



# **DEMAND PLANNING PRACTICES IN THE GAUTENG CLOTHING INDUSTRY**

by

**Ntombizodwa Jolinah Matsoma**

submitted in accordance with the requirements

for the degree of

**MASTER OF COMMERCE**

in the subject

**LOGISTICS**

at the

**UNIVERSITY OF SOUTH AFRICA**

**Supervisor: Prof I.M. Ambe**

**December 2016**

## **DECLARATION**

I, **Ntombizodwa Jolinah Matsoma** declare that **DEMAND PLANNING PRACTICES IN THE GAUTENG CLOTHING INDUSTRY** is my own work; that all sources used or quoted have been indicated and acknowledged by means of complete references, and that this dissertation was not previously submitted by myself or any other person for degree purposes at this or any other university.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## **ACKNOWLEDGEMENTS**

I would like to express my deepest appreciation to the following people that assisted and supported me during the preparation of this dissertation:

My creator God the Almighty, Romans 8:37 “In all these things we are more than conquerors through him who loved us”.

A special thanks to my dearest husband Thabo Matsoma for his love and continual support. To my beautiful daughters, Ofeletje and Botegile Matsoma, for allowing me to sacrifice the time I should have spent with them cuddling and playing, to work on this study.

A special thanks to my supervisor and my mentor Professor Marcus Ambe, who continually communicated and supported me throughout the study. I thank Dr Marthi Pohl who assisted with the statistics analysis of this study. I thank Retha Burger for her professional editing and proofreading of this dissertation. I also wish to thank Bongani Maluleke and Mandisa Magwaza for their assistance and support.

Finally, from the bottom of my heart, I thank our librarian, Leanne Brown and my sister-in-law, Celia Matsoma for assisting with the referencing in this study.

A special thank you to Professor John Maluleke, Professor Mathipa, Dr Jackie Moyana and Dr Senia Nhamo, who supported me in this study. I would like to honour my parents, the late Johanna Kabini and Abram Kabini for the support and contribution towards my education. My acknowledgement goes to my brother, Shadrack Kabini, for the support and contribution he provided towards my tertiary education.

I wish to thank my sister, Thokozile and friends, Mathabo, Mudanagundo, Lesedi, Violet, Nhlanhla Winnie and the other Winnie, for all their prayers and support.

I wish to thank my helper, Tsholofelo for taking good care of my beautiful daughters while I was busy writing this dissertation. A special word of thanks to the Kabini and Matsoma families for all the support and encouragement and best wishes.

## **DEDICATION**

This dissertation is dedicated to my late mother, Johanah Kabini, who taught me that even the largest undertaking can be accomplished through perseverance and prayer. I also dedicate it to my dearest husband, Thabo Matsoma, and my brother, Shadrack Kabini who were always willing to support and encourage me throughout my studies.

## ABSTRACT

The clothing industry is multifaceted and is characterised by garments with a short life cycle, unstable customer needs and varying fashion styles. This affects the accuracy of demand planning. In SA, the clothing industry has experienced a decline in the number of clothing manufacturers and manufacturing outputs as well as fluctuations in employment. This study investigates demand planning practices in the Gauteng clothing industry. A descriptive and exploratory study was conducted based on a semi-structured questionnaire. The structured data was descriptively analysed using SPSS and inferentially analysed using the Kruskal–Wallis test as well as content analysis for the unstructured questions. The findings revealed that demand planning practices in the Gauteng clothing industry are conducted using the hierarchical and optimal demand planning approaches. The results also revealed that there are certain factors which affect the way demand planning is conducted in the clothing industry in Gauteng. These factors includes: scheduling, fashion clothes, point of sale system, imports, estimation, recession and lead time. Furthermore, the study revealed that there are differences in the factors affecting demand planning regarding the three key clothing stakeholders (fabric suppliers, clothing manufacturers and fashion designers).

The study revealed that key demand planning practices employed in the Gauteng clothing industry are production planning, uncertainty prevention, forecasting and production machine capabilities. These practices are important attributes of the hierarchical and optimal demand planning approaches. The study recommends that the hierarchical demand planning approach is more effective when planning for basic clothes (which involved planning horizon of twelve months), while the optimal demand planning approach is effective when planning for fashion clothes (which involved planning horizon of six months). The study recommends that the Gauteng clothing industry should consider factors which affect demand planning when planning for customers' needs as they affect the level of productivity in the organisation.

