SKILLS REQUIREMENTS IN THE SUPPLY CHAIN INDUSTRY IN SOUTH AFRICA

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ABSTRACT

The skills shortage in the supply chain industry in South Africa is much touted but underresearched. The research conducted attempts to identify the skills sets typically required by supply chain organisations as well as those skills areas that are the most challenging to fill, thus identifying the critical skills shortages in South Africa. The study includes benchmarking with international trends, conclusions and identification of key areas for future research.

INTRODUCTION

The shortage of skills in South Africa is frequently cited as one of the key features inhibiting growth in the country's economy. In Grant Thornton's International Business Report (2012), the lack of availability of a skilled workforce is cited as one of the key constraints to the expansion of business operations in South Africa. Furthermore, this constraint has been cited by the report as a key constraint by South African business owners for the past five years. 'Most economists agree that South Africa's skills shortage poses a significant limitation on the country's long-term economic growth potential. Due to a lack of needed skills, including managerial, professional and technical skills, viable economic opportunities cannot be productively tapped' (Sharp, 2011).

It is worthwhile noting that although the South African skills shortage is regarded as critical, it is not unique. ManpowerGroup (2011a), in its sixth annual Talent Shortage Survey, showed that 52% of US employers experienced difficulties in filling critical positions within their businesses. Furthermore, the report states that 'one in three employers globally report experiencing difficulty filling jobs due to lack of available talent'. In a recent report, INSEAD (2009) stated that, although unemployment in Europe was approaching 18 million, an estimated 4 to 5 million positions could not be filled, largely due to a lack of skills.

The situation is not much different in Asia. Numerous studies in various regions in Asia indicate that the skills shortage is critical. One survey of chief executives of businesses across Asia indicated that a shortage of qualified staff was ranked as their biggest concern in China as well as South East Asia; in Japan it is regarded as their second biggest concern and in India as their fourth greatest concern (*The Economist*, 2007). More recent surveys, such as that done by Hudson, find 'A dearth of appropriately skilled talent is the single biggest recruitment challenge faced by companies in Singapore, Hong Kong and China' (Yap, 2011). Hays, in their survey of 900 employers, supports this statement, finding that 95% of employers in Hong Kong, Singapore, China and Japan 'said skills shortages have the potential to hamper the effective operation of their business or department' (JobsDB HK , 2012).

The skills shortage thus appears to be a global problem, both in developed and developing markets. In a worldwide survey done by ManpowerGroup polling approximately 39 000 employers in 33 countries across the globe, a massive 30% reported having difficulties in recruiting appropriate staff due to a lack of suitable talent (Zieminski, 2009). ManpowerGroup attributes this to the fact that the 'working population is aging in both developed and emerging economies, while lower birth rates point to a dwindling supply of workers in coming decades'. This is supported by Keeffe who states that 'The baby boomers who represent a significant percentage of the workforce with an irreplaceable reservoir of skills and experience are beginning to retire. At the same time the declining birth rate means that fewer workers will be available to replace those who have left the workforce' (Keeffe, 2010).

However, these are not the only reasons underlying the global skills shortage. 'Skills shortages vary from country to country but common threads appear in that many countries have failed to educate their indigenous workforce in a manner that produces the skills demanded by the production sectors in the countries concerned' (Slay, 2010). 'Work is getting more complex, employers are looking for more specific skills, so there is more of a mismatch between supply and demand' (Zieminski, 2009).

It is evident from these perspectives that, not only are there are numerous causes for the skills shortage, but also that these are unlikely to be resolved in the near future (Neumark, Johnson & Mejia, 2011). On the contrary, there are many opinions that would support the fact the 'talent crunch' will not be alleviated, but rather will almost certainly continue for some years to come (Keeffe, 2010; Neumark *et al.*, 2011). The global recession has had the effect of softening the effect of the skills shortage; however, evidence suggests that as the global economy starts changing, more and more firms will find it increasingly difficult to fill and retain their available positions (Labour Market Research and Analysis Branch Department of Education, Employment and Workplace Relations, 2010). Even though unemployment, particularly in countries such as South Africa, remains high, employers will find it difficult to find the right people for their positions.

