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A supply chain leadership model in a developing economy with reference to operational excellence and innovation

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ABSTRACT

Purpose of the study: There seems to be insufficient knowledge and awareness of strategic actions in supply chain management (SCM) from a developing economy perspective. This has culminated in a lack of understanding of supply chain leadership (SCL), operational excellence and innovation in a developing economy.

Purpose of the study: The transformation in SCM activities has prompted companies to reconsider the set goals and objectives alongside those in the global competitive landscape of contemporary SCM for the achievement of SCL in a developing economy. The primary objective of the study was, therefore to develop a model that allows for companies to identify strategic actions to be taken in SCM to attain SCL in a developing economy.

Design/methodology/approach: The study used a mixed-methods survey method that was conducted among 100 companies purposively drawn from 400 JSE-listed companies and 8 industry specialists for quantitative and qualitative surveys, respectively.

Findings: The study found that it is critical for companies to identify the strategic actions for implementation in SCM about operational excellence and innovation to achieve SCL. Leadership elements (LE), sustainability elements (SE), operational elements (OE) and innovation elements (IE) were found to be the best predictors of SCL in a developing economy because they are independent and complement one another to achieve SCL.

Recommendations/value: It is critical for companies to identify the strategic actions about operational excellence and innovation for implementation in SCM to achieve SCL in a developing economy.

Managerial implications: The adoption of a model for SCL with four primary elements (LE, SE, OE, and IE) could serve as a comprehensive strategy for any company in a developing economy to attain SCL.

Keywords

Supply chain leadership; supply chain management; developing economy; operational excellence; innovation, JSE-listed companies.

JEL Classification: L25

1. INTRODUCTION

There seems to be insufficient knowledge and awareness of the 'best' supply chain companies in South Africa and the strategic actions that they perform to reach the top levels in their respective industries regarding operational excellence and innovation. Riasi (2015) asserts that supply chain management (SCM) practices are positive contributors to the performance of a company. These practices, therefore, resemble a set of three or more entities in the form of organisations, individuals or multidimensional constructs that encompass the up and downsides of SCM (Jangga *et al*., 2015). However, the critical challenge of supply chains is that customers and suppliers of firms are located globally, and in this regard, two questions are raised (Avittathur & Jayaram, 2016):

- How are companies in developing economies, where formal and organised supply chains are still in their infancy in many industries, expected to respond to change?
- What would be the impact on supply chains when market growth for various products is driven primarily by developing economies?

These questions bear testimony to the scantiness of research that focuses on SCL from a developing economy perspective. Therefore, supply chain leadership (SCL) implies that different parties in the chain are likely to have different flexibility needs, and therefore collaboration within the chain is essential to add to an overall supply chain benefit (Manders *et al*., 2017) as well as for the performance of a successful company (Spina *et al*., 2015).

For many years, SCM has transformed itself to a level that has seen organisations being able to apply transformation to rejuvenate their goals and objectives. For instance, when a company decides on the goal and objective of designing and managing a supply chain globally, such a company can follow a process that may not seem much different from a process of managing the regional supply chain, which normally focuses on scale as the key difference. according to Sanders *et al.* (2016). The design might therefore be that of an optimal supply chain structure that aims to maximise market coverage and optimised location and capacity for facilities (Sanders *et al*., 2016). Furthermore, the idea of designing and managing the supply chain globally as opposed to nationally should be pursued, taking into account the global competition. Spina *et al*. (2015) opine that competition in the global market is much greater between supply chains than between companies, and for this reason, SCM has become a critical factor for the success of companies.

In all contemporary business settings, businesses have seen a shift towards becoming more sophisticated than they previously had been, particularly in developing economies. Tatham *et al*. (2017) allude to the high degree of sophistication in many contexts and settings that the management of supply chains has reached, leading to an increase in the perception that the basic structures may need revisiting, considering emerging changes in the global business environment. The global competitive landscape of contemporary SCM is, therefore, more complex than that of just a few years ago in the sense that companies are grappling with broad and multi-facetted supply chain issues, such as global value creation and delivery; healthcare service delivery; sustainability initiatives that drive environmental, social as well as economic improvements; and capturing market opportunities in emerging markets through improved food distribution networks (Sanders *et al*., 2016). Furthermore, even routine SCM issues have become complex, given the breadth of intertwined issues that must be considered (Sanders *et al*., 2016).

