenance value. There is essential for the organisation to recognize their capabilities and resources to support their maintenance management to create their value to the organisation. Thus, this study adopted two theoretical frameworks which were resource-based view theory and performance management theory to lead towards achieving the maintenance value. It is understood that the two stated theories have contributed to appease the conceptual completeness required for the development of this study.

2.1. Resource-based view theory

The strategic management theories have grown to fulfill the internal and external needs of the organisation's requirements. According to Omalaja *et al.* (2011), the strategic management theories were mainly from the systems perspective, contingency approach, and information management approach to corporate management. Initially, strategic management concentrated on business concepts that impact the organisation's performance (Hoskisson, Hitt, Wan, & Yiu, 1999). Fleming *et al.* (1996) assert that strategic management was founded on Chandler's work that focused on the strategic change leads to structural change. The study also declaring that strategic management consists of strategy and structure.

Table 1 Types of resources and capabilities within the organization based on RBV

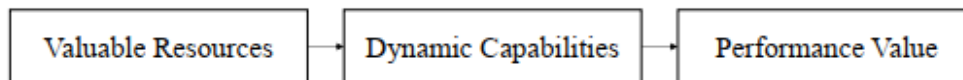
Types	Perspectives	Examples
Tangibles resources and capabilities	Financial	<ul style="list-style-type: none"> Ability to generate internal funds Ability to raise external capital
	Physical	<ul style="list-style-type: none"> Location of plants, machines, offices, and their geographical locations Access to raw materials and distribution channels
	Technological	<ul style="list-style-type: none"> Possession of patents, trademarks, copyrights, and trade secrets
	Organizational	<ul style="list-style-type: none"> Formal planning, command, and control systems Integrated management information systems
Intangible resources and capabilities	Human	<ul style="list-style-type: none"> Managerial talents Organizational culture
	Innovation	<ul style="list-style-type: none"> Research and development (R & D) capabilities to innovate new product, process, and services Capacities for organizational innovation and change
	Reputational	<ul style="list-style-type: none"> Perceptions of product quality, durability, and reliability among customers Successful product branding and positioning with a satisfied and loyal customer base Reputation as a good employer Reputation as a socially responsible corporate citizen

Source: Compiled by the authors based on (Madhani, 2010)

Thus, in many concerns, the study on the resource-based view (RBV) theory has shown that it requires various methods to identify, measure, and understand the firm resources within the organization (Hoskisson et al., 1999). Numerous previous researches show the RBV as a frame of reference to understand the extent to which different capabilities contribute value to the organization (Raduan, Jegak, Haslinda, & Alimin, 2009). The organization that has resources enables them to achieve a competitive advantage which led to long-term performance. Wade & Hulland (2008) defined the resources as "assets and capabilities that are available and useful in detecting and responding to market opportunities or threats". The definitions indicate that the assets and capabilities are the set of resources that must be made available within the organization. The assets encompassing the tangible and intangible items that are used for organization processes while capabilities include skills and processes involved. Table 1 shows the types of resources and capabilities within the organization based on RBV.

The RBV theory provides a valuable way for any researcher to think about how the resources relate to organization strategy and performance. Earlier, Barney (1991) claimed that resources that are valuable, rare and inimitable, and non-substitutable can make firms develop and remain competitive advantages. He also added that the valuable resources must support the organization to lead to high sales, low operating cost, high return, and added financial value to the organization. A continued understanding of the changing business environment, greater efficiency and effectiveness of management, and improvement on customer satisfaction can be obtained if the resources are valuable (Wade & Hulland, 2008). Therefore, Madhani (2010) implied that the resource value can be seen when the resources are used to reduce a firm's cost and to increase the firm's revenue. The dynamic capabilities will change parallel to the changes of resources due to changes in market conditions. The processes to integrate, reconfigure, gain and release resources are related to the dynamic capabilities in RBV (Raduan *et al.*, 2009). The resources and dynamic capabilities must be adjusted and changed over time-based to keep their relevance in management. The organization can develop value by enhancing the strategies according to their resources and capabilities (Cruz & Haugan, 2019). Figure 1 shows the RBV framework that was being used for the study.