As the global talent crunch deepens, many countries will find it difficult to hold onto their available talent. Countries such as the United Kingdom and Australia, with known skills shortages in particular areas, have adjusted their immigration policies to ensure that not only is immigration of persons with the relevant skills allowed, but positively encouraged (Migration expert, 2012; Woodward, n.d.). The implication for developing countries such as South Africa is that it is increasingly difficult to retain their few available skills, guaranteeing that the well-documented 'brain drain' continues unabated.

'While many more people are looking for work, they often lack the skills, or experience, that employers need' (Zieminski, 2009). 'Ninety percent of employers cite candidate-specific factors behind the challenge of filling mission-critical roles – including a lack of necessary skills and experience, insufficient qualifications, or a lack of soft skills – which means the world stands on the brink of a global employability crisis where there is an over-supply of available workers and an under-supply of qualified talent' (ManpowerGroup, 2011b). The fact that there is a huge level of demand for highly specialised workers means that this will eventually start to impact countries' economies as a whole. Brandt (2000) states that 'even areas that do have workers often have the wrong (unskilled) workers or workers with the wrong skill sets. Executives tell me that their firms are turning down orders or passing up new markets because they cannot staff their potential new production'.

What is evident from this discussion is that countries are not producing the skills that their economies require, and as long as this mismatch between supply and demand of skills continues to exist, economies will be on the back foot in trying to achieve the growth and development that they require in today's global environment. It is also evident that countries need to recognise the skills shortages that exist in particular areas and address these through specific interventions, whether this is through immigration policies or education initiatives or any other form of influence. The South African economy in particular needs to be able to identify these skills shortages and apply urgent and relevant interventions to resolve a situation that has now reached a crisis point.

In South Africa a national skills list is produced periodically to determine the types of skills that identify areas that require interventions either in terms of education and training drives or recruitment of foreign scarce skills. The last available national scarce skills list was produced in 2008 (Department of Labour, 2009), although a number of industry-specific scarce skills lists have been produced more recently such as those of the Mining Qualifications Authority (MQA, 2011) and the SETAs such as the SETA for Finance, Accounting, Management Consulting and other Financial Services (Fasset, 2012).

The 2006/7 scarce skills list (Department of Labour, 2007) identifies 11 major families of occupations where shortages are being experienced. These are engineering and built

environment professions, health professions, finance professions, law professions, city planners, IT/ICT professions, natural science professions, management professions, education professions, transport professions and artisans (Connellan, 2007; Department of Labour, 2007). It is interesting to note from this list that many of these skills are critical to the success of the supply chain, notably engineering, finance professions, law, IT/ICT, management, transport and artisans. This list thus provides some indication of the magnitude of the supply chain skills shortage in the country.

ManpowerGroup (2011a) estimates that the hardest jobs to fill in the US in 2011 are skilled trades, sales representatives, engineers, drivers, accounting and finance staff, IT staff, management/executives, teachers, secretaries/administrative assistants and machinist/ machine operators. Worldwide, the list looks similar: technicians; sales representatives; skilled trades workers; engineers; labourers; management/executives; accounting and finance staff; IT staff; production operators; secretaries, personal assistants, administrative assistants and office support staff (ManpowerGroup, 2011c). Notably, many of these skills are exactly the same skills identified as critical shortage areas in South Africa, implying that the ability to fill these skills will become increasingly difficult, as more and more employers around the world vie for the same candidates.

In the 2008 scarce skills list (Department of Labour, 2009), supply chain and distribution managers, including logistics managers, are specifically identified in the managers scarce skills section; however, in addition to this, several other areas critical to supply chain management are identified. These include chief executives and managing directors, general managers, corporate services managers, finance managers, human resource managers, engineering managers, production/operations managers, ICT managers and transport managers.

