

PRODUCT CHARACTERISTICS IN THE CLOTHING AND TEXTILE COMPANIES IN GAUTENG, SOUTH AFRICA

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ABSTRACT

Purpose of the paper

The purpose of this paper is establish the characteristics of the main products that are made by the clothing and textile companies in Gauteng, South Africa. The product characteristics were segregated as either functional, hybrid or innovative. Supply chains for functional products focus on operational efficiency, in contrast to supply chains for innovative products that focus on market responsiveness. Hybrid products are a mix of functional and innovative products.

Design/Methodology/Approach

The sample frame for this study was micro, small, medium and large companies that produce a wide range of yarn, textile and garment products.

Data was collected through a survey and the research instrument used was a questionnaire. The research questions were largely closed questions. Prior to the survey the research tool was tested on a pilot sample of members of the target population. The convenience sampling technique was used to select companies that participated in the pilot survey. This pilot survey helped researchers identify grey areas. After reviewing responses, the necessary changes were made to the questionnaire and subsequently the data collection exercise was commissioned.

Both the Department of Trade and Industry and Industry Development Corporation were unwilling to share company information. In this regard, the researchers adopted convenience sampling approach for the main survey. The questionnaire was hand delivered to the respondents and was self-administered. The respondents were people holding managerial positions with the firms approached. Data collection was followed by cleaning, entry into SPSS and lastly analysis.

Findings

The demographic data showed variation in company size, staff complement, company ownership, raw material used, source of raw material, sourcing strategies, sourcing channels, product range and customer base.

With regards to product characteristics, it is apparent that the distribution of functional, hybrid and innovative products was different with each variable. The respondents were not consistent in the way they described their product characteristics. Four groups of products emerged. The first three groups were either functional, hybrid or innovative. The fourth group was undefined. There was not enough evidence to identify them with any one of the above groups.

Research limitations/implications

The success of this research is based on the assumption that the respondents are willing to share accurate information on their products. Some respondents may have responded to the survey questions as they imagined themselves to be rather than as they actually were.

Practical implications

Knowledge of the product characteristic is the basis upon which a company chooses a matching supply chain. Hence the category of companies that could not classify their products might find it difficult to identify the appropriate supply chain and this could negatively affect their performance.

Originality/value of the paper

The study made a contribution to the local clothing and textile industry by providing knowledge to further the discussion surrounding product characteristics and supply chain choice.

Keywords: Survey, Clothing and textile companies, Product characteristics, Gauteng,

INTRODUCTION

The textile industry in South Africa has been in existence for more than 120 years. The first weaving factory was built in 1891 in King Williams Town. The clothing sector on the other hand started in 1907 in Cape Town. Two brothers W.M. and A. C. Middlemass who came from Scotland opened the first factory for manufacturing of men's suits (Barker, 1962). Researchers on the South African clothing and textile sector noted that ever since the sector started in South Africa, it has never been competitive enough to stand against international competitors. Its existence has always been dependent on the tariffs and quantitative quota protection. DTI (2009) indicated that the inability of the industry to adjust to international competition stemmed, among other things, from a complex set of dynamic linkages (value chains) between the producers (who sourced their materials both nationally and internationally) and the retail outlets.

The purpose of this study was to investigate the characteristics of clothing and textile products made in Gauteng Province of South Africa. Researchers like Fisher (1997), Huang *et al.* (2002), Selldin and Olhager (2007), and Stavroulaki and Davis (2010) indicate that knowing the characteristics of a product will help the manufacturer determine the appropriate supply chain, yet no studies have been conducted in South Africa to examine the characteristics of clothing and textile products. This study seeks to make a contribution to the local clothing and textile industry by providing knowledge that encourages discussion on product characteristics in the clothing and textile sector. This sector is important in the South African economy. However this sector has been under a lot of pressure from imports mainly from China.

The study was done in Gauteng Province because it is the economic hub of South Africa, and contributes 40% to the Gross Domestic Product. All the economic sectors of South Africa are represented and it has a fair share of both the clothing and textile companies.