Figure 1 The resource-based view framework



Source: Compiled by the authors based on (Madhani, 2010)

2.2. Performance Improvement Theory

Implications for practice tied directly to economic, system, and psychological theories also have value, are worthy of pursuit, and add value in pursuing the overarching approach to performance improvement practice (Swanson, 1999). Swanson (1999) also indicated that the economic principles for practice related to managing scarce resources and wealth production, while psychology principles practice related to the mental process of humans and determinants of human behavior. Besides, the system principles for practice require serious thinking, sound-theory building study, and also the use of new tools for comprehensive practice (Swanson, 2008). Al-Khouri (2010) clarified that performance improvement is more of a function of ability and motivation, where the ability is depending on education, training, and experience, while motivation is related to thoughts. Thus, effective performance improvement needs to deal with the performance of the organizational system as a whole. It requires an exploration of the organization's performance and broader systems that are run by the human which should in turn lead towards continuous performance-driven competence development (Keller, 2006). A larger set of competencies in terms of knowledge, skills, and abilities are needed to create conditions and space for further competency development of an organization (Hopper, 2018).

Table 2 The characteristics of performance improvement models

Performance Improvement Model	Characteristics
Balanced Scorecard (Kaplan, 1996)	<ul style="list-style-type: none"> • BSC translates an organization's mission and strategy into a comprehensive set of performance measures that provides the framework for a strategic measurement and management system. • Retains an emphasis on achieving financial objectives includes the performance drivers of these financial objectives. • There are four perspectives: Financial, Customer, Internal Business Process, Learning and Growth • Focusing on the business targets, resources allocation, the initiative taken and budget, provision of feedback, and strategic learning process. • Enables companies to track financial results and acquiring the intangible assets they need for future growth.
EFQM Excellence Model (EFQM, 2012)	<ul style="list-style-type: none"> • A practical and non-prescriptive framework that enables the organization to assess the strength and potentials gaps in vision and mission, facilitates the effective communication of ideas, integrate existing and planned initiative and provide the basic structure for an organization management system. • Nine criteria consisting five "Enablers" (Leadership, People, Strategy, Partnerships & Resources and Processes, Products & Services) and four "Results" (People Results, Customer Results, Society Results, and Business Results) • The fundamental concepts of excellence are adding value for customers, creating a sustainable future, developing organizational capability, harnessing creativity and innovation, leading with vision, inspiration, and integrity, managing with agility, succeeding through the talent of people, and sustaining outstanding results
Maturity Model (Carnegie Mellon University, 2002)	<ul style="list-style-type: none"> • Designed to assess the maturity of a selected domain based on more or less comprehensive set criteria. • Used as an evaluative and comparative basis for improvement and to derive an informed approach for increasing the capability of a specific area within an organization. • The most organization using five-levels of maturity (1-lowest maturity and 5-highest maturity) • Process of maturity using maturity model aims to assess the ability of organization including its processes to systematically improve the delivered results as part of its operation.

Source: Compiled by the authors

Numerous performance improvement processes and tools were developed for improvement activities and the decision-making process. The leaders need to have insights and knowledge in determining the best processes and activities for their organization (Schiuma & Schiuma, 2012). The effective use of these tools and techniques requires their application by the people who work on the processes, and their commitment to this will only be possible if they are assured that management cares about improving quality (Soković, Jovanović, Krivokapić, & Vujović, 2009). Some performance improvement models are widely used by the organization to maintain and improve their competitive advantage and business process. For instance, Wongrassamee *et al.* (2003) compared Balanced Scorecard and EFQM Excellence Model in their study regarding the improvement models. Instead, Leflar & Siegel (2013) prove that the maturity model is one of the effective performance improvement models that measure the maturity of the organization for incremental improvement of practices. Table

2 shows the characteristics for each of the performance improvement models that are mostly used in the field.

The performance improvement methods and tools need to be systemized through integration with the standard management practices for better results. Thus, based on the characteristics stated in Table 2, this study is adopting the maturity model as the performance improvement tool as it has design principles that provide assessment, improvement, and comparison for better results and value to the organization. Many previous studies had shown the utilization of the maturity model can contribute to effective and strategic management.

