

An evaluation of supply chain risk management practices: a developing country perspective

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ABSTRACT

Global supply chain networks are becoming more complex and are exposed to increasing uncertainty. Despite developments in globalization and technologies, supply chains have become more posed. Successful organisations perform proactive supply chain risk management to sustain their competitive advantage. The purpose of this paper is to investigate the most important risks facing the supply chain networks in southern Africa and to explore common risk avoidance/mitigation strategies. The results of a survey amongst practitioners indicate that supply chain risk is escalating and risk management has become a higher priority. The findings indicate that the main risks include affirmative action, currency volatility, customer retention and skills shortages. The study also found that business continuity planning, staff development and setting of internal quality standards are the most utilised risk mitigation strategies.

INTRODUCTION

Supply chain operations and supply chain management are inherently risky. In a global economy, where goods are traded across borders in supply chains that are often lengthy and usually multifaceted, it is inevitable that, as complexity in supply chains increase, so too does risk. Supply chain risk is not new, but, as Brindley and Ritchie stated in 2004, risk management has now taken on a new level of significance. They assert that ICT developments have facilitated the flow of information amongst stakeholders in the supply chain, making competitive advantage short lived. In addition, these ICT developments have facilitated the development of global competition and interactions and relationships within the supply chain itself have also evolved. The result is that the supply chain itself is now considered to be a weapon in the battle for competitive advantage. Brindley and Ritchie [1] go on to state that the consequences of these developments, together with the responses of supply chain members and competitors imply a potential increase in uncertainty and risk. Increasingly complex structures, strategies and systems that have been developed to respond to new competitive challenges result in further uncertainty and risk.

Supply chain risk is however notoriously difficult to define. In an early attempt, March and Shapira [2]

defined it as “variation in the distribution of possible supply chain outcomes, their likelihood, and their subjective values”. Zsidisin [3] defined it as “the potential occurrence of an incident or failure to seize opportunities with inbound supply in which its outcomes result in a financial loss for the [purchasing] firm”. Jüttner, Peck and Christopher [4] defined supply chain risk as “the possibility and effect of mismatch between supply and demand” and Peck [5] information, material or product flows from original suppliers to the delivery of the final product to the ultimate end user”. Heckmann et al. [6] concludes that “the definitions of supply chain risk are often vague, ambiguous and defy quantification. As a result, supply chain risk is still difficult to assess, monitor, control, and hardly representable in mathematical decision models.”

The difficulty in defining supply chain risk management led Zsidisin & Ritchie [7] to state that they would not promote a particular definition for the term “risk” in their book on supply chain risk as they believed that seeking agreement on a definition was problematic and prescribing “a particular definition is likely to prove counter-productive in generating and encouraging ... different perspectives and approaches ...”. They did however categorise risk into a number of dimensions, i.e.

- Disruptions to the supply of goods or services, including poor quality, which cause downtime and consequent failure to satisfy the customer’s requirements on time
- Volatility in terms of price may result in difficulties in passing on price changes to the customer and potentially have consequences in lost profit
- Poor quality products or service, either upstream or downstream, may impact on the level of satisfaction of the customer with consequences for future revenues and possibly more immediate claims for financial compensation
- The reputation of the firm, often generated by issues not directly related to the supply chain itself, may pose risks. Inadvertent comments by senior executives or the failure to endorse certain protocols may damage the reputation of the organization.

Chopra and Sodhi [8] had already determined similar risk categories in 2004, describing them as disruptions, delays, systems, forecasting, intellectual properties, receivables, inventory and capacity. The Queensland Government [9] categorises supply chain risk as either external, i.e. risks over which the