The research questions that the study sought to answer are:

- i. What is the distribution of demographic, company size, staff compliment, company location, company ownership, raw material, and product range among clothing and textile companies in Gauteng?
- ii. What are the basic characteristics of products that are made in the clothing and textile companies in Gauteng?

LITERATURE REVIEW

Fisher (1997) developed a framework that separates products into either functional or innovative categories based on their degree of demand uncertainty, profit margin levels and product mix. He suggested in his framework that supply chains for functional products focus on operational efficiency (emphasising primarily cost reduction strategies), in contrast to supply chains for innovative products that focus on market responsiveness (emphasizing quick turnarounds for time to market). Huang *et al.* (2002) recognised the existence of functional and innovative products. However they argued that there is also another group of hybrid products that consist of either different combinations of standard components, or a mix of standard and innovative components. Selldin and Olhager (2007), Pero *et al.* (2010) and Lo and Power (2010) supported Fisher's framework. They argued that knowing the characteristics of a product will help the manufacturer determine the appropriate supply chain. Stavroulaki and Davis (2010) developed an even more comprehensive framework. In addition to

influencing the type of supply chains, product characteristics play a central role of determining supply chain processes and supply chain strategies.

Knowing the product characteristics helps managers to manage their conversion processes. If a product is highly fashionable (innovative) then by its intrinsic nature its demand will be unpredictable (Christopher & Towill, 2001). In order to be competitive then agility has to be inherent within the company concerned. In like manner standard (functional) products do well when their processes are lean. The Leagile supply chain is the best choice for the hybrid product (Huang *et al.*, 2002). By employing leagile supply chain, the organisation can achieve cost minimization, mass customisation, and adaptability to future changes (Huang *et al.* 2002).

Normally, a product will follow the generic product life cycle consisting of an introduction, growth, maturity, saturation and decline phase. The introduction and decline phases of the product life cycle require quick response, flexibility and reliability in product design due to their high level of demand unpredictability (Bergvall-Forsberg & Towers, 2007). The growth and maturity phases are underpinned by higher volume with less volatility and more predictable demand (Bergvall-Forsberg & Towers, 2007). Cost is the main driver in the growth and maturity phases, where manufacturers need to reduce their production cost in order to lower the unit price (Bergvall-Forsberg & Towers, 2007).

METHODOLOGY

The study was cross-sectional, quantitative and non-experimental research that was conceptualised in terms of research questions rather than a research problem. The study was defined by the two research questions presented in the introduction section. It was conducted to: (a) describe clothing and textile products characteristics produced in Gauteng and (b) explain the influence of the characteristics on the supply chain implemented in the companies.

The population units for this study were clothing and textile manufacturers and the study included companies: (a) that were at the time of study involved in manufacturing of yarn, textile (weaving and/or knitting) and clothing; (b) that had their principal place of operation in Gauteng; (c) that were registered with the Registrar of Companies; and (d) were either micro, small, medium or large companies. The sampling frames used were local telephone directories, the Textile Federation of South Africa database, the National Bargaining Council for the Clothing Manufacturing Industry database and the South African Fashion Handbook. Companies that were registered on the internet were also considered for the study.

Direct, observable, naturally occurring information was obtained from the companies through a survey. Due to non-availability of a register for the total number of clothing and textile companies in Gauteng, the researcher used a nonprobability sampling technique. Participants were selected through purposeful sampling technique.

Survey questions to characterise the products were derived from Fisher (1997), Naylor *et al.* (1999), Mason-Jones *et al.* (2000), Sen (2008), Stavroulaki and Davis (2010), Wagner (2010) and Khan *et al.* (2012). The preliminary research tool was tested on a pilot sample of members of the target population. The researcher used convenience sampling technique to select ten companies that participated in the pilot survey. The selection of these participants was based on their nearness to the researcher. The questionnaire was emailed to the respondents. The respondents were either

founders, owners, chief executive officers, operations managers, general managers, sales managers, retail managers, administrators or production managers.

