

**UNIVERSITI TEKNOLOGI MARA**

**GREEN CLEANING MODEL FOR  
FACILITIES MANAGEMENT IN  
MALAYSIAN GENERAL  
HOSPITALS**

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## ABSTRACT

All economic sectors recognise the value of cleaning, but the healthcare sector particularly benefits from its combined benefits of surface cleanliness and infection prevention and control. Therefore, healthcare facilities need frequent, thorough cleaning using a variety of techniques. Cleaning has evolved into one of the crucial factors that must be taken into consideration for the wellbeing and overall performance of a building, accounting for the largest portion of building operations and maintenance costs. Currently, it is difficult to carry out green cleaning services that meet the needs of hospital building in Malaysia due to the unclear elements and criteria of green cleaning programme. Without green cleaning services, hospital buildings wouldn't meet the standards for sustainable performance criteria; economically, socially, and environmentally. This research aims to guide the hospital maintenance team and cleaning contractor in managing and maintaining the hospital. The objectives of the study are to identify the elements and criteria of green cleaning for Malaysian general hospital; to establish the sustainable performance criteria of hospital; and to develop the structural model of green cleaning for Malaysian general hospital. This study was focusing on the general hospitals in Malaysia, comprise of Hospital Kuala Lumpur, Hospital Sultanah Aminah, and Hospital Pulau Pinang. This study was conducted in three phases. The first phase is for achieving the first objective; the second phase to achieve the second objective; and the third phase to achieve the third objective. In the first phase, eight (8) elements and thirty-eight (38) criteria of green cleaning were identified from various literatures. The elements and criteria were then validated by ten panels of expert. The validated elements and criteria were then surveyed among one hundred and sixteen (116) cleaning service providers, twenty-six (26) Infection Prevention Control staff, twenty-one (21) hospitals' maintenance staff, seven-teen (17) SIRIM staff, and seventy-two (72) Green Building Index (GBI) facilitators in Malaysia. The relevance and level of importance of the elements and criteria to green cleaning were then analysed using frequency and importance index calculation, thus completing the first phase of this study. In the second phase, content analysis technique was used to establish the twelve (12) sustainable performance criteria (SPC) of hospital, hence completing the second phase. Lastly, in the third phase, the results from the first and second phase were then surveyed among the same group of the respondents in the first phase but with varying number of response (ninety-three (93) cleaning service providers, twenty-one (21) Infection Prevention Control staff, sixteen (16) hospitals' maintenance staff, thirteen (13) SIRIM staff, and forty-three (43) Green Building Index (GBI) facilitators) to establish the structural model of green cleaning for Malaysian public hospitals by using partial least square-structural equation modelling (PLS-SEM), thus completing the third phase. The results indicate that the elements of Policies, Procedures, Product, Supplies and Equipment, and Supporting Infrastructure have significant relationship with the sustainable performance criteria (SPC) of hospital. However, the elements of Organizational, Staffing and Education, and Monitoring, Feedback, and Audit were indicating no significant relationships with the sustainable performance criteria (SPC) of hospital. The results of this study significantly contribute to the disparities in hospitals' operations and maintenance area, as green cleaning is a crucial requirement on achieving sustainability goals for facilities management in hospital.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Research Background

Healthcare operations are the regular management and operation of a healthcare facility to provide medical services to patients. The triple bottom line (TBL) refers to the effects of an operation on the social, environmental, and financial aspects of a hospital. Olanrewaju et al., (2018) highlighted the effects of healthcare' operation and maintenance on the triple bottom line:

- a. **Social Impact:** The social dimension of the triple bottom line assesses how hospital activities affect people both inside and outside the organization. Positive social advantages include things like accessibility, community health, employee well-being, patient care, and employee well-being.
- b. **Environmental Impact:** The environmental dimension of the triple bottom line evaluates the environmental impact of hospital operations. The environment benefits from green initiatives, sustainable practices, and the reduction of emissions.
- c. **Economic Impact:** The triple bottom line's economic component assesses the financial aspects of hospital operations and their impacts on the whole economy. Financial viability, the creation of jobs, and the generating of money are all positive economic effects.

Hospital buildings pose a unique set of challenges due to their size, complexity, patient safety considerations, and need to balance the triple bottom line impact (Nazeer et al., 2019). Some of the main challenges are maintaining the infrastructure, patient safety, infection control, energy efficiency, space utilization, safety compliance, cost management, environmental impact, technology progress, and achieving the triple bottom line (Nazeer et al., 2019). To operate effectively and deliver high-quality patient care, healthcare facilities must have a thorough and planned strategy that takes these challenges into account.