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Revealing Key Factors and Obstacles in Reverse Logistics from a Stakeholder Theory Perspective

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Abstract

The implementation of environmental operations management in industries has become increasingly important because of the emergence of stricter environmental regulations and growing environmental consciousness of customers. To address this issue, reverse logistics applications have been utilised to improve environmental operations management. To successfully implement reverse logistics, it is necessary to examine influential factors, such as drivers and barriers, and consider the different perspectives of stakeholders regarding its implementation and development. This study proposes a multi-perspective framework for reverse logistics implementation based on stakeholder theory. The framework was developed through a structured literature review process in which 77 papers were carefully examined and classified based on their structural dimensions and analytical categories. The resulting framework considers the diverse stakeholders involved in reverse logistics and consists of two extensive lists: one containing 37 drivers, and the other comprising 44 barriers. The proposed framework provides a systematic approach for examining and addressing the key drivers and barriers related to the implementation of reverse logistics. Furthermore, this study offers a comprehensive understanding of the drivers required for adopting reverse logistics from various viewpoints, including those of the company, society, government, and customers. Each perspective was analysed separately, drawing on previous studies conducted in the field. It is important to note that while most barriers are identified from the firm's perspective, these barriers may also stem from external factors. Recognising influential factors as drivers is crucial so that managers can make necessary preparations and capitalise on these positive elements. It is critical to consider influential factors from multiple viewpoints in order to develop an effective industry-wide strategy for implementing product returns.

Keywords: Reverse Logistic, Product Return, Recycling, Remanufacturing, Stakeholder Theory

Introduction

The research conducted by Flapper et al (2012), and Nikolaou et al. (2013), Wassenhove and Besiou (2013), and Govindan et al (2015), collectively demonstrate that a combination of technological advancements, increased consumer demand, and shorter product lifecycles have led to a surge in global production. This surge has driven the extraction of raw materials and the generation of a higher volume of waste.

Recently, there has been growing interest among businesses, experts, and scholars in supply chains and the concept of reverse logistics. Rogers and Tibben-Lembke (2001) and Govindan et al. (2013), emphasised that the concept of reverse logistics (RL) entails the complex procedural rerouting of commodities from their originally intended points of arrival, aiming to reclaim value or ensure proper disposal. Proficiently handling waste, encompassing the realms of regulation, minimisation, processing, and elimination, remains of utmost importance throughout the comprehensive trajectory of merchandise, spanning across its production, packaging, utilisation, and subsequent reverse distribution stages.

Numerous scholarly investigations have extensively explored diverse aspects within the realm of reverse logistics (RL), encompassing subjects ranging from network design (Pishvaee et al., 2010; Srivastava, 2008), theory development (Dowlatshahi, 2000), and decision-making processes (Ravi et al., 2005). Despite the acknowledged strategic advantages of RL (Alvarez-Gil et al., 2007) and its escalating pragmatic integration, a discernible research gap has been underscored by Narayana et al. (2015), and Subramoniam et al. (2014, 2009). Specifically, scholarly discourse exhibits a dearth of comprehensive enquiry, concentrated on the strategic dimensions inherent in the domain of reverse logistics.

In the knowledge domain, multiple incentives drive companies to adopt environmentally friendly approaches, including the adoption of practices such as reverse logistics (RL). These motivating factors include legislative requirements, societal accountability, economic interests, stakeholder expectations, and ethical considerations as elucidated by Andiç et al. (2012). Within an organisation, employees might actively advocate eco-friendly practices because of their alignment with strategic goals such as cost reduction and the protection of intellectual property linked to end-of-life (EOL) products. Additionally, external pressures come into play, originating from clients, non-governmental organisations (NGOs), governmental bodies, media outlets, and local communities, all working towards ensuring that industries adhere to environmentally conscious policies.

However, as highlighted by Fleischmann et al. (1997), and Srivastava (2008), reverse logistics (RL) is not a mere replication of the conventional forward supply chain; rather, it presents unique challenges. Abdulrahman et al. (2014), noted that companies encounter obstacles both inside and outside their organisations when implementing Relationship Lying practices involving multiple stakeholders. Additionally, Bernon et al. (2013), pointed out that many industries are still struggling to adopt RL strategies due to a lack of enthusiasm from their supply chain partners.Furthermore, certain companies perceive RL as an underrated component of SC, attributing their hesitance to factors such as uncertain profitability,

inadequate technical expertise in their workforce, and challenges with their SC partners (Abdulrahman et al., 2014).

Sarkis et al. (2011), emphasized the obscurity surrounding the interplay of internal and external factors that propel green initiatives, along with the viewpoints of stakeholders engaged in the implementation process, given the prevailing challenges. Consequently, there is a pressing need to undertake research that delves into the drivers and barriers impacting the implementation of RL while also considering the roles of various stakeholders. Avkiran and Morita (2010), note that disregarding the concerns of diverse stakeholders can potentially lead to detrimental effects on company performance.

This study addresses a notable research gap concerning the interplay between drivers, barriers, and stakeholder theories in the context of RL implementation. While these elements have been acknowledged, the literature lacks in-depth exploration of their interconnectedness. Notably, stakeholders, including customers, government entities, and non-governmental organisations (NGOs), play a pivotal role in facilitating or impeding RL adoption by companies. This study emphasises the importance of elucidating the dynamics among stakeholders, drivers, and barriers to foster a comprehensive understanding of the implementation process and advance sustainable RL practices.

The principal objective of this study is to gain a more comprehensive understanding of the factors that encourage and impede RL from the perspective of diverse stakeholders. In pursuit of this aim, the study aimed to answer the research question: "What are the main motivating and inhibiting factors as perceived by various stakeholders?" This study has pursued the following overarching goals. First, it aims to identify the relevant literature centred on RL, its driving forces, challenges, and stakeholder involvement. Subsequently, it aimed to categorise these studies based on their methodologies, industry sectors explored, location-specific influences, and the drivers and barriers acknowledged by different stakeholders. Additionally, this study aimed to succinctly summarise the distinctive contributions of each prior study to the comprehension of stakeholders and matters related to RL. Finally, this study sought to investigate the motivators and impediments of RL from the perspectives of diverse stakeholders, leading to the formulation of a research agenda that tackles the gaps in existing research, emphasising the integration of barriers, drivers, and stakeholder theories to establish a strong theoretical framework. This framework allows future research to incorporate diverse perspectives from multiple stakeholders, recognising that interpretations of barriers and drivers in RL can vary.

The remainder of this paper is organised as follows. Section 2 provides a concise overview of this study's theoretical framework. Section 3 outlines the research methods employed, followed by a descriptive overview of the literature in section 4. Section 5 focuses on content analysis and the utilisation of a multi-perspective approach. Section 6 evaluates the outcomes, including a comparison with prior studies, and identifies the potential prospects in the field. Finally, Section 7 summarises the findings and highlights the emerging topics that require further investigation.

Theoretical Background

The theoretical foundation of this research is predominantly based on stakeholder theory, which offers a conceptual framework for comprehending the interactions and viewpoints pertinent to the implementation of RL. This study relies heavily on stakeholder theory, particularly within the realm of Sustainable Supply Chain Management (SSCM), as explored by Touboulic and Walker (2015). Their work serves as a basis for investigating the influence of stakeholders in either supporting or impeding sustainability initiatives.

The research conducted by Meixell and Luoma (2015), underscored that stakeholders in supply chain management can either support or hinder sustainability. Furthermore, as highlighted by Sarkis et al (2011), stakeholder theory posits that companies generate externalities that impact diverse stakeholders both within and outside the organisation. The incorporation of stakeholder theory provides a theoretical foundation for comprehending the intricate interplay and relationships between stakeholders and RL. This approach not only enhances the understanding of the factors influencing RL implementation but also provides deeper insights into stakeholder engagement within this context.

Scholars such as Freeman (1984), and Mitchell et al (2020), have proposed various definitions of stakeholders in the literature. Despite varied phrasing, these definitions share a common core. Freeman (1984) defines stakeholders as "any individual or group that can influence or be impacted by the attainment of the organization's goals." Mitchell et al (2020), proposed that stakeholders include a broad range of entities such as groups, organisations, societies, individuals, institutions, and the natural environment. Phillips et al (2003), and Crane and Ruebottom (2011), pointed out that stakeholder theory not only looks at who has a say in decision-making processes, but also focuses on those who will gain from the results of such decisions.

Alvarez-Gil et al (2007), and Andic et al (2012), emphasised that stakeholder pressures play a pivotal role in propelling the adoption of environmentally conscious initiatives. The demands and anticipations of diverse stakeholders serve as driving factors in the implementation of RL practices. Adoption of RL initiatives enables companies to address diverse stakeholder requirements. In contrast, Avkiran and Morita (2010), acknowledged the intricate and multifaceted nature of business operations, noting that engaging with various stakeholders enhances managerial decision-making processes and facilitates benchmarking against peers. Moreover, businesses are now accountable to a heightened degree, extending their responsibilities beyond conventional stakeholders, such as regulatory bodies and shareholders, to encompass newer entities such as non-governmental organisations (NGOs) with regard to their social and environmental performance. Additionally, companies bear responsibility towards their customers, a connection that can be facilitated through the use of social media platforms, as highlighted by Wassenhove and Besiou (2013).

Acknowledging the significance of various viewpoints, it is crucial to note that different stakeholders can hold opposing views on their preferred characteristics (Avkiran & Morita, 2010; Wassenhove & Besiou, 2013). Stakeholders have different aims and priorities. For instance, as Wassenhove and Besiou (2013), point out, shareholders may stress company profitability as a primary concern, whereas employees may give precedence to their own interests. This can lead to potential resistance to measures, such as factory closures, even if these measures can enhance profitability.

Government bodies and regulatory agencies often introduce legislation that increases costs associated with goods or services. Concurrently, non-governmental organizations might criticise companies for perceived lapses in environmental responsibility, while media outlets can disseminate negative narratives that potentially impact sales. The insights of Sarkis et al. (2010), underscore the need for businesses to navigate and reconcile the diverse perspectives and conflicting interests inherent in influential stakeholder groups. This undertaking may necessitate honing the skill set required to manage such pressure. Moreover, as evidenced by Alvarez-Gil et al (2007), these real-world instances exemplify the tangible significance of stakeholder theory in comprehending the influence of external forces wield influence over reverse logistics (RL).

Stakeholder theory was used throughout the research process to help authors gather and interpret the data. An inductive approach was used to (1) compile a list of stakeholders, (2) narrow down the list to the most pertinent stakeholders, (3) classify influential factors based on stakeholder perspectives, and (4) analyse the data by comparing it to prior studies. The following sections provide a thorough explanation of this research process.

