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## **“WASTE MANAGEMENT” SUSTAINABILITY IN SUPPLY CHAIN PERFORMANCE OF A PRINTING INDUSTRY IN MALAYSIA: A CONCEPTUAL PAPER**

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**Abstract:** This paper explores the theoretical review of sustainability in supply chain management of the printing industry in relation to the area of waste management. The overview of the study is in the printing industry in Malaysia. Printing industry is one of the major industries that contribute to aggregate paper-waste in Malaysia. Waste management is a major concern and is the environmental element in sustainable supply chain performance's dimension. The research analyses various factors that influence waste management issues and their impact on sustainable supply chain performance. Key factors identified include cooperation among supply chain partners, integration and alignment, bilateral communication and information sharing, collective flexibility and adaptability, combined agility, and joint learning and knowledge creation. By integrating concepts from the Resource-Based View (RBV) and Waste Management theories, the findings highlight the importance of managing both tangible and intangible resources for printing companies seeking a competitive advantage in sustainability of Supply Chain Performance (SSCP). This study emphasizes the need for strategic waste management practices aligned with sustainability goals to enhance overall supply chain effectiveness.

**Keywords:** Resource-Based View (RBV), Supply Chain performance, Sustainability, Waste Management, Printing

### **1. Introduction**

Printing is an essential part of communication, art, and commerce. As an industry, it has been one of the most significant economic avenues in Malaysia, playing a vital role in the nation's development. (Zin et al., 2016). According to the Malaysia Department of Statistics, the value of gross output for the printing industry was RM 2.153 billion in 2021, with an estimated 54,714 employees (Department of Statistics, 2022). The printing industry has been a significant and dynamic force in Malaysia over the past few decades, with a significant impact on business operations and management in every sector (Zin et al., 2016). Significant to this development, 15% of Malaysia's overall waste composition is composed of solid waste, a significant percentage accumulated by the printing industry in terms of waste disposal.

The Sustainable Supply Chain Management (SSCM) concept has evolved to integrate the supply chain's social, environmental, and financial concerns. (Kumar et al., 2023). Waste management is highlighted as a major concern, impacting the environmental sustainability of the company's supply chain performance. According to Filho and Moori (2020), businesses have focused their efforts on building connections and working with partners upstream and downstream to provide

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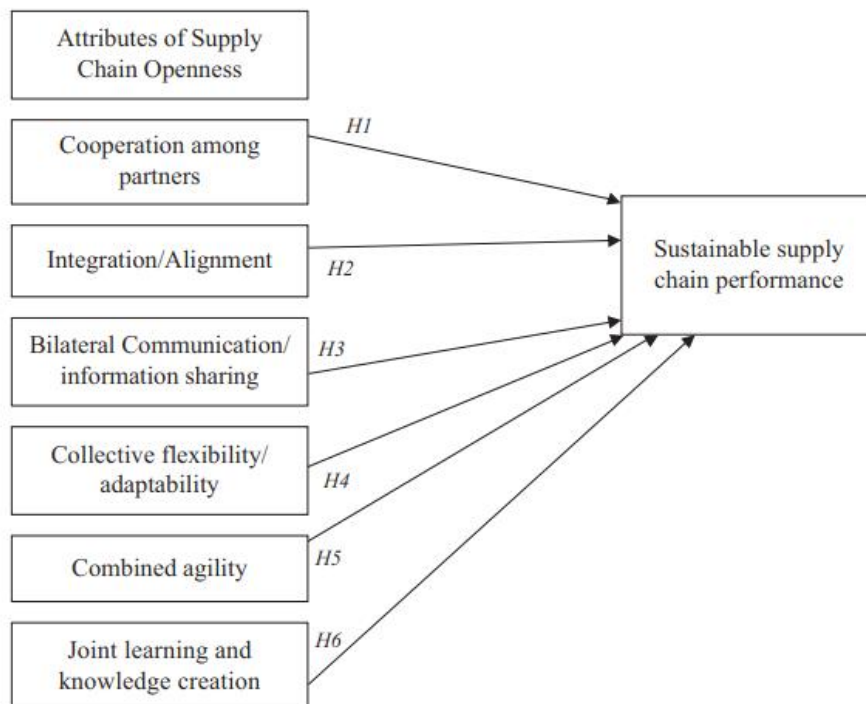
benefits throughout the supply chain in order to increase performance and survive in a market that is becoming more and more competitive. In large cities, waste is a major cause of pollution due to poor resource usage. Its improper management has a major impact on both environmental and human crises. Eghbali et al. (2022) described that waste is a big issue in the printing sector. This study aims to explore the areas of sustainable supply chain performance in the printing industry by exploring the concept of theory of waste management and SSCP theory. In this study, the SSCP is explained through the lens of RBV theory that adds value to its goods and services by utilizing its resources, which include all human and non-human tangible and intangible assets

