Returnable Transport Packaging in developing countries: drivers, barriers and business performance

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ABSTRACT

This study, drawing on natural resource-based view (NRBV), identifies drivers, barriers and the potential benefits of Returnable Transport Packaging (RTP) –that is, the repeated use of packaging items– and conceptualises RTP as a technology and resource that supports organisational competitiveness. Specifically, it investigates the impact of RTP adoption on business performance, the effects of drivers, barriers and size of organisations. The data collection took place in Nigeria and South Africa. The findings suggest that RTP has a significant positive impact on business performance. Whilst prior studies seem to suggest that shrinkage and attrition are the major problems identified with the usage of RTP, our findings indicate that there are several other barriers affecting RTP adoption and the resultant performance advantage. The results also show that there is increasing move towards adoption of RTP but some organisations are faced with financial constraints, especially the small and medium size enterprises. In addition, the results show that RTP is largely a 'sustainability facing' initiative with adoptee motivated primarily by potential environmental, economic, social and operational benefits of adoption.

Keywords: Reverse logistics, returnable transport packaging, sustainability, business performance, natural resource based view

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1. Introduction

Returnable Transport Packaging is part of Reverse Logistics. Reverse Logistics (RL) has recently gained attention in Supply Chain Management (SCM) as the process by which products are returned from consumers for the purpose of gaining their value or planning for their proper disposal (Rogers and Tibben-Lembke, 1999; Dowlatshahi, 2012; Nikolaou et al., 2013). Scholars have identified operational and environmental benefits related to RL (see, Lacerda, 2002; Rogers and Tibben-Lembke, 2001; Chan, 2011; Karia and Wong, 2013), including, among other things, environmental and business performance (e.g. Abdulrahman et al., 2014; Bouzon et al, 2015). RL has been also vital to achieving sustainable supply chains, since it helps in controlling

waste and maintaining environmental sustainability (Abdallah et al., 2011; Garetti and Taisch, 2012; Huang et al., 2012; Bouzon et al., 2015). Within RL, Returnable Transport Packaging (RTP) reduces or eliminates waste at the final customer, minimises risks to the environment, reduces warehousing costs, and provides workplace efficiency and safety (Silva et al., 2013; RPA, 2016). At the same time, returnable packages may involve higher costs of procurement, transportation, and other costs related to cleaning, repairing, storing, and managing (Zhang et al., 2015). Nevertheless, the drive for the adoption of RTP is as a result of the fast growing social expectations that organizations should create a well-improved business practices and safe working environments by engaging in socially responsible businesses.

Following the Natural-Resource-Based-View (NRBV) (Hart, 1995; Klassen and Whybark, 1999; Vachon and Klassen, 2007; 2008; Hart and Dowell, 2010; Bell et al., 2012; Shi et al., 2012; Jayaram et al., 2015), this research conceptualises RTP as an environmental technology and a esource that limits or reduces "negative impacts of products or services on the natural environment" (Srivastava, 1995: in Klassen and Whybark, 1999: p.599) and subsequently investigates the impact of RTP adoption on business performance, the effects of drivers, barriers and size of organisations, with data drawn from Nigeria and South Africa, the two largest economies in Africa. In comparison to developed countries, there are limited work on RTP in developing countries. Studies have underlined the necessity for developing countries to adopt sustainable practices and as part of such initiatives there is a need for understanding the impact of RTP on business performance in the context of those countries (Sohrabpour et al., 2012; Guarnieri et al., 2015).

The paper is organized as follows: Section 2 discusses the usage of RTP in RL, whereas section 3 presents the tenets of NRBV. Section 4 discusses our conceptual model and hypotheses, and section 5 our methodology. The findings of our research are presented in section 6, and finally, section 7 presents the conclusions, and future research directions.

2. Returnable Transport Packaging

Packaging prepares goods for safe, secure, efficient and effective handling, transport, distribution, storage, retailing, consumption and recovery, reuse or disposal combined with maximizing consumer value, sales and hence profit (Ballou, 2004; Saghir, 2004; Lambert *et al,*. 2011). At the same time packaging materials have contributed immensely to natural resource depletion, global warming, ozone layer depletion, and placing excessive pressure on the environment by the unceasing waste disposal (Kroon and Vrijens, 1995;

Amienyo and Azapagic, 2016; Xie et al, 2016). In addition, packaging takes up landfill space, serves as sources of toxic materials with health implications and potential for groundwater contamination. To deal with the negative consequences of packaging, RTP enables firms to reduce their operational cost and lessening environmental impact in conformity with government regulations for sustainable supply chains (Silva et al., 2013; RPA, 2015). RTP signifies a change in attitude towards the environment for the purpose of environmental sustainability, but also for potentially achieving business performance. It is defined as packaging material for conveying large or small, heavy or light components from one phase of supply chain to another while improving the stability of products and reducing their damage (Wu and Dunn, 1995; Hellström and Johansson, 2010). Wu and Dunn (1995) illustrated how environmental and economic performance can be improved by adopting the usage of returnable packaging. Similarly, Kroon and Vrijens (1995) encouraged the usage of RTP so as to minimize environmental impact via waste reduction while reducing operational costs.

However, the usage of RTP may increase operational cost, including for example, transportation, sophisticated equipment, and tracing and tracking. These might pose as barriers to the adoption and use of RTP. Furthermore, barriers to the usage of RTP could be maintenance, storage and cost of administration (Kroon and Vrijens, 1995). Also, the management of RTP is resource-intensive. A survey conducted by the Aberdeen Group in 2004 suggested that the cost of managing logistics assets consumes 5% or more of the corporate revenue (Ilic et *al*, 2009). Shrinkage and attrition have created further challenges in managing logistics assets, and this is mostly caused by theft, customers' failure to return empty RTP, unreported damages of RTP, leading to emergency purchase of another set of RTP to cope with demand and supply requirements (Breen, 2006). Twede and Clarke (2004) also identified that RTP are misallocated and misplaced often as they are hardly tracked especially in transit. The need to provide additional fund for supplementary logistics assets and sufficient workforce to manage them poses additional challenges to organizations that would have to manage RTP both effectively and efficiently to avert potential negative consequences. To achieve this, strict measures in the implementation and management of RTP are needed, such as tracking and tracing (Shamsuzzoha and Helo, 2011) for high-level visibility, and quality control of RTP movement using, for example, a controlled pool system (Maleki and Reimche, 2011). Tracking systems enhance product's identification and its actual location at any given time by connecting physical material flow with information systems (Stefansson and Tilanus, 2001; Johansson and Hellström , 2007). Furthermore, Tracking and tracing systems manage and control the conveyance of RTP, and reconcile RTP supply with demand (Johansson and Hellström, 2007). To manage

tracking, Fritz and Schiefer (2009) posit that the necessary capabilities need to be in place to facilitate the initial source (backward tracing) and final destination (forward tracing) of a product at any phase of the supply chain.

RTP can be used to achieve logical, marketing, and environmental objectives. For logical objectives, RTP enables distribution, protects product, preserves environment, leading thereby to substantial economic and environmental benefits. Furthermore, RTP provides information about product's condition and location even on transit, which in turn brings operational benefits. Regarding the achievement of marketing objectives, RTP expedites graphic design, satisfies legislative demands on environmental sustainability and offers competitive advantage. It also assists firms in meeting their market demands by satisfying the requirements of customers, and guarantees convenience for distribution, which is a major advantage over the single-use packaging. Finally, when it comes to environmental objectives, RTP facilitates recovery and recycling hence progressively reduces waste disposal emanating from single-use packaging (Hellström and Saghir, 2007). However, literature so far has not explored how RTP could improve business performance.

