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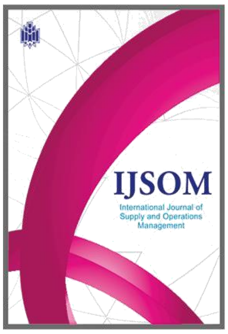

Exploring Disposition Decision for Sustainable Reverse Logistics in the Era of A Circular Economy: Applying the Triple Bottom Line Approach in the Manufacturing Industry

Hasnain Javed[a], Saba Fazal Firdousi[a,*], Majid Murad[a], Wang Jiatong[b] and Muhammad Abrar[c]

[a] *School of Management, Jiangsu University, Zhenjiang, China*
[b] *School of International Business, Yuexiu University, Zhejiang, China*
[c] *Lyallpur Business School, Government College University, Faisalabad, Pakistan*

Abstract

In recent times, the circular economy has gained much attention due to its emphasis on sustainability. Likewise, reverse logistics also plays a significant role in embracing and practical implications of the circular economy in the supply chain process. Disposition is among the critical factors that can strongly relate to reverse logistics in the light of sustainable practices. It also improves the overall operative productivity of reverse logistics. This study's primary goal is to investigate the concept of reverse logistics in the Pakistan textile manufacturing industry. Disposition decision effects using a triple bottom line that includes environmental, economic, and social performance under reverse logistics were also examined. Disposition decisions methodology and a triple bottom line approach were used for study hypothesis development. A survey-based approach was adopted using an online questionnaire technique by sending emails to 400 textile manufacturers in Pakistan. This study applied PLS (SEM) to test the hypothesis. Moreover, results also disclose positive linkage with triple bottom line performance. This research will be opening a new research paradigm for academicians, industries, and policymakers for the effective improvement in overall textile manufacturing reverse logistics.

Keywords: Disposition decision; Reverse logistics; Pakistani textile manufacturing industry; Circular economy; Structural equation modeling

1. Introduction

Global economists claim the textile industry to be the most important industrial segment with having long production process chains, with intrinsic value-added possible at each processing stage such as from cotton to ginning, spinning, fabric, dyeing and finishing, machining, and clothing. Moreover, it is also explored that the current worldwide clothing industry is worth $1.7 trillion, representing 2% of the world's GDP. The EU, the US, and China are the biggest apparel markets globally, with a cumulative share of nearly 54 percent. The main eight consumer countries of apparel make up a dominant 70 percent share of the world apparel market size (Tausif et al., 2018).

In Pakistan, the textile industry adds about one-fourth of the economic value-added and provides jobs for about 40% of the manufacturing workforce. Without periodic and recurring changes, textile products and goods have maintained an average national export share of about 60 percent (Arshad & Arshad, 2019). Pakistan's textile specialists also mention the addition of cotton spinning, fabric processing, home textiles, cotton cloth, cotton yarn, cotton fabric, towels, hosiery and knitwear, and ready-made clothing to the ancillary textile industry, both in structured large-scale manufacturing and in unorganized micro-small and medium-sized enterprises. The products produced by these firms have shorter product life cycles because owing to the introduction of the new technologies and changing fashion trends, customers modify them commonly.

* Corresponding author email address: sabafazalfirdousi@gmail.com
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With the rising population and clothing as one of the essential needs of human, its production demand is increasing day by day. According to global statistics, it is approximated 2.01 billion metric tons of municipal solid waste generation per annum. Moreover, the World Bank estimates also suggest the total generation of waste will rise by 2050 to 3.40 billion metric tons. Approximately 13.5% of today's waste is recycled and 5.5% composted.

Likewise, Pakistan is not behind and produces about 48.5 million tons of solid waste per annum, increasing at an average rate of 2% yearly. The developing countries lack infrastructure for proper waste management and its effective disposal and recycling, therefore, translating into severe environmental concerns. The case of Pakistan in this aspect is no different story. Due to ineffective measures, a major chunk of the industrial waste is either burned, dumped, or buried on empty lots, which in return endangering the general public's health and welfare. According to the Government of Pakistan (GOP), approximately 87,000 tonnes of solid waste is produced daily, primarily from major industrial clusters.

To address these rising global concerns, circular economy policies can be considered as a possible effective solution. The circular economy consists of end-of-life management of a product just so the product can be brought back to the supply chain by different mechanisms after completing its functional life, instead of being regarded as waste (Gaustad, Krystofik, Bustamante, & Badami, 2018). Moreover, reverse logistics methods can support the management of end-of-life products and other returned products properly to ensure productivity and efficiency and a sustainable supply chain (Govindan & Bouzon, 2018).

Reverse logistics includes the compilation, inspection, and segregation of used or end-of-life products into separate categories and their disposal for added dispensation. This arrangement is among the reverse logistics processes ' most significant decisions for its effective operational results (Mushtaq et al., 2018). This improved the sustainable supply chain's efficiency by enhancing its concentrated dimensions (Rana et al., 2019). Disposition significantly affects reverse logistics operational excellence, influencing the system's sustainability efficiency either directly or indirectly. Morgan et al. (2018) study indicates to have a positive contribution of reverse logistics in sustainability. It was further observed that disposition decisions are also positively associated with organization operational performance and overall economic performance (Feng et al., 2018). Besides this, the disposition of products is different from industry to industry. It might be product-specific based on several factors such as product price, value, shelf life, logistics costs, and the overall demand for the product in the market.