**Key Words:** demand planning, demand planning approaches, manufacturer, fabric suppliers, fashion designers, clothing industry, Gauteng, South Africa.

# TABLE OF CONTENTS

<b>DECLARATION.....</b>	<b>I</b>
<b>ACKNOWLEDGEMENTS.....</b>	<b>II</b>
<b>DEDICATION .....</b>	<b>III</b>
<b>ABSTRACT .....</b>	<b>IV</b>
<b>TABLE OF CONTENTS .....</b>	<b>V</b>
<b>LIST OF FIGURES .....</b>	<b>VIII</b>
<b>LIST OF TABLES.....</b>	<b>IX</b>
<b>LIST OF ACRONYMS AND ABBREVIATIONS .....</b>	<b>X</b>
<b>CHAPTER 1: BACKGROUND TO THE STUDY .....</b>	<b>1</b>
<b>1.1 INTRODUCTION.....</b>	<b>1</b>
<b>1.2 CONTEXUALISATION OF THE PROBLEM.....</b>	<b>1</b>
1.2.1 Demand planning in perspective .....	1
1.2.2 Demand planning in the clothing industry.....	2
1.2.3 Review of the South African clothing industry .....	3
1.2.4 Demand planning approaches .....	5
1.2.5 Factors affecting demand planning in the clothing industry .....	7
<b>1.3 PROBLEM STATEMENT.....</b>	<b>10</b>
<b>1.4 RESEARCH QUESTIONS .....</b>	<b>11</b>
<b>1.5 RESEARCH OBJECTIVES.....</b>	<b>11</b>
<b>1.6 RESEARCH HYPOTHESES .....</b>	<b>12</b>
<b>1.7 RATIONALE/SIGNIFICANCE OF THE STUDY .....</b>	<b>13</b>
<b>1.8 RESEARCH DESIGN AND METHODOLOGY.....</b>	<b>13</b>
1.8.1 Research design .....	13
1.8.2 Research approach.....	14
1.8.3 Research strategy .....	14
1.8.4 Population and sampling.....	14
1.8.5 Data collection method.....	15
1.8.6 Research instrument and measurement.....	15
1.8.7 Data analysis .....	16
<b>1.9 SCOPE OF THE STUDY.....</b>	<b>16</b>
<b>1.10 OUTLINE OF THE STUDY .....</b>	<b>16</b>
<b>CHAPTER 2: DEMAND PLANNING IN THE CLOTHING INDUSTRY .....</b>	<b>19</b>
<b>2.1 INTRODUCTION.....</b>	<b>19</b>
<b>2.2 DEMAND PLANNING IN PERSPECTIVE.....</b>	<b>19</b>
2.2.1 Definition and background .....	19
2.2.2 Importance of demand planning.....	23