The piloting exercise gave the researcher an opportunity to identify whether respondents understood the questions, and whether the questions meant the same to all respondents. The survey questions sought to characterise the products based on; average product life-cycle, average number of new designs produced per season, average number of product variants produced person, profit margin gained, average lead times, and the level of inventory accumulated at the beginning, in-process and at the end of the production line. The survey also indirectly characterised the products as follows.

- i. Establishing whether the products; were uniquely designed to order, uniquely produced to individual specifications, assembled to individual customer specifications, or mass produced without specific customer tastes in mind.
- ii. Establishing whether the products produced were low volume, medium volume or high volume.

On finalising the questionnaire, the main survey was commissioned. The questionnaire was hand delivered to one hundred and fifty six (156) companies. It was accompanied with a covering letter and instructions for completing and returning it. The cover letter gave details of the organisation behind the study, the contact name and address of the researcher, how and why the respondent was selected, aim of the study, potential benefits resulting from the study and what would happen to the information provided. The questionnaire was self-administered and individuals chosen to respond to the questionnaire were those holding managerial posts. To reduce non-response, companies that failed to return the questionnaires in time were contacted by the researcher on the phone or in person

After collection, the survey data required cleaning and conversion into numerical values useable with SPSS before it was entered into the computer for analysis. Descriptive analysis was used to summarize and describe the data. The aim was to reveal patterns in the data that were not immediately apparent when inspecting raw data. This section of the descriptive analysis was done on the demographic data and basic product characteristics. The statistical data identified every participant's main product as either functional, hybrid or innovative. Responses given to the survey questions helped the researcher determine whether the company was producing functional, hybrid or innovative products.

FINDINGS – DEMOGRAPHIC DESCRIPTIVE ANALYSIS

The total number of textile and clothing companies that were contacted during the survey were 180. Twenty two (22) of the 180 companies contacted refused to participate in the study. Thus, questionnaires were sent out to the remaining 158 companies and 122 completed and returned the questionnaire, giving a completion rate of 77%. On conducting a data screening exercise it was found out that 18 respondents did not fill in the questionnaire in full. This left the study with 104 (57.8%) respondents and these were used in the data analysis. The composition of the 104 companies was; 44 micro (42.3%), 36 small (34.6%), 16 medium (15.4%) and 8 large (7.7%). When analysed from the perspective of the economic subsector point of view the 104 respondents were categorised as follows: 2 printing and embroidery (1.9%), 13 textile (12.5%), 55 cut-make trim (52.9%) and 34 designers cum manufacturers (32.7%) (see Figure 1).

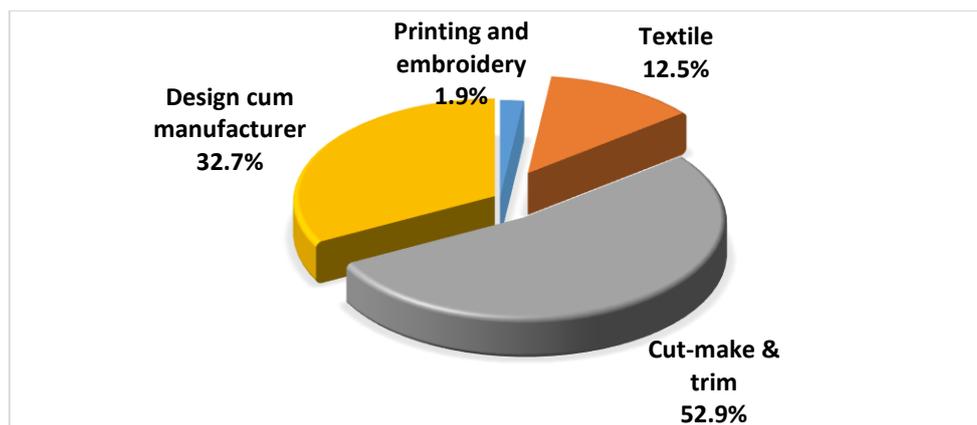


Figure 1: Composition of Companies that Participated in the Study

Table 1 presents the companies' ages ranging from 1 to 85 years, with a mean of 18.4 years. Twenty percent of the companies had been in business for 1-5 years, 28.8% for 6-15 years, 12.5% for 16-25 years, 13.5% for 26-35 years, 1.9% for 36-45 years, 4.8% for 46-55 years, 3.85% for 56-65 years and 1.95% for 76-85 years. Nine participants did not answer the question relating to their age, resulting in 8.65% missing data. Twenty seven companies entered business before 1991, i.e. during the time when protectionist policies shielded them against international competition.