The reality of the competitive environment for businesses is inevitable, whether in a developing or a developed economy. The difference, however, is that, in developing economies, the inadequate channels of distribution do not reach most consumers, unlike in developed economies, where there are large retailers in the supply chains (Sodhi & Tang, 2016). Moreover, Sodhi and Tang (2016) suggest that a social enterprise or company can use micro-entrepreneurs to distribute finished goods to overcome the high cost of lost distribution. In addition, to survive competition in developing economies, Jangga *et al*. (2015) believe that supply chain enterprises must be able to deal with external and internal uncertainties by adopting supply chain flexibility as an approach for coping with sources of uncertainty. For instance, at the process stage, labour and machine flexibility can be used to manage equipment, people, and infrastructure uncertainty (Jangga *et al*., 2015). Thoughtful supply chain planning should therefore be such that it considers both known and forecasted unknown elements of the future as not just critical for success but also as a requirement for survival (Wrobleski, 2014). In this case, therefore, the duty of supply chain managers should entail keeping in touch with other important aspects, such as cultural, historical, and political trends, as this can change the playing field at virtually any time to the detriment of the company and its stakeholders (Stank *et al*., 2015).

2. LITERATURE REVIEW

The literature review focuses on supply chain management as a concept and the relationship with other functional management areas; operational excellence, and innovation in SCM as well supply chain leadership as a concept.

2.1 Supply chain management as a concept

The concept of SCM is vigorous and important to both developed and developing economies of the world. Shukla and Sharma (2015:109) explain that SCM is viewed as "the act of designing, planning, execution, controlling and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronising supply with demand and measuring performance globally". SCM would therefore have to be smart in its approach to include technologies such as smart machines, intelligent infrastructure, and capabilities, such as interconnectivity, to enable data collection and real-time communication fully across all supply chain stages for better customer services (Wu *et al*., 2016).

A smart supply chain requires innovation in products or services, and processes. For instance, smart services or products and processes need to be innovative and different from the past in the sense that their functions ought to be based on high intelligence (Wu *et al*., 2016). Examples of firms that achieved innovative success through their supply chains are IBM, Intel, Unilever and Procter and Gamble (Kavin & Narasimhan, 2017). These firms promoted the success of their innovations by incorporating additional specialised skills and adapting to the requirements of their products through the development of internal operations that involve the acquisition of external knowledge beyond the scope of their own research and development (R&D) (Marche *et al*., 2017). In addition to SCM being smart, strategic supply chain programmes such as lean management and agility, which have yielded considerable benefits for supply chain processes in developed economies, are also being adopted by developing economies (Avittathur & Jayaram, 2016).

2.2 SCM and other functional management areas

There are other functional management areas to which organisations should also give the necessary attention, especially in collaboration with SCM activities, for the organisations to function properly. In other words, neglect of other functional management areas will derail everything that SCM intends to achieve in terms of success for the organisations. Whereas Jangga *et al*. (2015) believe the supply chain includes manufacturers, suppliers, warehouses, retailers and even customers, Riasi (2015) believes that SCM covers the procurement of raw

materials from suppliers and the distribution of finished products to the customers. On the other hand, Wu *et al*.'s (2016) opinion are that SCM includes integrated processes for purchasing, manufacturing, logistics and distribution. Within each organisation, such as a manufacturer, the supply chain, therefore, comprises all functions that are involved in receiving and carrying out a customer request, such as new product development, marketing, operations, distribution, finance, customer service and other functions that are related to serving customer requests (Jangga *et al*., 2015). In other words, it is essential for collaboration within the chain that parties discuss how fulfilling their individual needs may add to an overall supply chain benefit (Manders *et al*., 2017). Moreover, the value chain describes the full range of activities that firms and workers perform to bring a product from its conception to end use and beyond (Gerrefi & Fernandez-Stark, 2016).

2.3 The focus of SCM

The primary focus of SCM is to optimise the level of customer satisfaction because customers are important stakeholders of organisations. Avittathur and Jayaram (2016) assert that supply chain challenges have become even more critical because customers and suppliers of firms are globally located. The evolution of global value chains in diverse sectors, such as commodities, apparel, electronics, tourism, and business service outsourcing, therefore, has significant implications in terms of global trade, production and employment and how developing country firms, producers, and workers integrate into the global economy (Gerrefi & Fernandez-stark, 2016). However, as all supply chains are essentially demand-driven, final customer demand information is widely considered the most important information in the supply chain system (Wu *et al*., 2016). In addition, the need for flexibility emerges because of customers asking for variety, quality, competitive prices, and faster delivery. This has forced companies to make design changes quickly and respond faster to customer needs to sustain their competitive advantage (Jangga *et al*., 2015).