Although scholars have acknowledged the benefits accruing from the use of RTP for supply chain effectiveness and sustainability, there is a dearth of studies that focus on its competitiveness capabilities and barriers associated with the practice. Bernon et al. (2011) as well as others (Rogers and Tibben-Lembke, 1998; Guide and Van Wassenhove, 2009) suggest that despite the importance placed by the literature on RL, limited empirical research has been undertaken to address the underlying aspects of it. Furthermore, this previous research did not look at developing countries (Abdulrahman et al., 2014). However, it must be acknowledged that the effective usage of RTP in RL will remain unattainable without identifying its barriers to effective implementation and optimal usage. To address the aforementioned gaps this research draws on natural resource based view (NRBV), which is discussed next.

3. Natural resource based view of the firm

The Natural-Resource-Based View of the firm (NRBV) (Hart, 1995; Hart and Dowell, 2010) builds on the earlier theory of Resource-Based-View (RBV), which postulates how competition can be attained through intra-firm resources and capabilities (Barney, 1991). The RBV acknowledges and emphasizes political, economic, social, and technological environment to the virtual exclusion of the natural environment (Hart, 1995; Shrivastava, 1995). The RBV focuses on the accumulation and deployment of firm-specific resources that are difficult to imitate and substitute (Wernerfelt, 1995;

Hallgren et al, 2010). Resources are a combination of assets developed over time (Day, 1994; Perunovic *et al*, 2012) to provide distinctive capabilities that are the firm's sources of sustainable competitive advantage (Barney, 1991).

The RBV theory does not consider the impacts of the firm's operations on the natural environment or the life-cycle environmental costs of its products and services. However, given the growing concern for the ecosystem, this omission has rendered the theory inadequate as a basis for explaining sources of competitive advantage and for it to remain relevant, it must address and embrace the challenges of environmental sustainability.

Hart (1995) proposed the NRBV and suggested that the challenges regarding natural and social environments determine a company's competitive advantage as stemming from its capabilities to facilitate environmentally responsible activities. NRBV has been used to stress the importance of management capabilities in terms of achieving environmental performance and subsequently sustainable competitive advantage (e.g. Klassen and Whybark, 1999; Vachon and Klassen, 2007). Klassen and Whybark (1999) investigated the impact of pollution prevention and control technologies and found that those firms that implemented pollution prevention technologies improved their performance in terms of cost, speed, quality, and flexibility. Vachon and Klassen (2007) looked at the application of NRBV to link environmental collaboration to supply chain, as they studied environmental collaborative activity through logistical and technological integration.

In this paper, we follow the study of Klassen and Whybark (1999) and use NRBV to conceptualise the role of RTP as an environmental technology and a resource that could potentially impact positively on profitability whilst curtailing negative interactions with society and promoting environmental stewardship. A conceptual model is proposed, which is discussed in the next section.

4. Conceptual model of RTP and hypotheses

A number of authors (Kroon and Vrijens, 1995; Wu and Dunn, 1995; Twede and Clarke, 2004; Breen, 2006; Hellström and Saghir, 2007; Ilic et al., 2009) have elucidated on the drivers of, and barriers to, the usage of RTP. The key issue with RTP is the operational costs required for the effective and efficient management of the logistics assets. Operational costs are cost of transportation, cost of sophisticated equipment, cost of tracing and tracking and some other inevitable expenses. The management of RTP is resource-intensive (Aberdeen Group, 2004) due to the high operational costs required for a sustainable environment (Ilic et al., 2009). Furthermore, there is need for

RTP investment justification to the shareholders. As such, it is essential to measure the cost-effectiveness of the usage of RTP based on the company size, the level of investment and the return on investment duration of RTP. Similarly, the challenges of organizational inertia and resistance to change are vital, including, the lack of understanding of the potential benefits associated with the adoption of RTP. Therefore, in industrial sectors such as fast moving consumer goods (FMCG) and manufacturing companies, where the usage of RTP is highly paramount, it is important to understand the impact of RTP on business performance.

Figure 1 explains our conceptual research model consisting of seven dimensions: (i) adoption of RTP, (ii) company turnover, (iii) drivers of RTP, (iv) barriers to RTP, (v) investment in RTP, (vi) return on investment duration, (vii) business performance.

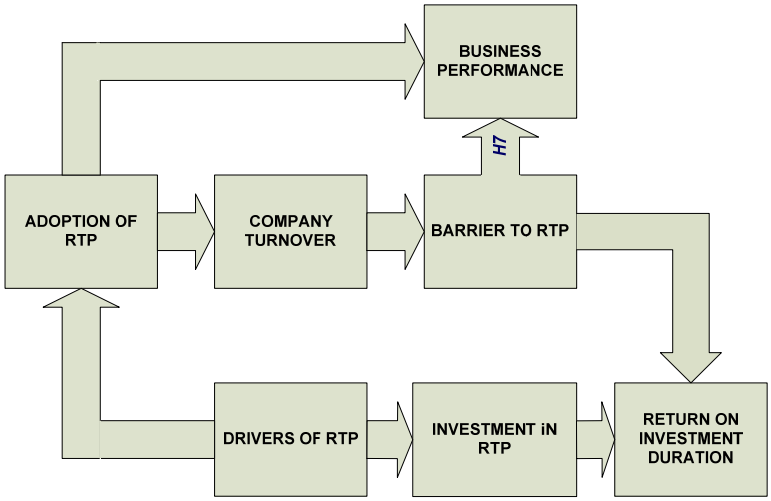

Figure 1: Conceptual Research model of RTP related factors

The conceptual model (Figure 1) illustrates the relationships among the seven dimensions with the arrows indicating the direction of influence. As indicated in the model, it is expected that the company's size as defined by annual turnover will influence the adoption of RTP in an organization. Conceptually, larger companies would be inclined to adopt the usage of RTP at a larger extent compared to smaller companies. The proposed drivers of RTP are government regulation, environmental consideration, economic benefits, operational benefits, social benefits, environmental benefits, competitive advantage, and advantages over single-use transport packaging. These are proposed to determine the adoption of RTP in RL and the level at which organizations invest in RTP in their businesses. The level of investment in RTP is projected to influence the return on investment duration. Similarly, business performance is measured based on the following performance measures (Klassen and Whybark, 1999): speed, quality of service/products,

sales turnover, low cost, net profit, customer loyalty, competitive advantage, customer satisfaction, innovation, technology and internal rate of return.

Practically, the barriers to the usage of RTP should be relatively proportional to company size as defined by annual turnover. The barriers to the usage of RTP are loss of RTP, unavailability of sufficient storage space, costly sophisticated equipment, cost of tracing and tracking of RTP, high transportation cost of RTP, sorting and cleaning of used RTP, mix-ups during allocation and return of RTP, difficulties in managing or controlling RTP, and additional cost required for effective management of RTP. These barriers are anticipated to weaken the business performance and extend the duration of return on investment.