To improve the understanding and interpretation of the research results, this study includes an additional theoretical framework known as organizational change management. RL implementation can be an environmental effort that can help complete the supply chain cycle. Consequently, it is essential to consider both motivating factors and hindrances to change when striving for sustainability. Lozano (2012), noted that, while drivers can drive change, their success can be hindered by obstacles.

Research Methods

The main method employed in the literature review is qualitative synthesis. As outlined by Fink (2013), a literature review involves a meticulous and thorough examination of the existing primary research involving the process of identification, assessment, and interpretation. As emphasised by Seuring and Gold (2012), the academic community places substantial importance on literature reviews.

This study adopted a systematic approach based on a well-defined process with a focus on objectivity to guarantee the accuracy of the research and minimise potential risks. The following steps were undertaken to enhance the accuracy: consulting databases and peer-reviewed journals, crafting a robust search strategy, and meticulously assessing the quality and relevance of the compiled literature.

This review draws on the contributions of Lage Junior and Godinho Filho (2010), Seuring and Gold (2012), Brandenburg et al (2013), and Govindan et al (2015). The study was founded on peer-reviewed articles sourced from credible databases, and an effective search strategy was employed to identify relevant literature. Rigorous assessments were performed to assess the quality and applicability of the selected studies. The criteria for article selection were as follows.

a) Inclusion of articles published within the realm of reverse logistics, addressing subjects such as strategies, applications, concepts, and stakeholder viewpoints.

b) Exclusively opting for articles that comprehensively explored, categorised, and scrutinised the driving forces and hindrances of reverse exclusion.
c) Omitting conference papers, master's and doctoral theses, textbooks, and unpublished working papers to enhance the credibility of this study.

Material Collection

According to Seuring and Gold (2012), two key decisions must be made during the material collection stage: defining the scope of the material and identifying the unit of analysis. Consequently, the selection process involved the application of the following filtering criteria.
(i) The scientific-technical bibliographic databases used for the article search included ISI Web of Science, Scopus, Science Direct , Emerald, Inderscience, Google Scholar, Taylor and Francis, Springer and Wiley.
(ii) The scope of the literature review was confined to studies published in English from January 2004 to June 2023, encompassing a period of 19 years.
(iii) Articles selected for the data collection phase were identified through keyword searches conducted within the titles and abstracts. These keywords encompassed terms like 'closed-loop supply chain,' 'reverse logistics,' 'reverse supply chain,' along with 'drivers,' 'barriers,' and 'stakeholders.' Furthermore, the literature review took into account relevant terminologies such as 'remanufacturing', 'reuse', and 'recycling' as well.
The initial stage of the process involved conducting a comprehensive literature search that yielded a pool of over 160 articles spanning more than 50 different journals. Subsequently, a meticulous sorting procedure was ensued, during which the titles and abstracts of these articles were scrutinised to ascertain their relevance to the scope of the research. Specifically, studies that delved into themes pertaining to RL were preferred.

This literature review centres on matters pertaining to the return of products concerning their end-of-life (EOL) and end-of-use phases as well as the associated packaging. Through the application of these criteria, 77 papers that aligned with the defined scope were identified. These studies contribute significantly to the exploration of reverse logistics within the context of eco-conscious and environmentally oriented supply chains.

Descriptive Analysis

Quantitative content analysis was employed to scrutinise the composition of the literature across diverse research bodies. This analytical methodology encompasses the evaluation of the distribution of papers in various journals and years. Moreover, a descriptive analysis was conducted to discern the geographical locales, industrial domains, and research methodologies used in the present study. The outcomes derived from these analyses are discussed in Section 4.

Material Evaluation and Results

Content analysis is an efficacious approach for conducting an exhaustive examination of the symbolic context inherent within published works, thereby facilitating the discernment of potential avenues for research across diverse studies (Shaharudin et al., 2014). Subsequent to the process of article selection and identification of pivotal subjects for analysis alongside their corresponding categories, a classification protocol was executed to systematically arrange the articles based on their primary focal points. In a more specific sense, an assemblage of documents centred around the thematic domain of reverse logistics (RL)

underwent meticulous scrutiny, employing structural dimensions and analytical categories rooted in stakeholder theory. To mitigate inaccuracies and comprehensively address various facets of the analysis, a spreadsheet software was used, as endorsed by Govindan et al. (2015).

To ensure the precision of the analysis, a rigorous approach was adopted involving the collaboration of three researchers in content analysis and paper coding. This collaborative effort aimed to establish agreement among coders, a practice endorsed by Brand Enburg et al. (2014). The framework for categorisation employed in this process was founded on an established theory encompassing well-defined categories and definitions. This meticulous categorisation framework not only enhanced the accuracy of the coding procedure, but also bolstered the internal validity of the findings, as outlined by Seuring and Gold (2012).
This review provides an analysis that yields valuable insights into the research topic, while pinpointing potential areas for further exploration within the domain of reverse logistics.

Descriptive Analysis
This study specifically focused on the analysis of double-blind peer-reviewed papers, culminating in the final selection of 77 journal articles. The decision to prioritise double-blind peer reviews over single-blind reviews was deliberate, aiming to bolster the credibility and precision of the study. The adoption of double-blind reviews, which maintain anonymity for both authors and reviewers, helps mitigate potential biases linked to single-blind reviews, as elucidated by Blank (1991). Moreover, Blank's study underscores the advantages inherent to the utilisation of double-blind reviews.

This study provides a summary of the journals cited, which can be found in Table A1 of the Appendix. . Supply Chain Management: The International Journal has the most publications, followed by the Journal of Cleaner Production, and the International Journal of Production Economics. The top eight journals accounted for more than 45% of the total number of journals identified.

The North American Industry Classification System was used to categorise the economic activities discussed in the articles (NAICS). The manufacturing of "transport equipment", electrical equipment, appliances, and components has been the subject of several studies. This outcome was anticipated given the influence of legislation and financial advantages of product revaluation in these sectors. Table A2 of the Appendix contains a comprehensive list of the industries examined.

China and the United Kingdom came next as the countries studied, with India producing the majority of the studies. Reverse logistics (RL) research has primarily been conducted in developed countries, but an increasing number of studies have examined RL issues in emerging economies, including BRIC nations. The distribution of papers by country is more thoroughly analysed in Table A3 in the Appendix.

The two most frequently used research methods in portfolio studies are case studies and surveys. The majority of articles in the "others" category applied multi-criteria decision-making (MCDM) methods such as interpretive structural modelling (ISM) and the analytic hierarchy process (AHP). The absence of literature reviews that concentrate on influencing

factors and various stakeholder perspectives for RL implementation is noteworthy. Please refer to Table A4 in the Appendix for a complete list of the methods employed.

Content Analysis & Framework Development

As described by Seuring and Gold (2012), statistical techniques were initially used to analyse the explicit content of documents and texts. In this step, explicit data presented in the literature must be quantified and summarised. Sections 5.1, 5.2, and 5.3 analyse the manifest content and provide quantitative assessments.

The main objective of the second stage of content analysis was to determine the hidden meanings of the manuscript. This step involves identifying the arguments, terms, and implicit meanings used in literature. There is some discussion of latent content in subsections 5.1, 5.2, 5.3, and 5.4, where the multi-perspective framework is primarily developed.

Identification of stakeholders

Understanding RL stakeholders is crucial before examining motivators and barriers to RL. Mitchell et al. (1997) proposed a stakeholder classification to comprehend stakeholder relationships in reverse logistics (RL). This classification shows that businesses cannot please all stakeholders, so managers should prioritise the more crucial stakeholders.

Inductive analysis was used in this study's RL context to identify eight stakeholder types. These stakeholders are crucial for the effective implementation of RL practices and have a significant impact on RL activities. The following list of parties involved in this study is provided.

1) Governmental organisations and regulatory bodies are responsible for being in charge of establishing RL-related policies, rules, and standards.
2) Customers: People or organisations that purchase goods or services and may be impacted by RL practices, such as product recovery or return policies.

3) Society/community: This category includes both local and regional social groups that are affected by RL activities as well as aspects of social and environmental spheres.

4) Markets/competitors: Other businesses operating in the same industry or market whose actions and methods can influence RL strategies.

5) Suppliers: Companies that provide the raw materials, parts, or components needed for supply chain and RL operations.

6) Organisation (Focal Company/Shareholders): This group includes the internal stakeholders of a company that uses RL practices, such as its shareholders and top management.

7) Workers: This includes all personnel within the organisation, including those involved in RL operations and decision-making.

8) Media: Refers to various media outlets and channels that can influence public opinion, reputation, and image in relation to RL activities.

Managers can effectively address stakeholder expectations, concerns, and interests during RL implementation by identifying and understanding them. Stakeholder analysis ensures the success and approval of RL initiatives and assists in prioritising efforts and resources. This also fostered collaborative relationships. These stakeholders were chosen for their relevance to green and environmentally friendly logistics as well as their influence on RL activities.

Table 1 provides a comprehensive and detailed overview of stakeholders, including their RL characteristics and roles.

RL Drivers

This study reviewed the literature to identify and categorise the factors that influence Reverse logistics (RL) initiatives. 37 drivers were identified and classified into categories based on their similarity and significance (Table 2). To categorise the drivers, Table 1's definitions of stakeholders and internal and external resources are used.

Eight driver clusters are identified in this study. By considering the functional aspects of RL and existing literature classification schemes, clusters were derived inductively (Abdul Rahman et al., 2014; Govindan et al., 2014). These groups are based on their similarities and meaningfulness. The following are the eight clusters and their succinct descriptions.

a) Policies (P) drive the laws and regulations governing product takebacks and RL.

b) Governance and supply chain processes (G and SC) include drivers related to the reverse supply chain, collaboration, and interaction with business partners.

c) Management (M) encompasses various drivers such as human resource support, employee satisfaction, and the integration of RL practices into different departments.

d) The market and competitor (M&C) considers factors such as environmental market considerations, customer satisfaction, competitive pressures, and potential competitive advantage as drivers.

e) Technology and Infrastructure (T&I) encompasses drivers pertaining to the availability of eco-design, information technology, and recovery technologies.

f) Economic (E) encompasses the financial and economic aspects of RL.

g) Knowledge (K) encompasses drivers related to internal resources, such as the degree of RL awareness and the flow of information within organisations.

h) Social (S) encompasses the forces of societal pressure, such as heightened public consciousness of environmental preservation and corporate responsibility.

Motivations for implementing RL were classified into internal and external categories based on their origin and impact. Internal drivers are the internal components of a company that influence resource allocation and promote RL use. External drivers drive RL adoption. The impact of drivers on stakeholders was also analysed in terms of how they inspired or affected them.

