

Supply Chain Risk Management Strategies: A Study of South African Third-Party Logistics Providers

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Abstract

The purpose of this study was to determine the supply chain risk management (SCRM) strategies that South African third-party logistics (3PL) service providers use to mitigate risks, the extent to which they adopt these strategies and the benefits derived thereof. An exploratory and descriptive method technique was adopted. The empirical study comprised of email surveys administered to 398 supply chain managers employed by South African 3PLs. The findings reveal that respondents place greater importance on risk identification than on the other SCRM strategies. Risk assessment attained the lowest rating, implying that 3PL providers placed the least importance on this risk assessment strategy. Risk response and risk monitoring, reporting and control are all adopted to a significantly lesser extent. The findings also revealed that 3PL providers derive significant benefits from all SCRM strategies. A limitation of this study is that not all 3PL providers affiliated with SAAFF participated. In addition, because only members of senior management were included in the study, the opinions of operational and tactical staff were not obtained. The study contributes to the current body of knowledge on SCRM by exploring how 3PL providers in a developing country, such as South Africa, assess supply chain risks, the strategies they have in place to respond to these risks, and the mechanisms in place to monitor and control SCM risks.

Keywords: supply chain; supply chain management; logistics management; third-party logistics; risk; supply chain risk management



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Introduction

Supply chain management is a field that covers a complex global network of many stakeholders who interact through the sharing of knowledge, goods/services, information and cash flow (Martí, Martín, and Puertas 2017, 94). Although key trends in the supply chain sphere (such as globalisation, the consolidation of suppliers, just-in-time activities, outsourcing and agile practices) are advantageous in ensuring efficient and effective supply chains, they also have the potential of introducing new risks to supply chain activities (Nel, De Goede, and Niemann 2018, 2; Sitkin and Pablo 2015, 132). Consequently, supply chain risk management (SCRM) has become an important element to consider in decision making. Decisions associated with supply chain management activities are particularly important for the profitability and effectiveness of third-party logistics service providers (3PLs) (Martí et al. 2017, 96).

Third-party logistics service providers (3PLs) can be defined as the supply chain partners who manage the performance of all, or part of, a company's logistics functions. These supply chain related services include packaging, handling, distribution, tracking and tracing, logistics IT software, terminal operations, warehousing, and customs brokerage (Novack et al. 2019, 289). Consequently, 3PLs play a vital role in the collaboration, integration and information-sharing between multiple supply chain partners. One of the key reasons for establishing strong relationships with 3PLs is to manage and mitigate risks (Meyer et al. 2019, 2).

The importance of logistics services in South Africa is evidenced by the amount spent on logistics costs, which comprise almost 12% of South Africa's annual gross domestic product (GDP) (Havenga et al. 2016, 4). As a developing country, South Africa is recognised as the most developed country in Africa in terms of the 3PL market (Nel et al. 2018, 2), with the industry having been in existence for over 50 years (State of Logistics Survey 2014, 78). South African companies acknowledge the benefits of the 3PL business model compared to conventional logistics (Havenga et al. 2016, 5). This has attracted many 3PL providers to compete in the South African market and to form long-term strategic partnerships with their clients. South Africa's 3PL business is costly and complex, as many companies are geographically far removed from their global suppliers and consumers (Havenga et al. 2016, 5). The country's economic hub is based in Gauteng and this has a significant impact on the complexity and cost of logistics due to the distance of the province from ports and the rest of the country's economic centres (Waugh and Luke 2011, 12).

The complexity of the operations of South African 3PLs leads to the possibility of the supply chain becoming susceptible to risks and disruptions (Nel et al. 2018, 7). These risks not only have a negative impact on supply chain operations but also have a direct impact on profitability. Although supply chain risks impact negatively on supply chain management operations, many South African 3PL companies do not invest enough in financial and human resources in the area of SCRM (Kumar, Himes, and Kritzer 2014, 73; Leat and Revoredo-Giha 2013, 24). Thus, many 3PL companies in South Africa are

unable to assess and evaluate risks and to implement appropriate mitigation strategies (State of Logistics Survey 2014, 1). As supply chains and SCM are exposed to cost implications through both accidental and intended activities, it is necessary for practitioners, researchers and other stakeholders to identify mechanisms to mitigate supply chain risks. Against this background, the problem statement can be formulated as follows:

Unless the SCRM strategies are implemented to proactively identify and successfully address or manage risks, supply chains and 3PLs' efficiency and effectiveness will be negatively affected.

The context of this study is the 3PL industry, particularly the SCRM strategies that South African 3PL providers use to mitigate supply chain risks and the extent to which they adopt these strategies and the resulting benefits. SCRM is a focus area of study and has gained considerable attention in recent times (Meyer et al. 2019, 2). There has been a surge of academic and practitioner interest in the area of 3PLs and their impact on the supply chain (Christopher and Holweg 2017, 137). However, there is a dearth of research on SCRM and understanding supply chain management and its attendant risks in developing countries, such as South Africa, versus research conducted in developed countries (Meyer et al. 2019, 2; Nel et al. 2018, 2; Prakash, Soni, and Rathore 2017, 78). Accordingly, the following research objectives guided the study:

Primary Research Objective

- To identify the SCRM strategies that South African 3PL providers have in place to mitigate supply chain risks.