Moreover, the disposition of products differs from industry to industry. In certain cases, it can be product-specific conditional on multiple elements such as price/ value/ shelf-life/ transportation and logistics cost of the product, and overall market trends and demand. Pires et al. (2019) stated the three most widely accepted and used disposition options: reuse, recovery, and waste management. The primary aim of these used options is to improve the overall resale value of the returned and disposed of products via effectively using the waste mechanisms or taking out recyclable material from the waste product for further usage as raw material. Reverse logistics processes are the backbone to achieve the highest success in the available options. Therefore, for effective outcomes, organizations must manage updated track of their respective product life, estimated useful life with the end customer, and efficiently take care of the product's flow at multiple stages.

Therefore, for effective management, all the available data must be relevant to the product to be digitized, updated, and shared among all the supply chain stakeholders (Kot, 2018). It further translates into the digitalization of complex reverse logistics functions and further improves reverse logistics' aggregate performance. However, organization performance evaluation comprises many other factors such as economic and environmental measures (Falinski et al., 2018; Morgan et al., 2018). Banihashemi et al. (2019) have also reviewed the operational and environmental performance of reverse logistics.

The study conducted by (Shabbir & Kassim, 2018) on manufacturing industries of Pakistan discussed that green environment products have effectively incorporated handling of returned products due to policies, rules, and regulations given by international e-waste management associations. A day's sustainability is an important ingredient to compete in the international market in the circular economy era. Shaharudin et al. (2019) used a structural modeling research application for investigating the linkage between green supply chain management and triple bottom line performance in reverse logistics. Moreover, Jia et al. (2018) found that reverse logistics and its implementation in developed countries are more common, but in developing countries, e.g., such as Pakistan, India, Brazil, and Indonesia, face many challenges reverse logistics operations for triple bottom line performance approach. Furthermore, Sudarto & Morikawa (2017) studied the relationship between products' life cycle and social performance, economic performance, and environmental performance.

Researchers claim that (Agrawal & Singh, 2019; Butzer, Schötz, Petroschke, & Steinhilper, 2017; Mani et al., 2016; Slomski, Slomski, Valim, & Vasconcelos, 2018) few studies are investigating the environmental, economic, and social performance despite the rising culture of the circular economy. However, the sustainability of reverse logistics and the effectiveness of products' disposition decisions are still considered critical in applications. Most scholars have not explored the importance of disposition decisions and their impacts on green-sustainable performance in developing countries like Pakistan (Anwar, 2018). Vahabzadeh et al. (2015) explored reverse logistics and multi-criteria decision-making tool Fuzzy-VIKOR to determine the disposition decision effectiveness. Still, they cannot identify the impact of disposition decisions on the performance of reverse logistics. Recently, Agrawal & Singh (2019) explored the importance of the effectiveness of disposition decisions in the Indian electronics industry by applying the triple bottom line technique in reverse logistics using structural equation modeling. They have mentioned the research gap and certain limitations due to the small sample size and the likelihood of bias with limited scope. Thus, we have tried to provide more empirical evidence in Pakistan manufacturing industries to analyze the impacts of disposition decisions on the triple bottom line in reverse logistics performance for incorporating sustainable decisions.

2. Literature Review

Pires et al. (2019) elaborated that reverse logistics concentrates on the ecosystem and profits but does not recognize the social element to be one of the aspects of circular economy structures. The circular economy idea includes all sustainability elements, i.e., social, environmental, and economic features referred to as the triple bottom line strategy (Manello & Calabrese, 2019). Moreover, the economic elements help generate persistent yields by keeping adequate money (De Angelis, Howard, & Miemczyk, 2018). Furthermore, the environmental element protects humanity's environmental capital (Kuznetsova et al., 2019). On the other hand, the social component enables employees to grow and progress their jobs, along with their health and social welfare (Manninen et al., 2018). Following the 2002 Earth Summit in Johannesburg, South Africa, its primary goal was to develop sustainable measures by applying a triple bottom line approach that enacts a hybrid integration of economic, environmental, and social performance (de Oliveira & Trindade, 2018). The notion of sustainability is based on three ingredients: people, planet, and profit (Gallagher, Hrivnak, Valcea, Mahoney, & LaWong, 2018).

Clayton & Radcliffe (2018), in their book, put forth many definitions of sustainability. Some of the definitions most quoted include sustainability can be defined as a situation in which human activity is conducted in a way that conserves the functions of the earth's ecosystems (Fang, Zhou, Tu, Ma, & Wu, 2018). The intention behind using the word sustainability is to eliminate waste, gain organizational revenue, and offer the commodity to customers at reasonable rates (Mont, Whalen, & Nussholz, 2019). However, the priority stands on aligning interests among all its stakeholders (Epstein, 2018). Sustainability was first viewed, considering all of the three dimensions as alike and unprejudiced, whereas the selection of intrusion among the three should be classified according to contextual differences (Ford, 2018).

In this modern era, the circular economy appears to have emerged consisting of different theoretic concepts, for instance, cradle-to-cradle (Kopnina, 2018), performance economy, reformative design, industrial ecosystem, biomimicry (Meherishi, Narayana, & Ranjani, 2019), and blue economy. Even though the circular economy notion attempts to significantly reduce raw material input and minimize waste and energy spillage through a circular model, an open-ended mechanism still implements the belief of sustainability (Sousa-Zomer et al., 2018). The circular economy certainly seems to optimize economic profits by lowering inputs and protecting the environment by reducing waste, but the focus remains implicit on the social element. There seems to be a scientific gap while taking into account the triple bottom line's aggregate efficiency, primarily the social aspect of sustainability (do Prado et al., 2019). To investigate the aggregate efficiency of reverse logistics procedures, by assessing sub-factors of all three-performance dimensions, equal weightage is provided to all three aspects, i.e., environmental, social, and economic.