Aside from the managerial skills shortage, there are numerous other skills that affect the supply chain that are included in the list such as air and marine transport professionals, automotive electricians, motor mechanics, purchasing and supply logistics administrators, transport and dispatch clerks, forklift drivers, automobile drivers, train drivers, delivery drivers, truck drivers, store persons, product quality controllers, freight handlers, etc. (Department of Labour, 2009). The preceding list, in which only the most obvious supply chain and logistics skills have been highlighted, indicates that the skills shortages in the South African supply chain industry are spread far wider than may have been anticipated, ranging across all levels from operational level, through to tactical level and all the way to strategic management level.

Hays (Lou, 2012) classifies the scarcest global skills as soft skills and hard skills. 'Our list is broken down by soft and hard (job-specific) skills and it shows there is a common global perception that candidates do not have a sufficient standard of soft skills. In terms of hard

skills, current economic circumstances and long-term demographic trends are driving demand.' This study regards the scarcest global soft skills as languages, people and communications, team management and leadership and organisational skills. The scarcest hard skills are financial and budgetary, IT, green skills, procurement and negotiation, research and development and healthcare.

From the 2008 scarce skills list (Department of Labour, 2009) it appears that the logistics and supply chain sector have skills shortages both in terms of soft and hard skills. Numerous studies have been done around the world to determine the types of skills that are required for successful supply chains. In a study done by the Canadian Logistics Skills Committee, it was found that 'communications and analytical skills are a requirement for all (logistics) occupation categories across all sub functions. Other common skills requirements include technology, interpersonal and customer service skills.' Furthermore, 'An emphasis on broader business, financial and logistics/supply chain skills and knowledge is noted' (Canadian Logistics Skills Committee, 2005: 7). This study emphasises that, in the Canadian logistics sector, there is considerable need for both soft and hard skills.

This is supported by Thai, Cahoon and Tran (2011) who looked at the profile of skills and knowledge of Australian logistics professionals. In this study the researchers report that the five most important skills as perceived by respondents are personal integrity, managing client relationships, problem-solving ability, cost control and ability to plan. This study also emphasises that logistics skills will change over time. Aspects such as understanding logistics terminologies, transportation management, staff supervision and occupational health and safety will become less important in the future while skills such as specialised software knowledge, strategic management, risk management, climate change and developing environmentally sustainable logistics systems will become more important.

In their often cited work, Murphy and Poist (2006: 46) state that the logistician's role no longer involves 'coordinating transportation, packaging, warehousing and inventory management', but is rather driven by 'a number of factors, including globalisation, computerisation, and cross-firm relationship management'. Murphy and Poist believe that practitioners need to have business, logistics and management skills. In business skills they find that discipline-specific knowledge is the most important, followed by aspects such as business ethics and business writing, the latter emphasising the role of communications in modern supply chains. In logistics skills they find that customer service is ranked as the number one requirement while under management skills, personal integrity, the ability to motivate others and decision-making ability are the most important skills. Specifically, they find that, regardless of the level of manager, management skills are the most important skills are the most important skills requirement, followed by logistics skills.

Kisperska-Moron (2010: 21) views the supply chain from a virtual perspective and asserts that a different skills set will be required in the future as excellence is required from the beginning of the start of operations as there is no time to improve performance during its lifetime, which he regards as usually not more than 5–7 years. His main findings are that highly educated personnel are required even at the operational level due to the extremely high level of customer service required, good communications skills required for efficient coordination, good skills in fully automated information systems, critical analysis, adaptability to changing requirements and an open mind.

Mangan and Christopher (2005) group the findings of their study in a similar fashion to Murphy and Poist, i.e. business, logistics and management skills. Under general skills they find that finance, IT and management/strategy are critical. They regard the most important logistics/SCM-specific skills to be operations, focus on processes/flow, legal, security and international trade, multimodal logistics and logistics in emerging markets. Under competencies, they highlight analytical, interpersonal, leadership, change management and project management skills.

Rahman and Yang (2009) also recognise that a combination of hard and soft skills is required. Their study considered the skills requirements for logistics managers in China and they find that the top ten skills requirements include sector-specific skills such as inventory management and transport management, but that there is also considerable emphasis on skills such as supply chain awareness, cross-functional awareness, customer service, supply chain cost, ability to see the big picture, cross-functional coordination, teamwork and information flow.