Secondary Objectives

- To determine the extent to which South African 3PL providers adopt SCRM strategies.
- To determine the extent to which South African 3PL providers derive benefits from SCRM strategies.

The study contributes to the current body of knowledge by addressing the gap that exists in literature on SCRM, by exploring how 3PL providers in a developing country such as South Africa assess supply chain risks, the strategies they have in place to respond to these risks, and the mechanisms in place to monitor and control SCM risks. SCRM strategies identified in the study have an impact on the competitiveness of the 3PL industry, which plays a key role in the overall South African economy. The study also identifies the extent to which South African 3PL providers adopt SCRM strategies and the benefits derived therefrom. The field of SCRM is dynamic, thus the study provides new insights in the field of SCM and the concept of SCRM, which can assist practitioners in developing appropriate SCRM strategies to mitigate supply chain risks.

The article first reviews available literature on 3PLs, SCRM and the benefits of SCRM. This is followed by a description of the research design and methodology, a report of the findings, recommendations and subsequent conclusions.

Literature Review

Role of 3PLs in the Supply Chain

With the globalisation of businesses, competition between enterprises has evolved to competition between supply chains. While faced with severe competition, supply chains that can deliver products quickly and on-time through the support of a logistics system have a higher probability of survival (Alshamsi and Diabat 2015, 93). However, supply chains cannot pursue cost reduction and shorten lead times simultaneously, as logistics costs are a large component of supply chain costs (Bowersox and Daugherty 2015, 86). During the last two decades, a new development in the global supply chain network—the emergence of third party logistics (3PL) providers—helped solve this problem. The core competitive advantage of a 3PL provider comes from its ability to integrate logistics services to help its customers manage their entire distribution systems and monitor supply chain risks that may occur (Choi, Chiu, and Chan 2016, 15; Coelho and Mateus 2017, 55).

3PL providers manage and control logistics activities such as route planning, distribution, storage, consolidation of shipment, fleet management, order processing, order fulfilment, product assembly, inventory management, carrier selection, packaging, warehouse management and handling (König and Spinler 2016, 38). The purpose of 3PL providers is to ensure that products and services are delivered to the customers on time. In addition, 3PL providers could play an important role in ensuring smooth supply chain processes and ultimately the management of risks. For example, a manufacturer needs to receive raw materials on time into a production plant to avoid any risks caused by production delays (Marchet et al. 2018, 45).

Supply Chain Risk Management (SCRM)

Supply chain risk is defined as the likelihood of a disruption that would impact the ability of the business to: continuously supply products and services; reduce productivity; increase costs and liabilities; and reduce profits (Jacobs and Chase 2018, 31). Global supply chains are faced with numerous uncertainties and complications. Unpredictability in supply and demand, internationalisation of the markets, shortened product life cycles, rapid developments in technology, and the increasing use of partners in production, transportation and other logistics activities have resulted in exposure to more risks from both their internal and external activities (Chakraborty 2015, 31). These risks can impact the ability of the business to supply products and services, which exposes the business to operational and financial losses (Jacobs and Chase, 2018, 33). Therefore, SCRM has become a necessary strategic process to address supply chain-specific risks that may happen within a business's supply chain (Meyer et al. 2019, 2).

In order to ensure that businesses are able to successfully operate globally, it is vital that they have a clear understanding of SCRM and use this strategic process as a competitive advantage (Meyer et al. 2019, 2). SCRM is defined as the implementation of strategies to manage risks facing the supply chain through continuous risk assessment, and to communicate them with various supply chain stakeholders in order to collectively reduce the impact of these risks (Rogers et al. 2015, 33; Simba et al. 2017, 3). Ho et al. (2015, 44) define SCRM as “an organisational collaborative endeavour utilising quantitative and qualitative risks management methodologies to identify, evaluate, mitigate and monitor unexpected macro and micro level events or conditions, which might adversely impact any part of a supply chain.”

Figure 1 presents the phases of the SCRM process, namely risk identification, risk assessment, risk response or risk handling, and risk monitoring, reporting and control. These phases provide managers with strategic information to select strategies to mitigate the different risks in order to improve the overall performance of the supply chain (Simba et al. 2017, 4). The four phases are explained in turn.