2.4 Operational excellence and innovation in SCM

To satisfy customers, companies would have to know the type of innovation needed and when that innovation is needed to reach the maximum level of operational excellence. Wu *et al*. (2016) describe innovation as the development of new value through solutions that meet new requirements, inarticulate needs, or even existing needs in superior ways. Since innovation is a highly structured, knowledge-intensive activity that is embedded in networks that span organisational boundaries, and because innovation is no longer a part of the internal activities of a firm, Jangga *et al*. (2015) suggest that suppliers should also be treated as part of the business and technical functions of a firm. In addition, for the success of innovation, Marche

et al. (2017) suggest that the related vulnerable supply chain needs to increase its ability to move to a more desirable condition after being disturbed. Furthermore, Kavin and Narasimhan (2017) suggest the adoption of the practice of fostering innovation to improve the performance of the innovation processes of a focal firm.

It is when innovation is planned appropriately that operational excellence is achieved. According to Gartner (2017), the term 'excellence' in business is defined as refers to how leadership is demonstrated towards a demand-driven ideal. Operational innovation refers to coming up with entirely new ways of filling orders, developing products, providing customer service, or doing any other activity that an enterprise performs. Operational excellence can be achieved by the application of a holistic approach that will provide results in the integration of methods for operations management to the extent that it optimises people, assets, and processes in a company (Adkins, 2007). The differences in the supply chain environment tend to differ from one country to another, affecting the operational effectiveness and efficiency of firms operating in the specific country, which in turn affects the overall competitiveness of the country (Avittathur & Jaharam, 2016).

2.5 Supply chain leadership concept

The concept of SCL involves awareness of risk and unforeseen business challenges and ways to deal decisively with them. It is no surprise that leading companies treat their supply chains as dynamic hedges against uncertainty by actively and regularly examining or even reconfiguring their broader supply networks towards economic conditions years ahead (Malik, Niemeyer & Ruwadi, 2011). Those companies tend to achieve a considerable degree of visibility and coordination, and they use highly reliable processes both within and across the plan, source, manufacture, deliver and return functions in partnership with sales and marketing and product management organisations in lines of business (Aronow *et al*., 2014). Grosspietch and Brinkhoff (2009) argue that leadership in supply chain transformation is one of the most difficult yet crucial factors for delivering and sustaining impact. Success in the SCL discipline, therefore, leans heavily on some of the very leadership skills that distinguish the world's best chief executive officers (CEOs) (Stratman, 2010). What differentiates the leaders is that they have moved beyond the words and presentation slides to make the hard changes that are needed throughout the organisation (Hofman *et al*., 2013). Stratman (2010) sees the supply chain leader's vantage point as that which encompasses the entire value chain and for which the best supply chain leaders regularly interact with key players in the business.

3. METHODOLOGY

3.1 Research design

The mixed-methods research (MMR) design was adopted to combine both qualitative and quantitative approaches to answer the research questions and address the research problem. It was suitable to use MMR because the intention was to have the best of both quantitative and qualitative approaches (Shorten & Smith, 2017). In addition, the intention was also to ensure that the two approaches would complement each other for a thorough exploration of the study. This study followed the exploratory sequential design to prioritise the qualitative aspect of the study so that the findings of the two phases could be integrated during the interpretation phase (Curry *et al*., 2015). The study, therefore, comprised two phases. Phase one used a qualitative approach to develop and inform the quantitative approach in phase two, the latter leading to the outcomes of the research.

3.2 Population and sample

The study was conducted in South Africa because it is one of the top 73 middle-income countries (Organisation for Economic Co-operation and Development (OECD), 2017) and one of the 11 advanced emerging economies (Financial Times Stock Exchange [FTSE], 2017). The country is, therefore, comparable to developing economies of the world.