organisation does not have control, or internal, i.e. those within the organisation's control. The former includes demand risks - caused by unpredictable or misunderstood customer or end-customer demand; supply risks - caused by any interruptions to the flow of product, whether raw material or parts, within your supply chain; environmental risks - from outside the supply chain; usually related to economic, social, governmental, and climate factors, including the threat of terrorism; business risks - caused by factors such as a supplier's financial or management stability, or purchase and sale of supplier companies; and physical plant risks - caused by the condition of a supplier's physical facility and regulatory compliance. The main type of internal risks are described as manufacturing risks - caused by disruptions of internal operations or processes; business risks - caused by changes in key personnel, management, reporting structures or business processes, such as the way purchasers communicate to suppliers and customers; planning and control risks - caused by inadequate assessment and planning, which amount to ineffective management; mitigation and contingency risks - caused by not putting contingencies (or alternative solutions) in place in case something goes wrong; and cultural risks - caused by a business's cultural tendency to hide or delay negative information. Such businesses are generally slower to react when impacted by unexpected events.

Whilst many other websites, organisations and journal articles describe other key risk areas, the essence of supply risk generally tends to be associated with the extent and complexity of the supply chain. That supply chains are complex tends to be regarded as an inevitability [10], thus implying that risk too is unavoidable. The latter thus emphasises the importance of supply chain risk identification and the consequent need to manage these risks. The Allianz Risk Barometer 2017 [11] emphasizes the criticality of this by finding that top business risk in 2017 was business interruption, which included supply chain disruption and vulnerability.

That supply chain risk should be at the forefront of organisations management strategies thus appears indisputable. In South Africa, supply chains are not only subject to risks typically associated with supply chains, but appear to have a unique set of risks, which are not as prominent in other supply chains. External risks are typically described as labour disputes, loss of electricity, economic recession, currency devaluation, civil unrest, counterfeit products, political turmoil, etc. Internal risks that are considered to be high are aspects such as transportation carrier failures, product quality failures, manufacturing failures and raw material failures. Employee theft and executive misdeeds, corruption, cash crises also feature as high risk areas in South African supply chains [12]. Talent shortages should also be regarded as a key supply chain risk in South Africa [13]. These risks, whilst not exclusive to South Africa, amalgamate into a set of supply chain risks which are very high. This is evidenced in the 2016 Allianz report [14] where it is asserted that

“Supply chain risk in Sub-Saharan Africa remains the highest in the world and continued to increase ... as South Africa ... economies struggled”. Furthermore, the report highlights external factors: “According to the Index, the underlying trend in operational risk for the region is deteriorating as lower global commodity prices and non-economic factors, such as drought and political uncertainty, weigh down key economies.” That supply chains in sub-Saharan countries, in general, and South Africa, in particular, are exposed to high levels of risk is highlighted again in the 2017 Allianz report, which identifies business interruption (incl. supply chain disruption and vulnerability) as the second highest risk in the country. The highest business risk (cyber incidents) and subsequent high risks (macro-economic developments, market developments, changes in legislation, etc. [15] are also potentially supply chain related and potentially impact the supply chain. Supply chain risk identification in the country thus becomes increasingly important, in order to participate in the global market and achieve competitive advantage.

RESEARCH METHODOLOGY

The purpose of this article is to explore the most critical risks facing the logistics and supply chain networks in southern Africa. To explore the insights and opinions of supply chain practitioners on the disruptive effects of different supply chain risks and the mitigating strategies they employ, a survey was conducted in June 2017 at the 39th Annual SAPICS (Association for Operations Management in Southern Africa) conference. The SAPICS conference is perceived as the principal logistics and supply chain management conference in southern Africa and was attended by more than 1000 supply chain and operations management professionals from around the world. Since the conference attendees are perceived to have a high level of knowledge of the supply chain industry, a convenience sampling methodology was applied to obtain responses.

A self-administered web-based questionnaire containing three separate sections was used to elicit responses from interested delegates at the SAPICS conference and was completed on-line by the respondents. The first section included questions regarding the respondent's demographic and employment characteristics; the second section contained questions regarding the priority of risk management and the different supply chain risk factors that will have the greatest disruptions or financial impact on their organization; and section three asked questions on how effectively certain supply chain elements are managed from a risk perspective and which risk avoidance and mitigation methods are used in their organisations.