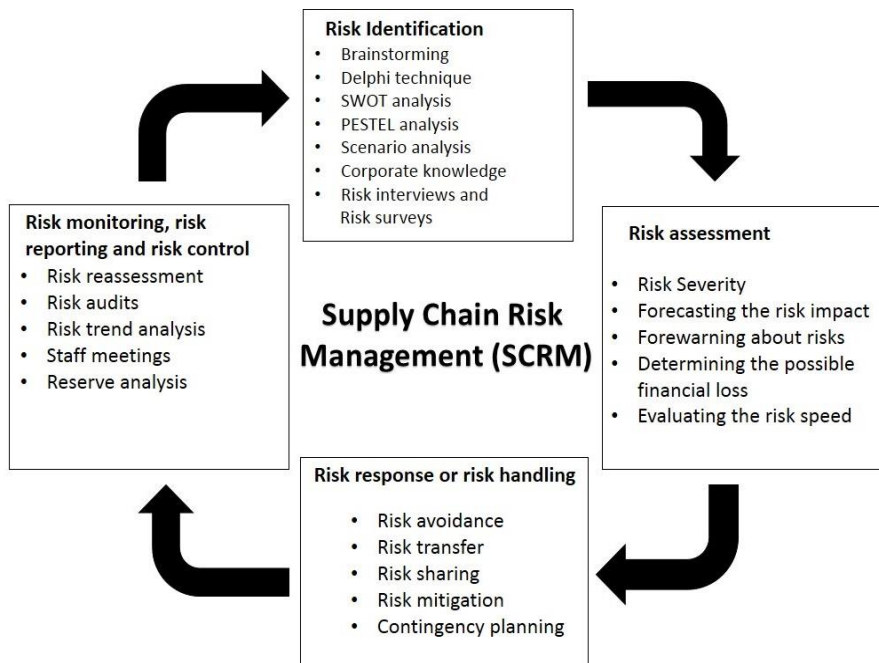


Figure 1: Supply chain risk management framework

Source: Adapted from Nooraie and Parast (2015, 36); Norrman and Jansson (2014, 10); Zsidisin and Wagner (2010, 21)

Risk identification

Risk identification is a significant step in the process of identifying all possible risk events which could impact on a project (Kodithuwakku and Wickramarachchi 2015, 122). It entails continuously documenting internal and external risks in the supply chain (Juttner, Peck, and Christopher 2013, 21). There are various strategies that can ensure proper identification of risks, as presented in Figure 1, and they are briefly explained below.

Brainstorming is a strategy that involves utilising various cross-functional team members who share their previous experiences and different viewpoints about risks (Darayseh 2013, 82). *The Delphi technique* is a system for estimating the probability and effect of an upcoming event (Hasson, Keeney, and McKenna 2014, 22). A *SWOT analysis* involves undertaking an analysis of the strengths, weaknesses, opportunities and threats within a business, and can assist in developing a risk map based upon the resultant agreed possible weaknesses and threats (Valentin 2014, 92). A *PESTEL analysis* is an analysis of the political, economic, sociological, technological, environmental and legal factors that have an impact on a business. It aims to evaluate risks arising from factors within the macro-environment (Sitkin and Pablo 2015, 51; Świerczek 2014, 60). *Scenario analysis* is a risk identification technique that utilises potential future events to predict how threats and opportunities could occur (Bishop, Hines, and Collins 2015, 27). The use and management of *corporate knowledge* is a strategy whereby a company's historical information is utilised as a form of risk identification to identify risks that previously occurred and could reoccur. *Risk interviews and risk surveys* involve the asking of a sequence of questions regarding both internal and external events (Scholten, Sharkey Scott, and Fynes 2014, 13).

Risk assessment

Risk assessment is the second step in the SCRM process. It seeks to predict the impact of risks by evaluating the potential risks that may occur in a projected activity or undertaking (Ho et al. 2015, 44). The following factors are considered during risk assessment: risk severity, forecasting the risk impact, forewarning about risks, determining the possible financial loss, and evaluating the risk speed.

Risk severity is the evaluation of the seriousness of the risk, namely the likelihood that a risk will occur and the extent of the impact if the risk actually occurs (Ho et al. 2015, 132). *Forecasting the risk impact* is where the extent of the risk impact is measured. The frequency and severity matrix is a useful technique to rate risks according to their frequency and anticipated severity. *Forewarning about the risks* prepares the business for the event and allows it to conduct contingency planning to deal with possible losses (Chan and Wang 2013, 34). *Determining the possible financial loss* can be achieved by examining any financial cost as a result of risks (Basole and Bellamy 2014, 88). Evaluating the risk speed can be categorised into rate of occurrence, impact of occurrence and rate at which the risk is discovered (Chan and Wang 2013, 34).

Risk response or risk handling

Risk response can be defined as the process of modifying or responding to a risk. Five response options are available: 1) risk avoidance entails reducing the probability of an adverse event from an existing source (Bandaly et al. 2013, 55); 2) risk transfer involves transferring the risk impact to a third-party along with the ownership of risk responses (Chang, Ellinger, and Blackhurst 2015, 45); 3) risk sharing involves assigning partial ownership of the risk to a third party (Chang et al. 2015, 46); 4) risk mitigation involves identifying risk responses that could reduce the probability of a risk event and/or lower the impact to an acceptable level (Elleuch, Hachicha, and Chabchoub 2013, 47); and 5) contingency planning deals with a specific event requiring a swift response within a reasonably short period of time (Sudeep and Srikanta 2014, 20).