There are eight possible linkages between the major research constructs as shown in the Figure 1. But as this paper is focused on company turnover, RTP drivers, adoption and barriers and their impacts on business performance, a sub-model depicting the relationships between these five variables was extracted from Figure 1 and represented in Figure 2 below. Therefore, subsequent to earlier discussion, we hypothesise as follows:

H1: Size of the company as defined by annual turnover restrains the range of barriers to the use of RTP;

H2: The drivers of RTP influence its adoption;

H3: The adoption of RTP improves business performance;

H4: The barriers to the use of RTP weaken the business performance;

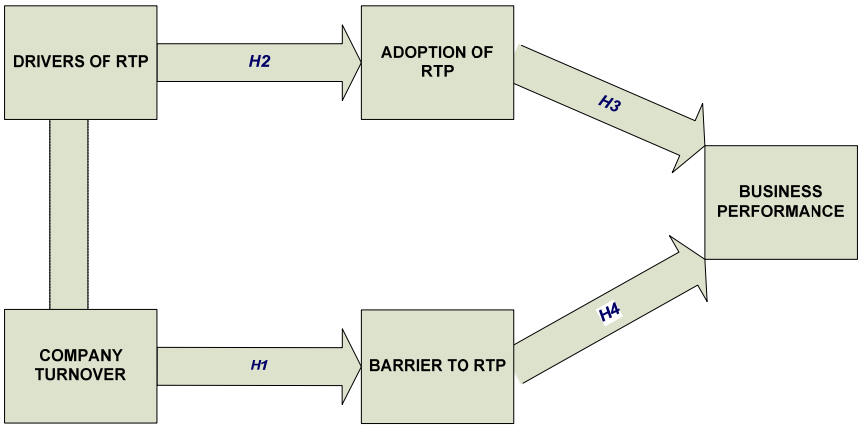

Figure 2: Sub-model of RTP related factors

5. Research Methodology

5.1 Survey development

A survey by questionnaire was conducted in the summer of 2014 to collect data from a random sample size of one hundred and twenty (120) companies from various business sectors in Nigeria and South Africa, resulting in 44 and 35 responses from both countries, respectively, and a total 79 responses altogether. We chose the survey methodology to test for theoretical relationships in large samples from businesses (Wacker, 1998). Survey appears to be the most-appropriate methodology for generating data from a large population (Wilson, 2014) and to test hypotheses. We used a non-experimental survey for data collection, using the approach by Dillman (2000).

The survey (see Appendix) entailed three (3) sections of thirty-nine (39) questions that aimed at providing answers to the research questions. The first section (Part A) was designed to build the company profile of the participants. Open-ended questions regarding name, address, telephone number, email, and category questions regarding annual expenditure, the total number of employees of the company, among others, were included. The second section (Part B), by means of multiple-choice questions, investigated the single-use transport packaging and the factors debarring some organizations from switching to RTP. The third section (Part C) enquired the RTP under some subsections which included the commonly used RTP, cost effectiveness of RTP, potential benefits of RTP, managing and controlling RTP, possible

challenges of RTP and the assessment of the usage of RTP. Questions in the third section entailed a combination of Likert-scale questions – to seek the best reflection of the respondents' opinion; closed-ended questions – to restrict the respondent to some specific and potential answers so as to make a comparative analysis of qualitative answers easy; multiple choice questions –where overlap in the choices was avoided; and open-ended questions – to give room for lengthy answers where applicable (Wilson, 2014). The questions in the second and third sections covered the major concerns of the RTP (Breen, 2006; Saghir, 2004; Wu and Dunn, 1995) as discussed earlier. They were relevant to those respondents whose company is yet to adopt the concept of RTP in their business. The questions in Part C were relevant to the respondents whose company has adopted the concept of RTP in their businesses. For instance, question 27 was formulated to buttress the point made by Kroon and Vrijens (1995) and Wu and Dunn (1995) on how environmental and economic performance can be improved by adopting RTP. The question equally investigated how other organizations' performance can be improved by adopting RTP.

5.2 Data collection

In line with Yun and Trumbo (2000), a multi-mode approach –a combination of internet and paper mail survey was implemented while administering the questionnaire– to generate responses from a greater range of individuals and boost the response rate. The multi-mode also known as mixed-mode approach equally creates a possibility of compensating for the flaws of each mode at affordable cost (De Leeuw, 2005). The paper mail questionnaire was initially sent out to potential participants, and a far less costly Internet survey was released for follow-up data collection. A covering letter was attached with the questionnaire to encourage the potential respondents in completing the questionnaire. Pre-notice and follow-up calls were used to enhance the response rate (Yun and Trumbo, 2000)

After six (6) weeks of administering the questionnaire, 7.5% response rate was generated via postage while 18.3% response rate was generated via electronic mails and 40% was generated via the web. Some responses were found unusable as the second and third sections of the questionnaire were left blank. Missing data (that were uncontrollable by the researcher) were assigned a missing code, which enabled the researcher to exclude them from the analysis and hence avoid any negative impact on the survey.

6. Results and analysis

Data were analysed with descriptive and inferential statistical methods and SPSS. Normality, reliability, validity and non-response bias tests were conducted on the data to measure for result generalization on the usage of RTP in RL. Furthermore, Pearson chi-square test and Spearman's rank order correlation were used to test hypotheses. Other tests including cross-tabulation, coefficient of determination, factor analysis, Kaiser-Meyer-Olkin and Bartlett's test were used to assess the relationships of the research variables. However, some of the results of the analysis are not included in this paper in order not to exceed the stipulated length.

6.1. Profile of the respondents

Table 1 depicts the profile of the respondent firms. The respondents' profiles were described by supply channel position, size of organizations evaluated by number of employees and size of organizations evaluated by the annual turnover. With regard to the supply channel position, 30.4% of the respondents operate as retailers while 43% operate as wholesalers. The highest response rate under the category of supply channel position (i.e. 60.8%) was the manufacturers. This indicates that the sample population is well-distributed across the three supply channel positions. Furthermore, the respondents were classified with respect to each company's number of employees (Table 1). Following the classification made by the European Union, a small and medium enterprise (SME) is made up of enterprises with a labour force less than 250 and an annual turnover not more than £40M (Europa, nd). This indicates that in terms of number of employees, a total of 66.3% of the respondents are SMEs, while 33.8% are large enterprises. Also, from the perspective of annual turnover, 68.9% of the respondents are SMEs while 31.1% are large enterprises.

Table 1: Profile of the respondents

Criteria			Percentages
Supply channel position			
Manufacturer	Yes		60.8
	No		39.2
	Total		**100.0**
Wholesalers	Yes		43.0
	No		57.0
	Total		**100**
Retailers	Yes		30.4
	No		69.6
	Total		**100.0**
Number of employees			
1-10			2.6
11-50			27.3
51-250			36.4
251-500			10.4
501 and above			23.4
Total			**100.0**
Annual turnover			
<£5M			29.9
£5M-£20M			31.2
£21M-£50M			7.8
£51M-£100M			10.4
>£100M			20.8
Total			**100.0**
Country breakdown of samples and respondents			
Country	N (Sample)	N (Respondents)	
Nigeria	70	42	54.55
South Africa	50	35	45.45
Total	**120**	**77**	**100**

6.2: Normality, reliability, and validity tests

To test for normality, skewness and kurtosis tests were used (Thode, 2002). All the essential variables for this study were assessed for normality, and they all fell within the required range (value less than 3) of normality as in skewness and kurtosis test (Tabachnick and Fidell, 2001) (Table 2).

Table 2: Skewness and Kurtosis test of normality for research variables

Variables	Min	Max	Mean	STD. Dev.	Skewness	Kurtosis
Loss of RTP	1	5	3.38	1.001	-0.037	-0.621
Sorting and cleaning of RTP	1	5	3.43	1.059	-0.186	-0.493
Quality of service/products	1	5	4.39	0.846	-1.987	2.875
Sales turnover	2	5	4.23	0.786	-0.907	0.63
Cost saving	2	5	4.57	0.657	-1.672	0.754
Storage efficiency	1	5	4.39	0.867	-1.739	1.603

Cronbach's Alpha was used to perform the reliability test (Flynn *et al.*, 1990; Forza, 2002) with Table 3 showing alpha values for the major constructs in this study. From the Table 3, it can be deduced that the coefficient alpha for all the main elements are so close to 1, which implies a strong internal consistency of the variables, and the survey instrument is thus reliable (Forza, 2002).