3.2.1 Phase 1 (Qualitative)

Qualitative research uses small samples because it aims to acquire information that is useful to comprehend the intricacy, depth, variation as well as context surrounding a phenomenon (Charles *et al*., 2015). Furthermore, Dworskin (2012) and Mason (2010) believe that a selection of anywhere between 5 and 50 participants in an interview is adequate. A purposive sample of 8 industry specialists in the field of SCM, logistics, chemical and industrial engineering, as well as production and manufacturing engineering, were selected in this study (n = 8). Six of these specialists were intentionally selected locally, and two from abroad to present opinions from both local and international perspectives. Their subjective opinions were sought on:

- the characteristics of SCL in the context of emerging economies;
- the strategies for and barriers to SCL;
- the importance and contribution of innovation and operational excellence to SCM and SCL; and
- the understanding of SCM of companies in emerging economies.

3.2.2 Phase 2 (Quantitative)

The target population was all 400 JSE-listed companies in 2015 (N = 400) to get a sense of leadership in a developing economy. A purposive sample of the top 100 JSE-listed companies was considered for this study (n = 100). The choice of the best 100 JSE-listed companies in this study was influenced by their highest shareholder returns over the past five years (i.e., 2010 to 2014). The top 100 JSE-listed companies were further stratified into relatively homogeneous sub-groups in accordance with the standard industrial classification relevant to the research and to attain greater precision as well as representation of the sample. A total of 46 out of 100 companies completed the online questionnaire (46%).

Table 1: Company classifications

Industry	Manufacturing	Retail, wholesale trade, commercial agents, and allied services	Mining, quarrying and agriculture	Information and Communication Technology (ICT), transport, logistics and storage	Finance and business services	Catering, accommodation, property, and hospitality	TOTAL
Sample	$n_1 = 9$	$n_2 = 18$	$n_3 = 8$	$n_4 = 18$	$n_5 = 25$	$n_6 = 22$	n = 100

Source: Author's own compilation

3.3 Instrumentation and reliability

A questionnaire (closed-ended questions) and an interview schedule (open-ended questions) were the two survey instruments used to collect primary data in this study. Semi-structured interviewing was used (phase 1), during which the same questions were asked in each interview while at the same time allowing flexibility for other important information to arise. On the other hand, structured questionnaires were used (phase 2), where the interviewer posed a series of questions using a five-point Likert-type scale for responses. The Likert-type responses were used to ask the participants to indicate the extent to which they agreed or disagreed with statements and to select their level of agreement with the statement, ranging from strongly agree to strongly disagree. The interviewer immediately recorded the responses by taking notes and using a voice recorder, while an online web-based questionnaire was used to collect data for automatic recording.

3.4 Ethical consideration

In this study, ethical considerations were based on protection from harm, informed consent, request for permission, voluntary participation, confidentiality as well as anonymity. Prospective research participants were informed about the procedures involved in the research and were allowed to give their consent to participate. Participation in this study was, therefore on a voluntary basis, while both physical and psychological harm was avoided at all costs. Ethical clearance was obtained from the Unisa Ethics Committee in line with the Unisa Policy on Research and Ethics. Assurance was given to the participants of confidential treatment of their responses as well as their participation in the study. No person or company had access to their completed questionnaires.

3.5 Data analysis

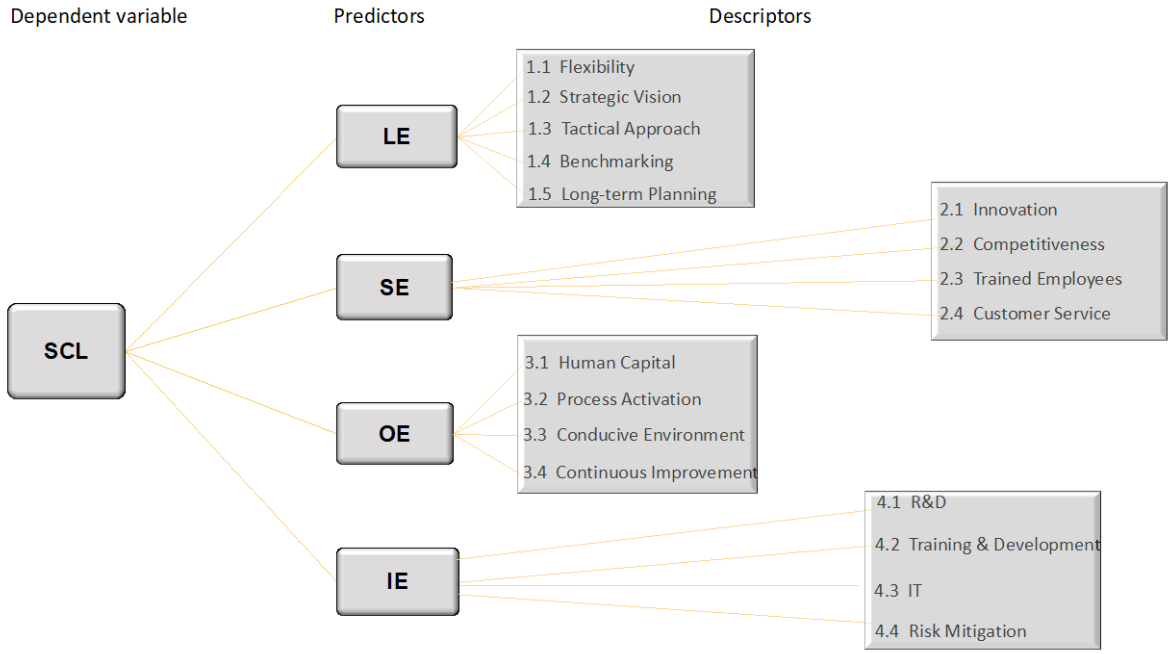
The qualitative data analysis yielded quotes, codes, and themes. The analysis of the qualitative data was done through content analysis. For the quantitative data analysis in this study, preference was given to the use of descriptive statistical analysis and inferential statistical methods of testing for relationships among variables, such as t-tests, analysis of variance (ANOVA), and tests for normality and homogeneity of variance. In addition, factor analysis was used to determine the latent variables that underlie a set of items and summarise data parsimoniously in a manner that allows relationships and patterns to be easily interpreted and understood.