Table 1: Year Started

	Years when started	Age of the respondents (years)	Frequency	Valid Percent
Time when business started	1931-1940	76 - 85	2	1.9
	1941- 1950	66 - 75	0	0
	1951- 1960	56 - 65	4	3.8
	1961 – 1970	46 - 55	5	4.8
	1971 – 1980	36 - 45	2	1.9
	1981 – 1990	26 - 35	14	13.5
	1991 – 2000	16 - 25	13	12.5
	2001 – 2010	6 - 15	30	28.8
	2011-2015	1 - 5	25	24
	Unspecified		9	8.65
Total			104	100

The participants in the study came from: Milpark/Melville, Rosebank/Hyde Park/Craighall Park/Parkhurst region that contributed 26.92%; Doornfontein 11.54%; Selby 9.62%; Jeppestown 8.65%; Johannesburg CBD 7.69%; Fairview/Troyville/Lorentzville 7.69%; and West Rand 4.81%. Collectively the contribution of the above regions stood at 76.92%. The other 12 regions, namely; Alberton, Amalgam/Crosby, Bedfordview/Wynberg, Benrose/Germiston, Centurion, Fordsbu

Hammanskraal, Kempton Park, Lenasia, Orphiton/Stafford/Robertsham, Pretoria and Randburg were poorly represented in the sample and had a cumulative contribution of only 23.08%.

The ownership structure of the participating companies indicates that 20.25% of participants were sole traders, 10.6% partnerships, 49% close corporations and 18.3% private companies, giving a total of 102 respondents. Two respondents did not indicate the ownership (see Table 2).

Table 2: Ownership of the Clothing and Textile Business

		Frequency	Valid Percent
Ownership of the Company	Sole trader	21	20.2
	Partnership	11	10.6
	Close corporation	51	49.0
	Private company – subsidiary of South African company	18	17.3
	Private company – subsidiary of foreign company	1	1.0
	Listed South African company	1	1.0
	Other	1	1.0
	Total	104	100.0

According to the National Small Business Amendment Act 26 of 2003 of the Republic of South Africa, companies in the manufacturing sector are categorised as micro, very small, small, medium or large companies (see Table 3). In this study, micro enterprises (under 10 employees) and small enterprises (under 50 employees) accounted for a larger share of participants. Medium and large companies together contributed 13.1% of the respondents. Eighty companies employed up to 50 employees, revealing that 76.9% of the respondents are in the micro and small size categories, followed by medium (15.4%) and lastly large companies (7.7%). These statistics show that the majority of participants in the study were micro and small companies. This observation is consistent with the observations of Bruce and Daly (2004) who found that the European industry sector was dominated by small- and medium-sized enterprises.

Table 3: Company sizes in the manufacturing sector (South African Government: National Small Business Act 26 of 2003)

Sector in accordance with the Standard Industrial Classification	Size of Class	The total full-time equivalent of paid employees	Total turnover	Total gross asset value (fixed property excluded)
Manufacturing	Medium	200	R51m	R19m
	Small	50	R13m	R5m
	Very Small	20	R5m	R2m
	Micro	5	R0.20m	R0.10m

The sample has clothing and textile companies which specialise in CMT, textile, design and manufacturing of clothing and printing and embroidery and they have been in business for 5 to 85 years. The following section gives a more detailed analysis of the companies' main products characteristics.

FINDINGS - PRODUCT CHARACTERISATION

As discussed in the methodology section, products were categorised as either functional, hybrid or innovative and the basis for classification was a set of nine questions that sought clarification on; nature of product, product design, number of new products produced per year, product variants produced in a year, operating environment, main product line characteristics, average production run per order, average product-life-cycle.

Details of the responses obtained from the participating companies are given in the following sections. Answers given help classify the products as either functional, hybrid or innovative.