Table 3: Reliability test output

Constructs	**Cronbach's alpha**
Business performance measures	0.857
Barriers to the usage of returnable transport packaging	0.866
Drivers of returnable transport packaging	0.884

SPSS ANOVA independent t-test was used to test the external validity for potential non-response bias based on the 65.8% response obtained. The variability in the first and second half of the responses is not significantly different as the values for Levene's t-test, and the two-tailed significance are greater than 0.05 (Table 4).

Table 4: ANOVA test of non-response bias.

Variable	1st Wave	2nd Wave	df	Sig. (2-tailed)	Levene's test
Speed	3.69	3.74	53	0.125	0.113
			31.643	0.164	
Low cost	3.55	3.82	52	0.952	0.057
			33.575	0.956	
Sales turnover	3.04	3.28	54	0.822	0.863
			46.36	0.823	
Net profit	2.73	2.97	54	0.853	0.993
			49.792	0.851	
Market share	3.82	3.71	54	0.667	0.729
			49.359	0.663	
Customer loyalty	3.82	3.64	54	0.007	0.152
			53.912	0.005	
Competitive advantage	3.55	3.59	54	0.15	0.685
			46.291	0.154	
Customer satisfaction	3.2	3.38	53	0.139	0.208
			52.361	0.104	
Quality of service/products	3.17	3.3	54	0.334	0.439
			36.862	0.365	
Innovation	3.47	3.82	54	0.017	0.815
			51.149	0.015	
Technology	3.02	3.14	54	0.246	0.059
			52.501	0.229	
Internal rate of return	2.45	2.86	54	0.826	0.192
			48.901	0.824	

6.3. General Observations

Analysing the data, it was observed that 70.9% of the respondents have adopted the usage of RTP considering the potential benefits it holds, while 29.1% are yet to adopt (Table 5). This is an indication that the majority of the companies sampled in Nigeria and South Africa have switched from the conventional single-use transport packaging to the usage of RTP.

However, as indicated in Table 5, a very low response rate (4.3%) of those that are yet to adopt the usage of RTP in their businesses appear certain of implementing RTP in the future. Some 73.9% are not sure of considering its implementation while 21.7% are not considering RTP. This result might be

connected to lack of funds or of knowledge regarding the potential benefits of RTP.

Table 5: Observed adoption level of RTP

Constructs	**Percentage**
Adoption of RTP	
Yes	70.9
No	29.1
Total	100.0
Future consideration for the adoption of RTP	
Absolutely yes	4.3
May be	52.2
May be not	21.7
Absolutely no	21.7
Total	100.0

Furthermore, as elucidated by Breen (2006), shrinkage and attrition were detected as significant problems encountered by organizations in using RTP, which could be considered as barriers to the usage of RTP. The analysis also reflects other barriers that could be linked to the rationale behind the non-adoption of RTP by some organizations in Nigeria and South Africa (Table 6).

Table 6: The potential barriers to the adoption of RTP in Nigeria and South Africa companies

Barriers to adoption of RTP	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Total (%)
High transportation cost of RTP	3.6	8.9	39.3	28.6	19.6	100.0
Loss of RTP in transit	1.8	17.9	35.7	30.4	14.3	100.0
Unavailability of sufficient storage space	3.6	10.7	21.4	30.4	33.9	100.0
Costly sophisticated equipment	1.8	17.9	41.1	25.0	14.3	100.0
Delay of other deliveries	3.6	14.3	51.8	17.9	12.5	100.0
Delay in RTP pick-up by suppliers	3.6	8.9	42.9	33.9	10.7	100.0
Sorting an cleaning of used RTP	3.6	14.3	35.7	28.6	17.9	100.0
Mix-ups during RTP allocation and return	3.6	16.1	44.6	19.6	16.1	100.0
Cost of tracing and tracking of RTP	3.6	16.1	37.5	23.2	19.6	100.0
Difficulties in managing and controlling RTP	5.4	17.9	37.5	16.1	23.2	100.0
Additional cost required for managing and controlling RTP	1.8	12.5	28.6	41.1	16.1	100.0

6.4 Test of Hypotheses

6.4.1 Test of Hypothesis One (H1)

The alternate hypothesis (H_1) and null hypotheses (H_o) state:

H_1: The size of the company as defined by annual turnover restrains the range of barriers to the use of RTP in reverse logistics.

H_o: The size of the company as defined by annual turnover does not restrain the range of barriers to the use of RTP in reverse logistics.

Spearman's rank order correlation (Pallant, 2010) was used to measure the relationship between the two categorical variables, that is, annual turnover and barriers to the use of RTP. Our results (see Table 7) show that the significant level of the concerned variables (annual turnover and barriers) are all greater than 0.05 (p-value), hence the null hypothesis is adopted. It is therefore proven statistically that the size of the company as defined by annual turnover does not moderate the range of barriers to the use of RTP in reverse logistics. The effect of the relationship between the annual turnover and barriers to the use of RTP was also examined by Spearman's correlation (Table 7). High transportation cost of RTP, unavailability of sufficient storage space, and difficulties in managing/controlling of RTP recorded -0.066, -0.026 and -0.061 respectively. This depicts an inverse slight relationship with annual turnover. This could be regarded as a relationship so low as to be random. Loss of RTP in transit recorded as 0, which means it has no relationship with annual turnover and could be concluded that the observed results were produced based on chance. However, some of the enlisted barriers indicate an iota of association with annual turnover, measured statistically. Cost of tracing and tracking of RTP, costly sophisticated equipment, delay of order deliveries, delay in RTP pick-up, sorting and cleaning of used RTP, mix-ups during RTP allocation and return, and additional cost required for managing/controlling RTP recorded 0.064, 0.122, 0.103, 0.161, 0.273, 0.236 and 0.22 respectively, describe very weak relationships with annual turnover.

Furthermore, the coefficient of determination is calculated to determine the proportion of variance that exists between the two variables. Using the formula, coefficient of determination = rho^2(x 100) % variance, where the correlation coefficient is denoted by rho in Spearman's rank order coefficient, the respective proportion of variance is illustrated in Table 7.

According to Burns and Burns (2008), there are four (4) different relationships that could exist in variables as follows:

- No common variance as a result of no correlation.

- 9% common variance as a result of a small correlation of +0.3.
- 49% common variance as a result of a high correlation of +0.7.
- 90% common variance as a result of an extremely high correlation of +0.95.

The proportion of variance that exists between annual turnover and the barriers to RTP as indicated in Table 7 can be classified as "no common variance" as a result of no correlation.

Table 7: Correlations of Annual turnover and barriers to RTP adoption

Correlations				
Spearman's Rank Order Correlation				
Annual Turnover and Barriers to RTP				
	Correlation Coefficient	**Sig. (1-tailed)**	**N**	**Variance %**
Annual Turnover	1.000	.	77	
High Transportation Cost of RTP	-0.066	0.318	54	0.436
Loss of RTP in Transit	0.000	0.500	54	0.000
Unavailability of Sufficient Storage Space	-0.026	0.427	54	0.068
Costly Sophisticated Equipment	0.122	0.189	54	1.488
Delay of Other Deliveries	0.103	0.229	54	1.061
Delay in RTP Pick-up	0.161	0.123	54	2.592
Sorting and Cleaning of Used RTP	0.273	0.023	54	7.453
Mix-ups during RTP Allocation and Return	0.236	0.043	54	5.570
Cost of Tracing and Tracking of RTP	0.064	0.322	54	0.410
Difficulties in Managing / Controlling of RTP	-0.061	0.330	54	0.372
Additional Cost Required for Managing / Controlling RTP	0.220	0.055	54	4.840

6.4.2 Test of Hypothesis Two (H2)

The alternate hypothesis (H_2) and null hypothesis (H_o) sate:

H_2: The drivers of RTP influence the adoption of RTP.

H_o: The drivers of RTP do not influence the adoption of RTP.