Risk monitoring, risk reporting and risk control

Risk monitoring can be defined as the continuous process of tracking and evaluating the risk management process by metric reporting, feedback on watch list items, and regular input with regard to potential risks (Chang et al. 2015, 45). Risk reporting makes use of mechanisms and systems to provide continuing information regarding the status of risks (Sudeep and Srikanta 2014, 20). Risk control refers to the deliberate use of design processes in order to reduce risk to a level of acceptability (Paul, Sarker, and Essam 2016, 93). The strategies related to this construct include risk reassessment, risk audit, risk trend analysis, and staff meetings (Olson and Wu 2010, 61).

Risk reassessment can be defined as the identification of new risks, re-evaluation of current risks, and the closing of risks that are outdated (Sudeep and Srikanta 2014, 26). *Risk audits* assess the performance and usefulness of risk response planning and the risk management process (Li et al. 2015, 96). *Risk trend analysis* aims to monitor the cost of all the various functions of the company (Smeltzer and Siferd 2006, 36). *Staff meetings* can be used to address risk monitoring, risk control and risk reporting with regular (e.g. monthly) staff meetings taking place in order to ensure that continuous information sharing about risks is maintained (Hoffmann, Schiele, and Krabbendam 2013, 35). The aim of *reserve analysis* is to compare existing reserves with the level of risk available at the time and ascertain whether reserves are enough (Ghadge et al. 2012, 112).

Benefits of Supply Chain Risk Management

There are a number of benefits that can be derived from adopting SCRM initiatives. The adoption of SCRM can present businesses with cost saving advantages by preventing loss of market share together with allowing businesses to achieve faster recovery ahead of competitors (Norrman and Lindroth 2013, 76). Businesses can also gain intangible benefits from SCRM, which could prevent brand reputation damage and could gain customer trust by establishing innovative ways to mitigate risks as well as ensuring uninterrupted supply of goods and services (Pradhan and Routroy 2014, 53).

Other benefits of adopting SCRM may include the avoidance of regulatory or legislative penalties due to non-compliance (Li et al. 2015, 91). Ghadge et al. (2012, 13) posit that a successful SCRM initiative will assist a business to be familiar with proposed, pending or new legislation and to take the necessary actions to comply with the legislation, and perhaps even allowing the business to play a shaping role in the writing of the legislation. The process of monitoring legislation includes the tracking of regulatory changes that may present compliance risks for the company (Ellinger et al. 2015, 88). Monitoring legislation is important in understanding how it may affect the business in order to develop an appropriate response strategy.

SCRM enables businesses to respond to unexpected events, helps to reduce the complexity of a risk and prevents risks altogether (Ruzic-Dimitrijevic 2014, 93). For example, it begins by identifying what risks might prevent a business from getting products to the customers on time, understanding how each risk would affect the company's operations, and finding quick solutions to manage the situation (Leat and Revoredo-Giha 2013, 47).

Research Design

An exploratory and descriptive method technique was adopted. The purpose of the empirical research was to determine: 1) the extent to which South African 3PL providers adopt SCRM strategies; and 2) the extent to which South African 3PL providers derive benefits from SCRM strategies. A structured questionnaire was designed to achieve this. The questionnaire consisted of three sections. Section 1 included the profile of the company. Section 2 required the respondents to indicate to what extent they adopt the SCRM strategies identified by means of a seven-point Likert scale for each of these constructs. The constructs measured included risk identification, risk assessment, risk response and risk monitoring, reporting and control. There was also a "not applicable" option to cover the possibility of a particular SCRM strategy not applying to the responding 3PL provider and a "not adopted" option. The extent of adoption was measured using a seven-point Likert scale varying from 1 (adopt to a lesser extent) to 7 (adopt to a greater extent). All responses indicating N/A (not applicable) for any strategy were excluded. A seven-point Likert scale was deemed appropriate as it offers the respondents more options from which to choose. Section 3 of the questionnaire required respondents to rate their agreement, from 1 = strongly disagree, to 5 = strongly agree, that benefits had been obtained from each of the four strategies under study. A statistician checked the questionnaire prior to conducting the empirical research to ensure that the formulation of the questions was clear and understandable to the respondents.

Sampling

The unit of analysis for the study was supply chain practitioners within the South African 3PL industry who are member companies of the South African Association of Freight Forwarders (SAAFF). SAAFF is an association that represents all the South

African 3PLs (SAAFF 2016, 01) and has 406 members. As the association represents the entire logistics industry in South Africa, it was decided to incorporate members of this association. Eight 3PLs were excluded since they had participated in the preliminary study. Consequently, a total of 398 questionnaires were sent out to the supply chain managers representing the 3PL companies—a census sample.

