

## South African 3PL firms' approaches to sustainable supply chain management

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### Abstract

There has been added pressure on firms to implement initiatives for sustainable supply chain management. The purpose of this study was to analyse South African 3PL firms' approaches to sustainable SCM and to determine if these approaches are more internally or externally influenced.

A qualitative research approach was used to explore this by means of semi-structured face-to-face interviews with ten participants from nine South African 3PL firms. The firms were mapped onto a typology of approaches to sustainable supply chain management to determine if their sustainability initiatives were mostly influenced internally or externally, and how this is likely to change in the near future.

The findings showed that external factors were more influential on South African 3PL firms, with this influence set to increase in the next three to five years. The growing impact of government, technology, and collaboration with customers and suppliers, as well as the importance of management to control these influencers were highlighted in the study. The study expands research on supply chain sustainability in an emerging and developing country context as little research is available on the topic.

**Key phrases**

*3PL firms; barriers; enablers; qualitative; South Africa; supply chain management; sustainability; third party logistics*

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## 1. INTRODUCTION

The Earth's natural resources are constantly being depleted by an ever increasing population of 7.2 billion people (United Nations 2014:Internet). Firms must not only seek profits, but also simultaneously develop and operate a sustainable system that has a low impact on the environment and the surrounding society (Giunipero, Hooker & Denslow 2012:259-261). Supply chain management (SCM) is defined as the management of the physical, logical and financial flows in a network of intra- and inter-organisational relationships, to add value and to achieve customer satisfaction (Brandenburg, Govindan, Sarkis and Seuring 2014:299; Harland 1996:S64-S68). Sustainable SCM means that firms have a responsibility to take care of the environment, while they ensure the social performance of their suppliers and customers (Carter & Easton 2011:47; Walker & Jones 2012:15). In recent years, there has been an increased interest in sustainable SCM and its initiatives, such as green SCM; ethical sourcing; and sustainable operations (Carter & Easton 2011:46; Pagell & Shevchenko 2014:44; Wolf 2011:222).

Firms in all corners of the world constantly face enablers and barriers to sustainable SCM (Carter & Jennings 2002:45-46; Seuring & Müller 2008:1703; Zhu, Sarkis & Lai 2013:107). Previous research on sustainable SCM categorised these influencers of supply chain sustainability into two main categories, namely external and internal influencers (Ageron, Gunasekaran & Spalanzani 2012:176; Walker & Jones 2012:17).

The external influencers most commonly identified in previous research consist of the government, customers, competitors, suppliers, shareholders, non-governmental firms (NGO's), media, and industry. The government, customers, competitors and suppliers can be viewed as both enablers and barriers to sustainable SCM. Shareholders and NGO's are more frequently referred to as external enablers while the media and the industry are more commonly found to be barriers to sustainable SCM (Giunipero *et al.* 2012:260-262; Hall 2000:467; Seuring & Müller 2008:1703-1705; Walker & Jones 2012:17). The internal organisational influencers most commonly identified

in previous research include employees, top management, strategic factors, and functional factors. Each internal influencer has the potential to be an enabler and a barrier to sustainable SCM (Carter & Jennings 2002:45; Giunipero *et al.* 2012:260-262).

Research on sustainable SCM in the Southern African context is limited and focuses mainly on practices, drivers, barriers and constraints of green supply chain management in various industries (Mvubu & Naude 2016:271-297; Niemann, Kotzé & Adamo 2016:977-1013; Pooe & Mhelembe 2014:1-9; Ojo, Mbohwa & Akinlabi 2013:315; Schoeman & Sanchez 2009:569-576).

Carter and Easton (2011:55) identified possibilities for research whereby the specific sustainability initiatives, approaches, policies and activities can be investigated within specific industries. Min and Kim (2012:46-47) as well as Brandenburg *et al.* (2014:309-310) agree and point out that there is a lack of research on industry-specific supply chain sustainability.

Various research articles have appeared in supply chain management journals reporting on the sustainability efforts of manufacturers and retailers (Cooke 2008:46-49; Murphy 2008:30-42). However, minor attention has been given to supply chain sustainability in the context of the third-party logistics (3PL) industry. A 3PL can be defined as "an external supplier that performs or manages the performance of all or part of a firm's logistics functions." This definition is purposefully broad and encompasses suppliers of services such as transportation, warehousing, distribution and financial services (Coyle, Langley, Novack & Gibson 2013:489). The importance of logistics services in South Africa is emphasised by the amount spent on logistics costs, which constitutes 11,7% of South Africa's GDP (University of Stellenbosch 2015:Internet). South Africa is the most developed country in Africa in terms of the contract logistics market (Analytiqa 2013:Internet).

Many 3PL firms increased their respective commitments to building sustainability programs due to various reasons like a corporate desire to do the right thing, a desire to attract green customers, customer pressure or a desire to enhance the firm's image (Lieb & Lieb 2010:526). According to Walker and Jones (2012:15-16) a firm's reason for and approach to sustainable SCM is contingent upon the environment and the contexts that the firm operates in. Firms that do not have a clear understanding of what enables or inhibits their efforts to sustainable SCM will not be able to practice sustainable SCM pro-actively (Pagell & Shevchenko 2014:51).

Walker and Jones (2012:15) states that it is unclear if certain types of firms are more externally or internally motivated to engage in sustainable SCM. The purpose of this study is to analyse South African 3PL firms' approaches to sustainable SCM and to determine if these approaches are more internally or externally influenced. Furthermore, this study explores new influencers to sustainable SCM practices emergent in the South African 3PL industry, as well as the future of sustainable SCM in this industry. This study adds value through the creation of an awareness of the enablers and barriers to sustainable SCM in the South Africa 3PL industry. An awareness of enablers and barriers can assist 3PL firms to develop more effective, efficient and comprehensive sustainable SCM practices with greater simplicity.

The following research questions guided this study:

- How do third party logistics firms in South Africa vary in their perceptions of internal and external enablers to sustainable SCM practices?
- How do third party logistics firms in South Africa vary in their perceptions of internal and external barriers to sustainable SCM practices?
- How do third party logistics firms vary in their predictions for the future of sustainable SCM in South Africa?

The contribution of this study is threefold. Firstly, the study identified which enablers and barriers to sustainable SCM exist in a 3PL context. The findings provide valuable insights to 3PLs and clients who intend to transform their supply chains from conventional to more sustainable ones. Secondly, this study extended the existing literature into a new context by identifying new internal and external influencers of sustainable SCM. Thirdly, the study gathered the perspectives of different South African 3PL firms regarding the future of sustainable SCM.

## **2. LITERATURE REVIEW**

### **2.1 The concept of sustainability**

The concept of sustainability has been around for centuries, however, specific attention towards sustainability only started to grow in the 1960s and 1970s when environmental issues began to appear. "The Limits of Growth" from the Club of Rome published in 1972 was the first major

publication on sustainability and this started what became known as the 'sustainability movement' when people and businesses started to take notice of environmental issues (Gomis, Parra, Hoffman & McNulty 2011:172-173; Müller & Pflieger 2014:317). With social issues contributing towards environmental issues, sustainability gained even more attention, especially after the 1982 Brundtland Report "Our Common Future", published by the World Commission on Environment and Development or WCED (Linnenluecke & Griffiths 2010:357; Müller & Pflieger 2014:317). In recent years, sustainability awareness has substantially increased, which has led to pressure on firms to raise their focus on sustainability and to adjust their practices to address relevant issues (Kang, Ryu & Kim 2010:415; Linnenluecke & Griffiths 2010:357).

There is no single, definitive definition of sustainability. The definition used most commonly is taken from the Brundtland report (Linnenluecke & Griffiths 2010:357; Müller & Pflieger 2014:317; Öztürk & Özçelik 2014:129). In the Brundtland Report (WCED 1987:43), sustainability is defined as, "... development which meets the needs of the present without compromising the ability of future generations to meet their own needs". For firms, this means that resources need to be allocated and decisions be made to achieve organisational objectives, without any negative outcome for future generations (Gomis *et al.* 2011:176; Guest 2010:327; Linnenluecke & Griffiths 2010:358).