4. RESULTS AND ANALYSIS

In pursuit of operational excellence and innovation, SCM was considered a viable alternative in a developing economy to improve business activities aimed at the satisfaction of customer needs. This is because the practice of SCM provides a positive contribution to the performance of a company, thereby creating a competitive advantage. Seemingly, the transformation in SCM activities has prompted companies to reconsider their set goals and objectives alongside those in the global competitive landscape of contemporary SCM for the achievement of SCL in a developing economy. It is critical for companies to identify the strategic actions for implementation in SCM in terms of operational excellence and innovation to achieve SCL. However, there seems to be insufficient knowledge and awareness of such strategic actions in SCM from a developing economy perspective, which culminated in a lack of understanding of SCL in a developing economy in terms of operational excellence and innovation. The primary objective of this study was, therefore, to develop a model that would allow companies to identify strategic actions in SCM to be taken to attain SCL in a developing economy.

The development of a model for SCL could serve as a comprehensive strategy for any company in a developing economy to attain SCL. To achieve the primary objective of this study, the model for SCL in terms of operational excellence and innovation in a developing economy is presented in Figure 1 below.

Figure 1: The study model for SCL



Source: Author's own compilation

SCL = Supply chain leadership

LE = Leadership elements

SE = Sustainability elements

OE = Operations elements

IE = Innovation elements

4.1 Model summary and validation

The four primary elements of SCL are LE, SE, OE and IE, and have been validated as follows:

4.1.1 LE validation

The set of four items that represented various options for obtaining a competitive advantage did not demonstrate good internal consistency. However, due to the exploratory nature of the study and because the purpose was to identify how many of the options were considered, the

consistency was considered acceptable with a scale of only four items (Table 2). In addition, the set of 12 items that represented issues according to which the performance of a company is compared to others in the same industry demonstrated good internal consistency (Table 3). Furthermore, the set of 11 items that represented the successful supply chain operation when developing a successful supply chain strategy demonstrated good internal consistency (Table 4).

Table 2: The set of four items that represent the options for obtaining a competitive advantage

Reliability statistics					
Cronbach's alpha			Number of items		
0.54			4		
Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. deviation
Question 27: Combined index	17	0	4	1.82	1.24
Valid N (list-wise)	17				

Source: Author's own compilation

Table 3: The set of 12 items that represent the issues for which the company is compared in terms of performance relative to the performance of other companies in the same sector

Reliability statistics					
Cronbach's alpha			Number of items		
0.78			12		
Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. deviation
Question 29: Combined index	18	17	51	40.33	8.18
Valid N (list-wise)	18				

Source: Author's own compilation

Table 4: The set of 11 items that represent the successful supply chain operations when developing a successful supply chain operation strategy

Reliability statistics					
Cronbach's alpha			Number of items		
0.87			11		
Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. deviation
Question 33: Combined index	17	2	11	9.18	2.43
Valid N (list-wise)	17				

Source: Author's own compilation

The overall index was described as a leadership index, which incorporated the number of ways in which the company attempted to obtain a competitive advantage, in other words, the extent to which there was better performance compared to other companies in the same industry and the number of ways in which attempts were made to develop a successful supply chain operation strategy. The LE index that ranged from 12 to 75 was therefore calculated (Table 5).