## 2. Literature Reviews

Prosperity depends on sustainable economic expansion, but this leads to waste as well (Kaluza & Winkler, 2006). In relation to this, the waste management system would be inspected as part of a due diligence period before the Solid Waste and Public Cleansing Management Act, Act 672 is adopted (Lee, 2024). As stated by SW Corporation, the hazardous effects of waste were sent to 26 landfills in which 15 percent of the total waste was from paper-based waste (Zainal, 2024). Furthermore, because of the expectations of investors, government agencies, environmental groups, and customers, the printing sector has paid a great deal of attention to sustainability (Aydemir et al., 2023). Therefore, there is an important need to explore how waste management may assist in the sustainable supply chain performance of a company.

According to Gawankar et al. (2017), further research is required to shed more light on the supply chain performance metrics (SCMP) and their positive correlation. In order to know about the SSCP, the conceptual model by Fantazy et al. (2020) can be adopted. In this context, Fantazy et al. (2020) proposed a conceptual model which shows the effects of six major attributes of supply chain openness on organizational performance. These attributes of supply chain openness include cooperation among supply chain partners, integration/alignment, bilateral communication/information sharing, collective flexibility/adaptability, combined agility, and joint learning and knowledge creation (Tipu & Fantazy, 2020).

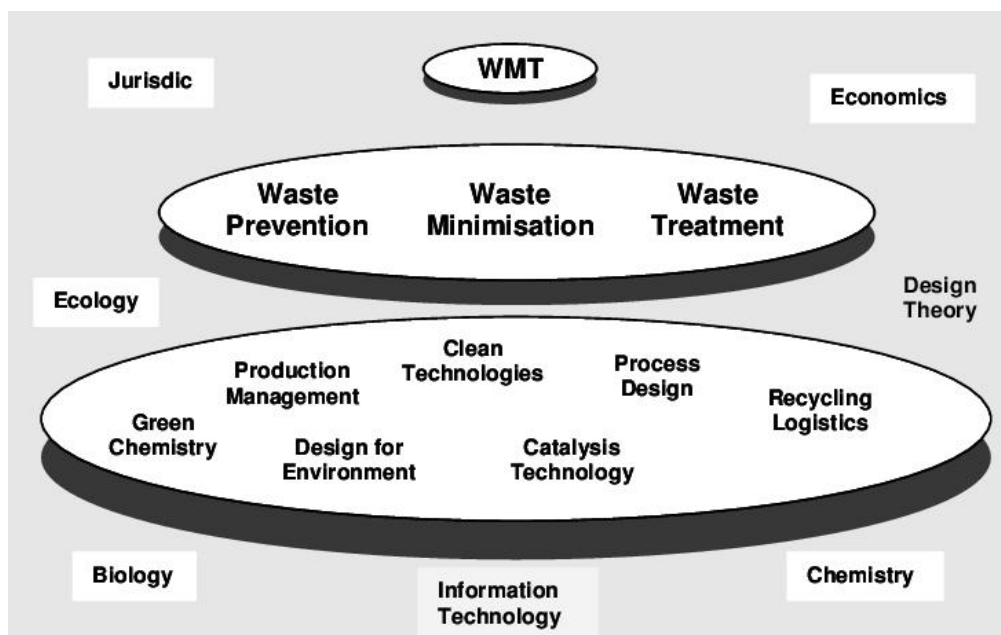
**Figure 1:** Sustainable Supply Chain Performance (SSCP)