Nature of Products produced by the participating companies

Data was collected to understand the type of products that the participating companies produced. The results in Table 4 show that 28.8% of respondents produced standard products, 20.2% fashion and 51% of respondents characterised themselves as manufacturers of both standard and fashion products.

Table 4: Nature of products (Question 8)

		Frequency	Valid Percent
Valid	To produce standard products	30	28.8
	To produce fashion	21	20.2
	To produce both standard and fashion products	53	51.0
	Total	104	100.0

Lean concepts work well with basic or standard products (functional) where demand is relatively stable and hence predictable and where variety is low (Naylor *et al.*, 1999). These basic products (e.g. T-Shirts, socks and underwear) are sold during the whole year with a minimal variation in demand (Naylor *et al.*, 1999). Their design characteristics and production requirements change slowly over time and the products are usually in the latter part of the growth segment of their product life cycle or beyond (Vonderembse *et al.*, 2006). As a result of this stability, customer contact tends to be periodic rather than continuous (Vonderembse *et al.*, 2006).

According to Cao *et al.*, 2008 apparel fashion (Innovative) is characterised by short lifecycle, high volatility of market demand, low predictability, and high impulse purchase by customers. It is usually in the introduction and growth stages of the product life cycle (Vonderembse *et al.*, 2006). Hence the need for agility (Christopher *et al.*, 2004). Forecasting demand for fashion (seasonal) products is complex (Lawson, 2003). These products' demand is rarely stable or linear (Ciarniene and

Vienazindiene, 2014b). This makes forecasting their demand complex. It is therefore not unexpected that they are made and delivered on the basis of real-time demand (Christopher *et al.*, 2004).

Hybrid products are complex products that have several to many components, which may be a mixture of standard and fashion products (Vonderembse *et al.*, 2006). Hybrid products may be at any stage of the product life cycle (Vonderembse *et al.*, 2006).

Analysing the distribution in Table 4, leads one to conclude that there are indications that all the three products are represented.

Product Design

The sample was a mixed group of companies. Table 5 shows that there are cut-make-trim companies (14.4%) that rely on designs from the retail shops rather than their own. Such companies are usually associated with standard products (khan *et al.*, 2012). The 34.6% companies that promote own label, have the flexibility to promote their own designs. This subgroup should develop its own in-house design capacity; thereby positioning itself to be agile and meet customer specific requirements in a relatively quick response.

Table 5: Product Design

		Frequency	Valid Percent
Valid	Retailer label	15	14.4
	Own label	36	34.6
	Both 1 and 2	53	51.0
	Total	104	100.0

The last group (51%) of the participants is involved in both retailer label and own label production. This group does well with leagile supply chain, i.e. a chain that minimises differentiation until there is clarity on customer requirements.

Number of New Products produced in a Year

Table 6 shows that: 26.9% of the companies produced up to 10 new products, 23.1% produced between 11 and 20 products, 14.4% between 21 and 30, 7.7% between 31 and 40 and 27.9% more than 40 new products annually.

Table 6: New products produced in a year

		Frequency	Valid Percent
Valid	Up to 10	28	26.9
	Between 10 and 20	24	23.1
	Between 21 and 30	15	14.4
	Between 31 and 40	8	7.7
	More than 40	29	27.9
	Total	104	100.0

Khan *et al.* (2012) argue that fashionable products come in and sell out. They are not replaced again unless there is a hot trend which may run as a repeat product for a particular season. In Table 6, companies that produce more than 40 new products per year are expected to deal with fashion and accordingly their supply chains should be agile. Companies that introduce less than 20 products in a year are those that largely deal with standard products, i.e. products that are simple and have limited amounts of differentiation. Such companies are associated with lean supply chain. They focus on simplicity, cost reduction, quality and limited amounts of flexibility (Vonderembse *et al.*, 2006).

Companies that introduce an intermediary number of new products, i.e. between 21 and 40, gain competitiveness when the supply chains are leagile.

