UNIVERSITI TEKNOLOGI MARA

PERCEIVED RISK-BASED MAINTENANCE MANAGEMENT MODEL FOR PUBLIC SCHOOLS PERFORMANCE

NURUL DIYANA BINTI MOHD DAHARI

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ABSTRACT

Today, the global movement highlights the critical need to enhance education and learning environments to advance sustainable development, in line with the objectives of SDG4. Malaysia's education plan aims to enhance access, quality, and governance, with RM58.7 billion allocated for educational development in 2024, including investments in school infrastructure. Yet many Malaysian schools struggle with aging infrastructure and insufficient resources. Over 1,290 schools are unsafe, with 701 exceeding 100 years of age, while only 27.3% of aging schools receive funding for necessary upgrades. Maintenance in these schools predominantly relies on reactive methods, which address issues only after they occur, leading to inefficiencies, higher costs, and compromised safety. Existing maintenance models fail to incorporate perceived risk maintenance management in a structured and proactive way, creating a critical gap in prioritizing maintenance activities. This research aims to develop a Perceived Risk-Based Maintenance Management (PRBMM) model to prioritise maintenance activities effectively and address these gap. This research follows a positivist philosophy with a deductive approach to ensure empirical rigor. It aims to achieve three objectives: to identify the determinant factors (DFs) influencing perceived risk-based maintenance management (PRBMM) performance in public schools, to examine the relationships between the identified determinant factors (DFs) influencing perceived risk-based maintenance management (PRBMM) performance in public schools, and to propose and validate a PRBMM model for public school performance. This research specifically focused on Government Primary Schools in Petaling district, Malaysia. The conceptual framework is developed based on Decomposed Theory of Planned Behaviour (DTPB) theory and extensive review of the existing literature. A systematic literature review (SLR) identified four determinant factors (DFs) influencing PRBMM performance: financial risk, safety risk, operational risk, and performance risk, with 20 independent variables (IV). These factors were examined for their impact on three dependent variables (DV): effective decision-making, effective budget allocations, and effective prioritisation of maintenance task. A questionnaire survey was distributed to 137 technical experts from 147 populations, resulting in a 95% response rate. Data analysis using Statistical Package of Social Sciences (SPSSv.29) for factor analysis and Structural Equation Modelling-Partial Least Squares (SEM-PLSv.4) to achieve the first and second objective whereby has confirmed determinant factors (DFs) of the perceived risk and significantly influences of financial, safety, operational, and performance risk for public schools performance. Experts with over 20 years of experience validated the PRBMM model has achieved the third objective, ensuring practical relevance. This research novelty introduces the PRBMM model, addressing maintenance challenges and filling in the gaps and contributes a structured, data-driven framework for improving school maintenance management performance and potentially be a guide for policymakers, partitioners and scholars.

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1.1 Introduction

In 2024, the Ministry of Education (MoE) was allocated RM58.7 billion, an increase of RM3.5 billion from RM55.2 billion in 2023. This substantial funding underscores the government's unwavering commitment to fostering the future of Malaysian education. To enhance student learning outcomes in 2024, RM930 million has been designated for school maintenance and upgrades throughout the nation (MoE, 2024). As recommended by Henan (2024) and Marsini (2023), the school's leadership team is imperative to ensure that buildings and facilities are in optimal condition. This proactive approach not only safeguards investment capital but also contributes to improved education and enhanced student intelligence.

Malaysia is not alone; compared with other countries, especially those in the developing world, struggling to sustain their old-school systems. Recent media reports highlighted the disrepair of many Malaysian school buildings, which the government must simultaneously improve (Othman et al., 2024; Jamaludin, 2023; Zhang, 2023). The same problems are being voiced in developed countries like the United States. According to Dickerson & Ackerman (2016), as many as 14 million students in the United States attend schools with inadequate facilities. Yusuf et al. (2023) discusses the challenges faced by rural elementary schools in Indonesia, particularly regarding inadequate school infrastructure and facilities, which aligns with the assertion made about the problems in developed countries like the United States regarding school inadequacies.

Although school building maintenance is a global issue that requires immediate attention, it should help schools achieve their goal of providing early education to all their students. The increasing importance of the maintenance industry, poor maintenance performance, and a lack of research support this research.