Table 5: LE index that ranges from 12 to 75

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. deviation
Leadership elements (12 to 75)	18	24	61	50.72	10.47
Valid N (list-wise)	18				

Source: Author's own compilation

4.1.2 SE validation

The set of 15 items that represented systems or approaches relevant to good SCM demonstrated good internal consistency (Table 6), and the set of 12 items represented advantages of implementing the systems or approaches that are relevant to good SCM demonstrated good internal consistency (Table 7).

Table 6: The set of 15 items that represent systems or approaches relevant to good SCM

Reliability statistics	
Cronbach's alpha	Number of items
0.85	15

Source: Author's own compilation

Table 7: The set of 12 items that represent advantages obtained from implementing systems or approaches relevant to good SCM

Reliability statistics	
Cronbach's alpha	Number of Items
0.89	12

Source: Author's own compilation

As any number of systems or approaches were used, and the benefits were not reported per system or approach, an index was calculated of how many systems or approaches were used (and at what level of sophistication). Moreover, some systems or approaches were used, and many benefits were derived from these systems or approaches. Combining these resulted in a single sustainability index that reflected both systems were used at differing levels of sophistication and whether (and how many) benefits were experienced at differing levels of advantage using these systems (Table 8).

Table 8: Sustainability index for the system use at different levels of sophistication and experiences at different levels of advantage using these systems

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. deviation
Question 21 Index (Question 21.1 & Question 21.2) - On a scale of 0 to 54, sustainable use of systems/approaches	23	19.00	48.00	33.43	7.90
Valid N (list-wise)	23				

Source: Author's own compilation

The set of nine items that represented the important factors for SCL demonstrated good internal consistency (Table 9), and therefore, an importance index was created from 0 to 18 by allocating 0 to 1 = Unimportant, 1 to 2 = Somewhat important, 3 = Important, 2 to 4 = Quite

important and 5 = Very important (Table 10). In addition, a set of six items that represented attitudes regarding consumers or products that might affect the sustainability of SCM demonstrated good internal consistency (Table 11), and therefore an awareness of relevance index was created from 0 to 12 by allocating 0 to 1 = Strongly disagree, 2 = Disagree, 1 to 3 = Agree somewhat, 2 to 4 = Agree and 5 = Strongly agree (Table 12).

Table 9: The set of nine items that represent factors important to SCL

Reliability statistics	
Cronbach's alpha	Number of items
0.75	9

Source: Author's own compilation

Table 10: Importance index

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. deviation
Question 26: importance index - On a scale of 0 to 18, how sustainable is awareness of important factors?	18	8	18	16.89	2.38
Valid N (list-wise)	18				

Source: Author's own compilation

Table 11: The set of six items that represented attitudes regarding customers or products that might affect the sustainability of SCM

Reliability statistics	
Cronbach's alpha	Number of items
0.92	6

Source: Author's own compilation

Table 12: An awareness of relevance index

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. deviation
Question 28 relevance index - On a scale of 0 to 12, how sustainable is awareness of client or product factors?	18	0.00	12.00	8.39	4.00
Valid N (list-wise)	18				

Source: Author's own compilation

A combination of the system index, importance index, and client or product factors awareness index created an index of SE, which resulted in an index that ranged from 0 to 84 (Table 13).

Table 13: An index of SE that ranges from 0 to 84

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. deviation
Sustainability elements index (0 to 84)	23	24.00	78.00	53.22	15.11
Valid N (list-wise)	23				

Source: Author's own compilation

4.1.3 OE validation

The set of 11 items that represented supply chain needs to demonstrate good internal consistency (Table 14), and therefore the needs index from 0 to 11 was created by allocating 0 for options 1, 2 and 5 and allocating 1 for options 3 and 4. In addition, the set of 11 items that represented actions to mitigate barriers to SCM demonstrated good internal consistency (Table 15), and therefore an action index from 0 to 11 was created by allocating 0 to options 1, 2 and 3 and allocating 1 to options 4 and 5 (Table 16). The set of four items that represented the key drivers to match a value proposition to the SCM of the company demonstrated good internal consistency (Table 17). Therefore, an importance index from 0 to 6 was created by allocating 0 for options 1, 2 and 3 and allocating 1 for options 4 and 5 (Table 18). Combining the values obtained from the indexes, an OE index was created with values that ranged from 0 to 26 (Table 19).