Data collection

Data collection took place during May 2018. The personal assistant of the SAAF CEO forwarded the questionnaire, together with a consent letter, to 398 members. The respondents were given seven days to return the completed questionnaires to the researcher via email. Respondents who had not completed the original survey by this date were sent reminders via email. A total of 215 respondents returned the completed questionnaire. Thus, a response rate of 54% was achieved.

Data analysis

The completed questionnaires were coded, following which the responses were captured in Excel and analysed by means of SPSS24, using descriptive statistics and binomial tests.

Reliability and validity

Reliability is defined as an evaluating measure, which tests the accuracy and consistency of a measuring instrument. It is the degree to which techniques, approaches and methodologies for collecting data provide reliable findings (Sekaran and Bougie 2016, 37). A reliability test was conducted on each of the four strategies, using Cronbach’s coefficient alpha as illustrated in Table 1.

Table 1: Reliability test—Cronbach’s alpha

Strategies	Questions included	Alpha
Risk identification	1–7	0.876
Risk assessment	1–7	0.894
Risk response	1–5	0.914
Risk monitoring, reporting and control	1–5	0.909

A Cronbach’s alpha value of 0.8 to 0.9 is generally accepted as a good indicator of reliability (George and Mallery 2013, 231). Table 1 shows that risk identification, risk assessment, risk response or risk handling, and risk monitoring, reporting and control achieved Cronbach alpha values that ranged from 0.876 to 0.914, thus indicating good reliability for all the measures.

Results and Discussion of the Findings

Profile of the 3PLS

Table 2 below presents the profiles of the 215 responding 3PLs.

Table 2: Details of the responding 3PLs

Profile of 3PL	N=215	%
Position of respondents		
Supply Chain Managers	135	63.0
Logistics Managers	19	8.7
Supply Chain/Logistics Directors	61	28.3
Status of 3PL		
Head Office	116	53.7
Holding Company	3	1.5
Branch	66	30.8
Subsidiary	2	0.9
Independent unit	28	13.1
Location of 3PL		
Western Cape	45	21
Eastern Cape	28	13
Northern Cape	8	3.6
Free State	10	4.4
KwaZulu-Natal	56	26
North West	8	3.6
Gauteng	51	23.9
Mpumalanga	6	3
Limpopo	3	1.5
Number of years 3PL has been operating		
1–20 years	118	55
21–40 years	65	30
41–60 years	15	7
61–80 years	1	0.5
81–100 years	16	7.5
Number of employees		
<50	5	2.2
50–100	31	14.5
101–300	75	34.8
301–500	71	33.3
501–1000	25	11.6
>1000	8	3.6

Supply Chain Risk Management Strategies

This section presents the SCRM strategies that South African 3PLs have in place and the extent to which they adopt these strategies and the resulting benefits. Descriptive statistics and binomial tests were used to describe the distribution of responses for each

strategy. In addition, the mean and standard deviation of the extent of adoption for each strategy is indicated. The results for SCRM strategies are presented below by category: risk identification strategies; risk assessment techniques; risk response or risk handling strategies; and risk monitoring, reporting and control mechanisms.

Risk identification strategies

The risk identification strategies identified in literature and from the findings of the first stage of the study were incorporated as items in the questionnaire. A short explanation of each of the strategies was provided in the questionnaire to ensure that the respondents were familiar with the terminology and meaning of the different strategies. The findings are presented in Table 3.

Table 3: Extent of risk identification adoption

					Binomial Test		
	Risk identification strategies	No of Valid Cases	Mean	Std. Deviation	Category	No.	Sig. (2-tailed)
1	Brainstorming	209	4.19	1.708	Yes No	198 11	.000 ^a
2	The Delphi technique	210	3.65	1.547	Yes No	201 9	.000 ^a
3	SWOT analysis	209	4.10	1.690	Yes No	203 6	.000 ^a
4	PESTEL analysis	207	4.07	1.652	Yes No	202 7	.000 ^a
5	Scenario analysis	209	3.89	1.741	Yes No	197 12	.000 ^a
6	Corporate knowledge	211	3.87	1.561	Yes No	202 9	.000 ^a
7	Risk interviews and risk surveys	212	3.97	1.799	Yes No	198 14	.000 ^a
	Composite Mean		3.96				

^aBased on Z approximation

The respondents were asked to provide their responses regarding the incidence of adoption of risk identification strategies. Results from the binomial tests confirm that, in each case, a significant proportion of the respondent 3PL providers (>93%) had adopted these risk identification strategies, which can assist in anticipating future uncertain events to proactively manage these when they occur. These findings are in line with the observations of Kodithuwakku and Wickramarachchi (2015, 122) as well

as Juttner et al. (2013, 21) that risk identification is a significant step in the process of identifying all possible risks and documenting them.