Three pillars support sustainability, namely environmental, social and economic. These three pillars are commonly referred to as the 'triple bottom line'; a concept that was developed by John Elkington in 1994 (Brockhaus, Kersten & Knemeyer 2013:167; Müller & Pflieger 2014:317; Öztürk & Özçelik 2014:129). The environment pillar consists of all those decisions concerned with the quality of the ecosystem (Gomis *et al.* 2011:181; Müller & Pflieger 2014:317). There are two perspectives to the environmental pillar. The first is aesthetics, which refers to the protection of environmental beauty. The second is security, which refers to the protection of the environment as it pertains to human survival (Gomis *et al.* 2011:181).

The social pillar relates to all the decisions concerned with the interests of the community, (for example, the decisions around a healthy and stable economy to ensure quality living conditions). The economic pillar refers to the profits that the firm desires to make, as well as the financial strength and future growth of the firm. However, the economic pillar could be unbalanced in weight, and result in the detriment of the other two pillars. (Gomis *et al.* 2011:182; Gupta & Kumar 2013:311; Müller & Pflieger 2014:317-319). For a firm to achieve overall sustainability, it must find a

balance between the three pillars (Gupta & Kumar 2013:311; Kang *et al.* 2010:416; Müller & Pfleger 2014:317).

To link sustainability with SCM, one needs to develop a definition of sustainable SCM first. Sustainable SCM means that supply chain resources, operations, funds, and information are managed to maximise the supply chain's profits, while impacts on the environment are minimised and the social well-being of the supply chain is maximised. Sustainable SCM requires coordination between members along the supply chain and the integration of their sustainability initiatives (Brockhaus *et al.* 2013:169; Öztürk & Özçelik 2014:131).

## **2.2 Sustainable supply chain management trends and practices**

An increasing number of firms now start to adopt and implement sustainable SCM practices (Ageron *et al.* 2012:168-169; Eltayeb, Zailani & Ramayah 2011:495; Zailani, Jeyaraman, Vengadasan & Premkumar 2012:330). For supply chain sustainability to be a success, firms need to build beyond their own borders. This means that they need to collaborate with the upstream and downstream members of the supply chain to ensure that their supply chain partners act in a sustainable manner and that all their sustainable SCM initiatives are integrated (Ageron *et al.* 2012:169; Mitra & Datta 2014:2085; Sarkis, Zhu & Lai 2011:8).

One of the major trends in sustainable SCM is Green Supply Chain Management (GSCM). GSCM is defined as the integration of environmental management with SCM (Golicic & Smith 2013:89; Vijayvargy & Agarwal 2014:25). The objective of GSCM is to eliminate or reduce negative environmental impacts on and waste of resources from operations along the supply chain (Eltayeb *et al.* 2011:496). Five GSCM initiatives have been widely used. These are i) eco-design, ii) green purchasing, iii) supplier environmental collaboration, iv) customer environmental collaboration, and v) reverse logistics (Eltayeb *et al.* 2011:496; Golicic & Smith 2013:81; Vijayvargy & Agarwal 2014:27).

## **2.3 External influencers**

The main external enablers and barriers as identified in literature includes the following:

### **2.3.1 Government**

The influence of government on a 3PL's approach to sustainable SCM can be either an enabler or a barrier to the success of the approach (Luthra, Kumar, Kumar & Haleem 2011:238; Walker, Di Sisto & McBain 2008:82). The influence of government on sustainable SCM practices can be a catalyst to the initial implementation of these practices. Their influence can encourage collaboration of supply chain partners on the design of products and it can also regulate the pollution or gas emissions of firms (Diabat & Govindan 2011:665; Seuring & Müller 2008:1703; Zhu & Geng 2013:11). As such, it is clear that the government can have a long-term impact on a firm's approach to sustainability with a positive environmental perspective. From this view, a 3PL firm would be wise to view such regulations as a source of guidance to increase efficiency within its supply chain operations (Ageron *et al.* 2012:176).

A lack of a government support systems for the development of sustainable supply chains can discourage firms, large or small, and therefore also be a barrier to sustainable SCM (Giunipero *et al.* 2012:267; Govindan, Kaliyan, Kannan & Haq 2014:558). Additionally, a government that discourages sustainable innovation and supports the use of older practices can hinder an firm's development of sustainability (Luthra *et al.* 2011:238).

### **2.3.2 Suppliers**

Collaboration with suppliers in initiatives of sustainability has been identified by previous research as a critical driver for the development of a sustainable supply chain, as integration with suppliers improves resource use. Added to this, suppliers can be a source of innovation. Collaboration with suppliers helps the firm to understand the total life cycle impact that the product will have on the environment. This information can be used to plan and design the products and the supply chain for minimal overall environmental impact (Ageron *et al.* 2012:178; Diabat & Govindan 2011:665; Gopalakrishnan, Yusuf, Musa, Abubakar & Ambursa 2012:200; Seuring & Müller 2008:1706).

Suppliers' lack of commitment to sustainable initiatives is a barrier, because by definition, a supply chain involves the integration of an firm's suppliers. Possible causes for a lack of commitment are inadequate communication and trust between firms (Seuring & Müller 2008:1704; Walker *et al.* 2008:82). Without the commitment of suppliers, effective supply chain sustainability cannot be

achieved (Ageron *et al.* 2012:177; Govindan *et al.* 2014:563). A supplier's lack of capacity to develop sustainability into its operations limits the capacity of an firm to expand its sustainability initiatives (Ageron *et al.* 2012:177).

### **2.3.3 Customers**

Customers' awareness of sustainability provide a demand for environmentally friendly products and organisational sustainability. This demand is a trigger and a constant driver for the firm to improve its sustainability. Larger customers may require from suppliers to develop a sustainable supply chain as part of the partnership agreement (Ageron *et al.* 2012:177; Giunipero *et al.* 2012:266-267; Govindan *et al.* 2014:557; Ojo, Mbowa & Akinlabi 2014:1978; Seuring & Müller 2008:1703). In the same way that customer demand and awareness are drivers of sustainable SCM, the lack thereof are barriers to the development of sustainable initiatives (Govindan *et al.* 2014:559; Luthra *et al.* 2011:252; Ojo *et al.* 2014:1979).

### **2.3.4 Stakeholders**

Stakeholders as a group include NGO's, communities, investors and employees. As a diverse group, the power of stakeholders can put pressure on a firm to develop sustainable SCM initiatives (Heikkurinen & Bonnedahl 2013:194; Seuring & Müller 2008:1703; Zailani *et al.* 2012:331). Stakeholder theory provides support for this, as the theory states that firms are required to act in a particular way that pleases both the stakeholders and society at large (Kang *et al.* 2010:415; Russo & Perrini 2010:209).

### **2.3.5 Sectoral standards**

The industry in which a firm operates, drives the implementation of sustainable SCM through set standards (Gopalakrishnan *et al.* 2012:196). The set standards, however, vary across industries, which creates a barrier for firms, as there are multiple drivers and best practices to adapt to (Walker *et al.* 2008:82). The competitors of a firm are viewed as drivers of sustainability, since leading firms set the standards for sustainable SCM. The capacity to operate an industry that leads in sustainable supply chain initiatives, provides an firm with a competitive advantage, because of higher effectiveness and lower total cost involved (Ageron *et al.* 2012:176; Giunipero *et al.*

2012:267; Gopalakrishnan *et al.* 2012:196; Luthra *et al.* 2011:250; Walker *et al.* 2008:79). Previous research indicates that competitors' approaches to sustainable SCM was found to have a low impact on the firm's approach to sustainable SCM (Giunipero *et al.* 2012:266; Walker & Jones 2012:24).

## **2.4 Internal influencers**

The main internal enablers and barriers identified in literature includes the following:

### **2.4.1 Top management**

Previous research has found two alternative views on the impact of top management on the approach to sustainable SCM. The first view is that top management's commitment and support of the environment and social initiatives integrates the approach to become part of the organisational culture. It establishes the firm within society, and helps to embed the initiative into strategic plans (Giunipero *et al.* 2012:266; Gopalakrishnan *et al.* 2012:199; Luthra *et al.* 2011:246; Ojo *et al.* 2014:1978).