<b>2.3 DEMAND PLANNING IN THE CLOTHING INDUSTRY .....</b>	<b>24</b>
2.3.1    The global clothing industry.....	24
2.3.2    The South African clothing industry.....	26
2.3.3    Contribution of the clothing industry to SA economy .....	29
<b>2.4 APPROACHES TO DEMAND PLANNING .....</b>	<b>31</b>
2.4.1    Hierarchical demand planning approach .....	31
2.4.2    Optimal demand planning approach.....	33
2.4.3    Hierarchical vs optimal demand planning .....	35
<b>2.5 FACTORS AFFECTING DEMAND PLANNING PRACTICES IN THE CLOTHING INDUSTRY .....</b>	<b>37</b>
2.5.1    Incorrect scheduling of manufacturing.....	38
2.5.2    Planning for fashion clothes .....	44
2.5.3    The point of sale (POS) system .....	47
2.5.4    Influx of clothing imports .....	51
2.5.5    Estimation of clothes.....	56
2.5.6    Recession impact on the clothing industry .....	59
2.5.7    The effect of long lead time for fabrics .....	61
<b>2.6 CONCLUSION .....</b>	<b>65</b>
<b>CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY .....</b>	<b>67</b>
<b>    3.1 INTRODUCTION.....</b>	<b>67</b>
<b>    3.2 RESEARCH DESIGN .....</b>	<b>67</b>
<b>    3.3 RESEARCH APPROACH.....</b>	<b>68</b>
<b>    3.4 RESEARCH STRATEGY.....</b>	<b>71</b>
<b>    3.5 POPULATION AND SAMPLING .....</b>	<b>72</b>
3.5.1    Population of the study.....	73
3.5.2    Sampling.....	73
<b>    3.6 DATA COLLECTION METHOD.....</b>	<b>75</b>
3.6.1    Primary data sources .....	75
3.6.2    Secondary data sources .....	75
<b>    3.7 RESEARCH INSTRUMENT AND MEASUREMENT.....</b>	<b>76</b>
<b>    3.8 DATA ANALYSIS .....</b>	<b>77</b>
3.8.1    Descriptive statistics.....	77
3.8.2    Inferential statistics .....	77
3.8.3    Content analysis .....	78
<b>    3.9 QUALITY OF RESEARCH DATA.....</b>	<b>79</b>
3.9.1    Reliability .....	79
3.9.2    Validity	79
<b>    3.10 ETHICAL CONSIDERATIONS.....</b>	<b>80</b>
<b>    3.11 THE RESEARCH PROCESS FOLLOWED IN THE STUDY .....</b>	<b>80</b>

<b>3.12 CONCLUSION .....</b>	<b>81</b>
<b>CHAPTER 4: DATA ANALYSIS AND INTERPRETATION.....</b>	<b>82</b>
<b>    4.1 INTRODUCTION.....</b>	<b>82</b>
<b>    4.2 DEMOGRAPHICS.....</b>	<b>82</b>
4.2.1 Key clothing stakeholders .....	83
4.2.2 Job profiles .....	83
<b>    4.3 DEMAND PLANNING PRACTICES IN THE CLOTHING INDUSTRY.....</b>	<b>84</b>
4.3.1 Demand planning approaches .....	84
4.3.2 Factors affecting demand planning .....	87
4.3.3 Conclusion on the factors affecting demand planning .....	106
<b>    4.4 DIFFERENCES IN DEMAND PLANNING PRACTICES AMONG KEY CLOTHING INDUSTRY STAKEHOLDERS.....</b>	<b>107</b>
4.4.1 Introduction.....	107
4.4.2 Statistically significant differences between types of clothing industry stakeholders .....	107
4.4.3 Differences between the groups of clothing industry stakeholders .....	114
4.4.4 Factors affecting demand planning in the clothing industry .....	117
<b>    4.5 CONCLUSION .....</b>	<b>121</b>
<b>CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>122</b>
<b>    5.1 INTRODUCTION.....</b>	<b>122</b>
<b>    5.2 REVISITING THE RESEARCH QUESTIONS AND OBJECTIVES .....</b>	<b>122</b>
<b>    5.3 DISCUSSION OF THE RESULTS .....</b>	<b>124</b>
5.3.1 Research sub-question 1 .....	124
5.3.2 Research sub-question 2 .....	125
5.3.3 Research sub-question 3 .....	129
<b>    5.4 PRIMARY RESEARCH QUESTION .....</b>	<b>137</b>
<b>    5.5 SUMMARY AND CONCLUSION .....</b>	<b>138</b>
5.5.1 Summary of the research study .....	138
5.5.2 Conclusions relating to the research objectives.....	139
5.5.3 Primary research objective.....	141
<b>    5.6 RESEARCH CONTRIBUTION AND RECOMMENDATIONS.....</b>	<b>141</b>
5.6.1 Conclusion .....	142
5.6.2 Recommendations .....	142
<b>    5.7 LIMITATIONS OF THE STUDY .....</b>	<b>146</b>
<b>    5.8 SUGGESTIONS FOR FUTURE RESEARCH .....</b>	<b>147</b>
<b>REFERENCE LIST .....</b>	<b>148</b>
<b>APPENDIX A: RESEARCH QUESTIONNAIRE .....</b>	<b>162</b>
<b>APPENDIX B: ETHICAL CLEARANCE .....</b>	<b>178</b>
<b>APPENDIX C: DECLARATON OF PROFESSIONAL EDIT .....</b>	<b>179</b>