The results from the composite mean ($M = 3.96$) reveal that respondents had a neutral attitude towards the adoption of risk strategies. “Brainstorming” ($M = 4.19$, $SD = 1.708$) received the highest adoption rating, which demonstrates that 3PL providers attached significant importance to this strategy more than any of the others. “SWOT analysis” ($M = 4.10$, $SD = 1.690$) and “PESTEL analysis” ($M = 4.07$, $SD = 1.652$) received the second and third highest adoption ratings respectively. The 3PL providers placed less importance on the “Delphi technique” risk identification strategy ($M = 3.65$, $SD = 1.547$) than the others, with it receiving the lowest adoption rating. The standard deviation is high in all cases, which implies that there was a variation across the responses. It is an indication that the individual responses to a question of the extent to which third-party logistics providers adopt risk identification strategies vary or “deviate” from the mean. For example, even though the mean is high for “Brainstorming,” the individual responses were scattered from the mean.

These findings are in line with those in the literature (for example Juttner et al. 2013, 21; Kodithuwakku and Wickramarachchi 2015, 122; Nooraie and Parast 2015, 36; Norrman and Jansson 2014, 10) who highlight the various strategies that can ensure proper identification of risks.

Risk assessment techniques

The risk assessment techniques referred to in the questionnaire were also based on the literature and the findings from the first stage of the study. The respondents were asked to provide their responses regarding the incidence of adoption of these techniques. A short explanation of each of the techniques was provided in the questionnaire to ensure that the respondents were familiar with the terminology and meaning of the different techniques. The findings are presented in Table 4.

Table 4: Extent of risk assessment adoption

	Risk assessment techniques	No of Valid Cases	Mean	Std. Deviation	Binomial Test		
					Category	No.	Sig. (2-tailed)
1	Risk severity using hazard and operability study (HAZOP)	202	2.88	1.951	Yes No	168 34	.000 ^a
2	Risk severity using fault tree analysis	190	2.81	2.078	Yes No	152 38	.000 ^a
3	Forecasting the risk impact using “what-if” analysis	209	3.10	1.795	Yes No	191 18	.000 ^a
4	Forecasting the risk impact using a checklist of risks	209	3.24	1.749	Yes No	192 17	.000 ^a
5	Forewarning about risks using failure mode and effect analysis	192	2.81	1.989	Yes No	157 35	.000 ^a
6	Estimation of possible financial loss	198	2.97	1.961	Yes No	172 26	.000 ^a
7	Evaluating the risk speed	203	3.03	1.971	Yes No	176 27	.000 ^a
	Composite Mean		2.98				

^a Based on Z approximation

The respondents were asked to provide their responses regarding the incidence of adoption of risk assessment techniques. Results from the binomial tests confirm that the responses on the adoption of risk assessment techniques were generally positive, indicating that the majority (>80% in each case) of the 3PL providers adopted such techniques. However, the results from the composite mean ($M = 2.98$) imply that 3PL providers placed the least importance on this risk assessment strategy, compared to the other SCRM strategies.

While risk assessment technique 3, “forecasting the risk impact using a checklist of risks” received the highest rating ($M = 3.24$, $SD = 1.749$), it is significantly different from “4” and is adopted to a significantly lesser extent. Risk assessment techniques 5 and 2, “forewarning about risks using FMEA” and “risk severity using fault tree analysis” received the lowest scores ($M = 2.81$, $SD = 1.989$ and $M = 2.81$, $SD = 2.078$), indicating that 3PL providers adopt these techniques to a significantly lesser extent than

all the other techniques. The standard deviation is high in all cases, which implies that individual responses to the question of the extent to which third-party logistics providers adopt risk assessment strategies, were very polarised.

Whilst it cannot be explained what hinders the effective adoption of risk assessment techniques among 3PL providers, SCRM is an organisational collaborative endeavour that uses quantitative and qualitative risk management strategies to identify, evaluate, mitigate and monitor risks that may negatively impact on any part of the supply chain (Ho et al. 2015, 44; Rogers et al. 2015, 33; Simba et al. 2017, 3). It is suggested that by placing the least importance on this strategy, this can result in serious consequences to the supply chain as it seeks to predict the impact of risks by evaluation of the potential risks (Ho et al. 2015, 44).

Risk response or risk handling strategies

The risk response or risk handling strategies based on the literature and on the findings from the first stage of the study were incorporated as items in the questionnaire. The respondents were asked to provide their responses regarding the incidence of adoption of these strategies. A short explanation of each of the strategies was provided in the questionnaire to ensure that the respondents were familiar with the terminology and meaning of the different strategies. The findings are presented in Table 5.