The alternative perspective is that top management's support has no influence on the approach to sustainable SCM. Out of 26 barriers studied by Govindan *et al.* (2014:563), a lack of top management support received the lowest rating of importance. The findings of Ageron *et al.* (2012:177) show that top management support did not have the same importance as the financial, supplier and capacity factors as a barrier to sustainable supply management. What is clear from previous research is that the role of top management will influence the firm's culture towards sustainability (Giunipero *et al.* 2012:266; Luthra *et al.* 2011:246).

### **2.4.2 Employees**

The involvement of employees is a critical success factor, as employees are ultimately the practitioners of the approach (Gopalakrishnan *et al.* 2012:195; Zhu *et al.* 2013:113). Proper training and the development of high calibre human resources has a positive relationship to the success of sustainable SCM approaches (Gopalakrishnan *et al.* 2012:200; Luthra *et al.* 2011:237). An organisational culture and a morale that is supportive of sustainability is an important driver of the

approach, as it encourages employees to act in an environmentally friendly manner (Gopalakrishnan *et al.* 2012:200; Luthra *et al.* 2011:251).

### **2.4.3 Strategic issues**

A successful approach to sustainable SCM requires the alignment of a firm's sustainable SCM goals with its overall strategy (Giunipero *et al.* 2012:262; Ojo *et al.* 2014:1979; Zailani *et al.* 2012:331). Small firms tend to be more sceptical of the investment in the development of sustainable initiatives, as their already limited resources are likely to be barely enough to cover the initial costs of development; large firms, however, is likely to have more resources and funds to cover initial costs (Gopalakrishnan *et al.* 2012:195; Ojo *et al.* 2014:1979; Walker *et al.* 2008:73).

Risk management is an enabler to the development of sustainable SCM, as a firm's desire to protect its reputation creates a constant internal pressure to act in a sustainable manner (Gopalakrishnan *et al.* 2012:195; Walker *et al.* 2008:82).

The performance measurement of a firm and its supply chain partners is an important enabling factor. The ability to track performance helps identify best practices and problematic areas (Gopalakrishnan *et al.* 2012:201). There are different environmental management systems that an firm can implement, including ISO 14001, ECO design, lean management, supplier self-evaluation, and triple bottom line reporting (Ageron *et al.* 2012:177; Diabat & Govindan 2011:665; Gopalakrishnan *et al.* 2012:200; Luthra *et al.* 2011:251; Seuring & Müller 2008:1704).

The development of a sustainable supply chain requires a high initial cost for upgraded equipment and training. Some firms still believe that the cost of a sustainable supply chain will be continuously higher than normal operating costs (Ageron *et al.* 2012:177; Giunipero *et al.* 2012:262; Govindan *et al.* 2014:562; Seuring & Müller 2008:1704). Sustainable supply chains, although initially costly, can return the value invested over the long-term through more efficient operations that can allow for cost savings (Giunipero *et al.* 2012:267; Gopalakrishnan *et al.* 2012:196; Zhu *et al.* 2013:114).

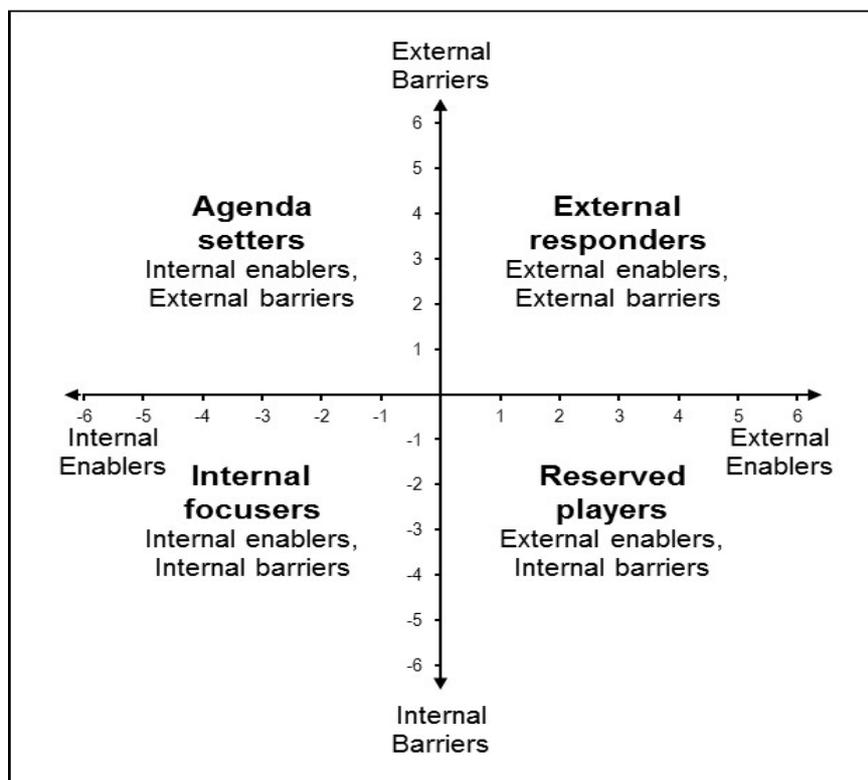
### **2.4.4 Functional issues**

A lack of skills to operate a sustainable supply chain exists due to the lack of training that firms' human resources receive. This results in sub-optimal performance of the supply chain (Govindan

*et al.* 2014:563; Seuring & Müller 2008:1704; Walker *et al.* 2008:82). The skills needed to operate a sustainable supply chain include the ability to communicate with internal and external parties. The lack of such a critical skill results in a less successful approach (Gopalakrishnan *et al.* 2012:196; Luthra *et al.* 2011:236; Ojo *et al.* 2014:1979).

## 2.5 Typology of approaches to sustainable supply chain management

Walker and Jones (2012:18) developed a typology of approaches to sustainable SCM, which they used to categorise the leading sustainable firms within the private sector of the United Kingdom. The typology uses the frequency of observations of internal and external enablers and barriers that a firm's representative identifies during a qualitative interview. Based on the frequency of each observation, the firm is then categorised into one of four groups as shown in Figure 1.



**FIGURE 1: Typology of organisational approaches to sustainable supply chain management**

Source: Adapted from Walker & Jones 2012:18

External responders are the firms whose approach to sustainable SCM is dominantly influenced by external factors. Agenda setters are firms that are internally motivated to engage in sustainable SCM, but are hindered by external factors. The reserved players are driven into sustainable SCM initiatives by external factors, but are hindered by the internal factors. Lastly, the internal focusers are predominantly influenced by the internal factors (Walker & Jones 2012:18).

### **3. METHODOLOGY**

#### **3.1 Research design**

A generic qualitative research design was adopted in this study. This approach seeks to provide a detailed description of multiple participants' views, opinions and experiences of a specific topic (Plano Clark & Creswell 2015:289). Generic qualitative research mainly makes use of semi-structured interviews with the focus on real-world external issues rather than on psychological issues (Percy, Kostere & Kostere 2015:79).

Participants were interviewed in different firms to provide multiple perspectives about South African 3PL firms' approaches to sustainable SCM and to determine if these approaches are more internally or externally influenced. The participants' contributions were analysed to gain a deeper understanding of the topic and to obtain new explanations, which could contribute towards expanding on existing theory in the field of sustainable SCM (Cooper & Schindler 2011:12).

#### **3.2 Sampling**

The unit of analysis used for this study was 3PLs. Semi-structured interviews were conducted with ten participants of nine South African 3PL firms. Service providers that assume the responsibility of several logistics functions for a client were selected. Each participant was interviewed once. Homogenous purposeful sampling was used to select the best sources of rich information required to understand the topic (Creswell 2012:206; Polit & Beck 2012:515). The firms had to be 3PL firms in South Africa, active in sustainability, and subscribing to ISO standards. Firms were selected through one-on-one meetings at the 37<sup>th</sup> SAPICS conference, through networking, and through consultation of 3PL firm websites. The firms that participated are described in Table 1.