The survey was completed by 115 respondents, a response rate of approximately 13%, which was viewed acceptable for the purposes of the study. Although the number of respondents may possibly be viewed as a limitation of this study, the researchers

however are of the view that the particular sampling cluster (i.e. SAPICS delegates) was capable of obtaining an acceptable number of responses from supply chain professionals to be adequately representative of the practitioners' perspective.

RESULTS

The results of the practitioners' survey were analysed to identify the most important risks facing supply chain networks in southern Africa; to obtain an understanding of the risk impact on the organization and to explore how effectively certain supply chain elements are managed.

The majority of the respondents are from the transport, storage and communication and manufacturing sectors (60.5%), and just over 75% of the respondents were middle and senior managers, indicating that the respondents can be regarded as the decision-makers within their particular firms. The average years of work experience of all the respondents over 16 years, with the average experience in the area of logistics and supply chain management being over 10 years. More than 93% of the respondents had completed tertiary qualifications. The survey data was analysed using SPSS for Windows version 24.

When asked to indicate if the priority of risk management in their supply chains have changed over the past three years, most of the respondents (73.6%) indicated that it has become a higher/significantly higher priority, with only 6.3 percent indicating that it has become less important. This is depicted below.

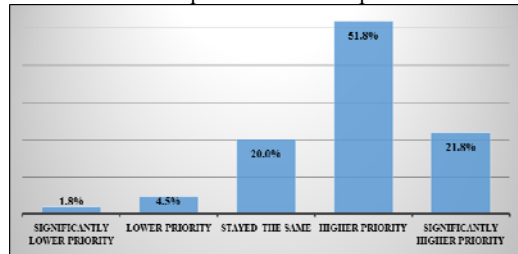


Figure 1 Priority of supply chain risk management

When asked to indicate which key risk factors they foresee will have the greatest logistics / supply chain disruption or financial impact on their organisation in the next three years, the respondents identified Broad Based Black Economic Empowerment requirements, currency fluctuations, customer retention, competition, and skills shortage as their top five disruptive risk factors. The least important risk factors identified are: terrorism, tax risks, interest rates and natural disasters. The results are shown in Figure 2.

Respondents were asked to rate how effectively certain risk elements are managed on a 5-point Likert-type scale. The response format was anchored from not effectively (1) to very effectively (5).

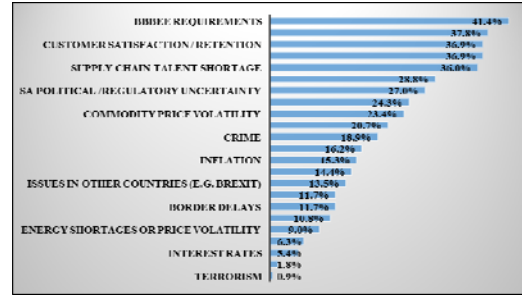


Figure 2: Key supply chain risk factors

The mean and standard deviation were also calculated to establish the effective management ranking of selected supply chain risk elements. The Cronbach's α value for this question was 0.892, which indicates values for this dimension are acceptable [16].

Table 1 depicts the proportional split and descriptive statistical results for the selected supply chain risk elements. In terms of perceived effective management, the three highest ranked supply chain elements are, regulatory compliance, supplier relationships and managing multiple suppliers.