As illustrated in Figure 1, after examination and sorting, the recovered item is available for repair, reuse, recycling, reprocessing, or disposal. Moreover, this decision on returning products' disposition becomes more and more crucial because their quantity is repeatedly rising—studies found by observing facts of the significance of disposition. In textile remanufacturing research, it was discovered that adopting the recent techniques in reverse logistics is more economical (Maurel & Trabado, 2018). (Kot, 2018) proposed that "the existence of strengths in the use of the reverse logistics for the textile waste valuing in the clothing industry, it is still required a readjustment of the destination of textile waste as a by-product to be used in a new cycle." They recognized that only recycling and disposal are feasible disposal alternatives for improving reverse logistics economic performance.

Hasegawa et al. (2019) noted that recycling is a recommended disposal alternative for goods with low salvage value, while remanufacturing should be suggested for goods with strong salvage value. They even further indicated that the amount of returned products is significant in recycling for economies of scale where cost and time are appropriate in recycling. They stressed the need for cost-time trade-offs for efficient reverse logistics. (Agrawal & Singh, 2019) proposed that the applications' economic performance should be based on the anticipated value obtained from the goods. In the presence of intrinsic variables, (Vargas, Mantilla, & de Sousa Jabbour, 2018) used graphical analysis techniques on multiple parts of disposition decision-making under the umbrella of business and corporate policies to decide reverse logistics activity should be chosen for reverse logistics sustainability. Preferences on the disposition rely on different features. These features under current research are viewed through a diverse lens by critically assessing the literature and further evaluated during field visits based on individuals from distinct organizations. The following rationales are given to different features.

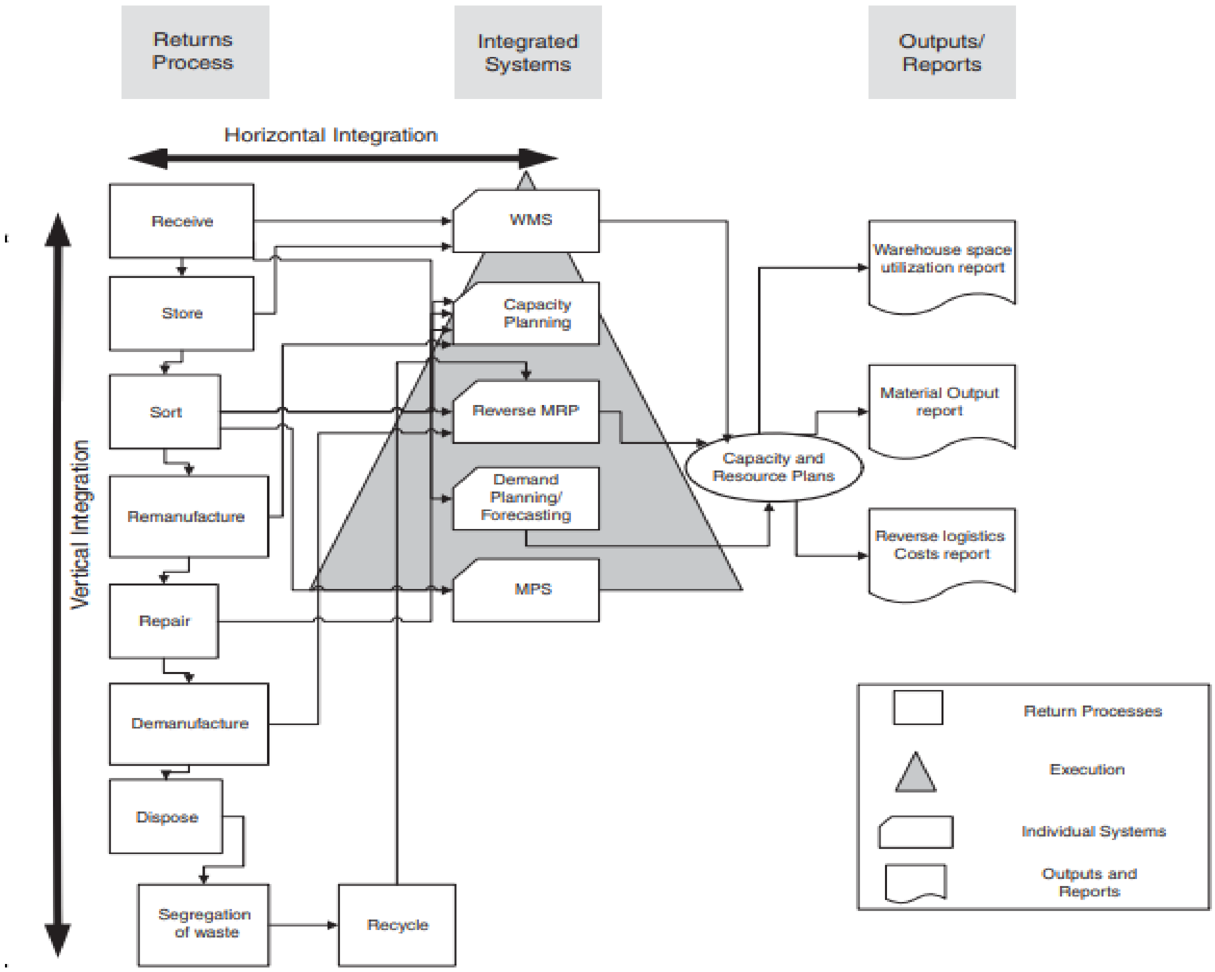


Figure 1. Product Return Flow and Reverses Logistics

2.1. Consumer Behavior

It has a noticeable effect on reverse logistics performance. Recycling rests on quantity, while the choice to reproduce is subject to the item's quality reimbursed. The amount and quality of products returned relies on the consumer's outlook, attitude, and consciousness. More aware customers can return the products in good time instead of keeping or disposing of them in the setting (Burucuoglu & Erdogan, 2019).