**TABLE 1: Details of firms**

Firm	Logistics services offered	Active in sustainability
L1	Transportation	Yes, available on website
L2	Transportation	Yes, available on website
L3	Transportation Warehousing	Yes, available on website
L4	Transportation Distribution	Yes, available on website
L5	Transportation Warehousing	Yes, available on website
L6	Solutions provider	Yes, available on website
L7	Transportation Warehousing Distribution	Yes, available on website
L8	Transportation Warehousing Distribution	Yes, available on website
L9	Transportation Warehousing Distribution	Yes, available on website

Source: Authors' compilation

Participants had to be in a senior or high-level supply chain management role, a director, or the chief executive officer of the firm. They also had to have an in-depth knowledge of the firm's sustainable supply chain practices. Participants are described in Table 2.

**TABLE 2: Details of participants**

Participants	Position/Job title	Firm	Duration of interview
AB	CEO	L1	1:05:20
BC CD	Director National Network Manager	L2	51:31
DE EF FG	Business Development Manager Supply Chain Solutions Manager Legal Executive	L3	40:00
GH	Contract Logistics Manager	L4	37:55
HI	Director	L5	45:53
IJ	Supply Chain Solutions Manager	L6	36:27
JK	Director	L7	43:04
KL	Director	L8	41:28
LM MN	Sales Training Manager Business Development Manager	L9	37:30

Source: Authors' compilation

### 3.3 Data collection

Interview questions were developed based on the literature review and were then tested in a pilot interview to determine if changes had to be made. During the course of the interviews, no major changes were made to the discussion guide. The data for analysis was primarily collected through semi-structured one-on-one interviews with the specific individuals from nine 3PL firms.

All interviews, with exception of one, were conducted at the different 3PL firms' offices. One interview was conducted over Skype. All interviews began with an explanation of the study and its objectives. Participants were asked to explain their roles in the firm. This was followed by questions about the sustainability practices in the firm, as well as the barriers and enablers that influenced these.

The interviews were concluded with questions about the participants' views of the future of sustainability. All interviews were recorded and then transcribed by the researchers within a week of the interview. The interviews lasted from 36 minutes to 65 minutes with an average duration of 45 minutes.

### 3.4 Data analysis

Thematic analysis of the data was used to analyse the transcriptions according to the predetermined main themes, sub themes and codes. Table 3 outlines the key terms of the thematic analysis.

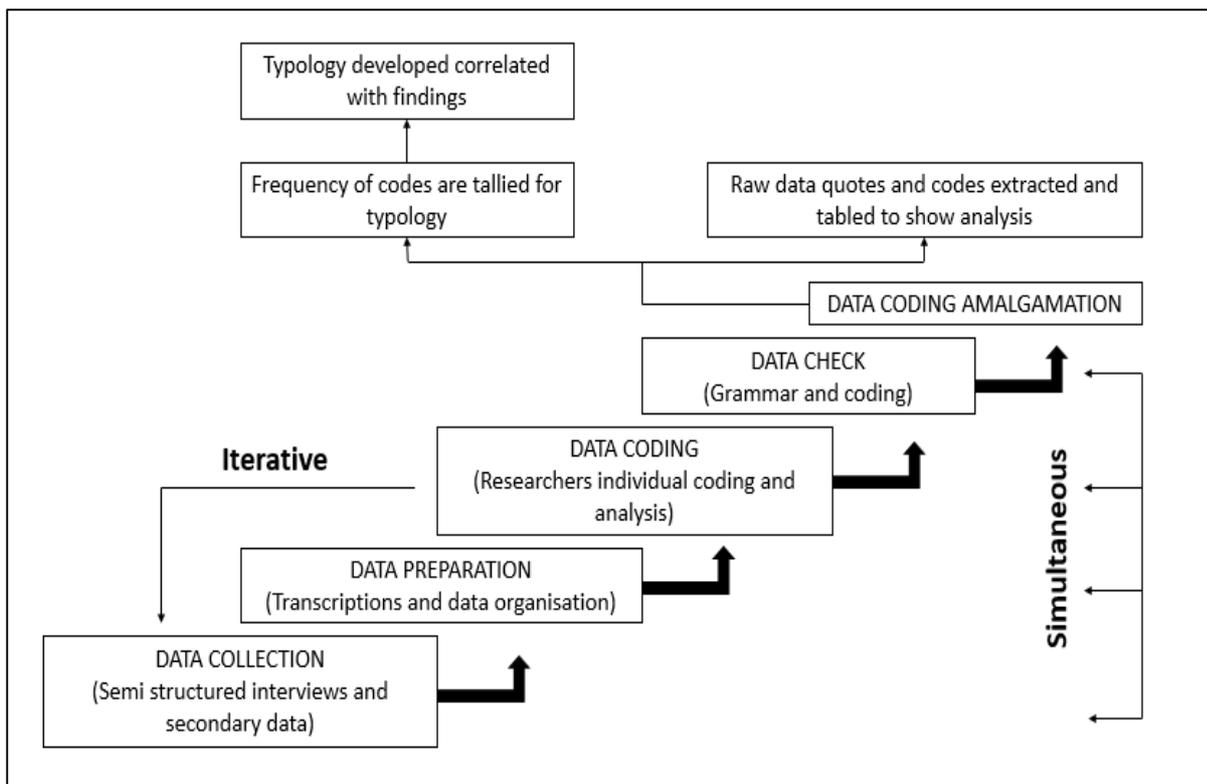
**TABLE 3: Definition of data analysis terminology**

Term	Definition
Codes	"Coding is the process of segmenting and labelling text to form descriptions and broad themes in the data." (Creswell 2012:243)
Coding process	"The objective of the coding process is to make sense of the text data, divide it into text or image segments, label the segments with codes, examine codes for overlap and redundancy, and collapse these codes into broad themes." (Creswell 2012:243)
Theme	"Because themes are similar to codes aggregated to form major idea in the data base, they form the core element in qualitative data analysis. Like codes, themes have labels that typically consist of no more than two to four words." (Creswell 2012:248)

Term	Definition
Thematic analysis	"Thematic analysis is the method for identifying, analysing and reporting patterns (themes) within data. It minimally organizes and describes your data set in (rich) detail. However, frequently it goes further than this, and it interprets various aspects of the research topic (Boyatzis 1998)." (Braun & Clarke 2006:79)

Source: Authors' compilation

The selected data analysis process used in this study was to systematically collect, organise and analyse the data, as outlined in Figure 2.



**FIGURE 2: Qualitative data analysis process**

Source: Al-Salti & Hackney 2011:460; Creswell 2012:237

### 3.5 Trustworthiness

The data collected for this research can be considered credible, as the study adopted a line of interview questions that were previously tested and confirmed to be successful (Walker & Jones 2012:18). The use of interview questions and the collection of secondary data allowed for method triangulation (Polit & Beck 2012:590; Shenton 2004:64).

To show dependability of this research the methodology is described in detail, so that the study can be repeated accurately by use of the same type of data and thus aid in future researchers' judgement of the transferability of the research (Polit & Beck 2012:585,525; Shenton 2004:69-70). To ensure confirmability, data triangulation and dual analysis of the data by the researchers was used. This ensures that the information provided match the secondary data collection and that the opinions of individual researchers did not affect the study (Polit & Beck 2012:590; Shenton 2004:72).

### 3.6 Ethical considerations

Ethical clearance for the study was obtained from the relevant research ethics committee at a South African university. Before each interview started, the participants were required to sign an informed consent form, and were assured of anonymity and confidentiality. Written permission was required when multiple participants were interviewed in a firm.

## 4. FINDINGS

A summary of the findings of the research interviews are presented in Table 4.

The table represent the frequency of each internal and external barrier and enabler as mentioned by the participants. The table further assists to identify the dominant factors which influence South African 3PL firms' approaches to sustainable SCM, as well as allow the researchers to position the nine firms onto the typology used by Walker and Jones (2012:18).