Previous research suggests that regulatory pressure is the primary driving force behind the adoption of RL initiatives and nearly half of the articles point to regulatory requirements as a key factor. The second most common motivator is the economic viability of RL practices,

highlighting their importance in enhancing the economic efficiency of businesses. Finally, consumer awareness of environmental issues places green consumerism in third place, indicating a growing concern for the environment.
These findings suggest that regulatory pressure, financial feasibility, and eco-friendly consumer attitudes play crucial roles in determining RL adoption in organisations.

RL Barriers

Barriers preventing the implementation of RL can be either external (outside the organisation) or internal (within the organization). Table 3 summarises the 44 identified barriers, their classifications, stakeholders, and sources. These 44 barriers were subsequently grouped into seven clusters based on their similarities and meanings.

a) Technology and Infrastructure (T&I) comprises obstacles to technical expertise, information technology, and the lack of infrastructure for the advancement of RL.

(b) Governance and supply chain processes (G&SC) encompass barriers related to cooperative issues, reverse supply chains, and performance.

c) Economic (E): Financial and economic barriers to RL.

(d) Knowledge (K) encompasses barriers to RL awareness and information flow within companies.

e) Policy (P) encompasses barriers associated with laws and regulations concerning product takeback and RL.

(f) Market and competitor (M&C) encompasses barriers to market recovery and competitive advantage.

g) Management (M) encompasses barriers related to the relative importance of RL compared to other activities and managers' attitudes toward RL.

Of the 44 barriers, 21 were identified as internal and 21 as external barriers. The frequency of RL barriers was determined on the basis of their presence in the article portfolio.
The literature indicates that a significant hindrance to the implementation of RL is the inadequate technical expertise of personnel. This issue has been emphasized by multiple authors, including Kapetanopoulou and Tagaras (2011), Skapa (2011), Aitken and Harrison (2013), and Abdulrahman et al. (2014). These studies have collectively demonstrated that insufficient training and a lack of technical knowledge are major obstacles to the successful implementation of RL.
Low involvement of top management and lack of initial capital were the next most frequently cited barriers, appearing in 27 and 25 articles, respectively. These barriers emphasise the significance of financial resources and leadership support in driving RL initiatives within organisations.

Multi-Perspective Framework in Reverse Logistics (RL).

This study emphasises the importance of understanding and reconciling stakeholders' views in the implementation of RL. Stakeholder pressure is a significant factor driving a company's environmental efforts (Kim & Lee, 2012). Avkiran and Morita (2010), pointed out that overlooking stakeholder interests can harm a company's performance. Therefore, it is essential to consider the diverse views of these variables among stakeholders.

Figure 5(a) and (b) depicts a multiple-perspective framework that highlights the influential factors in RL based on a comprehensive literature compilation, as presented in Tables 5 and 6. This framework considers the external views of key stakeholders and encompasses the

various perspectives, pressures, and challenges imposed on RL development. To streamline the analysis and address its complexity, the framework primarily focuses on the most frequently mentioned drivers and barriers, which are extracted from Figures 4 and 5, and reflects the organizational viewpoint.

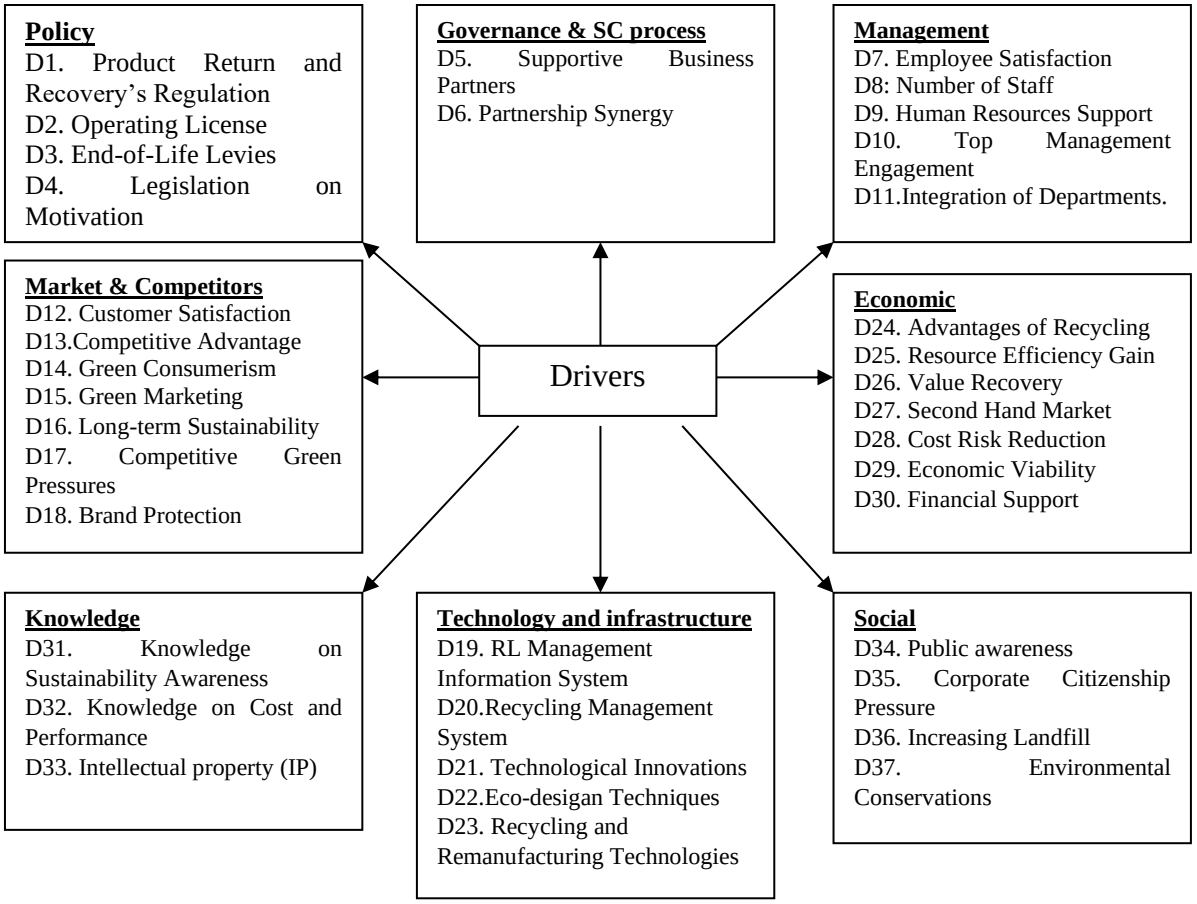

Figure 5 (a): List of RL drivers

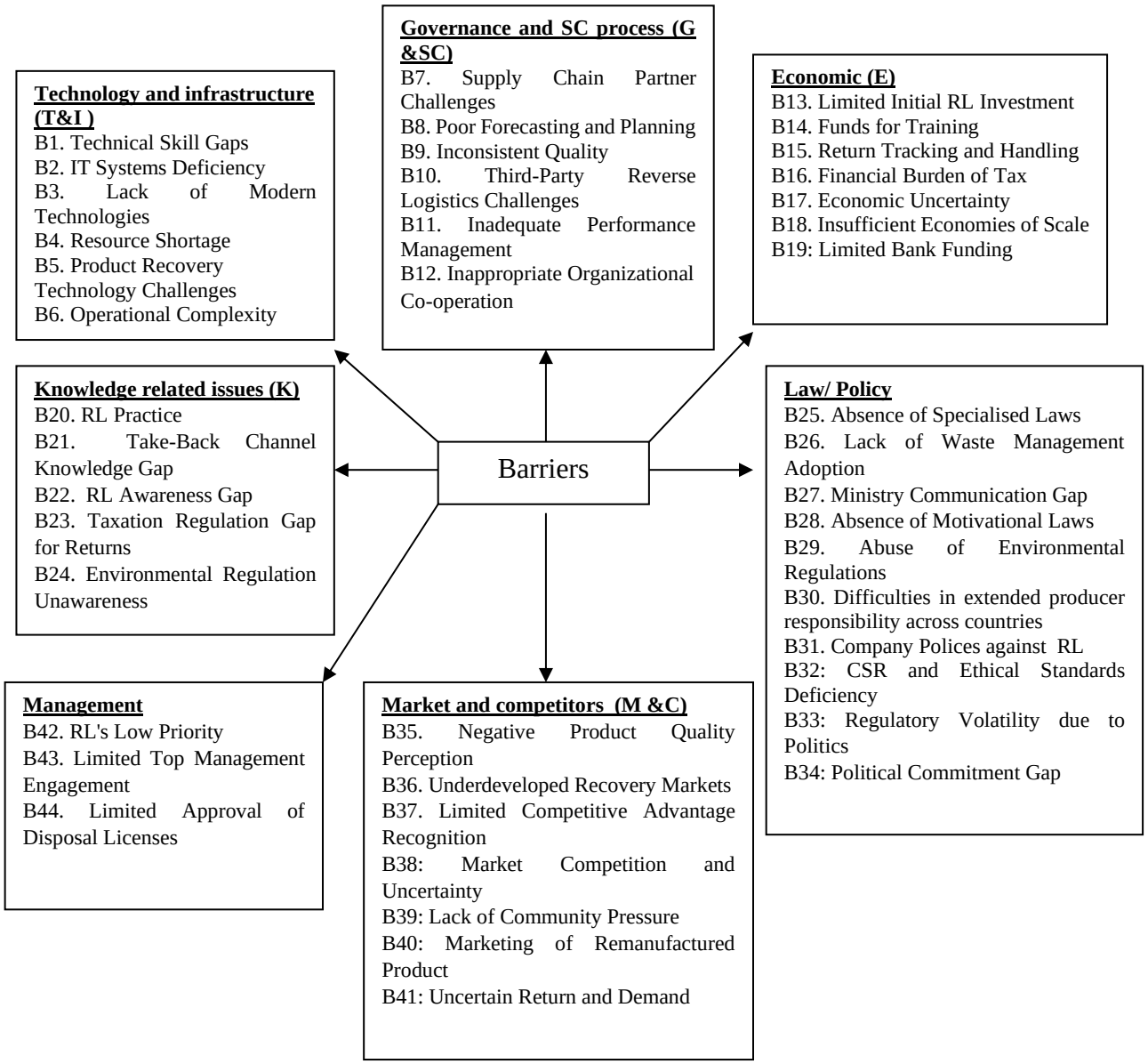

Figure 5 (b): List of RL Barriers

Discussion

Based on the findings of this study, several noteworthy directions for future investigation can be considered. These directions can be categorised into three sub-sections: RL barriers, RL drivers, and further insight.