2.2. Business Environment

The business environment for the reconditioned environment's sale is critical to the strategic thinking of disposition (Chaowanapong, Jongwanich, & Ijomah, 2018). To sell these products, it relies on market dynamics. At the same moment, it can influence the brand preview of the new item, indeed promoting the green image. Organizations are more satisfied if these practices are also carried out by rivals and peer group organizations (Zhu, Shah, & Sarkis, 2018; Soleimani et al., 2020).

2.3. Current Practices

Current procedures can function as a barrier to the disposal of products. Business and the market may not allow most other disposal solutions to be selected (Cruz-Cárdenas & Arévalo-Chávez, 2018).

2.4. Environmental Conditions

Decisions on disposal have a significant effect on the virtual environment. Correct disposal alternative can enable to reduce of environmental waste. Many studies have regarding the environmental impact of reverse logistics (Ikhlayel, 2018).

2.5. Integration of Supply Chain Processes

It has to do with a firm's ability to embrace reverse logistics and incorporate it into the current supply chain. It intends to include operating reverse logistics with funds effectively (Arunachalam, Kumar, & Kawalek, 2018).

2.6. Government Rules, Regulations, and Reforms

The government rules, regulations, and reforms by the newly elected government are crucial for policymaking on disposition. Constraints by legislative bodies on some reverse logistics operations significantly affect disposition choices in reverse logistics (Govindan & Bouzon, 2018).

2.7. Product Value

It is classified as the most essential and among the essentials while making disposition choices. In general low value, added products are used for material recovery while recycling. Moreover, due to the high cost associated with low-value addition product recycling, it is generally not practiced, and with changing trends, customers prefer to buy new products (Milios, Beqiri, Whalen, & Jelonek, 2019).

2.8. Costs of Reverse Logistics

Much such expenditure consists of the various costs engaged in the reverse logistics operations of collection, logistics, processing, and retrieval. Decisions are made based on the reverse logistics cost-benefit assessment (Thain, 2019).

2.9. Recapturing Value

Recapturing value has a significant effect on the disposition choice due to its revenue growth contribution. If the recovery price is minimal, organizations are unwilling to reproduce (Larsen, Masi, Feibert, & Jacobsen, 2018).

2.10 Quantity of Returned Products

For disposition choices, the amount of products on the market for disposal is very crucial. High concentrations of returned products are usually needed for recycling due to increased recycling equipment investment (Badenhorst, 2018).

2.11. Quality of Returned Products

Product quality has a crucial role in disposition choices. In contrast, high-quality products are normally favored for reproduction to justify the price of reproduction (Duan & Aloysius, 2019).

3. Hypotheses Development

Previously, reverse logistics was regarded as to be a risk-driven activity that primarily focused on the performance of economic dimensions (Priem, Wenzel, & Koch, 2018). (Asees Awan & Ali, 2019) discovered in a study of Pakistan's textile manufacturing industry that organizations adopt reverse logistics methods on economic grounds. Moreover, organizations now mostly approach environmental concerns through reverse logistics contributions (Martinez-Martinez, Cegarra-Navarro, Garcia-Perez, & Wensley, 2019). Reverse logistics can significantly contribute to their sustainability objectives (De Clercq, Thongpapanl, & Voronov, 2018). Also, reverse logistics monitoring and decision-making must be explored to enhance the organization's sustainability efficiency (Farooq, Farooq, & Reynaud, 2019; Pundhir et al., 2020).

Nonetheless, it did not consider its social element (Campagnolo et al., 2018). This research considers all three sustainability dimensions and scrutinizes the effect on reverse logistics triple bottom line output of disposition decisions. Fig 2 represents the conceptual framework proposed for this study. The figure highlights the link between internal and external variables, the validity of disposal choices, and their relevance to the triple bottom line.

In reverse logistics, by recapturing value from the returned item, the focus was mostly on economic profits. Disposition for the useful reverse logistics scheme is an essential choice (Shaik & Abdul-Kader, 2018; Zamanian et al., 2020). It significantly affects reverse logistics efficiency, regardless of the number of variables involved. We discussed the internal and external factors for the effectiveness of disposition decisions. Internal factors related to the pertains reverse logistics costs, the importance of quality of returned products, the importance of supply chain integration, the volume of returned products, and the importance of production values in the disposition decisions. External factors are linked to economic, environmental, social, consumer behavior, business environment, and government rules and regulations (Andalib Ardakani & Soltanmohammadi, 2019; Dissanayake & Cross, 2018; Ahmed et al., 2020).

The hypotheses are formed to assess whether these variables affect the efficacy of disposition choices in reverse logistics to study the overall effect of internal and external factors on the performance of disposition choices.