2.3. Value in Strategic Management

The essential of getting a higher maturity level within the management is to obtain and secure greater cost efficiency where it relates to better strategies and changes. Johansen *et al.* (2017) claimed that a greater understanding of the impact of the selected alternatives will be presenting through the cost and quality of the product and services. It is possible to trust and rely on the experience and expertise from the multiples professions while assessing the object or organization (Mielcarek, 2017). Silvius & Schipper (2010) believed the control over the organization process offers more value to the organization in terms of cost and quality which is then will drive better performance towards sustainability. Any business or organization relies heavily on plans to ensure that their business grows and prospers. Strategic plans outline the tactics and aptitudes used in attaining specific results (Mostafa, Lee, Dumrak, Chileshe, & Soltan, 2015). Effective strategic plan regularly develops from the core values of the organization and the actions they endorse directly reflect those values. Therefore, the organizations need to determine the values related to a specific strategic management plan to assist the upbringing of the strategy into focus for all management levels (Omalaja *et al.*, 2011). Many research studies show both financial and non-financial benefits can be derived from a strategic management approach to the decision-making stage (Walker & Mercado, 2015). Research performed by Omalaja *et al.* (2011) indicated that formalized strategic management encompassing strategic planning does result in superior performance by organizations. The study was able to provide conceiving evidence of the profitability of strategy formulation and implementation. The formalized strategic management process does make a difference in the recorded measurements of profits, sales, and return on assets. Organizations that adopt a strategic management approach can expect that the new system will lead to improved financial performance.

3. Maintenance Management of Public Facilities by Local Authorities

Public facilities are one part of social and economic necessities for the community to improve their standard of living while ensuring progressive development in a particular area. Provision of adequate facilities in terms of quantity and quality is essential because it not only reflects changes in demand but also as indicators of sustainable development level of countries towards the creation of prosperous communities (Salleh & Okinono, 2016). The provision of a range of good quality facilities and services in local communities adds to the quality of life of residents. As the public facilities are the immovable asset that is provided by the local authorities, they tend to deteriorate and wear over time, so if they are needed to continue to provide quality and satisfaction, they need to be appropriately maintained. The major problem that will encounter if the facilities unable to serve and be used by the public, the more investments need to be made to overcome the problems (Rahmat & Nawawi, 2017). The investment comprises of the cost for the maintenance, and enormous resources are needed. The maintenance management practices play important roles as it covers the planning until the control stages. To ensure the public facilities can serve the public well, the best practices of maintenance management need to be planned and implemented effectively. Hayat (2014) claimed that the local authorities are liable to ensure that the public facilities and infrastructure can well-performed to meet the level of satisfaction of the public. Thus, the best practices of maintenance management can help the organization to provide better value for money and enable improvement in the delivery of services by the service provider (Mong, Mohamed, & Misnan, 2018). The maintenance management conducted

by local authority refers to the practices in ensuring the facilities are in the right shape, able to support the daily activities of the public, safe and sound to be used, and can contribute to the economic and social aspect of the local people.

According to Tsang *et al.* (2006), the importance of maintenance in operation management is depending on strategic dimensions of labour, materials, spares, tools, information, money, and external services. However, Gulati & Smith (2009) argued that the best practices for maintenance and reliability require culture and leadership, work management, planning and scheduling, materials, parts, and inventory management, measuring and designing for reliability and maintainability, managing performance, workforce management, maintenance analysis, and improvement tools. Olanrewaju & Abdul-Aziz (2015) asserted that the organization can improve its profit margin, productivity and satisfy its customers by having a systematic maintenance management system. Systematic maintenance management includes maintenance information, procurement management, maintenance standards, labour management, time management, performance measurement, and performance management. On the other hand, the common structure for maintenance management systems according to standards as indicated in The Excellence EFQM model involving leadership, planning, support, operation, performance evaluation, and continual improvement (Nagyova & Pacaiova (2018), Qureshi, Muhammad Imran, et al. (2020)). Therefore, for this study, these nine elements as shown in Table 3 were representing the maintenance resources, while maintenance practices characterizing the capabilities in maintenance management. The generalization of the significant elements allows the organization to recognize the important aspects leading towards better performance of maintenance management.