## **LIST OF FIGURES**

Figure 1.1:	The study outline .....	18
Figure 2.1:	Components of demand planning .....	21
Figure 2.2:	Hierarchical characteristics of production demand planning.....	33
Figure 2.3:	Optimal approach characteristics .....	34
Figure 2.4:	South African trade in textiles, clothing and leather goods in ZAR bn .....	54
Figure 3.1:	Research strategies .....	72
Figure 4.1:	The clothing industry stakeholder distribution (in %) .....	83
Figure 4.2:	Job positions of respondents (in %) .....	84
Figure 4.3:	Perceptions on statements regarding demand planning approaches (in %)	85
Figure 4.4:	Perception of respondents on scheduling manufacturing of customers' orders (in %) .....	88
Figure 4.5:	Perception of the respondent regarding planning for fashion clothes (in %)	91
Figure 4.6:	Perception of the respondents regarding the point-of-sale (POS) system (in %) .....	93
Figure 4.7:	Perception of the respondents regarding the imports of clothes (in %).....	96
Figure 4.8:	Perception of the respondents regarding estimating future clothing requirements (in %).....	98
Figure 4.9:	Perception of the respondents regarding recession (in %) .....	100
Figure 4.10:	Perception of the respondents regarding the impact of late arrival of clothes (in %) .....	102
Figure 5.1:	Recommended framework for adoption by the Gauteng clothing industry.	143

## LIST OF TABLES

Table 1.1:	Factors affecting demand planning in the SA clothing industry .....	9
Table 2.1:	Annual sales and GDP contribution of the clothing industry .....	25
Table 2.2:	Distinctive activities of the clothing industry stakeholders.....	29
Table 2.3:	Trend in the reduction of employment in the clothing industry.....	30
Table 2.4:	Hierarchical vs optimal demand planning approaches .....	35
Table 2.5:	Summary of factors affecting demand planning in the clothing industry .....	63
Table 3.1:	Attributes of deductive and inductive research approaches.....	69
Table 3.2:	Distinguishing attributes of quantitative and qualitative research approaches	71
Table 3.3:	Summary of the research process .....	81
Table 4.1:	Description of statements in Figure 4.3 relating to demand planning approaches.....	85
Table 4.2:	Description of statements relating to scheduling manufacturing of customer orders .....	89
Table 4.3:	Description of the statements relating to planning for fashion clothes .....	91
Table 4.4:	Description of statements in Figure 4.6 relating to the point-of-sale (POS) system .....	94
Table 4.5:	Description of statements regarding the imports of clothes .....	96
Table 4.6:	Description of statements regarding estimations of future clothing requirements.....	99
Table 4.7:	Description of statements in Figure 4.9 regarding recession .....	100
Table 4.8:	Description of statements on the effect of late arrival of clothes .....	102
Table 4.9:	Description of open-ended questions.....	104
Table 4.10:	Statistically significant differences between the clothing stakeholders.....	109
Table 4.11:	The statements with statistically significant differences between groups of respondents.....	115
Table 4.12:	Statements with statistically significant differences for fashion clothing with regard to factors affecting demand planning .....	119

## **LIST OF ACRONYMS AND ABBREVIATIONS**

CTM	Cut-Make-Trim
DTI	Department of Trade and Industry
EDI	Electronic data interchange
EU	European Union
GDP	Gross domestic product
GGDA	Gauteng growth and development agency
HDPA	Hierarchical demand planning approach
IDC	Industrial Development Corporation
JIT	Just-in-time
KZN	KwaZulu-Natal
LCU	Local currency unit
MFA	Multi-Fibre Arrangement
ODPA	Optimal demand planning approach
OER	Official exchange rate
POS	Point of sale
SA	South Africa
SATCL	South African Textile, Clothing and Leather Goods
SACTWU	South Africa Clothing and Textile Workers Union
SC	Supply chain
SCM	Supply chain management
SKU	Stock keeping unit
SPSS	Statistical Package for the Social Sciences
SSA	Sub-Saharan Africa
TELT	Department of Transport Economics Logistics and Tourism
UK	United Kingdom
UNISA	University of South Africa
US\$	United States dollar
USA	United States of America
ZAR	South African Rand

# **CHAPTER 1: BACKGROUND TO THE STUDY**

## **1.1 INTRODUCTION**

In 2004, the South African government lowered the tariffs on the import of goods/services into the country. Since then the South African clothing industry has been in decline (Nattrass and Seekings, 2012:10). This decline has negatively affected the level of sales, employment, gross domestic product (GDP), as well as the accuracy of demand planning (Kim, 2012:1285; Rotunno, Vèzina and Wang, 2012:2).

