E-PROCEEDINGS

INTERNATIONAL TINKER INNOVATION & ENTREPRENEURSHIP CHALLENGE (i-TIEC 2025)

"Fostering a Culture of Innovation and Entrepreneurial Excellence"

23 January 2025
PTDI, UiTM Cawangan Johor
Kampus Pasir Gudang

ORGANIZED BY:

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A-ST122: A STRATEGIC MAINTENANCE MANAGEMENT MODEL: ENHANCING DEFECT RESOLUTION EFFICIENCY IN LOCAL GOVERNMENT INFRASTRUCTURE

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ABSTRACT

This product introduces an innovative Strategic Maintenance Management (SMM) model aimed at improving the efficiency of defect resolution in local government infrastructure. Recognizing the growing public demand for quality services and the growing role of local government, this model emphasizes the importance of integrating strategic management principles into the maintenance process. Although previous studies in Malaysia have highlighted the importance of strategic planning in maintenance management, they have often lacked focus on innovative, entrepreneurial-driven approaches tailored to the local context. The proposed SMM model addresses this gap by incorporating a proactive strategy that streamlines maintenance workflows, optimizes resource allocation, and fosters collaborative innovation among stakeholders. By emphasizing agility and entrepreneurship, this model is expected to transform maintenance management from a reactive, cost-driven function to a value-generating asset for local governments. Preliminary findings suggest that implementing such a framework not only improves operational efficiency but also promotes sustainable development and public trust in municipal services. This research contributes to the discourse on strategic innovation in public sector management and provides actionable insights for local governments seeking to align their maintenance practices with contemporary demands for service excellence and entrepreneurial thinking.

Keywords: Strategic Maintenance Management, Maintenance Management, Local Government

1. Product Description

The product developed is a study of the strategic maintenance management model in the maintenance department for local governments in managing building defects to improve service performance. Therefore, the purpose of this study is to examine the determinants of strategic maintenance management by managing the building defect approach in the maintenance department for a local government organization in Malaysia. The main key elements of strategic maintenance management **(Figure 1)** are: Strategy Analysis; Strategy Formulation; Strategy Implementation and Strategy Evaluation. Examination of the main elements in strategic maintenance management is important for this study because it will be a determining factor in management towards improving service performance in managing building defects in the maintenance department for local government organizations. **Figure 2** illustrates the entire flow process of data collection in producing the model.

This model will identify the key elements that help the maintenance department work better and encourage a shift from solving problems that arise to preventing them before they happen. It also helps save resources, increase trust with the public, and provide better services. This approach not only solves current issues but also helps local governments keep up with future needs, making them a valuable tool for better management.