RL Barriers

Government Perspectives

Nine barriers to implementing RL have been identified in the literature from the governmental perspective.

Limited Bank Funding (B19) was found to be a hindrance because of the limited understanding or appreciation of the reverse logistics sector and its potential for profitability, which can lead to hesitation in extending loans for RL investments.

The lack of specialised laws (B25) is also viewed as a resource restriction obstacle, such as the absence of supportive policies and regulations for end-of-life (EOL) management, which impedes resource limitations because companies lack guidance and incentives.

The barrier known as (B26), which lacks a waste management option, is also regarded as an obstacle to RL implementation. Many countries have experienced difficulties in implementing RL because of their poor waste management systems and practices. Janse et al (2010); Abdulrahman et al (2014), Ganjali et al (2014), and Bouzon et al (2015), the absence of well-regulated waste management creates challenges for organisations seeking to construct efficient RL processes.

Another hindrance,(B27), stems from the Ministry of Communication Gap. When various government ministries fail to effectively communicate, conflicting laws and regulations pertaining to RL may arise. This lack of coordination and alignment among various authorities complicates RL implementation and the absence of motivational laws (referred to as B28) hampers RL. This barrier signifies the absence of directives or regulations that incentivise manufacturers to embrace RL practices and encourage customers to purchase environmentally friendly products. Without proper motivation, the implementation of RL initiatives may be hindered and the use of environmental regulations (B29) can impede RL implementation,as discussed by Gonzalez-Torre et al (2010) and Andiç et al (2012), Giunipero et al (2012) and Abdurrahman et al (2014) and Bouzon et al (2018). When environmental regulations are not correctly enforced or utilised in a manner that impedes RL, they create hurdles for its implementation. This barrier highlights the challenges arising from the improper application or abuse of environmental regulations in RL.

Other barriers include difficulties extending producer responsibility across countries (B30). The complexity arising from the globalisation of supply chains creates challenges in implementing extended producer responsibility (EPR) programs. Coordinating EPR efforts across different nations has become challenging because of the variations in regulations and practices.

Additionally, Regulatory Volatility due to politics (B33). When there is increased emphasis on environmental awareness and concerns within the political landscape, governments may introduce or strengthen regulations to address reverse logistic-related environmental issues. These regulations pertain to waste management, recycling targets, EPR, and promotion of circular economic principles.

Furthermore, the Political Commitment Gap (B34) hinders reverse logistic. In the absence of robust political support, governments may not prioritise reverse logistics in their policy agendas, leading to a lack of comprehensive frameworks, guidelines, and incentives to promote and regulate reverse logistics activities.

Recognising these barriers from the government's perspective underscores the significance of supportive legislation, effective waste management systems, interministerial coordination, appropriate motivational laws, proper enforcement of environmental regulations, and addressing the challenges associated with extended producer responsibility in global supply

chains. Overcoming these barriers is crucial for the successful implementation of reverse logistics initiatives.

Customers' perspective

The literature identifies three barriers to RL implementation from the customer's perspective: clients and consumers.

The first barrier involves the Supply Chain Partner Challenges (B7). This refers to the difficulties encountered in securing customer support and cooperation within a supply chain to introduce RL. This includes matters such as retailers' hesitance to divulge pricing data, and the absence of backing from distributors, dealers, and retailers regarding RL. These difficulties impede the effective implementation of RL initiatives, and the second barrier is related to challenges in implementing product recovery systems, Poor forecasting and planning (B8) for returns impede their successful execution of product recovery systems. Uncertainties in predicting the volume and timing of returns can complicate RL. Effective forecasting and planning mechanisms are crucial for the smooth functioning of RLs, and the third barrier is the Negative Product Quality Perception (B35). This barrier arises from customers' perception that remanufactured products or products incorporating recycled materials are of lower quality than new products. This perception can influence customer willingness to purchase or support RL initiatives. Overcoming this perception and effectively communicating the quality and value of RL products are essential for addressing this barrier.

These barriers underscore the importance of addressing issues related to coordination and support from supply chain members, improving forecasting and planning mechanisms for returns, and managing customer perceptions of the quality of RL products. Collaborative efforts among supply chain partners, effective communication strategies, and quality assurance measures can help overcome these barriers and promote their successful implementation.

Organizational perspective

From an organizational perspective, several barriers to RL implementation have been identified, with 11 being the most widely cited.

The most widely cited barrier is an inadequate proficiency in technical abilities. (B1). This obstacle is due to a lack of technical expertise and understanding among personnel engaged in RL activities. It involves elements such as low dedication, inadequate technical expertise, and lack of instruction and qualifications.

The Limited Initial RL Investment (B13) was the second most commonly cited obstacle. Lack of financial resources is a major obstacle to the implementation of RL. This leads to difficulties in obtaining the funds required to establish and sustain RL. The limited involvement of top management and strategic planning (B43) in RL is a prominent barrier. This includes resistance to change, organizational culture, and the perception that RL does not add value to a company. IT Systems Deficiency (B2) is the fourth most widely cited impediment to RL. Problems related to IT connectivity and compatibility hinder RL implementation. These include issues, such as incompatibility, inadequate IT support, and IT systems. Standardising IT systems and improving connectivity are crucial for effective RL operations, and the Taxation Regulation Gap for Returns (B23) hinders RL implementation (fifth most cited). Limited understanding of customs procedures and the financial implications associated with returned

products, such as value-added tax payments, hampers RL implementation. Insufficient taxation knowledge can create a cost burden for the companies.

These barriers emphasise the importance of addressing issues related to technical skills, financial resources, top management involvement, IT infrastructure, and taxation knowledge within organisations. Overcoming these barriers requires investment in employee training, securing adequate funding, promoting top management commitment and strategic planning, improving IT standards and connectivity, and enhancing the knowledge of taxation procedures related to RL. By addressing these organizational barriers, companies can facilitate successful implementation of RL initiatives.

RL Drivers

Government Perspective

From an organizational perspective, several barriers to RL implementation have been identified, with 11 being the most widely cited.

The most widely cited barrier is inadequate proficiency in technical skills (B1). This obstacle is due to a lack of technical expertise and understanding among personnel engaged in RL activities. It involves elements such as low dedication, inadequate technical expertise, and a lack of instruction and qualifications.

Limited Initial RL Investment (B13) was the second-most commonly cited obstacle. Lack of financial resources is a major obstacle to the implementation of RL. This leads to difficulties in obtaining the funds required to set up and sustain RL. The limited involvement of top management and strategic planning (B43) in RL is a prominent barrier. This includes resistance to change, organizational culture, and the perception that RL does not add value to a company. Insufficiency in IT system standards(B2) was the fourth most widely cited impediment to RL. Problems related to IT connectivity and compatibility hinder RL implementation. These include issues, such as incompatibility, inadequate IT support,and IT systems. Standardising IT systems and improving connectivity are crucial for effective RL operations, and the Taxation Regulation Gap for Returns (B23) hinders RL implementation (fifth most cited). A limited understanding of customs procedures and the financial implications associated with returned products, such as value-added tax payments, hampers RL implementation. Insufficient taxation knowledge can create a cost burden for the companies.

These barriers emphasise the importance of addressing issues related to technical skills, financial resources, top management involvement, IT infrastructure, and taxation knowledge within organisations. Overcoming these barriers requires investment in employee training, securing adequate funding, promoting top management commitment and strategic planning, improving IT standards and connectivity, and enhancing the knowledge of taxation procedures related to RL. By addressing these organizational barriers, companies can facilitate successful implementation of RL initiatives.

Customers' Perspective

From a customer’s perspective, the literature review identified five drivers of RL implementation.

Supportive Business Partners (D5): Working with knowledgeable partners, such as customers and suppliers, encourages RL implementation. Partners with RL expertise can improve the success of their RL initiatives.

In addition to training, Partnership Synergy (D6) was identified as the driving force behind the RL implementation. The joint responsibility for returned products and collaboration for efficient product recovery and disposal can enhance RL implementation. From a market perspective, customer satisfaction (D12) is the driving force behind after-sale initiatives. The appropriate disposal of products and involvement in RL activities can boost customer loyalty and contentment. Fulfilling customer expectations for responsible and sustainable practices can help to create a positive brand image and foster strong customer relationships. Green consumerism (D14) is a significant driver of the RL implementation. Increasing environmental awareness among consumers has led to growing pressure for companies to adhere to environmental standards and legislation. The adoption of RL to meet the expectations of environmentally conscious consumers can positively affect a company's reputation and market position.

These drivers highlight the influence of customers and market forces in promoting the implementation of RL. Collaborative relationships with business partners, customer satisfaction, and responses to the demands of environmentally conscious consumers drive companies to adopt RL. By addressing these drivers, companies can enhance their competitiveness, meet customer expectations and contribute to environmental sustainability.

Societal Perspective

No obstacles to RL implementation have been identified in literature from a societal perspective. Extensive research on these 44 barriers did not find any direct association with stakeholders or societal viewpoints. The authors argue that communities, non-governmental organisations, and society, which represent societal interests, advocate responsible environmental behaviour and do not hinder RL implementation and advancement.

Five motivational factors are identified in this review. One of these factors is the increasing concern among industries regarding green marketing (D15), which aims to address the pressure from groups such as NGOs. This driver ranked fourth in terms of the frequency of use among the authors. Companies are also apprehensive about the negative media attention from green action organisations or groups (Mathiyazhagan and Haq, 2013). Heightened public awareness of environmental issues (D34) drives RL from a social perspective. Corporate citizenship pressure (D35) has become a way to promote green initiatives, ranking third among the most commonly cited motivators. Companies are pressured to act in a socially responsible manner by fulfilling their legal, ethical, and economic obligations (Abdullah et al. 2012).Kannan et al. (2013, 2014) proposed that the limited availability of landfill space (D36) drives the RL. With illegal landfills posing significant threats, RL presents a solution for proper disposal of end-of-life products.

Organizational Perspectives

From the perspective of firms and shareholder demand, five drivers of RL implementation have been identified in the literature.