Demand planning is a component of supply chain management (SCM), which adds value to customers by providing products according to the customers' needs and preferences (Priem and Swink, 2012:7). Through the application of proper demand planning practices, the customers' needs can be fully met, thus improving the performance of the clothing industry. This study sought to explore demand planning practices in the clothing industry in the Gauteng province of South Africa. It uncovered some of the factors that affect demand planning practices in the clothing industry in Gauteng. The study makes a contribution to the improvement of demand planning, not only to the Gauteng clothing industry, but to the South African industry at large.

## **1.2 CONTEXUALISATION OF THE PROBLEM**

This section provides a context of the problem necessitating the study. It covers demand planning in perspective, demand planning in the South African clothing industry, demand planning approaches, and the factors affecting demand planning practices in the Gauteng clothing industry.

### **1.2.1 Demand planning in perspective**

Demand planning is critical to the success of organisations (Rexhausen, Pibernick and Kaiser, 2012:269). In the 1980s, organisations were relying on their own decisions when planning for customer demands. However, due to the changing business conditions organisations have to become flexible in demand planning (Bhardwaj and Fairhurst, 2010:165; Pretorius, 2013:1). Proper demand planning

exists when organisations are able to succeed in obtaining the correct items, at reasonable costs and at the correct time (Mason-Jones, Naylor and Towill, 2000:4061). Demand planning adds value to products and customers by providing products according to the customers' needs and preferences (Priem and Swink, 2012:7). As indicated by De Villiers, Nieman and Niemann (2008) the implementation of demand planning is affected by various factors, such as huge market demand for certain products, demand location, supplier distance, product variety, different data technological systems, matching demand and supply, and bulk product ordering, which all have a significant effect on planning. Hence, organisations, including the clothing industry, have to prevent errors when planning for customer needs (Gauteng Growth and Development Agency (GGDA), 2014; Nattrass and Seekings, 2012; Oberhofer, 2012; Vlok, 2006). Demand planning adds value to products and customers by providing products according to the customers' needs and preferences (Priem and Swink, 2012:7).

### **1.2.2 Demand planning in the clothing industry**

Demand planning is critical in the South African (SA) clothing industry. Chaudhary (2011:2) asserted that clothes are one of the basic requirements of human beings and demand for clothes will continue to exist. The demand planning process of customer clothing starts from the producers of raw materials; to fabric suppliers; clothing manufacturers, and finally to the end customer (Oberhofer, 2012:66; Nattrass and Seekings, 2012:17; GGDA, 2014:2). It indicates how material production supply is communicated within the supply chain (SC) among the SC partners (Larsson, Peterson and Mattila, 2012:72). As alluded by Nattrass and Seekings (2012:17), the clothing industry is multifaceted and there are several manufacturing lines involved in each stage of the production process. Thomassey (2010:471) indicated that the demand of fashion customers differs from the demand of basic clothes. Gereffi and Frederick (2010:17) mentioned that the complexity of clothing production increases as garments are being produced. On its own, this affects the accuracy of demand planning in the clothing industry worldwide, as well as the SA clothing industry.

### **1.2.3 Review of the South African clothing industry**

The SA clothing industry has existed since the Second World War (Salm, 2002:7). The industry is labour-intensive and it offers entry-level jobs for unskilled labour in developed as well as developing countries (Nordas, 2004). In Gauteng, for example, there are 306 organisations that form part of the clothing industry. This number is made up of 95 fabric suppliers, 139 clothing manufacturers, and 72 fashion designers (South Africa Clothing and Textile Workers Union (SACTWU), 2012; Schreiber, 2013).