2. Method Flow Chart and Product Model

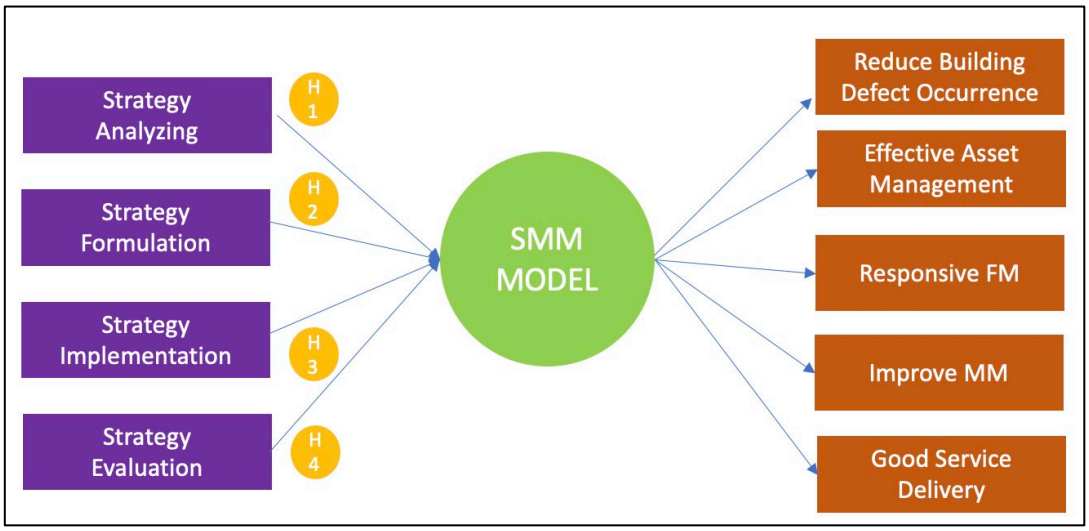

Figure 1. SMM Conceptual Model

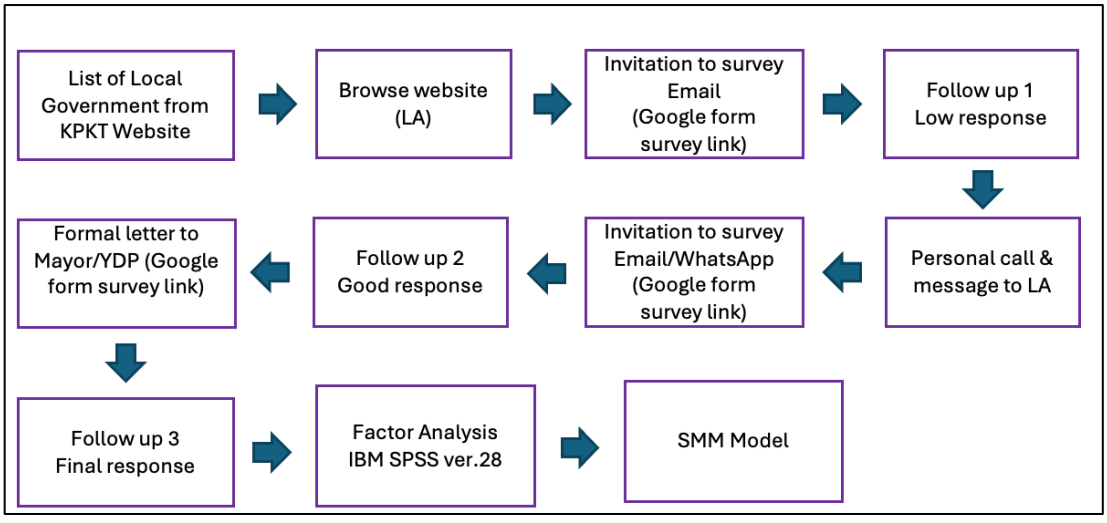

Figure 2. Developing model flow

Table 1. Reliability Test Result

Constructs		*Number of items*	*Cronbach's Alpha*
IV	Strategy Analysis (SA)	5	0.85
IV	Strategy Formulation (SF)	5	0.80
IV	Strategy Implementation (SI)	5	0.87
IV	Strategy Evaluation (SE)	4	0.74
DV	Benefit of SMM	5	0.96

Table 2. Validity Test Result

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.789
Bartlett's Test of Sphericity	Approx. Chi-Square	1623.926
	df	276
	Sig.	<.001

Anti-image Matrices

	Anti-image Correlation	
SA1	Stakeholder Analysis	.798[a]
SA2	Situational Analysis	.854[a]
SA3	Portfolio Analysis	.556[a]
SA4	Benchmark Analysis	.788[a]
SA5	Operational Analysis	.895[a]
SF1	Vision & Mission	.750[a]
SF2	Achievable Objective	.733[a]
SF3	Systematic Developing Strategy	.833[a]
SF4	Policy Guidelines	.871[a]
SF5	Competitive Strategy	.826[a]
SI1	Action Plan	.844[a]
SI2	Service Agreement	.688[a]
SI3	Work Transaction	.796[a]
SI4	Performance Measurement	.796[a]
SI5	Operationalize Strategy	.828[a]
SE1	Periodic Review	.562[a]
SE2	Support System Initiative	.684[a]
SE3	Alternative Strategy	.737[a]
SE4	Corrective Action	.830[a]
B1	Reduce Building defect Occurrence	.743[a]
B2	Valuable Asset management	.840[a]
B3	Responsive FM	.859[a]
B4	Effective Maintenance Management	.867[a]
B5	Good Service Delivery	.871[a]

3. Novelty and uniqueness

The novelty and uniqueness of this study focus on the development of a Strategic Maintenance Management (SMM) model designed specifically for local government maintenance departments to effectively manage building defects. Unlike traditional reactive approaches, this model focuses on proactive strategy that integrates four key elements: Strategy Analysis, Strategy Formulation, Strategy Implementation and Strategy Evaluation.

The uniqueness of this study is its focus which is adapted to the needs and challenges faced by local government organizations in Malaysia. By emphasizing a structured and preventive approach, this model not only increases the efficiency of defect resolution but also improves resource optimization, public trust and service quality. This study will enhance innovation in maintenance practices and align them with sustainability goals, offering scalable solutions that can be adapted across multiple regions and sectors for long-term impact.

4. Benefit to mankind

The SMM model for local governments will significantly impact the defect management practices, providing a comprehensive framework for improving service performance and reducing defect occurrences. This model offers practical guidelines to enhance the efficiency and effectiveness of maintenance management within local governments. By implementing a robust strategic approach to defect management, the model aligns with Malaysia's national agenda outlined in RMK 12 and *Rangka Kerja Pemerkasaan Pihak Berkuasa Tempatan* (2022-2030), aimed at strengthening public service. It encourages good governance in maintenance practices, fostering the transformation of the public sector and driving improvements in public service performance.

5. Innovation and Entrepreneurial Impact

The SMM model offers a forward-thinking approach to manage building defects in local government maintenance departments. By transitioning from reactive problem-solving to proactive defect prevention, it will promoting the innovation in maintenance practices. The model emphasizes strategic planning, systematic evaluation, and resource optimization, streamlining operations and anticipating future needs. This approach enhances efficiency and sustainability in service delivery, transforming maintenance management into a more proactive and responsive system within the public sector. This model creates entrepreneurial opportunities for local governments to enhance their maintenance operations. By adopting a strategic framework, they can improve service reliability, build public trust, and foster innovation in service delivery. The model’s focus on resource savings and enhanced performance opens new avenues for business models, partnerships, and innovations, benefiting both the public sector and the wider community.

6. Potential commercialization

The strategic maintenance management model has a high potential for commercialization since it creates a uniform method that can be used by a various of local governments,

municipalities, and private enterprises responsible for public infrastructure. Licensing the model or providing it as a consultancy service might produce money as local governments strive to improve service performance and reduce flaws in maintenance operations. Furthermore, creating software tools or platforms based on the model could provide real-time tracking, analytics, and predictive maintenance solutions for building defect management. Training and certification programs in strategic maintenance management for local government employees or private sector experts may also be profitable. By packaging the model for broader use, it provides a scalable solution with national and worldwide market potential.

7. Acknowledgment

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8. Authors' Biography

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