**TABLE 4: Patterns of internal and external enablers and barriers of participating 3PL firms**

Firm	L1	L2	L3	L4	L5	L6	L7	L8	L9	Total	Total future
<b>Internal enablers</b>											
Top management	-3	-4	-3	-2	-2	-3	-3	-2	-3	25	{1}
Employees		-2	-1	-2	-2	-2	-3	-2	-1	15	
SI: Performance measurement	-1	-3	-2	-2			-1		-2	11	
SI: Cost						-1				1	
FI: Skills			-1	-2 {1}			-1	-1		5	
FI: Warehouse management		-1			-1	{1}	-1	-1	-2	6	
FI: Communication		-1	-1	-2	-1	-1	-1	-1	-1	9	
Organisational culture		-2	-2	-1					-2	7	
<b>Total internal enablers</b>	-4	-13	-10	-11	-6	-7	-10	-7	-11	79	
<b>Total future internal enablers</b>				-1		-1					2
<b>External enablers</b>											
GOVT: Infrastructure		1					1			2	{1}
GOVT: Regulations		2	1	1	1					5	
GOVT: BEE		1	1		2{1}	2	1			7	
GOVT: Other	2				1					3	
Suppliers	2	2	1	2	2	1	3	2	2	17	
Customers	1	2	3{1}	2{1}	1		3		1	13	

Firm	L1	L2	L3	L4	L5	L6	L7	L8	L9	Total	Total future
Collaboration		2	1	1{1}			1	2	1{1}	8	{2}
Stakeholders							2	1		3	
Shareholders			2			1				3	
SS: SHEQ, SCOR and ISO	2		{1}		1	1	1{1}		2	7	{2}
SS: Competition		1	1				1			3	
Generations	{1}							{1}		0	{2}
Technology		1	2	1	2{1}	3{1}	4{1}	5{3}	3	21	{6}
<b>Total external enablers</b>	7	12	12	7	10	8	17	10	9	92	
<b>Total future external enablers</b>	1		2	2	2	1	2	4	1		15
<b>Firm</b>	<b>L1</b>	<b>L2</b>	<b>L3</b>	<b>L4</b>	<b>L5</b>	<b>L6</b>	<b>L7</b>	<b>L8</b>	<b>L9</b>	<b>Total</b>	<b>Total Future</b>
<b>Internal barriers</b>											
Top management				-1	-1					2	
Organisational culture	-1						-1	-1		3	
Employees	-1			-1			-1	-1		4	
SI: Performance measurement		-1								1	
SI: Cost			-2		-1	-2	-2	-1	-1	9	
SI: risk			-1	-1	-1	-1		-1		5	
SI: time						-1				1	
FI: Skills	-2			-3	-1			-2	-1	9	
FI: Communication				-1						1	

Firm	L1	L2	L3	L4	L5	L6	L7	L8	L9	Total	Total future
Company strategy				-1				-1		2	
<b>Total internal barriers</b>	-4	-1	-3	-8	-4	-4	-4	-7	-2	37	
<b>Total future internal barriers</b>											0
<b>External barriers</b>											
GOVT: Infrastructure	1					1		1		3	
GOVT: BEE	2		{1}	1	1{1}	{1}		{1}	1	5	{4}
GOVT: regulations	1{1}	{1}	1{1}	1	1	1{2}	1{1}		{1}	6	{7}
GOVT: Other	1	{1}			3		1	1{1}		6	{2}
Suppliers			1			1		2		4	
Customers	2{2}	1	2	{1}	3	1	2	2		13	{3}
SS: SHEQ, SCOR and ISO	1				1		{1}			2	{1}
SS: Competition	2	1	1	1	1		1		1	8	
WP: Culture	1				1	1		{1}		3	{1}
WP: Skills	1		1							2	
Economy		1{1}		{1}	1	2		1{1}		5	{3}
Immaturity of South African supply chains						1		1		2	
Shareholders						1				1	
Technology					1	1				2	
Environmental change								{1}		0	{1}
Collaboration							1	1		2	
<b>Total external barriers</b>	12	3	6	3	13	10	6	9	2	64	

Firm	L1	L2	L3	L4	L5	L6	L7	L8	L9	Total	Total future
Total future external barriers	3	3	2	2	1	3	2	5	1		22
Firm	L1	L2	L3	L4	L5	L6	L7	L8	L9		
Total enablers to position on typology	3	-1	-1	-4	4	1	7	3	-2		
Total barriers to position on typology	8	2	3	-5	7	6	2	2	0		

Table legend: SI – Strategic Issues / FI – Functional Issues / GOVT: Government / SS – Sectoral Standards / WP – Working Population

Source: Authors' compilation

#### 4.1 External enablers

The external enablers identified in the literature review are government, customers, suppliers, stakeholders and sectoral standards. A prominent additional external enabler identified is technology; this new factor was not evident in previous literature. Firm L7 is the most externally motivated to operate in a sustainable manner with technology being the most influential. L6 follows closely with their adoption of technological advancements that enable cost savings with software that allowed them to move to a paperless system.

As identified in the literature, suppliers are a critical driver for a firm's sustainability practices (Ageron *et al.* 2012:178; Diabat & Govindan 2011:665; Gopalakrishnan *et al.* 2012:200; Seuring & Müller 2008:1706). Suppliers are the second factor mentioned by all the participating firms, with L7 collaborating with their suppliers the most.

It is clear from this study that 3PL firms within South Africa need to collaborate with both upstream and downstream partners of the supply chain to leverage the full benefits of sustainable SCM. Two unexpected external enablers are brought to the forefront in the findings. Firstly, the role that government plays in enabling firms' sustainable SCM approaches through infrastructure, regulations, and Broad Based Black Economic Empowerment (BBBEE) requirements. Secondly,

the role future generations will play, because of their positive attitudes towards sustainability, as pointed out by L1 and L8.

#### **4.2 Internal enablers**

The internal enablers recognised in the literature review are top management, employees, strategic issues and functional issues. This study found that the factors that were identified in previous research are prevalent in the South African environment. Top management is one of only two factors that was mentioned by all participating firms in the study.

As shown in Table 4, L2 is the most internally enabled firm with a big drive coming from top management to engage in sustainability. This correlates with their position as an agenda setter on the typology that was developed, as evident from Figure 3.

Two new factors were identified. The first was functional warehouse management, which allows for financial benefits, while it simultaneously reduce the facility's impact on the environment. The second was the organisational culture towards sustainability initiatives. L9 is the firm most actively involved in warehouse management while L2 and L3 had an affirmative organisational culture towards sustainability.

#### **4.3 Internal barriers**

Internal barriers are an influencing force on a firms approach to sustainable SCM, with 37 reports of these factors. The most prominent internal barriers consisting of the lack of employee skills levels, which is largely due to a low standard of education among the firms' blue-collar employees, and the cost of sustainable SCM in South Africa.

In South Africa, there is a clear concern for the financial risks that threaten the sustainability of firms and the supply chain as a whole. Firms L4, L5, L6 and L8 all indicate that security measures need to be in place to protect the firm from financial losses caused by hijackings, employee turnover, and theft. This is in contrast to Walker and Jones (2012:23), who defined risk mainly as a reputational risk.

#### 4.4 External barriers

Customers were identified by previous research as the largest individual barrier. This is due to customers' lack of willingness to pay for the sustainable practices they demand; therefore, they are creating unrealistic standards that limit the growth of small firms. The reasons why customers do not want to pay for sustainability is due to the competitive pricing as a result of high levels of competition between 3PL firms in South Africa. Customers tend to select the cheaper option rather than the more sustainable one. Firms L1, L4 and L7 alluded to the fact that customers are not loyal, and they will move to the 3PL firm that offers them the lowest rates, which counters the development of sustainable long-term partnerships.

South African supply chains are considered to be immature compared to supply chains in Europe, in regard to collaboration, infrastructure, and technological developments as indicated by L6 and L8. Additionally, a factor that is unique to South Africa and has a primarily negative stigma is the South African government's BBBEE requirements.