Table 14: The set of 11 items that represented supply chain needs

		Frequency	Valid percent	Cumulative percent
Valid	0.00	35	76.1	76.1
	1.00	3	6.5	82.6
	2.00	2	4.3	87.0
	3.00	2	4.3	91.3
	4.00	3	6.5	97.8
	5.00	1	2.2	100.0
	Total	46	100.0	

Descriptive statistics

	N	Minimum	Maximum	Mean	SD. deviation
Question 23: Number of needs met - standardised (0 to 11)	20	0.00	11.00	5.47	3.40
Valid N (list-wise)	20				

Source: Author's own compilation

Table 15: The set of 11 items that represent actions to mitigate barriers to SCM

Reliability statistics

Cronbach's alpha	Number of items
0.84	11

Source: Author's own compilation

Table 16: An action index from 0 to 11 by allocating 0 to 1, 2 and 3 and 1 to 4 and 5

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Question # 25: Number of actions taken (0 to 11)	20	0	8	3.50	2.16
Valid N (list wise)	20				

Source: Author's own compilation

Table 17: The set of 4 items that represent key drivers to match the value proposition to the SCM of the company

Reliability statistics	
Cronbach's alpha	Number of items
0.65	4

Source: Author's own compilation

Table 18: An importance index from 0 to 6 by allocating 0 to 1, 2 and 3 and 1 to 4 and 5

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. deviation
Question 25: Number of key drivers that are important (0 to 4)	17	0	4	2.94	1.39
Valid N (list wise)	17				

Source: Author's own compilation

Table 19: OE index that ranges from 0 to 26 (adding together the values obtained for the Question 23.1, Question 25, and Question 36 indexes)

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. Deviation
Operations elements (0 to 26)	20	.00	20.00	11.47	4.67
Valid N (list-wise)	20				

Source: Author's own compilation

4.1.4 IE validation

The set of eight items that represented measures of innovation demonstrated good internal consistency (Table 20), and therefore an importance index was created from 0 to 8 by allocating 0 to options 1, 2 and 3 and allocating 1 to options 4 and 5 (Table 21). In addition, the set of 14 items that represented factors that affect the development of new and innovative ideas demonstrated good internal consistency (Table 22), and therefore an importance index was created from 0 to 14 by allocating 0 to options 1, 2 and 3 and allocating 1 to options 4 and 5 (Table 23). Furthermore, the set of four items that represented factors that are important for innovation demonstrated good internal consistency (Table 24), and therefore an importance index was created from 4 (if 1 for all 4 factors) to 20 (if 5 for all the factors) by adding together

the scale scores for the four factors (Table 25). Combining the values obtained indices, an IE index that ranged from 0 to 42 was calculated (Table 26).

Table 20: The set of 8 items that represent measures conducive to innovation

Reliability statistics	
Cronbach's alpha	Number of items
0.72	8

Source: Author's own compilation

Table 21: An importance index from 0 to 8 by allocating 0 to 1, 2 and 3 and 1 to 4 and 5

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. deviation
Question 22: Number of measures conducive to innovations that are important (0 to 8)	22	0	6	3.14	1.83
Valid N (list-wise)	22				

Source: Author's own compilation

Table 22: The set of 14 items that represent factors that affect the development of new and innovative ideas

Reliability statistics	
Cronbach's alpha	Number of items
0.91	14

Source: Author's own compilation

Table 23: An importance index from 0 to 14 by allocating 0 to 1, 2 and 3 and 1 to 4 and 5

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. Deviation
Question 30: Number of measures conducive to innovations that are important (0 to 14)	17	0	***14***	8.12	4.29
Valid N (list wise)	17				

Source: Author's own compilation

Table 24: The set of 4 items that represent factors that are important for innovation

Reliability Statistics	
Cronbach's alpha	N of items
0.76	4

Source: Author's own compilation

Table 25: An importance index from 4 (if 1 for all 4 of the factors) to 20 (if 5 for all 4 of the factors) by adding together the scale scores for the 4 factors

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. deviation
Question 31: Level of importance re factors important for innovation (4 to 20)	17	10.00	20.00	15.47	3.06
Valid N (list-wise)	17				