Operating Environment Descriptors

The questions in this section allowed multiple responses. The results in Table 7 show that at one extreme end of the scale: 38.5% companies argued that they were operating in a cutthroat environment, 27.9% believed that the products they made were those that could easily be reproduced by a competitor, 40% saw price as the basis for competition, and 8.7% believed that competitors were weak. Only 11.5% believe that they subjected to an environment where customers were always changing their product.

Lastly 20.2% are operating in an environment where product demand was erratic.

At the other extreme end, 8.7% companies strongly disagree that their line is subjected to a cutthroat competition, 4.8% strongly disagree that what one competitor offers, another can readily match, 6.7% strongly disagree that price competition is the hallmark of the industry, 22.1% strongly disagree that competitors are weak, 14.4% strongly disagree that customers frequently change their product and 9.6% strongly disagree that product demand is erratic.

In short the selected sample is a mixture of companies that are struggling to compete in the prevailing environment, and those that are doing extremely well. In between these two extremes there is also a group of companies that are uncertain and show mixed feelings about the environment in which they are operating in. These results also confirm the existence of companies that make functional, hybrid and innovative products.

Main Product Line Characteristics

Table 8 shows that 36.5% of the companies developed their products to meet changing customer needs, 41.3% produced a mix of standard and innovative products and 22.1% produced products that were synonymous with commodities and standard products.

One sees again a situation where the sample is a mixture of companies that focus on making innovative, hybrid and functional products. These product characteristics determine demand predictability (Morita *et al.*, 2015). Innovative products, which add newness as an additional reason for customers to purchase, produce uncertainty of demand in proportion to the degree of newness (Morita, *et al.*, 2015). On the other hand, the demand for functional products (i.e. the staples that people buy in a wide range of retail outlets) is not so variable and is more predictable than the demand for innovative products (Morita *et al.*, 2015).

Table 7: Operating Environment Descriptors

		Strongly disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Strongly agree	Total
The line is subjected to a cutthroat competition	Count	9	9	16	30	40	104
	Row N %	8.7%	8.7%	15.4%	28.8%	38.5%	100.0%
What one competitor offers, another can readily match	Count	5	22	9	39	29	104
	Row N %	4.8%	21.2%	8.7%	37.5%	27.9%	100.0%
Price competition is the hallmark of the industry	Count	7	13	15	27	42	104
	Row N %	6.7%	12.5%	14.4%	26.0%	40.4%	100.0%
Competitors are weak	Count	23	24	29	19	9	104
	Row N %	22.1%	23.1%	27.9%	18.3%	8.7%	100.0%
Customers frequently change their product	Count	15	24	25	28	12	104
	Row N %	14.4%	23.1%	24.0%	26.9%	11.5%	100.0%
Product demand is erratic	Count	10	8	29	36	21	104
	Row N %	9.6%	7.7%	27.9%	34.6%	20.2%	100.0%

The third group produces a mixture of standard and innovative products. This group of companies has two regimes of supply chains that are separated by a decoupling point. Above the decoupling point, the system adopts lean concepts and below the decoupling point it adopts agile concepts. Such a group competes well when it adopts an “assemble to order” supply chain.

Table 8: Main product line characteristic

		Frequency	Valid Percent
Valid	It was developed to meet changing customer needs	38	36.5
	It is a mix of standard and innovative products	43	41.3
	It produces simple products synonymous with commodities and standard products	23	22.1
	Total	104	100.0

Average Production Run

This section of the study sought to understand the average production runs per product in the participating companies. The results in Table 9 show that 51% of the participating companies get orders that require them to produce 100 units per order, 24% have run orders that average 100 to 200 units, 22.1% average 200-500 units per order and 19.2% exceed 500 units per order.

One can deduce that the participating companies are a mixture that has capacity to do short, medium and long runs.

Table 9: Average Production Run

		No	Yes	Total
Up to 100 units per order, q41.1	Count	51	53	104
	Row N %	49.0%	51.0%	100.0%
100-200 units per order, q41.2	Count	79	25	104
	Row N %	76.0%	24.0%	100.0%
200 – 500 units per order, q41.3	Count	81	23	104
	Row N %	77.9%	22.1%	100.0%
More than 500 units per order, q41.4	Count	84	20	104
	Row N %	80.8%	19.2%	100.0%

In the literature companies doing such runs need to adopt agile, leagile and lean supply chains respectively.