Table 5: Extent of risk response or risk handling adoption

					Binomial Test		
	Risk response strategies	No of Valid Cases	Mean	Std. Deviation	Category	No.	Sig. (2-tailed)
1	Risk avoidance	209	3.13	1.842	Yes No	192 17	.000 ^a
2	Risk transfer	208	3.51	1.742	Yes No	199 9	.000 ^a
3	Risk sharing	209	3.44	1.913	Yes No	192 17	.000 ^a
4	Risk mitigation	209	3.50	1.917	Yes No	193 16	.000 ^a
5	Contingency planning	210	3.55	1.864	Yes No	197 13	.000 ^a
	Composite Mean		3.43				

^a Based on Z approximation

The respondents were asked to provide their responses regarding the incidence of risk response strategies. Results from the binomial tests confirm that a majority (>90% in each case) of 3PL providers had adopted risk response strategies.

The results from the composite mean ($M = 3.43$) reveal that respondents had a neutral attitude towards the adoption of risk response strategies. The results show that “contingency planning” received the highest score ($M = 3.55$, $SD = 1.864$), while “risk avoidance” received the lowest rating ($M = 3.13$, $SD = 1.842$), indicating that 3PL providers placed the least importance on this strategy. The mean adoption scores are all significantly different from “4” and can all be interpreted as “adoption to a significantly lesser extent.” The standard deviation is high in all cases, which implies that there was a variation across the responses. This is an indication that the individual responses to a question of the extent to which third-party logistics providers adopt risk response strategies, vary or “deviate” from the means.

The risk response strategies identified in this study are in line with those outlined in the literature (Bandaly et al. 2013, 55; Chang et al. 2015, 45; Elleuch et al. 2013, 47; Sudeep and Srikanta 2014, 20). These authors identified the five response options available, namely risk avoidance, risk transfer, risk sharing, risk mitigation and contingency planning.

Risk monitoring, reporting and control mechanisms

The risk monitoring, reporting and control mechanisms based on the literature and on the findings from the first stage of the study were incorporated as items in the questionnaire. The respondents were asked to provide their responses regarding the adoption of these mechanisms. A short explanation of each of the mechanisms was provided in the questionnaire to ensure that the respondents were familiar with the terminology and meaning of the different mechanisms. The findings are presented in Table 6.

Table 6: Extent of risk monitoring, reporting and control adoption

					Binomial test		
	Risk monitoring, reporting and control mechanisms	No of Valid Cases	Mean	Std. Deviation	Category	No.	Sig. (2-tailed)
1	Risk reassessment	207	3.36	2.047	Yes No	191 16	.000 ^a
2	Risk audit	209	3.42	2.086	Yes No	189 20	.000 ^a
3	Risk trend analysis	208	3.51	1.985	Yes No	190 18	.000 ^a
4	Staff meetings	207	3.49	2.033	Yes No	185 22	.000 ^a
5	Reserve analysis	206	3.47	2.113	Yes No	186 20	.000 ^a
	Composite Mean		3.45				

^a Based on Z approximation

The respondents were asked to provide their responses regarding the adoption of risk monitoring, reporting and control mechanisms. Results from the binomial tests confirm that a majority (>90% in each case) of 3PL providers had adopted risk these mechanisms. The mechanisms identified in this study are in line with the literature (for example Hoffman et al. 2013, 55; Li et al. 2015, 96; Olson and Wu 2010, 61; Sudeep and Srikanta 2014, 20).

The results from the composite mean ($M = 3.45$) reveal that respondents had a neutral attitude towards the adoption of risk response and risk monitoring. The results show that “risk trend analysis” received the highest score ($M = 3.51$, $SD = 1.985$), indicating that it was adopted the most by this sample of respondents. It aims to monitor the costs of all the various functions of the business (Smeltzer and Siferd 2006, 36). “Risk reassessment” received the lowest rating ($M = 3.36$, $SD = 2.047$), implying that 3PL providers placed the least importance on this strategy. It entails identifying new risks, re-evaluating current risks and closing risks that are outdated (Sudeep and Srikanta 2014, 26).

Extent to which third-party logistics providers derive benefits from SCRM management strategies

This section presents the findings with regard to the extent to which 3PL providers derive benefits from SCRM strategies. Respondents were asked to rate their agreement,

from 1 = strongly disagree, to 5 = strongly agree, that benefits had been obtained from each of the four strategies under study. The findings are presented in Table 7.

Table 7: Extent of benefits of SCRM adoption

					One sample t-test Test Value = 3	
	Benefit	No of Valid Cases	Mean	Std. Deviation	t	Sig. (2- tailed)
1	My company has obtained benefits from risk identification strategies	214	4.21	0.882	20.083	<.0005
2	My company has obtained benefits from risk assessment techniques	214	4.24	0.869	20.846	<.0005
3	My company has obtained benefits from risk response strategies	214	4.33	0.772	25.132	<.0005
4	My company has obtained benefits from risk monitoring, reporting, and control mechanisms	214	4.31	0.769	24.973	<.0005

Results of the analysis indicate that there is significant agreement that benefits are obtained from risk identification strategies (M=4.21), risk assessment techniques (M=4.24), risk response or risk handling strategies (M=4.33) and risk monitoring, reporting and control mechanisms (M=4.31). Therefore, it can be concluded that 3PL providers derive significant benefits from all SCRM strategies.