First, the concern for the long-term sustainability of the business (D16) serves as a motivating force. Jindal and Sangwan (2013) and Mathiyazhagan and Haq (2013) have mentioned companies are concerned about factors that drive the adoption of RL practices, such as the rise of green consumerism and the increasing scarcity of raw materials. Second, eco-design (D22) stimulates the implementation of RL. Implementing eco-design practices and techniques, such as designing for remanufacturing, recycling, or disassembly, increases the likelihood of retrieving end-of-life (EOL) products. This reduction in RL costs has stimulated the implementation of RL initiatives, and there are two aspects to the economic benefits of driving RL implementation. First, the potential decrease in raw material consumption and waste disposal costs (D25) incentivises companies to implement RL. Rahimifard et al. (2009) and Subramoniam et al., (2013) have mentioned that companies aim to decrease raw material usage and disposal expenses by substituting recovered materials with new ones. Second, the opportunity to recover the remaining value of used products (D26) drives RL implementation. Subramoniam et al., (2013) commented that this value can be derived from reclaiming assets , spare parts and the recapturing value.
Subramoniam et al.Subramoniam et al.Finally, various authors, such as Jindal and Sangwan (2013), Krikke et al. (2013), Subramoniam et al. (2013), and Kannan et al. (2014) regarded economic viability (D29) as a key driver of RL. The economic feasibility and profitability of RL initiatives are crucial factors motivating companies to adopt RL practices.

Further Insights

Content analysis of the 71 articles yielded valuable insights into the factors that influence RL implementation from multiple perspectives. The inclusion of stakeholders in the framework has been successful because it considers multiple perspectives such as those of society, government, business, and customers.

Several key insights were obtained from a theoretical perspective. Business customers expect their supply chain partners to adhere to green standards including RL. Consumer expectations are evolving, with companies with strong social and environmental reputations preferring environmentally friendly products (Wassenhove and Besiou, 2013).

The government's role is influential as it can impose ecological requirements through regulations, compelling companies to comply with legal consequences (Sarkis et al. 2010). NGOs and society also play a crucial role in promoting socially responsible behaviour among companies by collaborating with governments and exerting pressure on corporate conduct. Additionally, satisfying shareholder demand is vital for companies to protect their capital investments because shareholders have a significant influence on logistics decisions including RL (Kim & Lee, 2012).

In the corporate world, particularly among executives, it is commonly accepted that a company's primary allegiance is to shareholders (Avkiran and Morita, 2010). This information and the results of this study are corroborated by Meixell and Luoma (2015), who asserted that shareholders have a major impact on logistics decisions, including RL.

It is important to consider the differences between the impacts of stakeholder pressure. Meixell and Luoma (2015), proposed that stakeholder demands can increase a company's understanding of stakeholder concerns or mirror the company's objectives towards

sustainability without necessarily resulting in the adoption of practices such as RL. This analysis focused on the expected or key stakeholders to investigate the elements that directly influence RL implementation.

Insights have emerged regarding the barriers to RL implementation. While most of the identified barriers are situated from a firm's perspective, they may stem from external impediments. For example, the absence of specific laws (B25) and motivating legislation from a governmental perspective can significantly influence the system, affecting factors such as Limited Initial RL Investment (B13) and top management engagement (B43).Poor forecasting and planning (B8) from a customer's perspective can also impede Limited Top Management Engagement(B43). This multi-perspective framework sheds light on the potential linkages between these factors, providing avenues for further exploration in future research.

Overall, content analysis provides valuable insights into the factors influencing RL implementation across different stakeholders. The multi-perspective framework enhances our understanding of these influences and their interconnectedness, thereby enabling a comprehensive analysis of RL implementation challenges and opportunities.

Future Research Opportunities

Considering the preceding analysis and the proposed framework, a few potential research questions can be posed: What are the interactions and influential links between drivers and barriers to reverse logistics? Through this exploration, the most influential factors driving and hindering behaviour were identified. Understanding these relationships can help prioritise the focus on key drivers and barriers to enhance the implementation of reverse logistics.

What steps can be taken to integrate social elements into reverse logistics to make it more sustainable? Previous studies have primarily focused on the environmental effects of reverse logistics. To maximise the potential of the supply chain and increase competitiveness, reverse logistics must consider all three aspects of sustainability: economic, environmental, and social. Addressing this research question will improve the effectiveness of reverse logistics and promote sustainable development.

What impact does a customer's attitude towards reverse logistics have on a company's choice to incorporate it into its operations? Although numerous studies have investigated the perspective of green customers, research on customer perspectives with respect to reverse logistics is limited. Furthermore, many customers are inadequately informed about reverse logistics. Answering this question can enhance customers' understanding of reverse logistics, thereby creating a sustainable relationship between companies and customers. Additionally, companies can gain a better understanding of customer expectations regarding RL implementation of reverse logistics through real-life scenarios.

What are the appropriate strategies for implementing reverse logistics at the organizational level? Figure 6 indicates that there are more organizational obstacles than from other perspectives. Consequently, it is essential to address the obstacles to logistics implementation and suggest suitable solutions to surmount them. This study focuses on discovering efficient tactics and procedures for the successful execution of reverse logistics within organisations.

Final Remarks

This study conducted an exhaustive review of over two decades of research focused on exploring topics related to reinforcement learning (RL), stakeholders, and influential factors. A total of 160 articles were identified, 77 of which were included in the analysis, demonstrating an increase in the number of publications related to the RL field. The purpose of this study was to gain a better understanding of the elements that facilitate or impede RL implementation from the perspective of multiple stakeholders.

A systematic content analysis approach was employed to ensure reliability and accuracy of the results. The selected studies were assessed using predefined structural dimensions and analytical categories, utilising both deductive and inductive methods. This process yielded 37 drivers who fostered RL. These drivers have contributed to the adoption and development of RL. Furthermore, the reviewed papers identified 44 obstacles to the implementation of RL. These obstacles impede or present difficulties for the successful execution of RL.

The main purpose of this study was to understand the influential factors related to RL implementation from the perspectives of different entities, including businesses, society, government, and customer organisations. A thorough RL multi-perspective framework was constructed to identify the catalysts and obstacles to RL implementation. This framework can be used to inform managerial decision making and direct organizational change management. This underscores the need to consider influential factors from multiple perspectives in order to devise a comprehensive industrial strategy for successful RL implementation.

Although this study was conducted systematically, there are still opportunities for future research. Further investigation can explore the contextual nature of certain factors that may be perceived as drivers or barriers depending on specific circumstances. Understanding the interactions and contingencies between drivers and barriers is another area of deep insight. Empirical validation and testing of the RL multi-perspective framework are required, along with an assessment of the relative importance and influence of each factor within the system. The framework can be expected to include additional stakeholders or be adapted to different country contexts. Prioritising actions to overcome barriers can be achieved by establishing a priority rank based on the importance of each barrier.

It is important to note that the categorisation of the papers was subjective and open to interpretation, considering the involvement of the three researchers in the content analysis and validation processes. To address this issue, a more comprehensive bibliometric citation analysis can be used to provide a structured approach for categorising these factors. This technique can reduce subjectivity and enhance the dependability of the categorisation process. These restrictions create opportunities for further exploration of RL, including the investigation of promising research areas. One approach is to use multi-criteria decision-making (MCDM) tools to assess the interactions among the factors that affect RL implementation. Using MCDM techniques, researchers can systematically and objectively evaluate the connections and dependencies between different factors.

Table A1
References categorised by Journals

No	Journal Title	Number of Articles	No	Journal Title	Number of Articles
1	Supply Chain Management: An International Journal	6	24	International Journal of Sustainable Engineering	1
2	Journal of Cleaner Production	5	25	International Journal of Technology Management	1
3	International Journal of Production Economics	5	26	Journal of Applied Science & Engineering Management	1
4	The International Journal of Advanced Manufacturing Technology	5	27	Journal of Business Research	1
5	International Journal of Operations & Production Management	5	28	Journal of Cleaner Production	1
6	Resources, Conservation & Recycling	3	29	Journal of Fashion Marketing & Management	1
7	International Journal of Physical Distribution & Logistics Management	3	30	Journal of Manufacturing Systems	1
8	Academy of Management Perspectives	1	31	Journal of Modelling in Management	1
9	Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis	1	32	Journal of Operations Management	1
10	Applied Sciences	1	33	Journal of Purchasing & Supply Management	2
11	Benchmarking: An International Journal	1	34	Journal of Sustainable Development	1
12	British Journal of Management	1	35	Logistics Information Management	1
13	Clean Technologies & Environmental Policy	1	36	Management Decision	1
14	Computers & Industrial Engineering	1	37	Measuring Business Excellence	1
15	Corporate Social Responsibility & Environmental Management	1	38	Omega	1
16	European Journal of Operational Research	1	39	Proceedings of the Pakistan Academy of Sciences	1
17	Global Journal of Flexible Systems Management	1	40	Production Planning & Control	1

18	International Journal of Automation & Logistics	1	41	Resources Policy	1
19	International Journal of Business Performance & Supply Chain Modeling	1	42	Renewable & Sustainable Energy Reviews	1
20	International Journal of Logistics Management	1	43	Technological Forecasting & Social Change	1
21	International Journal of Modelling & Optimization	1	44	TQM Journal	1
22	International Journal of Production Research	1	45	Sustainability	1
23	International Journal of Sustainable Development & World Ecology	1			

Table A2
Distribution according to industry sector

No.	Industry Sector	Papers	No.	Industry Sector	Papers
1	Many (more than 2 sectors)	15	11	Flour Miling	1
2	Transportation Equipment Manufacturing	12	12	Online Industry Business	1
3	Electrical Equipment, Appliance, & Component Manufacturing	10	13	Food Processing Industry	1
4	Chemical Manufacturing	2	14	Food Retailer	1
5	Apparel Manufacturing	1	15	Automotive	1
6	Paper Manufacturing	1	16	Electronic	1
7	Primary Metal Manufacturing	1	17	Renewable /Sustainable Energy Technology	1
8	Construction	2	18	SME	1
9	Fastener Manufacturing Industry	1	19	Logistic Industry	1
10	Mining Industry	1	20	Not specified	16

Table A3
Country Specific

No	Country	Papers	No	Country	Papers
1	India	15	12	Greece	1
2	China	6	13	Holland	1
3	UK	4	14	Pakistan	1
4	Malaysia	3	15	Poland	1
5	Many (more than 2)	4	16	Taiwan	1
6	Spain	3	17	USA	1
7	Brazil	3	18	Thailand	1
8	Hong Kong	2	19	Canada	1
9	Turkey	2	20	UAE	1

10	Australia	1	21	Sweden	1
11	Czech Republic	1	22	None	17

Table A4: Methods

No	Methods	Papers
1	Case Study	20
2	Survey	19
3	Other	11
4	Theoretical	6
5	Literature Review	8
6	Interview	2
7	Mathematical Modelling	5

Table 1
Stakeholders categorized by reference.