Source: Author's own compilation

Table 26: An Innovation elements indexes that range from 0 to 42

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD. deviation
Innovations elements (0 to 42)	22	1.00	40.00	21.36	12.26
Valid N (list-wise)	22				

Source: Author's own compilation

5. FINDINGS AND DISCUSSION

The model consists of a dependent variable (SCL) and four independent variables, also termed predictors, namely LE, SE, OE, and IE. As indicated in section 4.1 above, all four predictors were duly validated using tables for reliability and descriptive statistics. Among the four predictors, LE was unsurprisingly found to be at the highest level of the SCL model, while IE represented the lowest level of the model. In other words, when the model is implemented, LE should represent the foundation on which the other three predictors are built. The predictors in the model are independent and complement one another to achieve SCL in a developing economy in terms of operational excellence and innovation.

Each of the predictors in the model comprises various key variables (descriptors), which are explained below:

- the descriptors associated with the LE predictor are flexibility, strategic vision, tactical approach, benchmarking, and long-term planning;
- SE descriptors are innovation, competitiveness, trained employees, and customer service;
- OE descriptors are human capital, process activation, conducive environment, and continuous improvement; and
- IE predictors are R&D, training and development, information technology (IT), and risk mitigation.

These are the descriptors of the predictors for building an SCL model. In general, the model is considered significant, and all the predictors were found to be significant. It is therefore concluded that SCL= f (LE, SE, OE, and IE).

5.1 Application of the model

This study was conducted in South Africa, one of the developing economies on the African continent. The JSE-listed companies were selected to ensure global relevance because a significant percentage of the top 100 JSE-listed companies are regarded as multinationals. The SCL model should be applied as a comprehensive strategic plan for any company to achieve SCL in a developing economy in terms of operational excellence and innovation. To achieve SCL, companies should therefore focus on the four predictors in the model, namely LE, SE, OE, and IE, as the predictors that positively affect SCL from the perspective of a developing economy. To achieve each predictor in the SCL model, companies in developing economies should focus on descriptors that underlie each predictor.

5.2 Practical implication

The adoption of a model for SCL with four primary elements (LE, SE, OE, and IE) could serve as a comprehensive strategy for any company in a developing economy to attain SCL. To achieve the first predictor (LE), the company should focus on five descriptors, namely flexibility, strategic vision, tactical approach, benchmarking and long-term planning. To achieve the second predictor (SE), the company should focus on four descriptors, namely innovation, competitiveness, training of employees and customer satisfaction. To achieve the third predictor (OE), the company should focus on four descriptors, namely human capital, process activation, an environment conducive, and continuous improvement. To achieve the

fourth predictor (IE), the company should focus on four descriptors, namely R&D, training and development, IT, and risk mitigation.

5.3 Limitation and direction for further research

The study was conducted in South Africa among the top 100 JSE-listed companies. The researcher recommends that a larger study be done that comprises more countries from developing economies as it would be worthwhile to use a larger sample than a small sample. The top 100 JSE-listed companies are large multinational companies, and therefore, the present study provides an opportunity for future studies that focus on small and medium-sized enterprises, with the exclusion of the big companies. Furthermore, the study provides an opportunity for future longitudinal studies that take the outcomes of the present study a step further to determine how SCL could be improved from the current situation. Further opportunity exists for future comparative studies between developing and developed economies to compare the outcomes from the perspectives of the different economies.

6. CONCLUSION

In developing the SCL model for developing economies, this study contributed by modelling the relationship between the dependent variable and the independent variables within SCM and SCL from the data analysed. The model could serve as a frame of reference for supply chain managers, practitioners, and scholars in the field of SCM.

This study provided the overall conclusions in respect of the objective. The value of a supply chain, SCM and SCL in a developing economy cannot be underestimated. Indeed, there is renewed energy in the field, given the industrial revolution that focuses on operational excellence and innovation. Given the changes in the world in terms of technology, regulations, and politics, developing economies need to be better equipped to handle these challenges. At the time of completion of this research, the South African economy, and indeed developing economies at large, were challenged to perform against their Northern counterparts. In this context, the fundamentals of innovation, operational excellence, sustainability, and leadership are all called for to develop seamless supply chains individually and jointly for competitiveness. The aspects addressed in this research provide a clear foundation for this renewed drive and, adhering to the predictors and descriptors identified and explained, might possibly be the foundation for SCL in the challenges of developing economies.

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