Mangan, Gregory and Lalwani's study (2001) in Ireland identified the most important supply chain skills for the future as communications/negotiations, computers/IT, general experience, logistics/supply chain management and people management. Gammelgaard and Larson's (2001) work done in the same period emphasises problem-solving, decision-making, teamwork, ability to see the big picture, prioritising, supply chain awareness, cross-functional awareness and written and oral communication as critical skills.

Razzaque and Bin Sirat (2001), who looked at skills requirements for Asian logisticians, used a similar framework to Murphy and Poist and found that the critical business skills were transportation and logistics, human resource management, business ethics, general business administration and information systems. Critical logistics skills are transportation management, customer service, inventory control and demand forecasting. Finally, management skills include aspects such as personal integrity, the ability to plan, the ability to adapt to change, problem-solving abilities, etc.

McCrea (2012), writing on a survey from Supply Chain Management Review and Logistics Management, states that logistics managers seek people with strong communications skills, who are knowledgeable in the latest technologies, require the relevant technical training and demonstrate some knowledge on industry trends.

All of the above studies emphasise that there are a number of critical issues in supply chain skills in today's economy. The changing nature of the supply chain has meant that, over time, the skills required to implement and manage successful supply chains have changed. Today's supply chain is global and therefore requires high levels of communications, team work and the ability to see the big picture; it is fast moving, which requires strong decision-making and change management skills; it is cross-functional, which requires the ability to think outside the box and look at processes rather than functional silos; it is highly complex, which requires all of these skills as well as high levels of integrity, problem-solving capabilities and leadership. The strong emphasis on customer service will continue to drive the skills requirements into the future. The focus on management skills does not, however, detract from the need for supply chain-specific skills, particularly in terms of the strongest cost drivers such inventory, warehouse and transportation. Finally, the literature analysis indicates that skills such as IT knowledge and total cost management will continue to grow in importance as supply chains become more global and integrated.

Barloworld Logistics' Supplychainforesight 2012 report indicates that the supply chain skills shortage is the one of the top five constraints to South African supply chains and the single biggest constraint on competitiveness. 'It's not just that we are short of people with skills, but we are short of people with the right skills: people who link their functional role and activities to the needs of the supply chain within which they operate' (Waller, n.d.). This article attempts to identify the skills that are regarded as the 'right' skills for South African supply chains.

STUDY METHODOLOGY

The purpose of this article is to identify the skills sets typically required by logistics and supply chain organisations in Southern Africa. Based on similar comparative studies an initial and extensive list of 66 skills and skills areas were identified and considered as important skills required by logistics and supply chain managers (Gammelgaard & Larson, 2001; Mangan, Gregory & Lalwani, 2001; Razzaque & Bin Sirat, 2001; Mangan & Christopher, 2005; Murphy & Poist, 2006; Rahman & Yang, 2009; Thai, Cahoon & Tran, 2011).

A panel of six academics and experts in the field of logistics and supply chain management were brought together to deliberate on the initial list of skills perceived to be relevant in the logistics and supply chain environment. The panel was selected based on their experience within the teaching environment as well as their interactions with industry sector specialists, highlighting skills shortages in the relevant areas. The panel agreed on a set of 38 skills which were further grouped into six skills groups, viz.: 1) general management; 2) behavioural/ interpersonal skills; 3) logistics awareness; 4) logistics analytical; 5) logistics information technology; and 6) environmental awareness. Table 1 depicts the number of skills assigned to each skills group.

Skills group	No of skills items
General Management	5
Behavioural/Interpersonal Skills	12
Logistics Awareness	6
Logistics Analytical	10
Logistics IT	3
Environmental Awareness	2
Total	38

Table 1: Number of skills per skills group

To ascertain the trends and statistics with regard to the current logistics skills gaps in South Africa, a survey was conducted in June 2011 at the 33rd Annual SAPICS (Association for Operations Management in Southern Africa) conference. The SAPICS conference is perceived as the foremost logistics and supply chain management conference in Southern Africa and was attended by more than 1 200 supply chain and operations management professionals from all over the world. The methodology used was convenience sampling, whereby responses were elicited from attendees at the SAPICS conference, which was selected because of the attendees' perceived level of knowledge in the supply chain industry.