No	**Stakeholder**	**Source**
1	Government	Alvarez-Gil et al., (2007), Subramoniam et al., (2009),Avkiran and Morita (2010), Gonzalez-Torre et al., (2010),Sarkis et al., (2010),Crane and Ruebottom (2011),Abdullah et al. (2012), Kim and Lee (2012),Aitken and Harrison (2013), Hsu et al., (2013), Mathiyazhagan and Haq (2013), Shaik and Abdul-Kader (2013),Wassenhove and Besiou (2013), Ye et al. (2013), Kannan et al. (2014), Narayana et al.(2014)
2	Customers	Alvarez-Gil et al. (2007), Rahimifard et al., (2009) , Avkiran and Morita (2010), Gonzalez-Torre et al., (2010), Sarkis et al. (2010),Crane and Ruebottom (2011),Abdullah et al. (2012), Kim and Lee (2012),Hsu et al. (2013),Mathiyazhagan and Haq (2013), Shaik and Abdul-Kader (2013), Wassenhove and Besiou, (2013),Ye et al., (2013), Kannan et al.(2014), Narayana et al. (2014)
3	Society/NGOs	Alvarez-Gil et al. (2007),Subramoniam et al. (2009), Gonz alez-Torre et al. (2010), Sarkis et al.(2010),Crane and Ruebottom,(2011), Abdullah et al. (2012),Kim and Lee (2012),Van Der Wiel et al., (2012), Hsu et al. (2013), Mathiyazhagan and Haq (2013), Wassenhove and Besiou (2013)
4	Market/Competitors	Alvarez-Gil et al. (2007),Rahimifard et al., (2009),Gonzalez-Torre et al., (2010),Crane and Ruebottom, 2011, Abdullah et al., 2012,Ye et al., 2013
5	Suppliers	Crane and Ruebottom (2011),Van Der Wiel et al.(2012) ,Hsu et al. (2013), Kannan et al. (2014)
6	Organization	Alvarez-Gil et al. (2007),Rahimifard et al. (2009), Subramoniam et al. (2009),Avkiran and Morita (2010),Sarkis et al. (2010) ,Crane and Ruebottom (2011), Kim and Lee(2012), Van Der Wiel et al. (2012), Shaik and Abdul-

		Kader (2013),Wassenhove and Besiou (2013), Narayana et al. (2014)
7	Employees	Avkiran and Morita (2010),Sarkis et al. (2010), Crane & Ruebottom (2011) ,Kim and Lee (2012), Hsu et al. (2013), Shaik and Abdul-Kader (2013), Wassenhove and Besiou (2013),Kannan et al. (2014), Kannan (2018)
8	Media	Sarkis et al. (2010),Crane and Ruebottom (2011), Mathiyazhagan and Haq (2013),Wassenhove and Besiou (2013)

Table 2
List of RL drivers, classification & sources

Driver	**Stakeholders Involved**	**Internal /External**	**Sources**
1 - Policy			
D1. Product Return and Recovery's Regulation Many countries have adopted legislation to ensure proper product disposal, or may require firms to accept responsibility for the collecting of discarded products.	Government	External	Alvarez-Gil et al., (2007), Subramoniam et al., (2009), Avkiran and Morita (2010), Gonzalez-Torre et al., (2010), Sarkis et al., (2010), Crane and Ruebottom (2011), Abdullah et al. (2012), Kim and Lee (2012),Aitken and Harrison (2013) Hsu et al., (2013), Mathiyazhagan and Haq (2013), Shaik and Abdul-Kader (2013), Wassenhove and Besiou (2013), Ye et al. (2013), Kannan et al. (2014), Narayana et al. (2014)
D2. Operating License Companies are progressively implementing Reverse Logistic (RL) methods into their corporate operations in order to secure a license to operate.	Government	External	Andiç et al.,(2012)
D3. End-of-Life Levies	Organization	Internal	Rahimifard et al., (2009)

Customers are encouraged to return end-of-life (EOL) products when tax revenue is available at the time of sale.			
D4. Legislation on Motivation Manufacturers' application of take-back taxes motivates industries to return their products. One significant example is the provision of special tax breaks for enterprises that have achieved ISO 14001 certification, which encourages responsible product management and disposal practices.	Government	External	Rahimifard et al., (2009), Mathiyazhagan and Haq (2013)
2-Governance & SC process			
D5. Supportive Business Partners Well-trained supply chain partners help with RL deployment.	Suppliers, Customers	External	Ho et al. (2012),Aitken and Harrison (2013)
D6. Partnership Synergy Cooperating with business partners within a supply chain can greatly speed up the deployment of RL.	Suppliers, Customers	External	Subramoniam et al. (2009) , Janse et al.,(2010),Ho et al., (2012), Xie and Breen (2012), Saavedra et al. (2013), Shaik and Abdul-Kader (2013), Subramoniam et al. (2013)
3 - Management			
D7. Employee Satisfaction Environmental practices within a business can have a good impact on a number of aspects, such as employee happiness, a sense of wellbeing, and employee morale.	Employees	Internal	Andiç et al. (2012)

D8. Number of Staff The positive correlation between the number of staff and the adoption of RL suggests that an increase in staff may lead to a higher rate of RL adoption.	Employees	Internal	Ho et al., (2012)
D9. Human Resources Support The company's human resources support enhances RL activities	Employees	Internal	Ho et al. (2012)
D10. Top Management Engagement The implementation of RL becomes more manageable when top managers are aware of its significance and are committed to its execution.	Employees	Internal	Janse et al. (2010) , Xie and Breen (2012),Agrawal et al., (2015)
D11.Integration of Departments. An organizational structure that includes both physical and intangible components, such as manufacturing divisions, can positively impact the decision to adopt and implement RL practices.	Organization	Internal	Subramoniam et al. (2009)
4-Market & Competitors			
D12. Customer Satisfaction Enhancing after-sales services can lead to increased customer satisfaction, trust, and loyalty.	Customers	External	Jayaraman and Luo (2007), Kapetanopoulou and Tagaras (2011),Andiç et al., (2012), Jindal and Sangwan (2013), Mathiyazhagan and Haq, (2013), Shaik and Abdul-Kader (2013).

D13.Competitive Advantage By implementing reinforcement learning techniques, companies can gain a significant competitive advantage, leading to numerous benefits such as lower expenses, higher earnings, increased market dominance, and a distinct position against their competitors.	Market/Competitors	External	Jayaraman and Luo (2007),Chan and Chan (2008),Lau and Wang (2009),Kapetanopoulou and Tagaras (2011), Andiç et al. (2012), Mathiyazhagan and Haq (2013)
D14. Green Consumerism The growing demand from customers for environmental protection is becoming an increasingly pressing matter in promoting sustainability.	Customers	External	Srivastava (2008), Lau and Wang (2009),Kapetanopoulou and Tagaras, (2011),Andiç et al., (2012), Chan et al., (2012), Hsu et al., (2013), Jindal and Sangwan (2013), Mathiyazhagan and Haq (2013), Shaik and Abdul-Kader (2013, 201,Subramoniam et al. (2013, 2014)
D15. Green Marketing Industries are increasingly focusing on cultivating green images.	Society, Media	External	Wang and Sun (2005), Lau and Wang (2009),Kapetanopoulou and Tagaras (2011), Van Der Wiel et al., (2012),Jindal and Sangwan (2013),Mathiyazhagan and Haq (2013), Shaik and Abdul-Kader (2013)
D16. Long-term Sustainability Businesses are becoming increasingly concerned about their ability to remain competitive and viable in the long-term.	Organization	Internal	Kumar and Putnam (2008), Andiç et al. (2012), Jindal and Sangwan, (2013), Mathiyazhagan and Haq (2013), Kannan et al. (2014)

D17. Competitive Green Pressures To stay competitive, companies often feel compelled to adopt environmental initiatives.	Market/Competitors	External	Hsu et al. (2013), Mathiyazhagan and Haq (2013), Shaik and Abdul-Kader (2014)
D18. Brand Protection The existence of competing companies and the resulting brand loss can lead to firms feeling pressured, ultimately affecting their decision to participate in RL activities.	Organization	Internal	Jindal and Sangwan (2013), Subramoniam et al., (2013)
5-Technology and infrastructure			
D19. RL Management Information System The success of RL development depends on the availability of specific IT resources.	Organization	Internal	Subramanian et al. (2014)
D20.Recycling Management System The success of RL implementation and adoption heavily relies on the availability of a dependable recycling management system and services.	Organization	Internal	Lau and Wang (2009)
D21. Technological Innovations Advancements in RL come with rapid progress, leading to faster obsolescence and shorter product lifetimes.	Organization	Internal	Lau and Wang (2009), Shaik and Abdul-Kader (2014)
D22. Eco-design Techniques	Organization	Internal	Xie and Breen (2012),Subramoniam et al., (2009,

Creating designs that account for remanufacturing, recycling, or disassembly can make it more likely that the end-of-life product can be recovered, as the cost of retrieval is reduced.			2013),Kannan et al., (2014)
D23. Recycling and Remanufacturing Technologies As they advance, researchers are constantly devising recycling and remanufacturing tactics.	Organization	Internal	Shaik and Abdul-Kader (2013),Kannan et al., (2014)
6 – Economic			
D24. Advantages of Recycling The growing financial advantages of recycling have encouraged firms to devise more efficient reverse logistics (RL) plans.	Organization	Internal	Chan et al. (2012)
D25. Resource Efficiency Gain By substituting recovered materials for raw materials, it is possible to decrease the amount used and, consequently, lower the final disposal costs.	Organization	Internal	Rahimifard et al. (2009),Mathiyazhagan and Haq (2013), Subramoniam et al. (2013), Subramanian et al. (2014)
D26. Value Recovery Recycling and repurposing of spare parts and assets can be achieved through RL, thereby resulting in value recovery.	Organization	Internal	Chan and Chan (2008),Rahimifard et al. (2009), Janse et al. (2010),Kapetanopoulou and Tagaras (2011), Chan et al. (2012), Mathiyazhagan and Haq (2013), Subramoniam et al. (2013), Kannan et al.