Disposal choices are essential in the efficiency of reverse logistics. These choices have a major role in operational efficiency and customer satisfaction, thus contributing to the reverse logistics economic outcomes (Sorkun & Onay, 2018; Mardan & Kamranrad, 2020). The reliability of returned products' disposal is significantly correlated with economic and environmental performance (Banihashemi et al., 2019). According to (Laguir, Marais, El Baz, & Stekelorum, 2018), these decisions can also reverse logistics social performance. Even so, not much consideration is given to the social aspect of sustainability (Ahmad, Wong, & Rajoo, 2019). The proposed research also incorporates the social performance assessment and environmental and economic performance to investigate reverse logistics sustainability dimensions. It is further measured whether the effectiveness of Pakistan's manufacturing industry's disposition choices is favorably associated with reverse logistics triple bottom line performance. These hypotheses have been tested in responses to questions in the article's and further elaborated in the conceptual framework Figure 2.

H1a: External factors measured in disposition decisions significantly and positively affect the manufacturing industry's effectiveness of disposition decisions.

H1b: Internal factors measured in disposition decisions significantly and positively affect the manufacturing industry's effectiveness of disposition decisions.

H2a: The effectiveness of disposition decisions is positively and significantly related to reverse logistics' economic performance in the manufacturing industry.

H2b: The effectiveness of disposition decisions is positively and significantly related to reverse logistics' environmental performance in the manufacturing industry.

H2c: The effectiveness of disposition decisions is positively and significantly related to reverse logistics' social performance in the manufacturing industry.

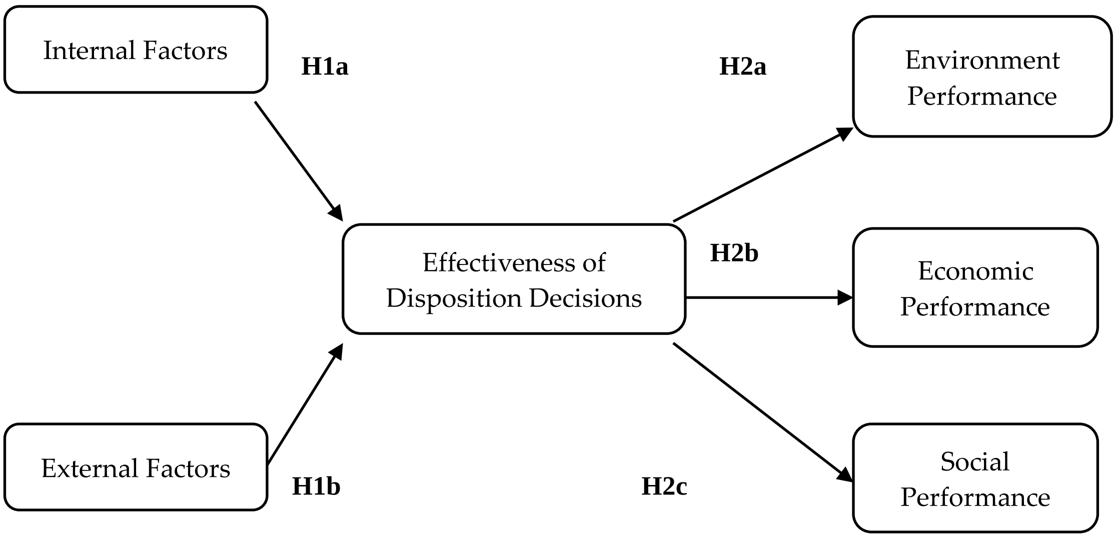


Figure 2. Framework of the Study

4. Materials and Methods

The nature of this study was cross-sectional and the scope of the study was limited to the manufacturing industry in Pakistan. The hypotheses were tested using the Smart-PLS (SEM), technique. This technique was used to analyze the relationship between variables. This software was also used in other fields such as science, engineering, and management studies.

4.1. Data Collection

A questionnaire was formed based on the proposed hypotheses offered for the research and intended at collecting in Pakistani manufacturing sector data linked to disposition decisions and reverse logistics results. The questionnaire was adapted from (Agrawal & Singh, 2019). The questionnaire was self-administered, and the data was collected online via Google form the Pakistan's textile manufacturing industries. The study link was sent with a cover letter to the respondents email addresses. Many researchers are now using web-based surveys because of less time, easier accessibility, real-time information, and cost-efficient. The questionnaires have been sent in two stages to the participants. Initially, 200 forms were sent through Google forms, and answers were evaluated to distinct organizations. Also, 300 further emails were sent to other firms. For the study, 500 emails have been sent to the textile manufacturing sector, 400 answers have been obtained, and 32 have been withdrawn due to incomplete information. The survey accomplished an efficient response rate of 73.6% that is adequate for the research. Participants who responded to the survey constitute specific managerial levels, including top-level, middle-level, and executive-level staff and mostly from the logistics, marketing, sales, corporate policy, and departments of human resources management. Besides, non-response bias with the cloud-based study was collected by dividing the sample into two groups based on the date the answers were received. The early response group consisted of 158 answers, and 210 responses were included in the second response group. In the early cohort and second cohort, the t-test was conducted to determine the difference. There was no statistically significant difference in the average of the two groups ($p > 0.05$). Furthermore, statistical tests and measures indicate no important difference between samples in company size, number of workers, and ranks.