A two-page self-administered questionnaire containing four separate sections was handed to interested participants at the SAPICS conference and filled in by hand by respondents. The first section included questions regarding the respondent's demographic and employment characteristics; the second section asked questions regarding the difficulties experienced and the level of education and work experience required when recruiting new employees; section three and section four listed the six skills groups and 38 supply chain-related skills items respectively.

Respondents were requested to rate the perceived importance of the selected skills items typically required by managers in logistics and supply chain organisations on a four-point Likert-type scale. The response format was anchored by *to no extent* (1) and *to a large extent* (4). This is a forced choice method where the middle option of *undecided or neutral* is not available. The questionnaire was also subjected to pre-testing by a panel of six academics

and logistics experts to identify any vagueness and uncertainty. Certain questions were adjusted to ensure clarity and correct interpretation.

The survey was completed by 204 respondents. Not all attendees responded to the survey; however, the response rate of 204 respondents of a total of approximately 1 200 (17%) was deemed sufficient for the purposes of the study. The number of respondents could be viewed as a limitation of the study; however, the researchers believe that the specialised nature of the sampling pool (i.e. SAPICS) was capable of eliciting an adequate number of responses from industry specialists and could therefore be regarded as sufficiently representative of the industry perspective.

DISCUSSION OF RESULTS

The majority of the respondents are from the manufacturing and the transport, storage and communication sector (68.2%). Just over 78% of the respondents were middle and senior managers, indicating that the respondents can be viewed as the decision-makers within their respective organisations. The profile of the participating respondents is depicted in Figure 1 and Figure 2.



N=195

Notes:

- 1. Financial intermediation, insurance, real estate and business services
- 2. Wholesale & retail trade; motor vehicles/cycle repair, personal & household goods; hotels & restaurants
- 3. Private households, exterritorial organisations, representatives of foreign governments and other activities not adequately defined





N=190



The average years of work experience of all respondents was over 16 years (average male = 18.07 years and average female = 13.29 years), with the average work experience in the area of logistics and supply chain management being over ten years (average male = 11.65 years and average female = 8.12 years). More than 92 per cent of the respondents had completed tertiary qualifications of which 70 per cent were male and 30 per cent female.

The respondents were asked to rate the importance of each of the six skills groups on a four-point Likert-type scale, (1 = to no extent, 4 = to a large extent). In terms of mean importance rating, the respondents ranked the skills group 'Logistics Awareness', as the most important, followed closely by 'General Management' and 'Behavioural/Interpersonal skill'. Table 2 depicts the importance ranking of the various skills groups.

Table 2	Mean	rating	of	pro	posed	skills	grou	os
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RANK	SKILLS GROUP	MEAN	STD
1	Logistics Awareness (e.g. see "big picture", total cost concept)	3.47	.690
2	General Management (e.g. plan, organise, control)	3.42	.778
3	Behavioral / Interpersonal skills (e.g. time & diversity management, people & social skills)	3.39	.649
4	Logistics Analytical (e.g. demand forecasting, transport & warehouse management, quantitative analysis)	3.37	.780
5	Logistics IT (e.g. software knowledge, computer skills)	3.03	.815
6	Environmental awareness (e.g. reverse and "green" logistics)	2.89	.903

The survey data was analysed using SPSS for Windows version 20. The reliability of the measurement scale was assessed to determine the internal consistency. Internal consistency was evaluated for both the total skills items and the various skills groups. The overall Cronbach's α value for the total skills items was 0.958 which indicates that the survey is very reliable (Field, 2009). The reliability of the measurement sets measuring the various skills groups was assessed by examining the internal correlation of the various skills within each skills group. Table 3 depicts the item-total correlation analysis and Cronbach's α values of the scale measuring the perceptions of the various skills groups.