			(2014), Subramanian et al. (2014)
D27. Second Hand Market Accessing a second-hand market presents further financial possibilities.	Organization	Internal	Chan et al. (2012)
D28. Cost Risk Reduction Companies utilize reinforcement learning to minimize penalties and risks, such as reducing fuel costs to comply with carbon tax regulations.	Organization	Internal	Andiç et al. (2012) , Mathiyazhagan and Haq (2013)
D29. Economic Viability RL can improve economic efficiency	Organization	Internal	Wang and Sun (2005), Srivastava (2008), Lau and Wang (2009),Chan et al. (2012), Jindal and Sangwan (2013), Krikke et al. (2013), Shaik and Abdul-Kader (2013), Ravi et al., (2015), Subramoniam et al. (2013),Kannan et al. (2014), Shaik and Abdul-Kader (2014),Agrawal et al., (2015)
D30. Financial Support Availability of initial capital for investment in RL operations.	Organization	Internal	Ho et al., (2012)
7 – Knowledge			
D31. Knowledge on Sustainability Awareness Managers and businesses are increasingly aware of environmental concerns, the importance of sustainable	Organization, employee	Internal	Ho et al., (2012)

growth, and their responsibility to society.			
D32. Knowledge on Cost and Performance Understanding the costs and efficiency of RL operations thoroughly.	Organization, employee	Internal	Janse et al., (2010), Mathiyazhagan and Haq (2013)
D33. Intellectual property (IP) The protection of a product's intellectual property (IP) is a crucial factor in the decision to implement RL	Organization	Internal	Subramoniam et al. (2013)
8-Social			
D34. Public awareness The growing environmental consciousness among the public has led to an increased demand for responsible behavior from NGOs, driving the implementation of RL operations.	Society , Customers	External	Alvarez-Gil et al. (2007), Lau and Wang (2009)
D35. Corporate Citizenship Pressure As companies strive to meet their ethical, legal, and economic obligations, they are under increasing pressure to operate in a socially responsible manner.	Society , Media	External	Jayaraman and Luo (2007),Chan and Chan (2008),Chan et al. (2012), Van Der Wiel et al. (2012),Aitken and Harrison (2013), Hsu et al., (2013), Jindal and Sangwan (2013), Mathiyazhagan and Haq (2013), Shaik and Abdul-Kader (2013), Shaik and Abdul-Kader (2014)
D36. Increasing Landfill Due to the scarcity of available landfill spaces, RL can provide a solution for the	Society	External	Jindal and Sangwan (2013), Kannan et al. (2014)

proper disposal of end-of-life (EOL) products, particularly in light of the emergence of illegal landfills as a significant threat.			
D37. Environmental Conservations EOL goods release hazardous substances, which pose significant environmental risks.	Society	External	Kannan et al. (2014)

Table 3
RL barriers, categorization and sources

Barriers Name	**Stakeholders Involved**	**Internal/ External**	**Sources**
1 - Technology and infrastructure (T&I)			
B1. Technical Skill Gaps There is a scarcity of skilled personnel and an inadequacy of resources to conduct RL tasks efficiently.	Employees, Organizations	Internal	Daily and Huang (2001), Rogers and Tibben-Lembke (2001), Hillary (2004), Perron and Student (2005), Ravi and Shankar (2005), Wang and Sun (2005), Chan and Chan (2008), Fawcett et al., (2008), Walker et al., (2008), Gonzalez-Torre et al., (2010), Mudgal et al., (2010),Sarkis et al., (2010), Kapetanopoulou and Tagaras (2011) ,Sharma et al. (2011), Skapa, (2011),Balasubramanian (2012) ,Giunipero et al. (2012),Van Der Wiel et al., (2012),Aitken and Harrison (2013), Govindan et al. (2013), Yusuf and Raouf (2013),Pumpinyo and Nitivattananon (2014),Abdulrahman et al. (2014) , Ganjali et al., (2014),Govindan et al., (2014), Shaharudin et al.,

			(2014), Bag and Anand (2015), Bouzon et al., (2015), Chkanikova and Mont (2015) , Prakash and Barua (2015), Bouzon et al., (2018)
B2. IT Systems Deficiency IT connectivity issues manifest as a dearth of information and technological systems, incompatibility between IT systems, and inadequate support for information technology	Organization	Internal	Rogers et al., (1999), Ravi and Shankar (2005), Wang and Sun (2005), Chan and Chan (2008) , Gonz alez-Torre et al., (2010), Janse et al., (2010),Sharma et al., (2011), Skapa (2011), Aitken and Harrison (2013), Bernon et al. (2013), Yusuf and Raouf (2013), Abdulrahman et al., (2014), Bouzon et al., (2015), Chileshe et al., (2015)
B3. Lack of Modern Technologies There is a deficiency in accessing the most recent technologies employed for product and material recycling.	Organization	External	Beamon (1999), Dashore and Sohani (2008) , Guide and Van Wassenhove(2009),Lau and Wang (2009),Torre et al., (2010) ,Balasubramanian, (2012), Chan et al., (2012),Al Zaabi et al., (2013),Abdulrahman et al., (2014),Ganjali et al., (2014), González-Govindan et al, (2014),Pumpinyo and Nitivattananon (2014), Shaharudin et al., (2014) , Bouzon et al., (2015)
B4. Resource Shortage There is a shortage of equipment, storage facilities, and vehicles for handling reverse operations in the industrial infrastructure	Organization	Internal	Gonz alez-Torre et al., (2010) , Shaharudin et al., (2014),Abdulrahman et al., (2014), Bouzon et al., (2015), Chileshe et al., (2015)
B5. Product Recovery Technology Challenges The complexity of designing for recycling	Organization	Internal	Beamon (1999), Rahimifard et al., (2009),Andiç et al., (2012), Govindan et al., (2013),Ganjali et al., (2014),

and reuse of used products can be challenging, as many manufacturers are resistant to altering their designs for end-of-life recovery. The adoption of recycling technologies and design for 'X' techniques is limited, especially in developing countries.			Shaharudin et al., (2014), Bouzon et al., (2015)
B6. Operational Complexity RL systems are characterized by greater uncertainty and complexity compared to forward distribution, primarily due to the variability of recovery options and processes, which depend on factors such as product characteristics, life cycles, facility capacities, and resource requirements.	Organization	Internal/External	Wang and Sun (2005),Kapetanopoulou and Tagaras (2011)
2-Governance and SC process (G &SC)			
B7. Supply Chain Partner Challenges Due to the variety of products and intricate flow patterns, several companies struggle with forecasting and planning for their returnable packaging operations, caused by factors such as random returns, fluctuating demand, and varying	Suppliers, Customers	External	Ravi and Shankar (2005), Wang and Sun (2005), Walker et al., (2008), Gonz alez-Torre et al., (2010),Sharma et al., (2011),Balasubramanian (2012),Mangla et al., (2012),Bernon et al., (2013), Bouzon et al., (2015),Abdulrahman et al., (2014), Agrawal et al., (2015), Chileshe et al., (2015)

product mixes, leading to difficulties in accurately predicting and organizing RL operations.			
B8. Poor Forecasting and Planning The consistency of product quality in reverse logistics is not as consistent as it is in forward logistics.	Customers, Organization	Internal	Lau and Wang (2009), Janse et al., (2010),Abraham (2011), Sharma et al., (2011), Chan et al., (2012), Yusuf and Raouf (2013), Shaharudin et al., (2014),Abdulrahman et al., (2014),Bouzon et al., (2015)
B9. Inconsistent Quality Locating third-party entities to collect used goods can be a daunting task, and the number of consultancy firms specializing in reverse logistics is relatively low.	Organization	External	Ravi and Shankar (2005) ,Abraham (2011),Sharma et al., (2011), Yusuf and Raouf (2013), Shaharudin et al., (2014), Bouzon et al., (2015)
B10. Third-Party Reverse Logistics Challenges A lack of suitable performance metrics and dedicated performance management systems for reverse logistics activities is hindering the efficient execution of these processes.	Organization	External	Hung and Wang (2009) ,Skapa (2011),Govindan et al., (2013),Ganjali et al., (2014),Shaharudin et al., (2014),Prakash and Barua (2015)
B11. Inadequate Performance Management The absence of collaboration between departments obstructs	Organization	Internal	Janse et al., (2010), Rao and Holt (2005) ,Ravi and Shankar (2005),Sharma et al., (2011),Yusuf and Raouf (2013),Abdulrahman et al., (2014),Govindan et al.,

seamless communication and results in limitations to the exchange of information.			(2014),Shaharudin et al., (2014)
B12. Inappropriate Organizational Co-operation There is a shortage of skilled personnel and a lack of sufficient capabilities to perform RL tasks effectively.	Organization	Internal	Ravi and Shankar (2005),Gonzalez-Torre et al., (2010),Govindan et al., (2013),Shaharudin et al., (2014)
3 - Economic (E)			
B13. Limited Initial RL Investment Restructuring the process of reverse logistics (RL) requires a significant investment.	Organization	Internal	Carter and Ellram (1998),Rogers and Tibben-Lembke (2001),Hervani et al., (2005),Ravi and Shankar (2005),Wang and Sun (2005),Chan and Chan (2008),Fawcett et al., (2008),Lau and Wang (2009),Gonzalez-Torre et al., (2010),Mudgal et al., (2010),AlKhidir and Zailani (2009),Sharma et al., (2011),Skapa (2011),Andiç et al., (2012),Giunipero et al., (2012),Mangla et al., (2012),Van Der Wiel et al., (2012),Govindan et al., (2013),Yusuf and Raouf (2013),Abdulrahman et al., (2014),Ganjali et al., (2014),Pumpinyo and Nitivattananon (2014) ,Bouzon et al., (2015),Chkanikova et al., (2015),Bouzon et al., (2018)
B14. Funds for Training There is a dearth of financial resources for	Organization	Internal	Abdulrahman et al., (2014),Ganjali et al., (2014)

training personnel specifically for reverse logistics (RL) operations..			
B15. Return Tracking and Handling The insufficient evidence to support the investment in monitoring systems for reverse logistics (RL) and storage and handling operations, coupled with the lack of economic justification for investing in product recovery activities, often prevents resources from being allocated to RL initiatives.	Organization	Internal	Kapetanopoulou and Tagaras (2011),Abdulrahman et al., (2014),,Ganjali et al., (2014),Bouzon et al., (2015),Prakash et al., (2015)
B16. Financial Burden of Tax The intricate flows of goods and the wide variety of purchased services involved in reverse logistics (RL) lead to a heightened degree of tax complexity. This complexity can result in unexpected tax consequences and higher operational costs for RLs.	Organization	Internal	Lau and Wang (2009),Sharma et al., (2011),Abdulrahman et al., (2014)
B17. Economic Uncertainty Investors are looking for a return on their investment, but	Organization	Internal	Alvarez-Gil et al., (2007),Hung and Wang (2009),Gonzalez-Torre et al., (2010),Kapetanopoulou and Tagaras (2011),Shaharudin

implementing product recovery initiatives is a risky and uncertain undertaking. The potential economic benefits of these initiatives are difficult to envision, which is one reason why companies are hesitant to implement them.			et al., (2014),Prakash and Barua (2015)
B18. Insufficient Economies of Scale Reverse logistics (RL) can be uncertain in terms of the volume of returned products, which presents a challenge to achieving economies of scale, typically associated with larger volumes and contributing to operational cost efficiency.	Organization	Internal	Abdulrahman et al., (2014),Bouzon et al., (2015), Prakash and Barua (2015)
B19: Limited Bank Funding Due to the limited understanding or knowledge of the reverse logistics industry and its profitability potential, some may view investments in reverse logistics as risky or untested. This perception often results in hesitation to provide loans or financial backing for reverse logistics initiatives.	Government	External	Hung and Wang (2009)