#### 4.5 Dominant internal factors

There were some internal factors that were mentioned repeatedly as an influence on 3PL firms' approaches to sustainability. The dominant internal factors identified (and the number of times they are mentioned,  $N = X$ ) are:

- top management ( $n = 28$ )
- employees ( $n = 19$ )
- functional issues: skills ( $n = 15$ )

The most dominant internal factor was top management as they have to ensure that all decisions made by the firm are economically viable and sustainable. Top management have to lead by example in their actions and decisions, and ensure that they drive their employees to understand and actively participate in the firm's practices, as the following quote highlights:

"Leadership dictates what the direction of the firm will be and if your firm will take things like sustainability serious." (L8, KL)

Employees are enablers to sustainability, as many new ideas and solutions are often driven from the bottom of the firm. Employees can also be seen as a barrier to firms' sustainability when they insist to do things by means of outdated methods and are negative about change. A lack of skills is a major barrier to sustainability when employees lack the skills to use new technological equipment and machinery. 3PL firms have noticed this and now put in the extra effort to train their employees and improve their skills to drive the success of the firm. Cost was the fifth most dominant internal factor and the internal barrier mentioned most often by participants. The following quote highlights the barrier that cost can be for a firm:

"The biggest challenge there is probably cost. So often, if you do undertake these initiatives it does come with a cost. What we always do with everything that we do is we do a cost benefit exercise."  
(L6, IJ)

#### **4.6 Dominant external factors**

The dominant external factors identified are:

- government ( $n = 37$ )
- customers ( $n = 26$ )
- technology ( $n = 22$ )

The most dominant external influencer that was identified is government. Even though government legislation and regulations can enable firms to become more sustainable through compliance, these regulations are often changed too regularly and can in cases be quite unrealistic. It was found that, if a firm complies with BBBEE standards, it enables them to gain more business, but it also becomes a barrier if there are not enough suppliers that are also black-owned firms.

Customers set requirements that, in most cases, help drive sustainability. However, in other cases customers do not care about sustainability, and only worry about cost and BBBEE. This is a barrier for 3PL firms, because their customers do not contribute to the cost of sustainable initiatives, as the following quote highlights:

"So they will force compliance on us, they won't pay for it but they will make it an entry level requirement." (L5, HI)

A major drive by 3PL firms is to start collaborations with customers to ensure that both become more sustainable, which could lead to more business. Technology was identified as the most dominant external enabler, as it enables firms to operate more efficiently, which in turn builds long-term sustainability. Understandably, a few of the firms referred to technology as being the biggest enabler for sustainability, as is highlighted in the following quote:

“Your biggest enabler is technology. Technology enables you to do it in a much quicker time than in the past and a much cheaper rate.” (L8, KL)

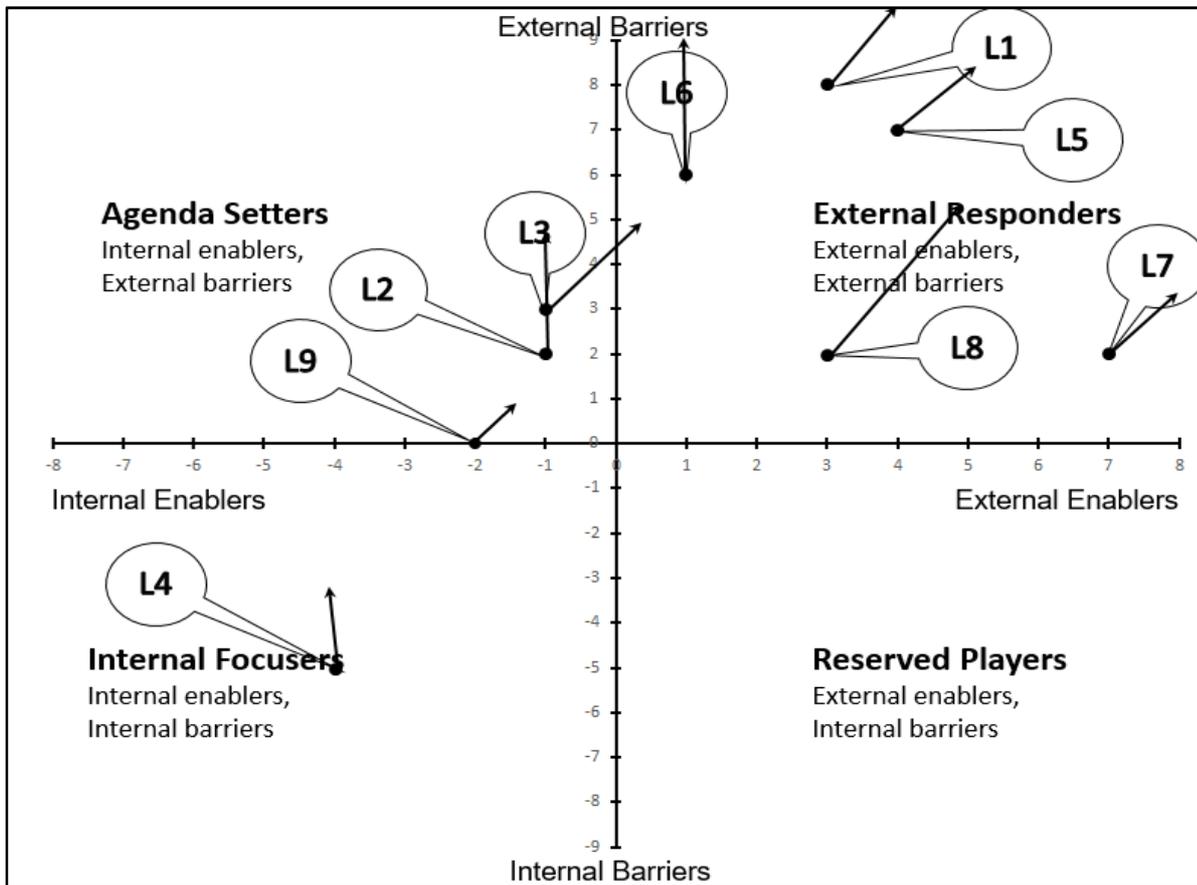
Suppliers are the fourth most dominant factor identified. It was noted that, because of the position of 3PLs in the supply chain, it is difficult for them to force compliance of sustainability on suppliers. 3PL firms now start to focus more on their sourcing, thereby they obtain their vehicles and equipment from suppliers that they can collaborate with to ensure greater sustainability. Competition was identified as a major barrier, due to the lack of compliance of rules and regulations as these are not always policed properly by government. Small 3PL firms battle to compete with large firms, because they do not have the funds available for sustainable programs like the large firms do.

#### **4.7 The sustainable SCM typology**

Similar to the methodology of Walker and Jones (2012:24), the frequency of responses was used to plot the firm's position in relation to the internal or external factors. The arrows on the graph indicate the scale and the direction of the future predictions of sustainability that each firm mentioned, as shown in Figure 3.

Walker and Jones (2012:24) did not find any of the firms they investigated in the UK to be an agenda setter. However, the opposite is true in South Africa, as no 3PL firm that participated in the study was categorised as a reserved player. This shows that there is a strong internal commitment from South African 3PL firms to participate in sustainable SCM practices, with a weak presence of internal resistance. The approach that was adopted in this study can be used by most industries and firms within South Africa to identify the external and internal factors that can influence firms' approaches to sustainability.

**FIGURE 3: South African 3PL firms' position on the typology**



Source: Adapted from Walker & Jones 2012:24

#### 4.8 Future developments

The third research question led to an investigation of predicted future developments of 3PL firms' sustainable SCM approaches. It is evident from Table 4 that in the next three to five years, 3PL firms will be influenced more by external factors. There appears to be very little predicted change for internal factors.

When asked about the near future, six firms mentioned that government regulations is likely to increase, which could lead to additional costs to ultimately put strain on firms' sustainability approaches. The following quote highlights the above:

“So there is no doubt that government is going to start regulating the transport industry far greater than what they are and they have made that very clear.” (L7, JK)

It was also mentioned that government is likely to continue with unrealistic demands when it comes to BBBEE, which can constrain firms' selection of suppliers and could also lead to them to lose customers.

L2, L4 and L8 all predict that the negative view of the future economic climate is a future constraint on 3PL firms. L1 and L4 predict that customers will expect 3PL firms to reduce costs more. However, L4 and L9 predict that there will be more collaboration along the supply chain in future, which will enable better results of sustainable SCM initiatives.

Predictions indicate that technological advancement and innovations are expected to be the biggest enabler in the future, with technologies such as 3D printing and driverless trucks set to increase supply chain efficiency and at the same time lower costs. Participant KL indicated that people from Generation Z are found to be more eager to partake in sustainable initiatives, and this should have a positive effect on 3PL firms' sustainability initiatives in the near future.