Over the years, there was less attention given to measuring and assessing the capability of the local authorities in Malaysia in their asset maintenance management. There was a lack of consideration in providing the maintenance framework that describing the whole process for local authorities (Khalid, Abdullah, Hanafi, Said, & Hasim, 2019). There is a crucial need for the local authorities to have a better framework consisting of the particular set of maintenance practices and maturity level measurement to define their capabilities within an organization. The maturity measurement of the practices using the maturity model may give the local authorities a set of potential strategies for improvement that are necessary for the successful delivery of responsibilities towards the public. The progression of maintenance practices will be resulting in improvement based on the maintenance maturity level. The better performance of maintenance management implemented by local authorities can be assured through the reliability of the facilities and services and appropriate security cost.

4. Methodology

This paper intends to explore the features of the resource-based view theory and performance improvement theory. The discoveries of the significantly broader analysis that engaged a sensible and rational viewpoint were taken into account in integrating both theories to develop the conceptual framework as the basis for further in the future. The systematic literature review was conducted based on several steps which are: i) formulate the review question and eligibility criteria, ii) identify all the literature that meets the eligibility criteria, iii) extract and synthesize data, and iv) derive and present data results (Strech & Sofaer, 2012).

4.1. Formulate the Review Questions and Eligibility Criteria

The main purpose of the study is to focus on the improvement of maintenance practices among the local authority in Malaysia. The questions arising from the issues have led towards the identification of resources and capabilities of the local authority and the approach that can improve the current practices. Hence, the examination of several keywords becomes the criteria that may assist in the development of the conceptual framework. The eligibility criteria are as follows:

- i. the features of the resource-based view and performance theory
- ii. the key elements of maintenance management

iii. the performance improvement tools

4.2. Identify all the literature that meets the eligibility criteria

Textbooks and selected journals in hard copy and online were reviewed thoroughly which consists of established publishers such as Emerald, Elsevier, Wiley, Blackwell Publishing, Springer. The keywords related to the eligibility criteria were reviewed according to the selection of the literature ranging from the latest research since 2000 to 2020 which was based on articles published from various recognized journal such as Journal of Quality in Maintenance Engineering, Journal of Building Maintenance, World Journal of Engineering and Technology, Journal of Facilities Management, Property Management, Construction and Building Materials, Procedia Environmental Sciences, Procedia Engineering, Facilities, Journal of Building Appraisal, Journal of Performance of Constructed Facilities and Construction Management and Economics.

4.3. Extract and Synthesize Data

The data were extracted accordingly grounded on several eligibility criteria beforehand and tabulated to make the process of synthesizing data easier and manageable. Only the main features of the eligibility criteria were taken into consideration to be more focused.

4.4. Derive and Present Data Results

Lastly, the data were being appraised and transformed into the conceptual framework as the results of the study.

5. Results and Findings

The resource-based view (RBV) theory and performance improvement (PI) theory were integrated as the reference to explore the local authorities' maintenance management practices. The RBV emphasizing the resources and capabilities to achieve the value for strategic management. While the PI gives an overview of a suitable tool for improving the current processes. Referring to the features that have been described earlier, both theories are well-suited where the performance improvement theory embraces the functions of the local authority. Based on the literature review, there were nine key elements of maintenance management that demonstrating the maintenance resources (Table 3). Besides, there were several practices of maintenance that denote the maintenance capabilities in the maintenance management under each of the key elements. The maturity model is a suitable improvement tool for assessing, measuring, and improving the current maintenance practices based on its design principles.