**Source:** Conceptual Framework Adapted by Fantazy et al. (2020)

Sustainable supply chain management intends to minimize material flows both in production and consumption process by reducing pollution and waste generation throughout the supply chain (Dong et al., 2016; Sarkis et al., 2011; Genovese et al., 2017). Waste management techniques including waste minimization, waste prevention, and waste treatment are indicators that the business is implementing sustainable supply chain management techniques. By promoting conscious consumption in the short term and reducing waste and emissions along the entire sustainable value chain in the midterm, the use of SSCM can benefit society in a number of ways on the social, environmental, and economic fronts (Nascimento et al., 2019). In relation to this, Waste Management Theory (WMT) has been introduced to channel environmental sciences into engineering design (Pongrácz et al., 2004). The waste management theories and typologies are taken from a study by Nurminen and Pongrácz (2014). WMT is considered within the paradigm of Industrial Ecology, and built side-by-side with other relevant theories (Pongrácz et al., 2004). Figure 2 shows the theory of waste management in illustration.

**Figure 2: Theory of Waste Management**

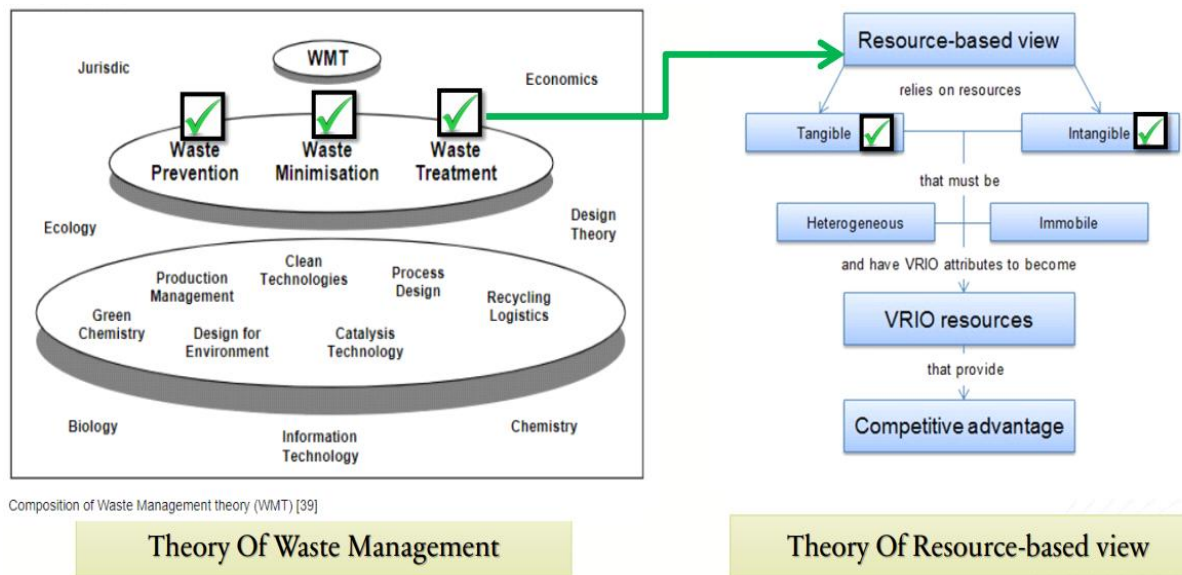


Source: Adapted from Nurminen & Pongrácz (2014)

### 3. Discussion

In mapping the waste management theory in RBV theory, the conceptual frameworks from Fantasy's (2020) are suitable to be applied. The conceptual framework by Fantasy et al. (2020) adopted the six factors or attributes that may affect SSCP. Fantasy's conceptual model outlines the internal and external resources in the RBV theory. Among these factors, it outlined either the tangible (internal) and intangible (external) resources as the six attributes that will affect SSCP. According to Filho and Moori (2020), businesses have focused their efforts on building connections and working with partners upstream and downstream to provide benefits throughout the supply chain in order to increase performance and survive in a market that is becoming more and more competitive. The six factors identified by Fantasy et al. (2020) are crucial in influencing waste management and overall supply chain performance. In this study, the RBV adds value to its goods and services by utilizing its resources, which include all human and non-human tangible and intangible assets.