As shown in Table 8, the significant level of the adoption of RTP and the drivers of RTP are less than the alpha level of 0.05. Therefore the null hypothesis is rejected and the alternate hypothesis is accepted. This implies that there is a statistically significant relationship between the drivers of RTP and the adoption of RTP.

Drivers such as government regulations, competitive advantage and advantages over single-use recorded a correlation coefficient of 0.262, 0.2 and 0.249 respectively, implying low correlations with the adoption of RTP. The relationship effect size of these drivers and adoption of RTP can be considered low according to Cohen's (1992) convention. Other drivers (environmental consideration, economic benefits, environmental benefits, operational benefits and social benefits) reported 0.47, 0.358, 0.439, 0.462 and 0.33 respectively implying a moderate correlation. The relationship strength of the later set of drivers with the adoption of RTP is certainly higher than the former ones. This means that most organizations are more interested in the environmental, economic, social and operational benefits when adopting RTP. Government regulations, competitive advantage and advantages over single-use did not seem to be as important as the other drivers discussed. Here we assume a more liberal definition of competitive advantage as the perception of adoptees of RTP to view it as granting a business advantage over rivals.

The coefficient of determination was calculated to delineate the proportion of variance that exists between adoption of RTP and drivers of RTP. This is presented in Table 8, indicating that the percentage of variance in adoption of RTP is predictable from the variance in five of the drivers of RTP. For environmental consideration, economic benefits, environmental benefits, operational benefits and social benefits over 9% variance was recorded, which implies a common variance. The other drivers (government regulations, competitive advantage and advantages over single-use) have no common variance with the adoption of RTP.

Table 8: Pearson Chi-square correlation for drivers of RTP and adoption of RTP

Correlations				
Pearson Chi-square Test				
Drivers of RTP and Adoption of RTP				
	Correlation Coefficient	**Sig. (1-tailed)**	**N**	**%Variance**
Adoption of RTP	1.000	.	56	
Government Regulation	0.262	0.004	56	6.864
Environmental Consideration	0.470	0.004	56	22.090
Economic Benefits	0.358	0.002	56	12.816
Environmental Benefits	0.439	0.005	56	19.272
Operational Benefits	0.462	0.006	54	21.344
Social Benefits	0.330	0.001	55	10.890
Competitive Advantage	0.200	0.001	55	4.000
Advantages over Single-use	0.249	0.007	55	6.200

6.4.3: Test of Hypothesis three (H3)

The alternate hypothesis (H_3) and null hypothesis (H_o) state:

H_3: Adoption of RTP improves business performance.

H_o: Adoption of RTP does not improve business performance.

Descriptive statistics were used to summarize the respondents' opinions on the impact of RTP adoption on business performance using various performance measures (Table 9). Hence, it can be inferred that the usage of RTP has a high level of positive impact on business performance based on the general performance measures. For instance, 92.9% of the respondents indicated that the usage of RTP has a high level of positive impact on the quality of service and (or) products. This shows that the conveyance of their products by RTP from one phase of the supply chain to the other has significantly increased the quality offerings of their products and services. Also, 87% of the respondents indicated that the usage of RTP has a high positive impact on their company's performance defined by low cost. This can be justified by the rate at which revenue is generated from usage of RTP when the companies start recuperating their capital investments in adoption once the break-even point of three years is reached.

Table 9: Impact of RTP adoption on business performance

	Impact of RTPs on Company's Performance Measures (in %)				
Performance Measures	**Very Negative Impact**	**Some Negative Impact**	**No Impact**	**Some Positive Impact**	**Very Positive Impact**
Quality of service/products	1.8	3.5	1.8	39.3	53.6
Speed	1.8	1.8	9.1	63.6	23.7
Low cost	0	1.9	11.1	59.3	27.7
Sales turnover	0	3.6	10.7	44.6	41.1
Net profit	0	1.8	10.7	53.6	33.9
Market share	0	3.6	39.3	44.6	12.5
Customer loyalty	0	3.6	16.1	64.3	16.2
Competitive advantage	0	3.6	17.9	50	28.7
Customer satisfaction	0	1.8	12.7	54.6	30.9
Innovation	0	1.8	17.8	51.8	28.6
Technology	0	1.7	30.4	55.4	12.5
Internal rate of return	1.7	3.6	12.5	64.3	17.9

Therefore, based on the above dataset and analysis, it can be concluded that adoption of RTP improves business performance.

The null hypothesis was further tested using the Pearson Chi-square test. The results presented in Table 10 show that the significant level for the adoption of RTP and the business performance are less than the alpha level of 0.05. As such, it is sufficient to reject the null hypothesis in favour of the

alternate hypothesis, which infers that there is a statistically significant relationship between the two variables, meaning that the adoption of RTP improves business performance.

Table 10: Pearson Chi-square correlation for adoption of RTP and business performance

Correlations				
Pearson Chi-Square Tests				
Adoption of RTP and Business Performance				
	Correlation Coefficient	**Sig. (1-tailed)**	**N**	**% Variance**
Adoption of RTP	1	.	56	
Quality of Service /Products	0.607	0.007	56	36.845
Speed	0.528	0.004	56	27.878
Low Cost	0.448	0.001	56	20.070
Sales Turnover	0.447	0.001	56	19.981
Net Profit	0.333	0.002	56	11.089
Market Share	0.234	0.008	56	5.476
Customer Loyalty	0.359	0.007	56	12.888
Competitive Advantage	0.463	0.001	56	21.437
Customer Satisfaction	0.354	0.009	56	12.532
Innovation	0.299	0.006	56	8.940
Technology	0.252	0.006	56	6.350
Internal Rate of Return	0.354	0.005	56	12.532

The correlation coefficient (Table 10) can be categorized into two categories (Cohen, 1992). Adoption of RTP and each of the performance measures under category 1 (which comprises of net profit, market share, customer loyalty, customer satisfaction, innovation, technology and internal rate of return) recorded correlation coefficient near 0.2. This indicates a small effect size relationship. Conversely, the adoption of RTP and each of the performance measures under category 2 (which comprises of quality of service/products, speed, low cost, sales turnover and competitive advantage) reported correlation coefficient close to 0.5. This indicates a medium effect size relationship. Largely, it can be established that the adoption of RTP improves business performance measures, though at varying rates.

Furthermore, the coefficient of determination was calculated to determine the proportion of variance that exists between the two variables (Table 10). The percentage of variance in the business performance measures is predictable from the variance in the adoption of RTP, as there exists common variance at various degrees.

6.4.7 Test of Hypothesis four (H4)

The alternate hypothesis (H_4) and the null hypothesis (H_0) state:

H_4: The barriers to the use of RTP weaken the business performance.

H_0: The barriers to the use of RTP do not weaken the business performance.

The null hypothesis was tested by spearman's rank order correlation (Table 11). The Table 11 suggests that the significant level for most of the barriers and business performance measures are less than the p-value of 0.05, which indicates that the null hypothesis should be rejected in favour of the alternate hypothesis and hence the barriers to RTP deteriorate business performance. However, it is expedient to measure the strength of the relationship that exists between the different barriers and the various business performance measures. The relationship strength differs based on their correlation coefficients and can be categorized into small and moderate effect size (Cohen, 1992) represented in Table 12 and Table 13 respectively.