4-Knowledge related issues (K)			
B20. RL Practice Understanding Acquiring knowledge about the most effective practices in reverse logistics (RL) can be challenging for organizations due to the limited availability of easily accessible and reliable information on the subject.	Organization	Internal	Ngai et al., (2008) ,Balasubramanian (2012) ,Sharma et al., (2012), Al Zaabi et al., (2013),Abdulrahman et al., (2014),Govindan et al., (2014),Agrawal et al., (2015),Bouzon et al., (2015),Prakash and Barua (2015)
B21. Take-Back Channel Knowledge Gap Customers are not sufficiently knowledgeable about the various return channels for their products.	Organization	External	Shen and Tam (2002),Archer et al., (2008),Ou et al., (2010),Wilson and Platts, (2010),Govindan et al., (2013),Abdulrahman et al., (2014),Bouzon et al., (2015), Gorane and Kant (2015)
B22. RL Awareness Gap Despite this, there is a lack of public and widespread understanding of the benefits of reverse logistics (RL).	Organization, Employees	Intenal	Hung and Wang (2009), González-Torre et al., (2010),Mudgal et al., (2010),Sharma et al., (2011),Aitken and Harrison (2013),Yusuf and Raouf (2013),Abdulrahman et al., (2014),Shaharudin et al., (2014),Agrawal et al., (2015),Bouzon et al., (2015),Chileshe et al., (2015),Chkanikova (2015)
B23. Taxation Regulation Gap for Returns Due to their lack of knowledge and inadequate financial	Organization, Employees	Intenal	Rogers and Tibben-Lembke (2001),Ravi and Shankar (2005), Meade et al., (2007),Lau and Wang (2009), Rahimifard et al., (2009),Gonzalez-Torre et al., (2010),Mudgal et al.,

resources, companies may face a cost burden related to value-added tax (VAT) payments.			(2010),Sharma et al., (2011),Van Der Wiel et al., (2012),Govindan et al., (2013),Yusuf and Raouf (2013),Bouzon et al., (2015)
B24. Environmental Regulation Unawareness There is a scarcity of information regarding environmental regulations, a widespread unawareness of the environmental impact of a company's activities, and a lack of understanding about the benefits of implementing reverse logistics (RL).	Organization, Employees	Intenal	Shen and Tam (2002),Janse et al., (2010),Govindan et al., (2014),Bouzon et al., (2018)
5-Law/ Policy			
B25. Absence of Specialised Laws The absence of supportive policies, such as inadequate legislation or laws, is a major hindrance to companies participating in end-of-life (EOL) returns.	Government	External	Carter and Ellram (1998),Chan and Chan (2008), Walker et al., (2008),Lau and Wang (2009),Sharma et al., (2011),Mangla et al., (2012),Krikke et al., (2013),Shaharudin et al., (2014),Starostka-Patyk et al., (2013),Abdulrahman et al., (2014),Ganjali et al., (2014),Agrawal et al., (2015),Bouzon et al., (2015),Prakash et al., (2015)
B26. Lack of Waste Management Adoption In numerous countries, the implementation of waste management procedures is impeded	Government	External	Janse et al., (2010),Abdulrahman et al., (2014),Ganjali et al., (2014),Bouzon et al., (2015)

by the absence of clear return policies or inadequately regulated waste management systems.			
B27. Ministry Communication Gap Inadequate communication between government departments can result in contradictory laws and regulations.	Government	External	Abdulrahman et al., (2014),Bouzon et al., (2015)
B28. Absence of Motivational Laws The lack of regulations or directives that incentivize producers to participate in reverse logistics (RL) and maintain an eco-friendly environment, as well as motivate customers to buy green products, is a major obstacle.	Government	External	Perron and Student (2005),AlKhidir and Zailani (2009), Yu (2011),Zhu et al. (2012),Govindan et al., (2013),Ganjali et al., (2014),Abdulrahman et al., (2014),Pumpinyo and Nitivattananon (2014),Shaharudin et al., (2014),Bouzon et al., (2015),Hung and Wang (201)9
B29. Abuse of Environmental Regulations In certain cases, environmental regulations are not enforced properly, as evidenced by the lack of deterrent penalties and loopholes in Waste Electrical and Electronic Equipment (WEEE) regulations.	Government	External	Gonzalez-Torre et al., (2010),Andiç et al., (2012), Giunipero et al., (2012),Abdulrahman et al., (2014),Bouzon et al., (2018)
B30. Difficulties in extended producer	Government	External	Abdulrahman et al., (2014)

responsibility across countries The intricacy caused by the globalisation of supply chains presents difficulties for the execution of extended producer responsibility (EPR).			
B31. Company Polices against RL Companies often worry that remanufactured products may cannibalize their first-quality products, prompting them to implement policies against product recovery operations.	Organization	Internal	Rogers et al., (1999),Ravi and Shankar (2005),Chan and Chan (2008),Sharma et al., (2011),Skapa (2011), Aitken and Harrison (2013),Abdulrahman et al., (2014)
B32: CSR and Ethical Standards Deficiency In the absence of corporate social responsibility (CSR) and ethical standards, businesses may disregard proper disposal, recycling, and environmentally friendly practices. This can lead to increased waste generation, improper handling of hazardous materials, pollution, and detrimental effects on the ecosystem and environment.	Organization	Internal	Hung and Wang (2009), Balasubramanian (2012),Mudgal et al., (2010),Bouzon et al., (2018)
B33: Regulatory Volatility due to Politics	Government	External	Muduli et al., (2013)

When there is a shift in the political climate towards heightened environmental awareness and concerns, governments may take steps to introduce or reinforce regulations that address environmental issues associated with reverse logistics. Such regulations can encompass waste management policies, recycling targets, extended producer responsibility (EPR) requirements, and promotion of circular economy principles.			
B34: Political Commitment Gap In the absence of strong political support, governments may not prioritise reverse logistics in their policy agenda, which can lead to a lack of comprehensive frameworks, guidelines, and incentives to promote and regulate reverse logistics activities.	Government	External	Luthra et al., (2015)
6 - Market and competitors (M &C)			
B35. Negative Product Quality Perception	Customers	External	Carter and Ellram (1998),Rahimifard et al., (2009),Gonzalez-Torre et al., (2010),Shaharudin et al., (2014),Bouzon et al., (2015)

Customers may view products that have been recovered or made from recycled materials as being of inferior quality compared to new products.			
B36. Underdeveloped Recovery Markets It can be difficult to create markets for recycled materials and remanufactured products at the end of their life cycles.	Market/ Competitors	External	Rahimifard et al., (2009), Abraham (2011),Shaharudin et al., (2014),Bouzon et al., (2015)
B37. Limited Competitive Advantage Recognition Numerous companies overlook reverse logistics (RL) as a potential source of competitive advantage.	Organization	Internal	Rogers et al., (1999) ,Janse et al., (2010),Skapa (2011),Abdulrahman et al., (2014),Shaharudin et al., (2014),Bouzon et al., (2015)
B38: Market Competition and Uncertainty In highly competitive markets, reverse logistics businesses often encounter challenges when attempting to establish themselves and gain market share. Existing players with well-established networks, customer relationships, and brand recognition can create significant	Market/ Competitors	External	

barriers for new entrants.			
B39: Lack of Community Pressure In the absence of community pressure, there may be a lack of understandingand knowledge among individuals and businesses regarding the benefits of reverse logistics, recycling, and responsible disposal practices. This limited awareness can lead to a low demand for reverse logistics services and a lack of participation in recycling programs	Society/NGOs	External	Meehan and Muir (2008),Srivastava (2008) , Muduli et al., (2013)
B40: Marketing of Remanufactured Product Remanufactured products often face negative consumer perceptions influenced by factors such as a lack of awareness, scepticism about product quality, or misconceptions about the remanufacturing process. These perceptions can pose challenges to the market acceptance and demand for remanufactured products	Market/ Competitors	Internal	Srivastava (2008),Hung and Wang (2009), Pokharel and Mutha (2009),Prakash et al., (2015)

B41: Uncertain Return and Demand Reverse logistics encompasses the management of returned products, and uncertainties related to return volumes can present significant challenges. Fluctuations in return volumes can make it difficult for businesses to effectively plan and allocate resources. When return volumes are high, businesses may need to adjust their processing capacity to accommodate the increased workload. However, low return volumes can lead to underutilised resources and inefficiencies in the reverse logistics process.	Market/ Competitors	Internal	Inderfurth (2005),Pokharel and Mutha (2009),Prakash et al., (2015)
7 – Management			
B42. RL's Low Priority Because product recovery activities are seen as being at odds with a company's core operations, they tend to be given a lower priority than other tasks.	Organization	Internal	Rogers et al., (1999),Wang and Sun (2005),Chan and Chan (2008), Walker et al., (2008),Kapetanopoulou and Tagaras (2011), Skapa (2011),Shaharudin et al., (2014),Abdulrahman et al., (2014),Ganjali et al., (2014),Bouzon et al., (2015)
B43. Limited Top Management Engagement Resistance from top management to	Organization	Internal	Rogers et al., (1999),Rogers and Tibben-Lembke (2001), Hillary (2004),Ravi and Shankar (2005), Perron et al., (2006), Zhu et al., (2007), Lin and Ho (2008), Walker et

adopting reverse logistics (RL) practices can arise because of organizational culture and resistance to change.			al., 2008, Gonzalez-Torre et al., 2010, Sarkis et al., 2010,,Dashore and Sohani (2011),Sharma et al., (2011),Skapa (2011),Balasubramanian (2012),Giunipero et al. (2012),Liu et al., (2012),Bernon et al., (2013),Govindan et al., (2013),Van Der Wiel et al., (2012),Yusuf and Raouf (2013),Jayant and Azhar (2014),Shaharudin et al., (2014),Abdulrahman et al., (2014),Bouzon et al., (2015),Chileshe et al., (2015), Gorane and Kant (2015), Prakash and Barua (2015), Shaharudin et al., (2015)
B44. Limited Approval of Disposal Licenses The system does not allow a single firm to hold multiple product disposal permissions simultaneously.	Organization	Internal	Andiç et al., (2012)

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