4.2. Data Analysis Technique

Before being moved to the Smart-PLS software for further evaluation, the information gathered was numerically coded in the MS Excel spreadsheet. For suitable adjustment, the information was scanned visually for mistakes and missing values. Both the measurement model and structural models were evaluated using structural equation modeling technique. Moreover, it was found that structural equation modeling can evaluate the measurement models using the same analysis (Ali, Rasoolimanesh, Sarstedt, Ringle, & Ryu, 2018). It is a systematic method to analyze causal models with their observed variables using latent factors (Westland, 2019). For this study, a two-step methodological approach was adopted in which the measurement model was analyzed initially, followed by the estimation of structural equation modeling. Smart-PLS software was used to analyze both the measurement and structural equation modeling. This software aids in providing results both in tabular and graphical representations (Li et al., 2020; Li et al., 2020).

4.3. Measurement Model

In the measuring model, the validity and reliability of the proposed model frameworks were checked to assure that the observed variables were correctly measured. The item's reliability, internal consistency, and convergent and discriminating validity were evaluated using Smart PLS software (Ghasemaghaei, Ebrahimi, & Hassanein, 2018). Moreover, to further evaluate whether a latent variable explains the significant portion of its observed indices' variance, the individual reliability of products was examined. It was assessed by examining the loading with the structure of each instrument and must be equivalent to or higher than 0.5 (Hair, Risher, Sarstedt, & Ringle, 2019). Also, internal consistency was tested. This indicator tests all indicators inner consistency while measuring construct notion. It shows how rigorously the deeply rooted factors measure the same latent variable. It can be evaluated in terms of Cronbach's alpha or composite reliability. Cronbach's alpha believes that all loading factors are equally accurate, and outcomes have internal consistency reliability (Sideridis, Saddaawi, & Al-Harbi, 2018). In terms of composite reliability, the internal consistency of the suggested model evaluated should at least be 0.7.

Besides this, convergent validity was screened to guarantee that the design represented by observed indices has the same underlying structure and uni-dimensional features. Average variance obtained (AVE) analyzes the convergent validity. It was suggested to have values more than 0.5 for the measurement model to achieve convergent validity (Cheah, Sarstedt, Ringle, Ramayah, & Ting, 2018). Furthermore, discriminant validity was the extent to which the variance in observed indicators taken into account by a latent variable. The average variance extracted (AVE) of the structure must be higher than the square of the correlations between that structure and other assessment model constructs (Hair et al., 2019).

4.4. Structural Model

Structural model evaluated after assessing the measurement model. For different constructs, the structural model was used to forecast the underline hypothesized relationships among latent variables. Moreover, Waqas et al. (2018) had applied structural equation modeling techniques to determine the critical success factors in Pakistani industries. Furthermore, hypothesized construct relationships were calculated in terms of the coefficients of the structural path model. The path coefficient's value was the strength of the connection between two paradigms (Knight, Megicks, Agarwal, & Leenders, 2019). Its regular value diverges from -1 to +1. The values closer to +1 reflect the strong linkage among the constructs and considered statistically significant. In contrast, values closer to 0 represent the weak associations, and it was generally insignificant. To further test the level of significance of multiple linkages among constructs. Specifically for this study, 5% of the significance level was used to determine the critical value.

Moreover, if the t-value greater than the critical t-value, the hypothesis is accepted at the mentioned significance level otherwise rejected. Moreover, the structural model's predictive precision is evaluated for the latent dependent variables by explained variance (R^2). This is a straight correlation between the designated endogenous construct's real and expected value. The standardized R^2 value ranges from 0 to + 1 with greater predictive accuracy values. Also, if the independent variable has R^2 values greater than 0.7, it is considered a strong coefficient determinant. The variables having a value of less than 0.25 are considered weak, and 0.5 is assumed to be moderate (Khairi & Ghani, 2019). There is no specified rule of thumb for R^2 as it varies from the research area and the model complexities. Besides, to determine the estimated results' stability, cross validity redundancy (Q^2) is analyzed, which was initially generated. The cross-validated redundancy strategy considers both the measurement model and the data analysis structural path model and suits perfectly for the structural equation path modeling. It processes the simplicity with which the model repeats the observed values and estimates its variable. The model is considered good if its predictive relevance Q^2 is greater than zero (Khan, Lee, & Bae, 2019).

5. Results

The present study result shows that both internal and external factors and their influence on the success of disposition decisions and their connection with environment, economic, and social performance were considered in the proposed model. Firstly, we did factor loading analysis to find out the reliability and validity of the constructs. We found that all the items range from 0.728 to 0.842, which were acceptable because it was more than a value of 0.5, as suggested by (Hair et al., 2019). Internal item consistency also accessed through composite reliability CR, which has the rule of thumb value of more than 0.7 to accept the measurement scale. We also found that all the construct's composite reliability values were greater than 0.7, as represented in Table 1. Furthermore, we also investigated the convergent and discriminant validity of all the constructs. We found that it was greater than the value of 0.5, shown in Table 2, and it was also acceptable.