Table 11: Spearman's rank order correlation for barriers to RTP and business performance

Correlation			Quality of Service / Products	Speed	Low Cost	Sales Turnover	Net profit	Market Share	Customer Loyalty	Competitive advantage	Customer satisfaction	Innovation	Technology	Internal Rate of Return
Spearman's rho	High Transportation Cost of RTP	Correlation Coefficient	.179	.118	.140	-.084	.032	.225*	.195	-.035	.025	.219	.244*	-.094
		Sig. (1-tailed)	.094	.195	.156	.269	.407	.048	.075	.399	.428	.052	.035	.246
		N	56	55	54	56	56	56	56	56	55	56	56	56
	Loss of RTP in Transit	Correlation Coefficient	.188	.148	.156	.422**	.422**	.099	.285*	.211	.204	.147	-.003	.285*
		Sig. (1-tailed)	.083	.141	.130	.001	.001	.234	.017	.059	.068	.140	.490	.017
		N	56	55	54	56	56	56	56	56	55	56	56	56
	Unavailability of Sufficient Storage Space	Correlation Coefficient	.194	.054	-.087	.214	.059	-.254*	-.057	.218	.175	.290*	.007	.162
		Sig. (1-tailed)	.075	.348	.265	.057	.333	.029	.339	.054	.101	.015	.480	.116
		N	56	55	54	56	56	56	56	56	55	56	56	56
	Costly Sophisticated Equipment	Correlation Coefficient	.328**	.237*	-.140	.315**	.271*	-.248*	.086	.205	.085	.190	.131	.156
		Sig. (1-tailed)	.007	.041	.157	.009	.022	.033	.265	.065	.270	.080	.169	.126
		N	56	55	54	56	56	56	56	56	55	56	56	56
	Delay of other Deliveries	Correlation Coefficient	-.045	.027	.070	.028	-.007	-.212	.053	.159	.022	.005	-.105	-.168
		Sig. (1-tailed)	.372	.422	.308	.418	.480	.058	.350	.121	.435	.486	.220	.107
		N	56	55	54	56	56	56	56	56	55	56	56	56
	Delay in RTP Pick-Up	Correlation Coefficient	.049	.048	.172	.202	.215	.056	.074	.008	-.038	.210	.125	.034
		Sig. (1-tailed)	.360	.363	.107	.067	.056	.342	.294	.476	.391	.061	.179	.402
		N	56	55	54	56	56	56	56	56	55	56	56	56
	Sorting and Cleaning of Used RTP	Correlation Coefficient	.052	.225*	.302*	.287*	.256*	.041	.119	0.179	0.188	0.224	.224*	.230*
		Sig. (1-tailed)	.351	.049	.013	.016	.028	.382	.191	.088	.169	.057	.048	.044
		N	56	55	54	56	56	56	56	56	55	56	56	56
	Mix-ups during RTP Allocation and Return	Correlation Coefficient	.053	.184	.271*	.324**	.234*	.097	.096	.163	.232*	.282*	.411**	.245*
		Sig. (1-tailed)	.350	.090	.024	.007	.042	.239	.241	.115	.044	.052	.001	.034
		N	56	55	54	56	56	56	56	56	55	56	56	56
	Cost of Tracing and Tracking of RTP	Correlation Coefficient	.038	.133	.038	.348**	.268*	-.262*	-.126	.090	.016	.126	.068	.277*
		Sig. (1-tailed)	.392	.167	.392	.004	.023	.025	.177	.255	.454	.177	.308	.019
		N	56	55	54	56	56	56	56	56	55	56	56	56
	Difficulties in Managing / Controlling RTP	Correlation Coefficient	.108	.116	.002	.336**	.238*	-.227*	.064	.258*	.181	214	.154	.259*
		Sig. (1-tailed)	.214	.199	.494	.006	.038	.046	.320	.028	.094	.057	.129	.027
		N	56	55	54	56	56	56	56	56	55	56	56	56
	Additional Cost Required for Managing and Controlling RTP	Correlation Coefficient	-.032	.190	.053	.337**	.270*	-.249*	-.055	.294*	.195	.201	.111	.168
		Sig. (1-tailed)	.407	.082	.352	.006	.022	.032	.344	.014	.077	.069	.208	.107
		N	56	55	54	56	56	56	56	56	55	56	56	56

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

Table 12: Small effect size correlation of barriers to RTP and business performance

Correlation			Speed	Low Cost	Sales Turnover	Net profit	Market Share	Customer Loyalty	Competitive advantage	Customer satisfaction	Innovation	Technology	Internal Rate of Return
Spearman's rho	High Transportation Cost of RTP	Correlation Coefficient					.225*					.244*	
		Sig. (1-tailed)					.048					.035	
		N					56					56	
	Loss of RTP in Transit	Correlation Coefficient						.285*					.285*
		Sig. (1-tailed)						.017					.017
		N						56					56
	Unavailability of Sufficient Storage Space	Correlation Coefficient					-.254*				.290*		
		Sig. (1-tailed)					.029				.015		
		N					56				56		
	Costly Sophisticated Equipment	Correlation Coefficient	.237*			.271*	-.248*						
		Sig. (1-tailed)	.041			.022	.033						
		N	56			56	56						
	Delay of other Deliveries	Correlation Coefficient											
		Sig. (1-tailed)											
		N											
	Delay in RTP Pick-Up	Correlation Coefficient											
		Sig. (1-tailed)											
		N											
	Sorting and Cleaning of Used RTP	Correlation Coefficient	.225*		.287*	.256*						.224*	.230*
		Sig. (1-tailed)	.049		.016	.028						.048	.044
		N	55		56	56						56	56
	Mix-ups during RTP Allocation and Return	Correlation Coefficient		.271*		.234*				.232*			.245*
		Sig. (1-tailed)		.024		.042				.044			.034
		N		54		56				55			56
	Cost of Tracing and Tracking of RTP	Correlation Coefficient				.268*	-.262*						.277*
		Sig. (1-tailed)				.023	.025						.019
		N				56	56						56
	Difficulties in Managing / Controlling RTP	Correlation Coefficient				.238*	-.227*		.258*				.259*
		Sig. (1-tailed)				.038	.046		.028				.027
		N				56	56		56				56
	Additional Cost Required for Managing and Controlling RTP	Correlation Coefficient				.270*	-.249*		.294*				
		Sig. (1-tailed)				.022	.032		.014				
		N				56	56		56				

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

As shown in Table 12, each of the identified barriers has a small effect size correlation with most of the performance measures, which can be considered as weak relationships. For instance, high transportation cost of RTP has a small effect size correlation with market share and technology. Likewise, loss of RTP in transit holds a small effect size correlation with customer loyalty, and internal rate of return. Unavailability of sufficient storage space also retains a small effect size relationship with market share, competitive advantage and innovation.

Table 13: Moderate effect-size correlation of barriers to RTP and business performance

Correlation			Quality of Service / Products	Low Cost	Sales Turnover	Net profit	Technology
	Loss of RTP in Transit	Correlation Coefficient			.422**	.422**	
		Sig. (1-tailed)			.001	.001	
		N			56	56	
	Costly Sophisticated Equipment	Correlation Coefficient	.328**		.315**		
		Sig. (1-tailed)	.007		.009		
		N	56		56		
	Sorting and Cleaning of Used RTP	Correlation Coefficient		.302*			
		Sig. (1-tailed)		.013			
		N		54			
	Mix-ups during RTP Allocation and Return	Correlation Coefficient			.324**		.411**
		Sig. (1-tailed)			.007		.001
		N			56		56
	Cost of Tracing and Tracking of RTP	Correlation Coefficient			.348**		
		Sig. (1-tailed)			.004		
		N			56		
	Difficulties in Managing / Controlling RTP	Correlation Coefficient			.336**		
		Sig. (1-tailed)			.006		
		N			56		
	Additional Cost Required for Managing and Controlling RTP	Correlation Coefficient			.337**		
		Sig. (1-tailed)			.006		
		N			56		

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

From Table 13 it can be construed that some of the barriers hold medium effect sizes with some of the performance measures, and this implies moderate relationships. For instance, loss of RTP in transit is interpreted to lessen a company's sales turnover and net profit moderately while costly sophisticated equipment is translated to diminish the quality of service / products and sales turnover moderately. Therefore, it can be established statistically that barriers to RTP deteriorate business performance.