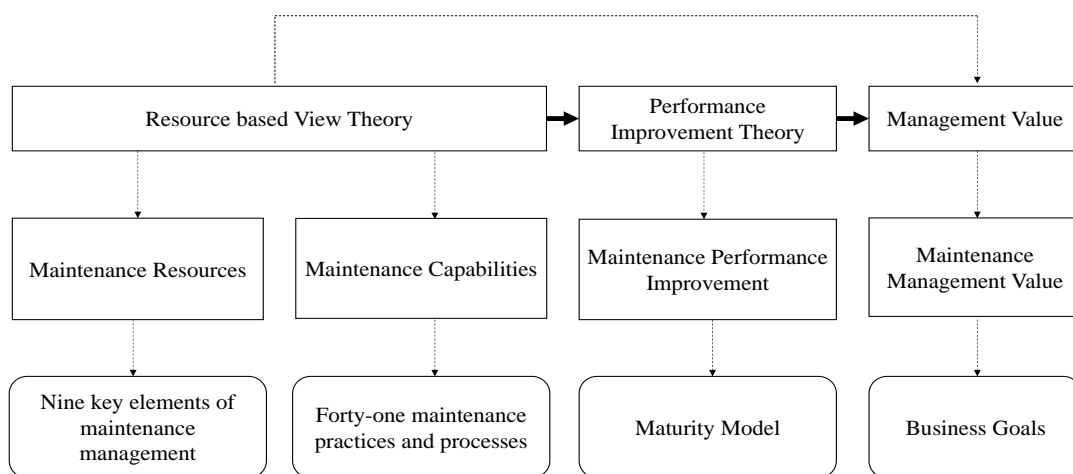
The integration of the resource-based view and performance improvement theories was shown in Figure 2 outlined the valuable resources, dynamic capabilities, and performance value. As one of the approaches for continuous improvement, the maturity model completes the purpose of the conceptual framework for this study as it provides continual effort in maintenance management. Moreover, both theories aim in achieving the value in management which also suited the function of the local authorities in managing and maintaining the public facilities. The local authority in Malaysia that acts as the service provider has the vision and mission in fulfilling their obligations towards their stakeholders including the public.

Table 3 Elements for maintenance management practices

Authors	Maintenance Management Practices								
	Leadership and top management commitment	Policies, Standards, and Guidelines	Organization management	Planning and scheduling	Work management	Resources management	Financial control	Information management	Performance assessment & improvement
Seeley (1987)		•	•	•	•	•	•	•	•
Wordsworth and Lee (2001)		•	•	•			•	•	•
Tsang (2002)	•	•	•	•	•	•	•	•	•
Marquez and Gupta (2004)			•	•	•	•	•	•	•
Garg <i>et al.</i> (2006)		•	•	•	•		•	•	•
Gulati and Smith (2009)	•	•	•	•	•	•	•	•	•
Nyman and Levitt (2010)	•	•	•	•	•	•	•	•	•
Duffuaa and Ben-Daya (2009)	•		•	•	•	•	•	•	•
Lateef <i>et al.</i> (2010b)	•	•	•	•	•	•	•	•	•
Lind and Muyingo (2012)		•		•	•	•	•	•	
Sodangi <i>et al.</i> (2014)		•	•	•	•	•	•	•	
Rastegari (2015)	•	•		•	•	•	•	•	•
Aldairi <i>et al.</i> (2017)		•	•	•	•	•	•	•	•
Nagyova and Pacaiova (2018)	•	•	•	•	•	•	•	•	•

Source: Compiled by the authors

Figure 2 The developed conceptual framework



Source: Compiled by the authors

6. Conclusion

The integration of the theories can be used in assisting and become the reference for the local authorities in managing and maintaining the public assets. The resource-based view components describe the importance of resources and capabilities for strategic management. Hence, the study developed a maintenance management framework for the maintenance function under the local authorities through the definition of maintenance management dimensions and maturity levels. The resource-based view theory and performance improvement theory were combined to underpin the research scope. All the aspects related to maintenance practices and maturity levels have been relatively allocated within the local authorities' organization. While ensuring the responsibilities towards the public, the developed framework aims to contribute to the achievement of better performance results in the local authorities' organization. More importantly, the motivation towards the continuous improvement in maintenance management shall assist the local authorities to minimize the problems and reducing the impact on maintenance cost.

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