Skills	Scale Mean (if Item Deleted)	Scale Variance (if Item Deleted)	Corrected Item- Total Correlation	Cronbach's Alpha (if Item Deleted)
Reliability Analysis for Skills	α = 0.768			
Ability to see big picture	15.91	7.475	0.321	0.775
Customer focus	15.82	7.249	0.404	0.758
Knowledge of the industry	16.21	6.381	0.542	0.726
Qualitymaagement	16.32	6.197	0.566	0.719
Reverse logistics	16.56	5.595	0.673	0.685
Transport and related regulation knowledge	16.32	6.090	0.555	0.722
Reliability Analysis for Skills	Group - Gene	ral Manageme	nt	α = 0.716
Ability to plan and prioritise	13.32	3.936	0.434	0.685
Business process improvement	13.44	3.602	0.487	0.664
Decision making	13.48	3.522	0.553	0.639
Leadership	13.54	3.604	0.476	0.668
Project management	13.75	3.261	0.450	0.688
Reliability Analysis for Skills G	roup- Behavio	oral / Interpers	onal	α = 0.892
Ability to think outside the box	36.53	28.207	0.504	0.888
Business ethics	36.39	29.435	0.391	0.893
Change management	36.75	27.438	0.548	0.886
Communication skills—written & oral	36.56	28.183	0.568	0.885
Conflict management	36.90	26.349	0.694	0.878
Cross-functional coordination skills	36.81	26.969	0.636	0.881
Motivation skills	36.79	27.110	0.650	0.880
Negotiating skill	36.82	26.107	0.691	0.878
Networking skill	36.88	26.268	0.670	0.879
Problem solving	36.48	28.349	0.522	0.887
Team work	36.47	27.435	0.688	0.879
Time management	36.62	27.421	0.632	0.881
Reliability Analysis for Skill	α = 0.899			
Demand forecasting	27.75	29.429	0.730	0.884
Facility location / Network design	28.04	30.026	0.618	0.892
Inventory management	27.58	29.944	0.659	0.889
Order processing	27.95	30.148	0.587	0.894
Procurement / Purchasing management	27.80	29.882	0.635	0.890
Quantitative and/or statistical skills	27.81	31.655	0.543	0.896
Supply chain cost knowledge	27.67	29.384	0.744	0.883
Supply chain design	27.77	29.096	0.711	0.885
Transport management	27.78	30.598	0.607	0.892
Materials Handling / Warehouse management	27.66	30.683	0.657	0.889
Reliability Analysis for	α = 0.623			
Data mining	6.05	1.487	0.478	0.454
IT skills / software knowledge	5.96	1.839	0.410	0.553
Spreadsheet abilities	5.67	1.828	0.412	0.551
Reliability Analysis for Skills G	α = 0.675			
ISO 14000 standards	2.67	.707	0.517	
Knowledge of environmental issues	2.73	1.006	0.517	

Table 3: Reliability analysis of the various skills groups

The first column in 'scale mean if item deleted' shows the effect on the overall mean of the scale (i.e. all the skills items that are included in a specific skills group) if an individual skills item is omitted. Table 3 further indicates that all the items in the 'corrected itemtotal correlation' column is above 0.3 which means that each particular item (skill) does correlate very well with the scale overall (Field, 2009). Table 3 also indicates the Cronbach α value for each measurement set (skills group) identified in the study. It is noted that all the skills groups, except Logistics IT and Environmental Awareness, presented a Cronbach α values above the acceptable 0.7 level (George & Mallery, 2003; Field, 2009). In the column labelled 'Cronbach's alpha if item is deleted', the deletion of the skill 'the ability to see the big picture' will improve the overall α from 0.768 to 0.775, thus improving the reliability measure. This improvement is however negligible and both values reflect an acceptable degree of reliability.

The survey further required the respondents to indicate, on a four-point Likert-type scale, their agreement with a list of 38 logistics and supply chain skills managers regard as important when recruiting employees. Table 4 depicts the descriptive statistical results of these skills. The mean and standard deviation were calculated to derive the descriptive profile of the variables. The ranking of the skills in terms of the perceived importance by the respondents was also established.