7. Conclusion

This paper developed and conceptualised RTP as an environmental technology and a resource. It developed and tested a model that explained the usage of returnable transport packaging in RL using natural resource based view (NRBV) (Hart, 1995; Hart and Dowell, 2010). In particular, we analysed the drivers, the barriers to the usage of RTP and its cost-effectiveness, as well as its impact on business performance. Although NRBV has been used broadly to clarify the importance of capabilities in achieving sustainable competitive advantage (Vachon and Klassen, 2007), we have used it specifically to explain RTP implementation advantage in achieving environmental stewardship while conferring sustained economic performance and a socially responsible status on adoptee organisations.

The majority of firms sampled in Nigeria and South Africa have adopted the usage of RTP in their businesses. This is in contrast to the current belief that

RL in developing countries is in its infancy (Sarkis et al., 2011; Zhang et al., 2011). Furthermore, there is increasing recognition and willingness to embrace RTP which is not matched by actual adoption due to financial constraints, especially amongst the SMEs. We have shown statistically that the size of the company as defined by annual turnover does not moderate the range of barriers to the use of RTP. This implies that both SMEs and large organisations face the same level of challenges when adopting RTP, thus highlighting the enormity of challenges confronting SMEs relative to the large and more resourceful organisations. These SMEs would benefit from financial support from large enterprises and governments in order to improve compliance with environmental regulations via the adoption of RTP.

Also, our findings corroborate that of Shaik and Abdul-Kaber (2013) where financial constraints was cited as a barrier to adoption in their studies of RTP implementation based on data drawn from developed countries. The barriers to RTP impacts the usage of RTP by weakening its business performance advantage. There is the need therefore for individual companies in to work collaboratively with logistics provider companies so as to abrogate some of these barriers (if not all) while improving the management and control of the usage of RTP in their organizations. This will not only eradicate the barriers, but will also develop mutual relationships across the supply chain of organizations concerned.

The relationship between the drivers and level of adoption of RTP are in two categories of those with low correlation and those with moderate correlation. Those drivers with moderate correlations include environmental, economic, social and operational benefits when adopting RTP. That is RTP adoption is largely a 'sustainability facing' initiative. Whilst adoption has a high level of positive impacts on measures of organisational performance, the measures are impacted upon at varying degrees.

In future research, there is the need to investigate the roles and types of products or supply chains within which the packages are used. This could then be extended to examine the effect of product status across the supply chain – that is, those products that are already shipped, to be shipped and will not be shipped in RTP. The focus of current study was Nigeria and South Africa, but future comparative studies of the developing countries and developed ones are necessary to test the influence of environmental awareness differentials across the two divide.

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APPENDIX : (Questionnaire)

Part A: General company information

1. Name of Company……
   ……..
2. Address of Company……
   ……
3. Company's telephone number……
   ……
4. Company's email……
   ……
5. Company's year of establishment……
   ……

6. Name of respondent (optional)……
……

7. Designation of respondent……
……

8. What is your company's average annual expenditure (kindly tick the closest option that applies)

<R91.5m ☐ R91.5m- R366m ☐ R384.3m- R915m ☐ R933.3m- R1830m ☐ > R1830m ☐

9. What is your company's average annual turnover (kindly tick the closest option that applies)

<R91.5m ☐ R91.5m- R366m ☐ R384.3m- R915m ☐ R933.3m- R1830m ☐ > R1830m ☐

10. What is the total number of employees in your company?

1-10☐ 11-50 ☐ 51-250 ☐ 251-500 ☐ 501 and above ☐

11. In which of the following channel positions do you operate? Check all that apply.

Channel positions	***Tick***
Manufacturer	☐
Wholesaler	☐
Retailer	☐
Service Provider / Logistics (Please specify :…….)	☐

12. What is your company's major line of product? Please tick all that apply

Line of products and activities	***Tick***
Pharmaceutical products and beauty Aids	☐
Perishable and non-perishable foods	☐
Drinks and beverages	☐
Fruits and vegetables	☐
Groceries	☐
Cooking gas	☐
Automobile and automotive assembly, parts, components, accessories	☐
Electrical and electronics equipment and components	☐
Chemical products, allied products	☐

Furniture, home Furnishings and equipment ☐

Construction products and building materials ☐

Hospital, industrial, agricultural equipment and components ☐

Supply and/or rental of equipment ☐

Transport and/or storage ☐

Consulting ☐

Telecommunication ☐

Clothing / apparel ☐

Government ☐

Catering ☐

Aircraft and ship-building assembly, components, accessories, *et cetera.* ☐

Other product line/ business activities (please specify)…….

…… ☐

13. Has your company adopted the usage of Reusable Transport Packaging Items in Reverse Logistics? If yes please go to part C else go to part B

Part B: Single-use Transport Packaging System/ Reusable Transport Packaging Items

14. Please indicate by ticking the type(s) of Transport Packaging system in use in your company

Single-use transport packaging

Tick

Corrugated containers ☐

Corrugated cardboard ☐

Expendable packaging ☐

Non-recyclable wax-coated corrugated boxes ☐

Shipping containers with no lids ☐

Bulk bags ☐

Others (please specify)…… ☐

15. What are the challenges faced by your organization in replacing the single-use transport packaging with Reusable Transport Packaging Items? Please tick all that apply

Challenges	***Tick***
Capital investment	☐
Cost for Tracking and Accounting	☐
Lack of governmental/law enforcement	☐
Logistics and Warehousing	☐
Transportation vs. Packaging	☐
Others (please specify)……	☐

16. Will your company consider replacing single-use transport packaging with Reusable Transport Packaging Items in the near future?

Absolutely Yes ☐ May be ☐ May be not ☐ Absolutely No ☐

17. If 'MAY BE NOT / ABSOLUTELY NO'; what factors would facilitate your company to consider the replacement of single-use transport packaging with Reusable Transport Packaging?

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18. **Part C: Reusable Transport Packaging Items**

Commonly used Reusable Transport Packaging Items:

19. Please indicate by ticking the type(s) of Reusable Transport Packaging Items currently in use in your company

Types of Reusable Transport Packaging Items	***Tick***
Crates	☐
Trolleys	☐
Cases	☐
Plastic pallets collar	☐
Bulk containers	☐
Plastic storage tanks	☐
Carts	☐
Reusable plastic pails	☐
Trolleys	☐

Trays ☐

Barrels
☐

Plastic boxes
☐

Plywood cases
☐

Flight cases ☐

Steel racks ☐

Roll cages ☐

Tote bins ☐

Pallet pooling
☐

Others (please specify)……
☐

20. Have the restraints of single-use transport packaging been concealed by Reusable Transport Packaging Items in your company? YES ☐
NO ☐

21. How did your company get informed about Reusable Transport Packaging Items?

Media
Tick

Government ☐

Reusable Transport Packaging

Items manufacturer ☐

Trade Union Association (please specify)……**……**
☐

Customers ☐

Consultants ☐

Others (please specify)……..... ☐

22. The usage of Reusable Transport Packaging Items in your company has been influenced by one or more factors. Please tick all appropriate boxes as applicable to your company.

Factors	***Agree Strongly***	***Agree***	***Neutral***	***Disagree***	***Disagree Strongly***
Government regulation	☐	☐	☐	☐	☐
Environmental consideration	☐	☐	☐	☐	☐
Economic benefits	☐	☐	☐	☐	☐
Environmental benefits	☐	☐	☐	☐	☐
Operational benefits	☐	☐	☐	☐	☐
Social benefits	☐	☐	☐	☐	☐
Competitive advantage	☐	☐	☐	☐	☐
Advantages over Single-Use Transport Packaging	☐	☐	☐	☐	☐

23. Rank the above factors in order of importance as making a decision to implement Reusable Transport Packaging Items in your company.