Table 1. Factor Loading of All Constructs

Constructs	Cronbach's Alpha	Loading	CR	AVE
Internal Factors	**0.779**		**0.863**	**0.533**
IF 1		0.778		
IF 2		0.792		
IF 3		0.747		
IF 4		0.770		
IF 5		0.721		
External Factors	**0.809**		**0.836**	**0.515**
EF 1		0.755		
EF 2		0.800		
EF 3		0.764		
EF 4		0.707		
EF 5		0.801		
EF 6		0.741		
Economic Performance	**0.775**		**0.820**	**0.501**
EP 1		0.750		
EP 2		0.758		
EP 3		0.767		
EP 4		0.821		
EP 5		0.799		
EP 6		0.728		
Environment Performance	**0.768**		**0.850**	**0.510**
EVP 1		0.742		
EVP 2		0.717		
EVP 3		0.762		
EVP 4		0.809		
EVP 5		0.742		
EVP 6		0.852		
Social Performance	**0.809**		**0.862**	**0.512**
SP 1		0.741		
SP 2		0.788		
SP 3		0.773		
SP 4		0.745		
SP 5		0.842		
SP 6		0.781		

Note: CR= Composite Reliability, AVE= Average Variance Extracted

Table 2. Discriminant Validity **(Formell- Larcker Criteria)**

Constructs	EF	EP	EVP	IF	SP
EF	**0.718**	0	0	0	0
EP	0.665	**0.680**	0	0	0
EVP	0.580	0.578	**0.658**	0	0
IF	0.620	0.578	0.581	**0.730**	0
SP	0.755	0.622	0.682	0.553	**0.716**

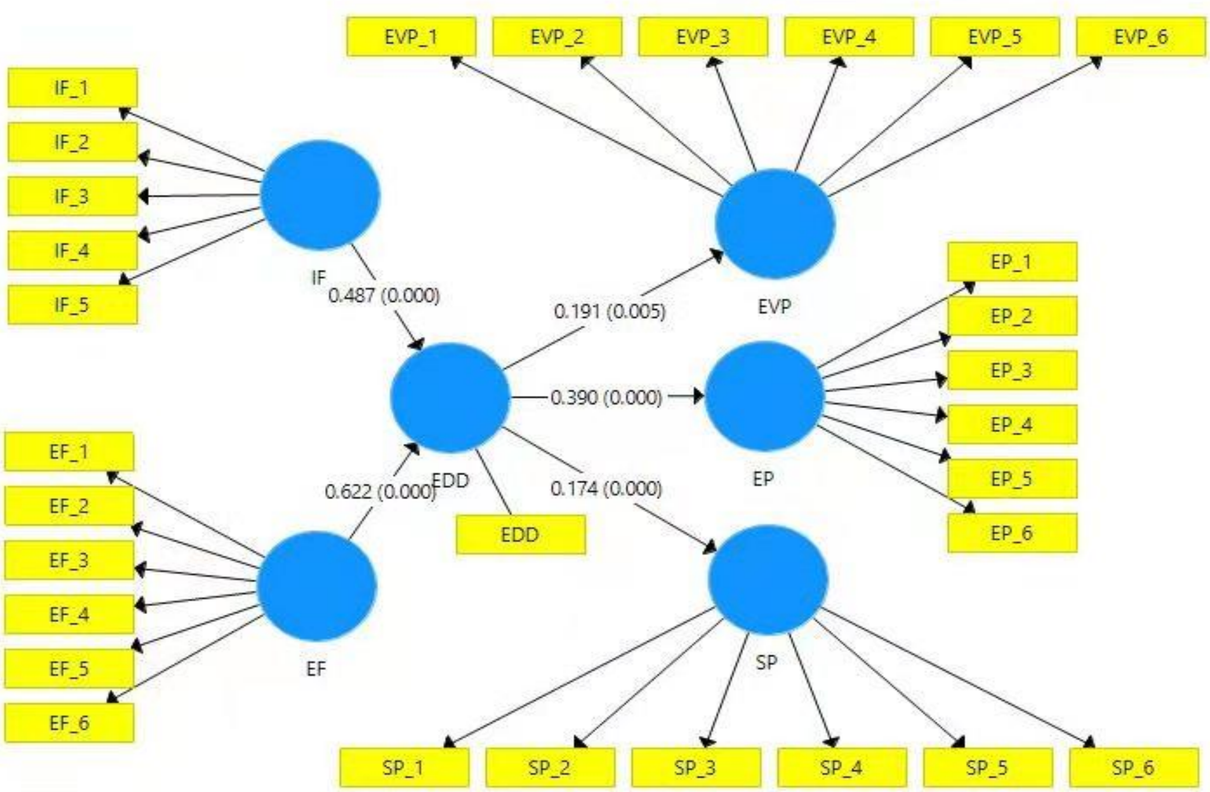
Note: EE= External Factors; EP= Economic Performance; EVP= Environmental Performance; IF= Internal Factors; SP= Social Performance

Our first hypothesis of the study H1a, H1b predicted that internal and external factors positively influence disposition decisions' effectiveness in reverse logistics. The outcomes are shown in Table 3, which indicated that internal and external factors are positively associated with disposition decisions' effectiveness in reverse logistics. The path coefficient for internal and external factors is 0.487, 0.622 p=0.000) respectively positive and significant. Our second hypothesis, H2a, H2b, and H2c, predicted that disposition decision effectiveness is positively related to reverse logistics' environmental, economic, and social performance. Table 3 and Figure 3 show that disposition's effectiveness has a significant and positive association with the economic, environment, and social performance in reverse logistics with the path coefficient values of (0.191, 0.390, 0.174 p=0.00). The R^2 and Q^2 values are also analyzed in this model, shown in table 3. Both are within the limit in our proposed model.