Average Product Life-Cycle

The results in Table 10 show that: 6.7% of participants produce fashion, 22.1% seasonal products and 71.2% basic products that last more than one year.

It is evident that the sample has companies that produce innovative, hybrid and standard products.

According to Huang *et al.* (2002), innovative products have a very limited life-cycle, generally ranging between three months to one year. One can deduce that the first two categories, constituting 28.8% of participants, focus on making innovative products. Managing these products requires constant

interaction between the organisation and the customer (Huang *et al.* 2002). Moreover companies make a profit when they rapidly respond to the product-life-cycle stages and employ suitable manufacturing methods that are enabled by using agile supply chain (Huang *et al.* 2002).

On the other hand, Huang *et al.* (2002), argue that functional products have an average life that exceeds two years. In this study 51% of participants produce products that sell beyond two years after introduction.

Table 10: Average product life-cycle

		Frequency	Valid Percent
Valid	Up to 20 weeks (fashion-unpredictable product)	7	6.7
	21 to 52 weeks (seasonal)	23	22.1
	1 year to 2 years (basic product)	21	20.2
	More than 2 years (basic product)	53	51.0
	Total	104	100.0

It means that, this group of companies produces products that are largely functional. With these kind of products it is expected that the supply chains would largely be lean, i.e. physically efficient, if the companies are to be competitive (Selldin and Olhager, 2007).

The intermediate group of companies (20.2% of participating companies) focuses on producing products that last one to two years. The products can in a way be viewed as hybrid products. The conversion process requires a leagile supply chain if the companies are to be competitive.

Product variants produced in a year

Data was collected to understand the number of product variants produced by the participating companies. Results in Table 11 show that: 46.2% participants produce up to 49 product variants per year, 21.2% between 50 and 99 per year, 20.2% between 100 and 499 per year, 4.8% between 500 and 999 per year and 7.7% produce more than 1000 variants per year.

Cumulatively, 67.4% of the participants produce less than 99 product variants per year. Since it is the least number of variants produced, this group of companies are likely to produce functional products. According to Huang *et al.* (2002), functional products have a low variety since several organisations manufacture the same types of products and in order to profit, cost minimization is essential, which is attainable only by keeping product types low and implementing a lean supply chain.

The 25% companies that produce between 100 and 999 product variants are bound to adopt a leagile supply chain strategy. This middle group attains competitiveness through postponement of product differentiation and the products that are produced are typically hybrids.

Table 11: Number of product variants produced in a year

		Frequency	Valid Percent
Valid	Up to 49 variants/year	48	46.2
	50-99 variants/year	22	21.2
	100-499 variants/year	21	20.2
	500-999 variants/year	5	4.8
	More than 1000 variants/year	8	7.7
	Total	104	100.0

The last group (7.7% of companies) produces a large variety of products. These tend to be innovative (Huang *et al.* 2002). Innovative products are easily customized per customer requirements (Huang *et al.* 2002).

Designs Introduced Per Season

The results in Table 12 show that: 44.2% of the participants introduce less than 10 designs per season, 18.3% between 10 and 19 designs, 9.6% between 20 and 29 designs, 4.8% between 30 and 39 designs, and 23.1% do more than 40 designs per season.

Table 12: Number of designs introduced per season

		Frequency	Valid Percent
Valid	Less than 10 designs/season	46	44.2
	10-19 designs/season	19	18.3
	20-29 designs/season	10	9.6
	30-39 designs/season	5	4.8
	More than 40 designs/season	24	23.1
	Total	104	100.0

In general lean supply chains produce standard products that have a moderate amount of variety (Vonderembse *et al.* 2006). Designs for these products change slowly and demand for these products can be characterised as slow and steady growth (Vonderembse *et al.* 2006). Under these circumstances, a lean supply chain effectively meets the needs of the manufacturing company (Vonderembse *et al.* 2006). Cumulatively 62.5% participants do not exceed 19 new designs per season. This encourages one to conclude that this group is bound to adopt a lean supply chain system if it is to survive competition. The medium category (14.4% participants) produces between 20 and 39 new designs per season. This operating level fits in well with a leagile supply chain strategy. Competitiveness is achieved through delaying product differentiation as much as possible. The last group (23.1% participants) attains competitiveness through customization of individual products to satisfy specific requirements at short lead times. These companies are bound to adopt an agile supply chain (Vonderembse *et al.* 2006).