**Figure 3:** Mapping the Theory of Waste Management to RBV



Empirical data from Al-Shboul et al. (2017) shows that improved supply chains and company performance can result from greater supply chain management performance levels. The SCMP dimensions provide insight into how the integration of its components could have a notable impact on supply chain performance, considering the RBV supply chain theory, system model, and comprehensive model. An increasing number of research on supply chain management (SCM) has examined resources and their link to performance by drawing on the fundamental concepts of the resource-based view (RBV) (Carter et al., 2017). As cited in Malhotra et al. (2023), the RBV provides a framework for gaining a competitive advantage using a firm’s resources and capabilities (Corbett & Claridge, 2002). Leveraging RBVs emphasises on internal resources and capabilities. To relate to the theoretical gap and the practical gap of this study, we understand from the context of the study that integrating the dimensions between one factor to another by utilizing the resources may contribute significantly towards SCMP.

According to the Resource-Based View (RBV) theory, gaining and maintaining a competitive advantage depends on a firm's internal resources and capabilities. The significance of both internal and external factors is emphasized by this method. By utilizing a company's distinct resources and competencies, supply chain performance can be enhanced, leading to increased productivity, responsiveness, and overall business success. In the printing business, efficient waste management is essential to improving a company's sustainable supply chain performance. Effective waste management techniques encourage recycling and reuse, which lowers the consumption of raw materials. In doing so, supply chain operations reduce their negative environmental effects and preserve natural resources. Furthermore, an increasing number of research on supply chain management (SCM) has examined resources and their link to performance by drawing on the fundamental concepts of the resource-based view (RBV) and its extensions, such as the relational view (RV) (Carter et al., 2017). SCM seeks to coordinate the major businesses in order to accomplish a tangible and intangible commodities flow that efficiently satisfies customers' demands and wants while providing benefits for the whole chain, as stated in Filho and Moori (2020) (Harrison et al., 2007). This is consistent with the RBV theory, which integrates both tangible and intangible resources into supply chain operations.

## 5. Methodology

This paper reviews the theories of sustainability in supply chain management (SSCP) in the printing industry, focusing on waste management. It examines past research and literature on SSCP and waste management. A broad search was conducted using prominent databases and search engines to find relevant academic literature (Žic et al., 2024). The review draws from a wide range of sources, including online databases related to SSCP and waste management, accessed through the university's subscriptions. The selected publications specifically address waste management in the printing industry and the impact of SSCP, providing insights into key theories and concepts. The study integrates concepts and theories on waste management and SSCP using conceptual models from previous research. It is exploratory in nature, focusing on the search for relevant concepts and theories in the Malaysian printing industry.

## 6. Conclusion

SSCP, which was established in the last few decades, is now a strategic method that businesses may utilize to gain a competitive edge by using less energy and resources across their whole supply chain and operating procedures (Nascimento et al., 2019). This paper employs a conceptual approach to explore and analyse relevant theories and concepts from the existing literature. The primary aim is to synthesize and integrate various theoretical perspectives to develop a comprehensive understanding of sustainable supply chain performance through the lens of RBV theory and waste management theory. In the adoption of RBV, the conceptual framework by Fantazy et al. (2020) is used to evaluate SSCP. The Fantazy's framework explored six (6) attributes in SSCP. Among these factors, it outlined either the tangible (internal) and intangible (external) resources as the six attributes that will affect SSCP. The study discovers that managing both tangible (internal) and intangible (external) resources in waste management is crucial for gaining a competitive edge in SSCP. The six factors identified by Fantazy et al. (2020) are crucial in influencing waste management and overall supply chain performance.

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