Table 3. Structural Modeling Result

Hypotheses	Relationship	Path Coefficient	f2	Q^2	t-value	P-value	Results
H1a	IF → EDD	0.487	0.410	0.355	5.827	0.000	**Accepted**
H1b	EF → EDD	0.622	0.452	0.302	6.421	0.000	**Accepted**
H2a	EDD → EP	0.390	0.276	0.182	3.972	0.000	**Accepted**
H2b	EDD → EVP	0.191	0.098	0.032	2.677	0.000	**Accepted**
H2c	EDD → SP	0.174	0.89	0.020	2.431	0.000	**Accepted**

Note: EE= External Factors; EP= Economic Performance; EVP= Environmental Performance; IF= Internal Factors; SP= Social Performance



Note: EE= External Factors; EP= Economic Performance; EVP= Environmental Performance; IF= Internal Factors; SP= Social Performance

Figure 3. Bootstrapping

6. Discussion

The present study analyzed the internal and external factors for the effectiveness of disposition decisions. We found that internal and external factors positively and significantly influenced the disposition decisions for reverse logistics. These all factors improve the operative performance of reverse logistics and help to make disposition decisions in the company. Furthermore, we analyzed the relationship between disposition decisions' effectiveness and economic, environmental, and social performance in reverse logistics. We found that disposition decisions' effectiveness is positively related to the economic, environmental, and social performance in reverse logistics and enhanced triple bottom line performance practices. According to the study (Hollos, Blome, & Foerstl, 2012), economic, environmental, and social performance positively impacts operational performance. Our findings are in line with the prior study of (Hollos et al., 2012).

Moreover, we analyzed the hypotheses H1a, and H1b, which is associated with the internal and external factors influence the effectiveness of disposition decisions in reverse logistics, as well as H2a, H2b, and H2c associated with the effectiveness of disposition decisions and economic, environmental and social performance in reverse logistics. We found that disposition decisions' effectiveness was significantly associated with the internal, external, and triple bottom line performance in reverse logistics. Conferring to the study (Sarkis, Zhu, & Lai, 2011), disposition decisions in reverse logistics are positively associated with social sustainability. Our results support the finding of the previous study of (Sarkis et al., 2011). Furthermore, the empirical study of (Attia, 2015) also found that the effectiveness of disposition decisions immensely impacts the organization's performance. Our results are also in line with the prior study of (Attia, 2015).

A prior study by (Hazen, Skipper, Ezell, & Boone, 2016) found a positive relationship between environmental performance and effectiveness of disposition decisions because these decisions are allowed to reverse logistics and contribute to economic and environmental performance. Our hypothesis H2b result is matched with the finding of (Hazen et al., 2016). The study of (Dubey et al., 2017) discussed reverse logistics in India's air conditioner industry. He found that the effectiveness of disposition decisions positively associated with social performance. Our hypotheses H2c results are in line with the prior finding (Dubey et al., 2017).

Moreover, a recent study (Agrawal & Singh, 2019) conducted on the effectiveness of disposition decisions in reverse logistics in India's electronic industries. He also found that disposition decisions' effectiveness positively and significantly influenced the internal, external factors of reverse logistics and triple bottom line performance. Our findings are similar to the prior study (Agrawal & Singh, 2019), which supported our study hypotheses, which we proposed in the model.

7. Conclusion, Limitations, and Future Implications

Due to the current development of the e-commerce industry and the overall development of the sector, product returns have become a critical component of the enterprise. Managing reverse logistics for viable results has become a challenge today and the age of stimulating internet marketing. Higher productivity, short product life cycle, and competitive market nature also led to increased product return flow. Due to government laws and regulations, environmental concerns, and corporate social responsibility, there is stress managing end-of-life product returns. Adapting and implementing best reverse logistics practices is one way to manage both types of returns. It has been concluded that disposition decision is one of the key variables for reverse logistics accomplishment. The research primarily examines the efficiency of reverse logistics disposition decisions on triple bottom line performance. After having an extensive literature review and identifying the research gap in this field for the Pakistan manufacturing industry, the research hypothesis was formulated to view reverse logistics' disposal issues.

Furthermore, the measurement model and structural equation modeling were used to test the hypothesis. Also, for the data collection, a questionnaire-based survey technique was adopted after considering all the statistical requirements. Moreover, after testing the hypothesis, both internal and external factors impact the disposition decisions. Disposition decisions also play a significant role in the triple bottom line approach for sustainable performance using reverse logistics. These decisions further translate into mapping the future action path in reverse logistics. Disposition decisions have multifaceted significance not only confined to the performance of reverse logistics; indeed, it also helps in the development of reverse logistics that, in turn, aids in important strategic decision-making. This study put forth the case of the textile manufacturing industry of Pakistan.

This study has important implications concerning the disposition for sustainable performance of reverse logistics. It explored both the internal and external factors influencing the disposition decisions that further impact reverse logistics' operational performance. The produced results will be helpful for academicians, industries, and policymakers. Moreover, this study correlates with the triple bottom line dimension of sustainability and disposition in reverse logistics, which has little empirical evidence from developing economies, specifically addressing the circular economy. Also, the Pakistan textile manufacturing industry is among the largest and growing industries. A survey conducted for this study on reverse logistics represents important implications for strategic level officials in organizational decision-making. The results also provide guidelines for improved performance of reverse logistics with the aid of disposition decision making. This study's major limitation is that it only focused on triple bottom line performance, whereas corporate social responsibility (CSR) should be considered in greater detail. It is suggested to carry out similar research analyses across various industrial sectors and comparative analysis inter-local and foreign industries. As there is a great trend towards the internet of things; therefore, this aspect should also be explored under reverse logistics for sustainable performance.

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