General Discussion on Product Characterisation

This study sought to characterise the products of the participating companies based on functional, hybrid and innovative groupings. This was in line with research aim number two. The categorisation was done through the following variables; product nature, product design, number of new products introduced per year, basis of competition, nature of product demand, product line characteristics, average production run, average product life cycle, number of product variants produced per year and number of designs introduced per season.

Each variable showed a unique distribution. In other words, the distribution of the product category changed with product variable. This change in distribution from one variable to the other points to the fact that the respondents were not consistent in their response. When all the variables were considered in identifying the type of products that the surveyed companies produced, it was found out that 24 companies identified their main products as functional, 30 as hybrid, and 28 as innovative. This left 22(21.2%) companies that could not adequately define their products (see Table 13).

The analysis done this far shows that in the participating companies is a group of companies that produce functional, hybrid and innovative products.

Table 13: The Initial Distribution of Product Characterisation

Product	Number	Percentage
Functional	24	23.1
Hybrid	30	28.8
Innovative	28	26.9
Undefined product	22	21.2

There were 22 companies (21.2%) in the sample that could not clearly identify the product that they make. Their failure to characterise their products could lead to its failure to identify a matching supply chain. According to Fisher, (1997), when selecting an appropriate supply chain strategy, the first step for a company is to consider the characteristics of end-products, including product life cycle length, predictability of demand, product variety, and market standards for lead times and service. The scenario in Table 13 could be one of the fundamental problems leading to lack of competitiveness of the clothing and textile companies in Gauteng.

CONCLUSION

A descriptive research design was followed by making use of a cross-sectional survey. A non-probability purposeful sampling of 152 companies was drawn from the clothing and textile companies operating in the Gauteng.

The data was collected through a self-administered questionnaire that comprised closed questions requesting demographic information and questions that sought to empirically establish the characteristics of the products in the clothing and textile companies in Gauteng Province of South Africa. Included in the study were yarn manufacturers, textile manufacturers and clothing manufacturers. Fibre suppliers and retailers were excluded. The data was analysed by making use of

IBM SPSS statistics version 22. The data analysis is largely descriptive. Attention was paid to the constructs that are pertinent to the purpose of study. These constructs were classified into three categories of themes: functional product, hybrid product and innovative product.

The results of this study contribute to the debate on the product characteristics in the clothing and textile sector. The results are significant to the manufacturing sector. Once they know the type of product they are making, they are bound to know the corresponding supply chains. This has a bearing on competitiveness of the companies. The findings are also significant to the sector associations and the government who are concerned with the job losses that are rampant in the sector. This will help them tailor-make an appropriate intervention to stop the collapse in the sector. The elements of the constructs border around product design, number of new products produced per year, the operating environment, main product line characteristics, average production run per order, average product life cycle, and number of product variants produced per year.

This first empirical research question was answered through presentation of frequency distribution data. The results were presented using tables, graphs and summary statistics.

The second empirical research questions sought to characterise the products of the participating companies

When all the variables considered it was found that 24 companies identified their main products as functional, 30 as hybrid, and 28 as innovative. This left 22 (21.2%) companies that could not adequately define their products. These findings go on to explain the challenges that the clothing and textile companies are facing from imports. In a situation where a company cannot characterise the products it makes, the chances of failing to identify a suitable supply chain are very high. The classical theories from Fisher (1997) and Stavroulaki and Davis (2010) agree that a company is bound to be competitive only if its supply chain matches the product it makes. Now when a company finds it difficult to characterise the product, it is likely that it will struggle to identify a suitable supply chain. This in turn will affect its competitiveness.

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