## **5. CONCLUSION**

### **5.1 Summary of findings and theoretical implications**

The aim of this study was to analyse South African 3PL firms' approaches to sustainable SCM and to determine if these approaches are more internally or externally influenced. Nine 3PL firms in South Africa were used for this study. The literature review analysed internal and external enablers and barriers to sustainable SCM, as found in previous research. Government regulations, suppliers, customers, and top management are considered to be key enablers and barriers. Other key enablers were employees, organisational culture, performance measurement, stakeholders, and sectoral standards. Key barriers were costs and lack of skills.

All of the key enablers and barriers that were mentioned in the literature review were raised by at least two firms in this study. New enablers that were identified in this study were collaboration with customers and suppliers and, the most dominant new factor identified, technology. New barriers that were identified were risk, time, the culture and skills of the working population, the economy,

and the immaturity of local supply chains. An additional item that was identified as both an enabler and a barrier, and that is unique to South Africa, is BBBEE. This was a factor identified more than once by the participants.

The first two research questions explored how South African 3PL firms vary in their perceptions of internal and external enablers and barriers to sustainable SCM practices. It was clear from the findings that firms view external factors to have enabled their sustainable SCM practices slightly more than internal factors. Most 3PL firms agree that top management, employees, customers, suppliers and technology are all key enablers to the success of their sustainable practices. Prominent enablers, not mentioned by all the participants, were performance measurement, communication, collaboration, sectoral standards, government regulation and BBBEE. The findings showed that the gap between external barriers and internal barriers was even greater than the gap between the external and internal enablers. This clearly indicates the significant influence that external factors have on South African 3PL firms. The firms' perceptions differed quite substantially when it came to barriers that influence sustainability. The most noteworthy barriers mentioned were cost, skills, government regulation, BBBEE, customers, and competition.

The third research question explored the future developments and changes that could influence the success of 3PL firms' sustainable SCM practices. It is evident from the findings that firms see external factors having an even greater influence in the near future. Factors such as stricter and unrealistic government regulations, as well as technological advancements, were considered to have major influences on 3PL firms in the next three to five years.

Theoretical implications of the study show that the influence of government on sustainable SCM practices is bigger in South Africa than in other countries where similar studies were conducted. 3PL firms either have to comply with unrealistic regulations and demands set out by government, or risk to lose out on business and fall behind their competitors. Furthermore, technology has become a prominent factor that enables firms to become more successful and more sustainable. This is an interesting statement, if one considers that technology was not mentioned in previous research on the issue. It is also evident from the findings that firms realise the importance to collaborate with suppliers and customers for each party to become more successful and more sustainable. It became evident in the findings that South African supply chains can be regarded as

immature in relation to the success and advancement of the supply chains of other countries, which means that South Africa lags behind and thus constrain its own sustainable SCM.

## **5.2 Managerial implications**

It is important for managers to understand the effect they can have on the success of their firms' sustainable SCM practices. Managers need to set the tone and ensure that everything the firm does is economically viable and sustainable, and does not have a negative impact on the environment and surrounding community. Employees have to be properly trained to be able to actively participate in sustainable SCM practices. Managers of South African 3PL firms need to understand the major influence that the government can have on the success of their firms' sustainable SCM practices. Managers need to keep up to date with all the changes in government regulations, and to ensure that their firm complies with all the regulations. Compliance could lead to new business for 3PL firms.

Managers need to ensure that they integrate technology into their firms. This means the import and implementation of new technological equipment and machinery into the firm and to ensure that vehicles are equipped with the latest technological advancements. Through a lack of integration of technology in their firms there is a risk to lag behind competitors. It was evident in the findings that technology enables firms to do things faster and cheaper than before.

## **5.3 Limitations and directions for future research**

This study was conducted on 3PL firms, in general, with few similarities in size and industry focus amongst them. Future research could focus on 3PL firms that are leaders in sustainable SCM in South Africa. This could provide different findings to those found in this study. In this research study only nine 3PL firms participated which is not a comprehensive representation of 3PL firms in South Africa. Future research could make use of a larger sample of 3PLs.

This study was limited only to 3PL firms. Future research could compare this study with a similar study on other South African industries. It is likely that the results from various samples will differ from this study, and could provide a more representative outlook of influencers on sustainable

practices in South Africa. Future research could also investigate comparable studies on publicly-owned versus privately-owned 3PL firms in South Africa.

In conclusion, it is clear that sustainable SCM is of constant increased importance and is expected to rise as environmental, social, and economic issues become more prominent and visible. This will inevitably lead firms to a continuous focus on sustainable SCM practices and thus also open the door to future research opportunities.

#### LIST OF REFERENCES

- ANALYTIQA.** 2013. Africa logistics: keep cool for growth. [Internet: <http://www.joc.com/sites/default/files/u52092/Arica.pdf>, downloaded on 2017-03-06.]
- AGERON B, GUNASEKARAN A & SPALANZANI A.** 2012. Sustainable supply management: an empirical study. *International Journal of Production Economics* 140(1):168-182.
- AL-SALTI Z & HACKNEY R.** 2011. Factors impacting knowledge transfer success in information systems outsourcing. *Journal of Enterprise Information Management* 24(5):455-468.
- BRANDENBURG M, GOVINDAN K, SARKIS J & SEURING S.** 2014. Quantitative models for sustainable supply chain management: developments and directions. *European Journal of Operational Research* 233(2):299-312.
- BRAUN V & CLARKE V.** 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3(2):77-101.
- BROCKHAUS S, KERSTEN W & KNEMEYER AM.** 2013. Where do we go from here? Processing sustainability implementation efforts across supply chains. *Journal of Business Logistics* 34(2):167-182.
- CARTER CR & EASTON PL.** 2011. Sustainable supply chain management: evolution and future directions. *International Journal of Physical Distribution & Logistics Management* 41(1):46-62.
- CARTER CR & JENNINGS MM.** 2002. Social responsibility and supply chain relationships. *Transportation Research Part E: Logistics and Transportation Review* 38(1):37-52.
- COOKE JA.** 2008. The greening of Whirlpool's supply chain. *CSCMP's Supply Chain Quarterly* Quarter 2, pp. 46-49.
- COOPER DR & SCHINDLER PS.** 2011. Business research methods. 11<sup>th</sup> ed. New York, NY: McGraw-Hill.
- COUNCIL OF SUPPLY CHAIN MANAGEMENT PROFESSIONALS.** 2013. Supply chain management terms and glossary. [Internet: [https://cscmp.org/sites/default/files/user\\_uploads/resources/downloads/glossary-2013.pdf?utm\\_source=cscmpsite&utm\\_medium=clicklinks&utm\\_content=glossary&utm\\_campaign=GlossaryPDF](https://cscmp.org/sites/default/files/user_uploads/resources/downloads/glossary-2013.pdf?utm_source=cscmpsite&utm_medium=clicklinks&utm_content=glossary&utm_campaign=GlossaryPDF); downloaded on 2015-10-13.]
- COYLE JJ, LANGLEY CJ, NOVACK RA & GIBSON BJ.** 2013. Supply chain management: a logistics perspective. 10<sup>th</sup> ed. Boston, MA: Cengage Learning.

**CRESWELL JW.** 2012. Education research: planning, conducting and evaluating quantitative and qualitative research. 4<sup>th</sup> ed. Boston, MA: Pearson.

**CSCMP** see **COUNCIL OF SUPPLY CHAIN MANAGEMENT PROFESSIONALS**

**DIABAT A & GOVINDAN K.** 2011. An analysis of the drivers affecting the implementation of green supply chain management. *Resources, Conservation and Recycling* 55(6):659-667.

**ELTAYEB TK, ZAILANI S & RAMAYAH T.** 2011. Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: investigating the outcomes. *Resources, Conservation and Recycling* 55(5):495-506.

**FLYNN BB, HUO B & ZHAO X.** 2010. The impact of supply chain integration on performance: a contingency and configuration approach. *Journal of Operations Management* 28(1):58-71.