The findings are in line with the observations of various authors (for example, Ellinger et al. 2015, 88; Li et al. 2015, 91; Norrman and Lindroth 2012, 67; Pradhan and Routroy 2014, 53; Ruzic-Dimitrijevic 2014, 93) who identified a number of benefits of adopting SCRM. Some of these benefits include cost saving advantages, preventing loss of market share, preventing brand reputation damage, and ensuring the uninterrupted supply of good and services.

Limitations and Future Research

The research was limited to the South African 3PL industry, who are members of SAAFF and, therefore, the findings are limited to members of that particular industry

and country. In addition, the study explored the perspectives of the supply chain practitioners at middle and senior management level working in the 3PL industry. Future studies could be undertaken to include all stakeholders in the 3PL industry, which would allow for a more holistic perspective of SCRM strategies among 3PL supply chain practitioners in South Africa.

A further avenue for future research is to examine the extent to which customers and suppliers are affected by a lack of SCRM adoption among South African 3PL providers. This would provide a holistic understanding of SCRM as the concept could be viewed from the point of view of external stakeholders, namely customers and suppliers. In conclusion, it is also suggested that a study focusing on the financial benefits of SCRM strategies could lead to a greater interest in the adoption of SCRM by supply chain stakeholders within South Africa.

Recommendations

Through the empirical research, it was established that 3PL companies adopt SCRM strategies to manage risks. The findings of the study confirm that the responding 3PL providers have adopted SCRM strategies to a significantly lesser extent and that 3PL providers derive benefits from the adoption of SCRM strategies. Therefore, it is suggested that executive management assumes ownership of the SCRM process by having a visible SCRM champion who actively supports the process. A risk-aware culture should be developed in order to increase awareness about risks. It is further suggested that establishing integrated risk management strategies could provide shareholders with more concrete and reliable information on the risks.

Conclusion

The objectives of this study were threefold, namely to 1) identify the SCRM strategies that South African 3PL providers have in place to mitigate supply chain risks; 2) determine the extent to which South African 3PL providers adopt SCRM strategies; and 3) determine the extent to which South African 3PL providers derive benefits from SCRM strategies.

The findings of the first objective revealed that 3PL companies had adopted the SCRM strategies (risk identification, risk assessment, risk response and risk monitoring, reporting and control) to manage risks.

The findings of the second objective revealed that a significant proportion of the respondent 3PL providers had adopted *risk identification strategies*, which can assist them in anticipating future uncertain events to be proactively managed when they occur. This corresponds with the existing literature that states that risk identification is a significant step in the process of identifying all possible risks and documenting them (Juttner et al. 2013, 21; Kodithuwakku and Wickramarachchi 2015, 122). In considering *risk assessment techniques*, the findings confirm that the responses on the adoption of

risk assessment techniques were generally positive, indicating that the majority of the 3PL providers had adopted such techniques. However, the results from the composite mean imply that 3PL providers placed the least importance on this strategy compared to the other SCRM strategies. It is suggested by Ho et al. (2015, 44) that by not placing importance on this strategy, this could result in serious consequences to the supply chain. The findings further revealed that a majority of 3PL providers had adopted *risk response strategies*. The risk response strategies identified in this study are in line with those outlined in literature (Bandaly et al. 2013, 55; Chang et al. 2015, 45; Elleuch et al. 2013, 47; Sudeep and Srikanta 2014, 20). With regard to the *adoption of risk monitoring, reporting and control mechanisms*, the findings revealed that a majority of 3PL providers had adopted this phase of SCRM. The risk monitoring, reporting and control mechanisms identified in this study correlate with existing literature (for example Hoffman et al. 2013, 55; Li et al. 2015, 96; Olson and Wu 2010, 61; Sudeep and Srikanta 2014, 20).

The findings of the third objective confirm that the responding 3PL providers derive benefits from the adoption of SCRM strategies. This is in line with existing literature wherein the benefits of adopting SCRM were noted (Ellinger et al. 2015, 88; Li et al. 2015, 91; Pradhan and Routroy 2014, 53; Ruzic-Dimitrijevic 2014, 93).

SCRM is a crucial element in decision making because of global interactions that have created new risks in SCM activities. Thus, the adoption of SCRM is vital to mitigate supply chain risks among 3PLs operating in South Africa. It can be concluded from this study that supply chain managers acknowledge the importance of SCRM strategies in the South African 3PL industry. There is a dearth of published research on SCRM and its attendant supply chain risks in developing countries. The study contributes to the current body of knowledge on SCRM by exploring how 3PL providers in a developing country assess supply chain risks, the strategies they have in place to respond to these risks, and the mechanisms in place to monitor and control SCM risks. The field of SCRM is dynamic, thus the study provides new insights on the concept of SCRM, which can assist practitioners to develop appropriate SCRM strategies to mitigate supply chain risks.

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