The industry is often seen as a conventional industry which is characterised by labour-intensiveness, low salaries, low potential for investment in research and development and innovation, flexible labour legislation, and powerful labour unions (Nattrass and Seekings, 2012:8). According to Vlok (2006:227), the industry remains an important sector in terms of employment and job creation, especially in the SA labour market. The SA clothing industry is concentrated in the Western Cape and KwaZulu-Natal (Nattrass and Seekings, 2012:1).

Having realised the importance of demand planning, the city of Johannesburg established centres in 1994 where various clothing styles are produced with the aim of improving clothing demand (Oberhofer, 2012:67). As alluded to above, the SA clothing industry consists of three key stakeholders, namely fabric suppliers, fashion designers and clothing manufacturers (GGDA, 2014:2; Oberhofer, 2012:65; Staritz and Morris, 2013:9). It is critical to note that in the process of satisfying customers' clothing demands, the SA clothing industry is faced with opportunities as well as challenges. Although the industry has the opportunity to grow, there is a low potential for investment in research and development, as well as innovation, in the industry (Nattrass and Seekings, 2012:8).

The literature on the SA clothing industry indicates that demand planning plays a critical role in the clothing industry. However, it has been found that there are inconsistencies that exist when demand planning is implemented, and these have affected changes in the number of clothing production organisations in South Africa; a decline in manufacturing output; and fluctuations in employment as briefly discussed below:

- ***Changes in the number of clothing production organisations in South Africa***

Over the years there have been changing trends in the number of clothing production organisations in South Africa. These trends may have emanated from the effect of inconsistencies in demand planning, as well as other factors such as clothing imports and recession (Gereffi and Lee, 2012:28; Steytler and Powell, 2010:2). According to the GGDA (2014:3), there are changing trends in the number of clothing producers in the country. In 1998, there were 784 clothing manufacturers, while in 2000, there was a decline to 672, but in 2006, there was an increase to 1008 clothing production organisations (GGDA, 2014:3). This clearly indicates that there are changing trends in the number of clothing production organisations in South Africa.

- ***Decline in manufacturing output***

The clothing industry makes a significant contribution to the manufacturing sector of a country (IQ Business, 2014:3). In terms of turnover, in 2005, the SA clothing industry grew by over R12 500 million; however, this was followed by a sharp decline in the clothing industry in 2006 to less than R11 500 million (IQ Business, 2014:3). From 2007 to 2012, the industry was stable, and in 2013 there was a slight growth to almost R13 500 million (IQ Business, 2014:3). Apart from the growth indicated in manufacturing output in this industry, employment in the industry has also shown variations.

- ***Fluctuation in employment***

The clothing industry has experienced fluctuation over the years with regard to employment (GGDA, 2014:3). This is supported by Nattrass and Seekings (2012:2) who state that there is evidence of fluctuation in the number of employees within the SA clothing industry. In terms of employment, the SA clothing industry employed 50 000 workers in 1950; in 2005, there were 142 865 workers employed, while in 2013, this was reduced to 80 000 workers being employed in the clothing industry. According to Rogerson (2006:222), employment in the SA clothing industry has been gradually declining, and the industry is encountering sales and financial losses (Rogerson, 2006:222).

As indicated in this sub-section, demand planning of the SA clothing industry **is** affected by changing trends in the number of clothing production organisations, decline in manufacturing output, as well as fluctuations in employment. This indicates that better approaches to improve planning for clothing demands are required.

#### **1.2.4 Demand planning approaches**

Organisations can use various demand management approaches to make sound decisions in their production processes to alleviate improper demand planning practices (Bowersox, Closs, Cooper and Bowersox, 2013:139). According to Sethi, Yan, Zhang and Zhang (2002:6) two generic types of demand planning approaches can be distinguished in literature, namely, the hierarchical and optimal approaches. A brief description of these demand planning approaches is provided below.

- ***The hierarchical demand planning approach***

The selection and implementation of appropriate demand planning approaches are critical to the decision-making processes of production organisations (Belmokhtar, Herrera and Thomas, 2010:1). The hierarchical demand-planning approach is a decision-making tool that breaks a difficult problem into manageable sub-problems on different hierarchical levels where each level is governed by a set of criteria or attributes, and a solution for the original problem is found from the solution to these simpler problems (Koprulu and Albayrakoglu, 2007:4).