RANK	SKILLS ITEMS	SKILLS GROUP	MEAN	RANK	SKILLS ITEMS	SKILLS GROUP	MEAN
1	Customer focus	Logistics Awareness	3.66	20	Warehousing / Materials Handling management	Logistics Analytical	3.19
2	Business ethics	Behavioural / Interpersonal	3.62	21	Spreadsheet abilities	Logistics IT	3.18
3	Ability to plan and prioritise	General Management	3.60	22	Qualitymanagement	Logistics Awareness	3.13
4	Problem solving	Behavioural / Interpersonal	3.54	23	Demand forecasting	Logistics Analytical	3.12
5	Ability to see big picture	Logistics Awareness	3.53	24	Networking skill	Behavioural / Interpersonal	3.12
6	Team work	Behavioural / Interpersonal	3.51	25	Supply chain design	Logistics Analytical	3.12
7	Communication skills—written & oral	Behavioural / Interpersonal	3.47	26	Transport and related regulation knowledge	Logistics Awareness	3.12
8	Ability to think outside the box	Behavioural / Interpersonal	3.46	27	Conflict management	Behavioural / Interpersonal	3.10
9	Business process improvement	General Management	3.45	28	Project management	General Management	3.10
10	Decision making	General Management	3.43	29	Transportmanagement	Logistics Analytical	3.08
11	Time management	Behavioural / Interpersonal	3.38	30	Procurement / Purchasing management	Logistics Analytical	3.06
12	Leadership	General Management	3.38	31	Quantitative and/or statistical skills	Logistics Analytical	3.05
13	Inventory management	Logistics Analytical	3.31	32	Order processing	Logistics Analytical	2.92
14	Change management	Behavioural / Interpersonal	3.24	33	Reverse logistics	Logistics Awareness	2.86
15	Knowledge of the industry	Logistics Awareness	3.23	34	IT skills / software knowledge	Logistics IT	2.85
16	Motivation skills	Behavioural / Interpersonal	3.23	35	Facility location / Network design	Logistics Analytical	2.84
17	Supply chain cost knowledge	Logistics Analytical	3.21	36	Data mining	Logistics IT	2.80
18	Cross-functional coordination skills	Behavioural / Interpersonal	3.21	37	ISO 14000 standards	Environmental Awareness	2.73
19	Negotiating skill	Behavioural / Interpersonal	3.20	38	Knowledge of environmental issues	Environmental Awareness	2.66

Table 4: Mean rating of proposed skills of logistics managers

The most important logistics and supply chain-related skills are '*Customer focus*' followed closely by '*Business ethics*' and the '*Ability to plan and prioritise*'. The top ten highest ranking skills comprise mostly 'softer' (i.e. Business/Interpersonal = 5) and very broad management skills (i.e. General Management = 3). 'Customer focus' and the 'Ability to see the big picture' are the two most important logistics awareness (LA) skills that are viewed as essential by the respondents.

The majority of the ten least important skills as perceived by the respondents are those related to logistics analytical skills (LAN). The other least important skills are environmental awareness (EA) and logistics information technology (LIT) related skills.

Figure 4 provides the ranking of the individual skills in terms of the perceived importance for the different skills groups.



Figure 4: Ranking of skills per skills group

The survey also requested the respondents to indicate which job functions are the most difficult to fill with suitable employees for operational, tactical and strategic level positions. Table 5 provides a list of the ten most challenging job functions to fill for each of the management levels.