Table 1: Managing supply chain elements

Supply chain element	Not effectively	Slightly effectively	Neutral	Moderately effectively	Very effectively	N/A	Mean	Std. Deviation
Regulatory compliance	0.91%	7.27%	20.00%	23.64%	42.73%	5.45%	3.84	1.36
Supplier relationships	1.82%	5.45%	20.91%	33.64%	30.91%	7.27%	3.65	1.40
Management of multiple suppliers	1.82%	14.55%	11.82%	39.09%	24.55%	8.18%	3.45	1.46
Customer demand	4.55%	10.91%	19.09%	35.45%	23.64%	6.36%	3.44	1.41
Quality control	3.64%	7.27%	20.91%	33.64%	24.55%	10.00%	3.38	1.52
Supplier visibility	5.45%	10.91%	26.36%	29.09%	22.73%	5.45%	3.36	1.38
Sustainability issues	2.73%	10.91%	21.82%	33.64%	20.91%	10.00%	3.29	1.49
Inventory levels	0.00%	10.00%	23.64%	35.45%	19.09%	11.82%	3.28	1.49
Sub-contracting	5.45%	6.36%	31.82%	23.64%	22.73%	10.00%	3.22	1.52
Single source suppliers	3.64%	10.00%	28.18%	32.73%	16.36%	9.09%	3.21	1.42
Availability of shared data/information	4.55%	20.91%	17.27%	35.45%	15.45%	6.36%	3.17	1.39
Globalisation of networks	3.64%	9.09%	28.18%	22.73%	22.73%	13.64%	3.11	1.62
Low-cost sourcing	4.55%	11.82%	22.73%	30.00%	18.18%	12.73%	3.07	1.58
Fragmentation along the value chain	2.73%	10.91%	32.73%	28.18%	10.91%	14.55%	2.90	1.50
Customs and border control	3.64%	10.00%	29.09%	22.73%	13.64%	20.91%	2.70	1.68
Reliance on specific raw materials	2.73%	10.91%	24.55%	25.45%	11.82%	24.55%	2.59	1.74
Mergers of transport providers	3.64%	13.64%	27.27%	20.00%	12.73%	22.73%	2.56	1.69

More than 66% of the respondents indicated that they manage their regulatory requirements moderately/very effectively. Although 50.9% of the respondents indicated that they share data/ information moderately/very effectively within the supply chain, more than 25% only share it slightly /not effectively.



Figure 3: Key risk avoidance/mitigation methods

Respondents also were asked to indicate the key methods for risk avoidance and mitigation used in their organisation. The results are indicated in Figure 3. Business continuity planning, staff development through training and internal quality standards were the highest cited practices applied by organisations.

The identified risk mitigation methods that were applied the least are outsourcing, professional certification and the use of track and trace tools.

CONCLUSION

The purpose of this article is to explore the most critical risks facing the logistics and supply chain networks in southern Africa. The results firstly reflected that South African practitioners recognised that supply chain risks were increasing and that risk management will become a higher priority than it has been in the past. This is strongly aligned with the literature that identifies supply chain risks and vulnerability as one of the most important business risks in South Africa (Allianz, 2017a).

Whilst typical supply chain risk areas such as competition and customer retention are noted amongst the top South African risks, others such as affirmative action (BBBEE), currency volatility, skills shortages, labour unrest, political uncertainty and corruption combine to form a very challenging set of supply chain risks. Interest rates and tax risks were not seen as high risk areas, which is notable given that South Africa has been downgraded to junk status, thereby impacting interest rates. Tax rates are also considered to be relatively high.

Respondents believed that the most effectively managed supply chain risk in their organisations was regulatory compliance. This is expected as the top supply chain risk is considered to be compliance with BBBEE requirements. Respondents also believed that they manage supplier relationships and multiple suppliers effectively. This should be seen in conjunction with the far lower ranked risks of supplier visibility, subcontracting, availability of shared data and fragmentation along the value chain. The low ranking of these latter items suggest that although the respondents believe they manage suppliers effectively, this does not necessarily imply supply chain integration, which would be considered as a typical and key supply chain risk mitigation strategy.

Business continuity management was the most utilised risk mitigation strategy. There was relatively low uptake of most of the other mitigation practices, implying that some of the key risk areas would not be addressed. For example, only 41% of respondents used training and education as a risk avoidance strategy, however it was identified as the fifth highest supply chain risk.

The results clearly indicate that practitioners recognise risk as being a very high priority in supply chain in South Africa, however risk management practices have not yet been developed that specifically target the unique set of constraints within this business environment. Future research should be aimed at identifying the reasons for the low level of maturity in supply chain risk management in the country.

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