Factors	***Very Important***	***Important***	***Moderately Important***	***Little Important***	***Not Important***
Government regulation	☐	☐	☐	☐	☐
Environmental consideration	☐	☐	☐	☐	☐
Economic benefits	☐	☐	☐	☐	☐
Environmental benefits	☐	☐	☐	☐	☐
Operational benefits	☐	☐	☐	☐	☐
Social benefits	☐	☐	☐	☐	☐
Competitive advantage	☐	☐	☐	☐	☐
Advantages over Single-use Transport Packaging	☐	☐	☐	☐	☐
Others (Please specify)	☐	☐	☐	☐	☐

Cost effectiveness of Reusable Transport Packaging Items:

24. How much has your company invested in Reusable Transport Packaging Items over the years?

<R91,500 ☐ R91,500 – R183,000 ☐ R201,300 – R457,500 ☐
R475,800 – R915,000 ☐ > R915,500 ☐

25. How long did it take your company to recover its investment on Reusable Transport Packaging Items?

Durations	***Tick***
Less than a year	☐
1 year	☐
2 years	☐
3 years	☐
4 years	☐
5 years	☐
Not yet	☐

26. What is your annual loss rate on Reusable Transport Packaging Items?

Annual Loss Rate returned	***Damaged***	***Never***
>R91,500	☐	☐
R73,200 – R91,500	☐	☐
R54,900 – R73,190	☐	☐
R36,600 – R54,890	☐	☐
R19,300 – R36,590	☐	☐
R9,150 – R18,290	☐	☐

<R9,150	☐	☐
R0	☐	☐

27. Based on cost, how can you assess the usage of Reusable Transport Packaging Items in your company?

Very effective ☐ Effective ☐ Neutral ☐ Less effective ☐ Ineffective ☐

Potential benefits of Reusable Transport Packaging Items:

28. Below are the measurable benefits of the Reusable Transport Packaging Items that pose as success factors for increasing the usage of Reusable Transport Packaging Items in reverse logistics, please tick the appropriate boxes as applicable to your company.

Factors	***Agree Strongly***	***Agree***	***Neutral***	***Disagree***	***Disagree Strongly***
Cost saving	☐	☐	☐	☐	☐
Storage efficiency	☐	☐	☐	☐	☐
Staff (workers) safety	☐	☐	☐	☐	☐
Less product damage	☐	☐	☐	☐	☐
Operational efficiency	☐	☐	☐	☐	☐

Improved inventory management ☐ ☐ ☐ ☐ ☐

Provided better ergonomic design ☐ ☐ ☐ ☐ ☐

Increased handling efficiencies ☐ ☐ ☐ ☐ ☐

Avoided waste disposal costs ☐ ☐ ☐ ☐ ☐

Factors	***Agree Strongly***	***Agree***	***Neutral***	***Disagree***	***Disagree Strongly***
Longer useful life	☐	☐	☐	☐	☐
Easy to sanitize	☐	☐	☐	☐	☐
Customers' satisfaction	☐	☐	☐	☐	☐
Environmental sustainability	☐	☐	☐	☐	☐

Others (please specify)

i……. ☐ ☐ ☐ ☐ ☐

ii……. ☐ ☐ ☐ ☐ ☐

iii……. ☐ ☐ ☐ ☐ ☐

Managing and controlling Reusable Transport Packaging Items:

29. How does your company manage and control its Reusable Transport Packaging Items?

In-house ☐

Third party such as distribution centres ☐

30. Has your company introduced/ initiated any structured management and control system to acquire an efficient and effective Reusable Transport Packaging Items distribution?

Certainly ☐ Somehow ☐ Not really ☐ Not yet ☐

31. Please identify which of the three main types of Reusable Transport Packaging Items control strategies is use by your company. Please tick where applicable.

Control strategy	***Tick***
Switch-pool system	☐
Transfer system	☐
Depot system	☐

32. Does your company include any form of visibility system in its Reusable Transport Packaging Items control strategy?

Yes ☐ No ☐

If YES, please state the visibility system use for controlling and monitoring Reusable Transport Packaging Items in your company

……
……

33. How long is the life cycle of a typical Reusable Transport Packaging Item in your company? Please tick that which apply to your company

Durations	***Tick***
Less than a year	☐
1 year	☐
2 years	☐
3 years	☐
4 years	☐
5 years	☐
More than 5 years	☐

34. What other measures has your company established for an efficient and effective management of Returnable Transport Packaging Items?
    .....
    .....
    .....
    .....
    .....

35. Have these measures been effective? Yes ☐ Somehow ☐ No ☐

36. If no, why?
    .....
    .....

Possible challenges of Reusable Transport Packaging Items:

37. Some challenges encountered in managing and controlling Reusable Transport Packaging Items are listed below, please tick the appropriate boxes as applicable to your company

Factors	***Agree***	***Strongly Agree***	***Neutral***	***Disagree***	***Disagree Strongly***

High transportation cost of Reusable

Transport Packaging Items ☐ ☐ ☐ ☐ ☐

Loss of Reusable Transport Packaging

Items in transit ☐ ☐ ☐ ☐ ☐

Unavailability of sufficient storage space ☐ ☐ ☐ ☐ ☐

Costly sophisticated equipment ☐ ☐ ☐ ☐ ☐

Delay of other deliveries as a result of same

time schedule of various packaging pick-ups ☐ ☐ ☐ ☐ ☐

Delay in Reusable Transport Packaging

Items pick-up by suppliers ☐ ☐ ☐ ☐ ☐

Sorting and cleaning of used Reusable

Transport Packaging Items ☐ ☐ ☐ ☐ ☐

Mix-ups during Reusable Transport

Packaging Items' allocation and return

(in case of multiple suppliers) ☐ ☐ ☐ ☐ ☐

Cost of tracing and tracking of Reusable

Transport Packaging Items ☐ ☐ ☐ ☐ ☐

Difficulties in managing/controlling

Reusable Transport Packaging Items ☐ ☐ ☐ ☐ ☐

Additional cost required for managing

and controlling Reusable Transport

Packaging Items ☐ ☐ ☐ ☐ ☐

Assessing the usage of Reusable Transport Packaging Items:

38. How has the usage of Reusable Transport Packaging Items impacted on the following performance measures in your company?

Measures	***Very Negative Impact***	***Some Negative Impact***	***No Impact***	***Some Positive Impact***	***Very Positive Impact***
Quality of service/products	☐	☐	☐	☐	☐
Speed	☐	☐	☐	☐	☐
Low cost	☐	☐	☐	☐	☐
Sales turnover	☐	☐	☐	☐	☐
Net profit	☐	☐	☐	☐	☐
Market share	☐	☐	☐	☐	☐
Customer loyalty	☐	☐	☐	☐	☐
Competitive advantage	☐	☐	☐	☐	☐
Customer satisfaction	☐	☐	☐	☐	☐
Innovation	☐	☐	☐	☐	☐
Technology	☐	☐	☐	☐	☐

Internal rate of return	☐	☐	☐	☐	☐
Others, please specify					
i.	☐	☐	☐	☐	☐
ii.	☐	☐	☐	☐	☐
iii.	☐	☐	☐	☐	☐

39. Do you think additional investments on Reusable Transport Packaging Items will boost your company's performance?

Definitely No	Maybe not	Not sure	Maybe yes	Definitely yes
☐	☐	☐	☐	☐

39. In general, what are your comments on the usage of Reusable Transport Packaging Items in reverse logistics

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