Table 5: List of job functions

Rank	Operational level	Rank	Tactical level
1	Managers (incl. WHS, transport, logistcs)	1	Managers (incl. WHS, transport, DC, demand)
2	Drivers (Truck)	2	Planners (incl demand, inventory, replenishment)
3	Transport planners (e.g. routing & scheduling)	3	SC & Business analysts
4	Stores & warehouse staff (incl. checkers & pickers)	4	SC Specialists & consultants
5	Controllers & supervisors	5	Supervisors
6	Procurement staff	6	Procurement staff
7	Clerks (incl. admin & financial)	7	Warehouse staff
8	Customer service	8	Customer service staff
9	Inventory conroller	9	Industrial engineers
10	Data (capturers & modelling)	10	Information technology
10	Data (captalets & modeling)	10	information teerinology
10		10	inomatori comology
Rank	Strategic level	10	into maxon tearnology
Rank	Strategic level Managers (incl. SC, Logistics, Import)		into maxon tearnology
Rank 1 2	Strategic level Managers (incl. SC, Logistics, Import) Executive & directors	10	
Rank 1 2 3	Strategic level Managers (incl. SC, Logistics, Import) Executive & directors Schedulers & planners (incl. demand, material)	10	into mason tearnology
Rank 1 2 3 4	Strategic level Managers (incl. SC, Logistics, Import) Executive & directors Schedulers & planners (incl. demand, material) Procurement	10	into mason toomology
Rank 1 2 3 4 5	Strategic level Managers (incl. SC, Logistics, Import) Executive & directors Schedulers & planners (incl. demand, material) Procurement Analysts	10	internation tearnology
Rank 1 2 3 4 5 6	Strategic level Managers (incl. SC, Logistics, Import) Executive & directors Schedulers & planners (incl. demand, material) Procurement Analysts SC Network designers	10	internation tearnology
Rank 1 2 3 4 5 6 7	Strategic level Managers (incl. SC, Logistics, Import) Executive & directors Schedulers & planners (incl. demand, material) Procurement Analysts SC Network designers SC Specialists	10	innomitation teorinology
Rank 1 2 3 4 5 6 7 8	Strategic level Managers (incl. SC, Logistics, Import) Executive & directors Schedulers & planners (incl. demand, material) Procurement Analysts SC Network designers SC Specialists SC Strategist		internation tearnology
Rank 1 2 3 4 5 6 7 8 9	Strategic level Managers (incl. SC, Logistics, Import) Executive & directors Schedulers & planners (incl. demand, material) Procurement Analysts SC Network designers SC Specialists SC Strategist Business development		internation teenhology

CONCLUSIONS AND RECOMMENDATIONS

The initial analysis of the six core skills groups indicated that critical areas are logistics awareness, general management, behavioural/interpersonal and logistical analytical skills. This is strongly aligned with the various international studies cited in the literature review. The changing nature of the supply chain industry indicates that skills such as the ability to see the big picture, the ability to think outside the box, cross-functional coordination, teamwork and strong communication skills are critical to the success of today's global and highly complex supply chain. Skills such as business process improvement, the ability to plan and prioritise, decision-making, change management and leadership will become increasingly important as supply chains develop and mature. Knowledge of the industry and logistical analytical skills remain crucial; however, a strong customer focus is frequently cited as being at the heart of the skills required in today's competitive supply chain environment.

The ranking of the skills in terms of the perceived importance indicated that respondents in South Africa found that customer focus was the single most important skill, followed closely by business ethics, the ability to plan and prioritise, problem-solving and the ability to see the big picture. These results indicate that South African supply chains experience similar shortages and challenges as their international counterparts, with the majority of these skills appearing in most of the comparative studies consulted. The exception to this is business ethics, which is regarded as far more important in South Africa than elsewhere, providing an indication of a possible problem area which requires a dedicated focus in the future. This study has provided a strong indication of the skills required in supply chains in South Africa. The study did not seek to identify the reasons underlying any of the skills shortages and it is therefore recommended that further research be conducted into the causes of the skills gap. The research implies that there are significant skills shortages in the supply chain industry in South Africa and that that urgent interventions are required to attract and retain these skills. A further recommendation is that research be conducted into the need for development of future training programmes, academic courses and other interventions in order to address these critical issues. Finally, the researchers believe that these severe skills shortages have a significant impact on the competitiveness of South African supply chains, and studies should be conducted into the extent to which the shortages are impacting on competitiveness as well as on the economy as a whole. Understanding the actual impact of the skills shortages on the country requires to change this critical situation.

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Table of acronyms and abbreviations

EA	Environmental Awareness skills
Fasset	Finance, Accounting, Management Consulting and other Financial Services
LA	Logistics Awareness skills
LAN	Logistics Analytical skills
LIT	Logistics Information Technology skills
MQA	Mining Qualifications Authority
SETA	Sector Education Training Authority
SPSS	Statistical Package for the Social Sciences