

CHAPTER I

INTRODUCTION

1.1 Background

Information Technology (IT) strategy prioritization is critical for universities to address digital transformation challenges, yet many institutions rely on subjective or ad-hoc decision-making processes (Tjong et al., 2017). Semarang University, like many higher education institutions (HEIs), faces constraints such as limited budgets and rapidly evolving technological demands, necessitating a systematic approach to IT planning (Mohamed Hashim et al., 2022). While traditional Multi-Criteria Decision-Making (MCDM) methods like AHP and TOPSIS have been applied in IT management, their reliance on crisp numerical inputs often fails to capture the inherent uncertainty of expert judgments (Abdullah et al., 2021).

This research introduces a novel integration of SWOT analysis and the Fuzzy Best-Worst Method (BWM) to bridge this gap. Unlike prior studies that use deterministic MCDM (Abdullah et al., 2021), our approach leverages fuzzy logic to quantify linguistic expert preferences (e.g., "moderately important"), enhancing robustness in strategy prioritization. Furthermore, while SWOT is widely used for strategic planning, its combination with Fuzzy BWM for IT strategy ranking in HEIs remains underexplored, offering a unique methodological contribution (Sadjadi & Karimi, 2018a).

The Fuzzy Best-Worst Method (FBWM) significantly reduces the cognitive burden on decision-makers by requiring fewer pairwise comparisons than traditional Multi-Criteria Decision-Making (MCDM) methods like the Analytic Hierarchy Process (AHP) (Majumder et al., 2021). By structuring comparisons strictly around the best and worst criteria, FBWM naturally minimizes redundant evaluations and achieves a notably higher consistency ratio in complex decision matrices (Moslem et al., 2020). Furthermore, the integration of fuzzy logic allows

the method to effectively capture human hesitancy, vagueness, and uncertainty, resulting in more accurate and adaptable outcomes for real-world scenarios(Haseli et al., 2024).

Semarang University (USM) is a private higher education institution in Central Java, Indonesia, that provides academic and professional education across various disciplines. The university plays an important role in advancing regional education while supporting research and community engagement. USM is chosen as the research object because it represents the challenges faced by many resource-constrained higher education institutions in Indonesia. The university must balance limited budgets, growing digital demands, and the expectations of diverse stakeholders such as students, faculty, and administrators. Studying USM provides valuable insights that can be replicated by similar institutions nationwide (*BluePrint SaKTI*, 2023, n.d.).

In terms of IT condition, USM is actively adopting digital solutions but still faces gaps in areas such as infrastructure integration, system prioritization, and governance alignment. The institution has made progress in digital learning platforms and administration systems, yet lacks a systematic framework to prioritize IT initiatives effectively. This situation makes USM an appropriate and practical case study for testing the hybrid SWOT–Fuzzy BWM approach in IT strategy planning (*BluePrint SaKTI*, 2023, n.d.).

This hybrid approach not only refines strategic decision-making but also offers a replicable model for other HEIs facing similar constraints, marking a significant departure from conventional IT planning frameworks(Guo & Qi, 2021).

1.2 Research Objectives

This study aims to:

1. Identify IT strategies for Semarang University through SWOT analysis, addressing gaps in existing IT infrastructure.

2. Prioritize Sub-strategies using Fuzzy BWM, advancing beyond classical MCDM by incorporating fuzzy linguistic scales.
3. Provide a replicable framework for IT strategy selection in resource-constrained universities.

The stated objectives are directly derived from the identified research problems, ensuring a consistent line of inquiry throughout the study. The first objective, which focuses on identifying IT strategies for Semarang University through SWOT analysis, addresses the need to determine how the hybrid SWOT–Fuzzy BWM approach can be applied to systematically recognize and categorize key strategies. The second objective, centered on prioritizing these strategies using the Fuzzy BWM method, responds to the problem of determining the most critical IT sub-strategies and converting subjective expert assessments into reliable, quantifiable weights. Finally, the third objective, which aims to develop a replicable framework for IT strategy selection, directly corresponds to the problem of deciding which strategies should be implemented first for maximum institutional impact. This alignment ensures that each research question is systematically addressed by a targeted objective.

1.3 Research Benefits

This research offers theoretical and practical contributions:

1. Theoretical: Demonstrates the efficacy of Fuzzy BWM in HEI IT management, filling a literature gap in fuzzy MCDM applications.
2. Practical: Empowers Semarang University to allocate IT budgets effectively by focusing on top-ranked strategies.
3. Methodological: Proposes a streamlined SWOT-Fuzzy BWM hybrid model, reducing complexity compared to traditional MCDM hybrids.