**GIUNIPERO LC, HOOKER RE & DENLOW D.** 2012. Purchasing and supply management sustainability: drivers and barriers. *Journal of Purchasing and Supply Management* 18(4):258-269.

**GOLICIC SL & SMITH CD.** 2013. A meta-analysis of environmentally sustainable supply chain management practices and firm performance. *Journal of Supply Chain Management* 49(2):80-95.

**GOMIS AJB, PARRA MG, HOFFMAN WM & MCNULTY RE.** 2011. Rethinking the concept of sustainability. *Business and Society Review* 116(2):171-191.

**GOPALAKRISHNAN K, YUSUF YY, MUSA A, ABUBAKAR T & AMBURSA HM.** 2012. Sustainable supply chain management: a case study of British Aerospace (BAe) systems. *International Journal of Production Economics* 140(1):193-203.

**GOVINDAN K, KALIYAN M, KANNAN D & HAQ AN.** 2014. Barriers analysis for green supply chain management implementation in Indian industries using analytic hierarchy process. *International Journal of Production Economics* 147 (Part B):555-568.

**GUEST R.** 2010. The economics of sustainability in the context of climate change: an overview. *Journal of World Business* 45(4):326-335.

**GUPTA S & KUMAR V.** 2013. Sustainability as corporate culture of a brand for superior performance. *Journal of World Business* 48(3):311-320.

**HALL J.** 2000. Environmental supply chain dynamics. *Journal of Cleaner Production* 8(6):455-471.

**HARLAND CM.** 1996. Supply chain management: relationships, chains and networks. *British Journal of Management* 7:S63-S80.

**HEIKKURINEN P & BONNEDAHN KJ.** 2013. Corporate responsibility for sustainable development: a review and conceptual comparison of market- and stakeholder-oriented strategies. *Journal of Cleaner Production* 43:191-198.

**KANG Y, RYU M & KIM S.** 2010. Exploring sustainability management for telecommunications services: a case study of two Korean companies. *Journal of World Business* 45(4):415-421.

- LIEB KJ & LIEB RC. 2010. Environmental sustainability in the third-party logistics (3PL) industry. *International Journal of Physical Distribution & Logistics Management* 40(7):524-533.
- LINNENLUECKE MK & GRIFFITHS A. 2010. Corporate sustainability and organisational culture. *Journal of World Business* 45(4):357-366.
- LUTHRA S, KUMAR V, KUMAR S & HALEEM A. 2011. Barriers to implement green supply chain management in automobile industry using interpretive structural modeling technique: an Indian perspective. *Journal of Industrial Engineering and Management* 4(2):231-257.
- MITRA S & DATTA PP. 2014. Adoption of green supply chain management practices and their impact on performance: an exploratory study of Indian manufacturing firms. *International Journal of Production Research* 52(7):2085-2107.
- MIN H & KIM I. 2012. Green supply chain research: past, present, and future. *Logistics Research* 4(1-2):39-47.
- MÜLLER A & PFLEGER R. 2014. Business transformation towards sustainability. *Business Research* 7(2):313-350.
- MURPHY JV. 2008. Supply chains reduce carbon footprints and save you money, *Global Logistics and Supply Chain Strategies* 12(3):30-42.
- NIEMANN W, KOTZE T & ADAMO F. 2016. Drivers and barriers of green supply chain management implementation in the Mozambican manufacturing industry. *Journal of Contemporary Management* 13:977-1013.
- MVUBU M & NAUDE MJ. 2016. Green supply chain management constraints in the South African fast-moving consumer goods industry: a case study. *Journal of Contemporary Management* 13:271-297.
- OJO E, MBOHWA C & AKINLABI E. 2013. An analysis of Green Supply Chain Management in South Africa and Nigeria: a comparative study. Johannesburg. (International Conference on Integrated Waste Management and Green Energy Engineering, 15-16 April, 315-319.)
- OJO E, MBOWA C & AKINLABI ET. 2014. Barriers in implementing green supply chain management in construction industry. Bali: Indonesia. (Paper presented at the International Conference on Industrial Engineering and Operations Management; 7-9 Jan 1974-1981.)
- ÖZTÜRK B & ÖZÇELİK F. 2014. Sustainable supplier selection with a fuzzy multi-criteria decision making method based on triple bottom line. *Business and Economics Research Journal* 5(3):129-147.
- PAGELL M & SHEVCHENKO A. 2014. Why research in sustainable supply chain management should have no future. *Journal of Supply Chain Management* 50(1):44-55.
- PERCY WH, KOSTERE K & KOSTERE S. 2015. Generic qualitative research in psychology. *The Qualitative Report* 20(2):76-85.
- PLANO CLARK VL & CRESWELL JW. 2015. Understanding research: a consumer's guide. 2<sup>nd</sup> ed. Upper Saddle River. NJ: Pearson.
- POLIT DF & BECK CT. 2012. Nursing research: generating and assessing evidence for nursing practice. 9<sup>th</sup> ed. Philadelphia PA: Wolters Kluwer Health.

- POOE RID & MHELEMBE K.** 2014. Exploring the challenges associated with the greening of supply chains in the South African manganese and phosphate mining industry. *Journal of Transport and Supply Chain Management* 8(1):1-9.
- RUSSO A & PERRINI F.** 2010. Investigating stakeholder theory and social capital: CSR in large firms and SMEs. *Journal of Business Ethics* 91(2):207-221.
- SARKIS J, ZHU Q & LAI KH.** 2011. An organisational theoretic review of green supply chain management literature. *International Journal of Production Economics* 130(1):1-15.
- SCHOEMAN C & SANCHEZ VR.** 2009. Green supply chain overview and a south african case study. Pretoria: South Africa. (Proceedings of the 28<sup>th</sup> Southern African Transport Conference, 6-9 July 2009, 569-576.)
- SEURING S & MÜLLER M.** 2008. From a literature review to a conceptual framework for sustainable supply chain management. *Journal of Cleaner Production* 16(15):1699-1710.
- SHENTON A.** 2004. Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information* 22:63-75.
- STONEBRAKE PW & AFIFI R.** 2004. Toward a contingency theory of supply chains. *Management Decision* 42(9):1131-1144.
- UNITED NATIONS.** 2014. Concise report on the world population situation in 2014. [Internet: <http://www.un.org/en/development/desa/population/publications/pdf/trends/Concise%20Report%20on%20the%20World%20Population%20Situation%202014/en.pdf>, downloaded on 2015-04-06.]
- UNIVERSITY OF STELLENBOSCH.** 2015. Logisitcs barometer South Africa 2015. [Internet: <http://www.sun.ac.za/english/faculty/economy/logistics/Documents/Logistics%20Barometer/Logistics%20Barometer%202015.pdf>, downloaded on 2017-03-06.]
- VIJAYVARGY L & AGARWAL G.** 2014. Empirical investigation of green supply chain management practices and their impact on organisational performance. *The IUP Journal of Supply Chain Management* 11(4):25-42.
- WALKER H & JONES N.** 2012. Sustainable supply chain management across the UK private sector. *Supply Chain Management: an International Journal* 17(1):15-28.
- WALKER H, DI SISTO L & MCBAIN D.** 2008. Drivers and barriers to environmental supply chain management practices: lessons from the public and private sector. *Journal of Purchasing and Supply Management* 14:69-85.
- WCED** see **WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT**
- WOLF J.** 2011. Sustainable supply chain management integration: a qualitative analysis of the German manufacturing industry. *Journal of Business Ethics* 102:221-235.
- WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT.** 1987. The Brundtland Report: our common future. Oxford, UK: Oxford University Press.
- ZAILANI S, JEYARAMAN K, VENGADASAN G & PREMKUMAR R.** 2012. Sustainable supply chain management (SSCM) in Malaysia: a survey. *International Journal of Production Economics* 140(1):330-340.

**ZHU Q & GENG Y.** 2013. Drivers and barriers of extended supply chain practices for energy saving and emission reduction among Chinese manufacturers. *Journal of Cleaner Production* 40:6-12.

**ZHU Q, SARKIS J & LAI KH.** 2013. Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *Journal of Purchasing and Supply Management* 19(2):106-117.