The hierarchical approach believes that all production procedures consist of a grouping of minor processes (Pycraft, Sigh, Philela, Slack, Chambers and Johnston, 2013:13). Pycraft *et al.* asserted that the hierarchical approach should focus on operational procedures and is based on three dimensions of the operational procedure, namely, the supplier, the internal supplier, and internal customers.

The hierarchical approach aims to reduce operational uncertainties, as this approach can assist in determining the necessary resources required by organisations in order to meet the needs of a specific product group (Belmakhtar *et al.*, 2010:1). Nielsen and Steger-Jensen (2006:2) asserted that the hierarchical approach is a demand-planning approach which assumes that data and ideas can

be combined across various operational dimensions, or through supply linkages, without any intervention.

- ***The optimal demand planning approach***

The optimal demand-planning approach is a demand management approach that assists in the production decision-making of organisations. According to Nielsen and Steger-Jesen (2008:57), organisations face vigorous interventions across various operational dimensions within the organisation and in the supply chain network. Hence, the optimal approach is crucial to ensure quick responses in the production decision-making processes. The optimal approach can be defined as an approach that is concerned with achieving operational goals over a limited period in order to satisfy a changing customer demand (Sethi *et al.*, 2002:6). The optimal demand planning approach focuses on obtaining a balance between time, cost, and the allocation of limited resources, while it employs different models in solving the production schedule problems (Leu and Yang, 1999:420). Challenges with regard to scheduling and time, the anticipated capacity, equipment and manufacturing blockage, as well as short-term planning challenges, need quick intervention and operational control decisions (Albey and Bilge, 2011:3322). The optimal approach addresses challenges pertaining to manufacturing scheduling in a flexible manner.

Both approaches (optimal and hierarchical) consider the segregation of decision-making in the operation planning process of organisations where operational process decisions are made according to product families, and a specific product within a product family to ensure smooth manufacturing operations and to save overall cost (Nielsen and Steger-Jensen, 2008:58). The **optimal** approach is more considerate to continuous changes in the environment, while a **hierarchical** approach operates effectively in a stable production process, which consists of reducing production interruptions (Nielsen and Steger-Jensen, 2006:2).

Both the hierarchical as well as the optimal approach are considered crucial for the demand planning in organisations. However, when organisations neglect the usage of such approaches, demand planning becomes cumbersome and eventually practically ineffective (Albey and Bilge, 2011:3321). The application of these approaches can also assist in ensuring accuracy when implementing demand planning in the clothing industry.

There are contributing factors to improper demand planning practices in the clothing industry in South Africa. When implementing demand planning approaches, organisations should consider the factors that affect demand planning practices in the clothing industry as discussed in the next section.

### **1.2.5 Factors affecting demand planning in the clothing industry**

There are challenges affecting demand planning in the clothing industry in South Africa. According to Aksoy, Azturk and Sucky (2012:223) and Nattrass and Seekings (2012:17), these challenges stem from the incorrect scheduling of clothing material and incorrect planning for fashion clothes, the incorrect use of the point-of-sale (POS) system, an influx of clothing imports, incorrect estimations of clothes, recession as a global economic condition, and the late arrival of clothing material.

These challenges have an effect on demand planning in the SA clothing industry. Annadurai and Uthayakumar (2010:3465) asserted that the scheduling of clothing material is one of the challenging aspects which can affect proper demand planning (Annadurai and Uthayakumar, 2010:3465). Scheduling is defined as the utilisation of correct and timely resources in manufacturing, fabric acquisition and production capabilities (Maravelias, 2012:1815). Gereffi and Frederick (2010:17) posited that in South Africa, the complexity of clothing production increases as the garments being produced require more detailed trimming, especially in fashion clothing.

The fashion industry is a fast-moving industry with customers that are fashion-driven and are not willing to compromise on the styles they demand (Wang, Gou, Sun and Yue, 2012:462). According to Wang *et al.* (2012:462), fashion clothes last for only a short period. Bhardwaj and Fairhurst (2010:166) confirmed that fashion clothes change constantly and require constant follow-ups. Hence, it becomes challenging to accurately implement demand planning of fashion clothes.

A Point-of-sale (POS) system is an automated system used by retail outlets to process sales of items bought by customers (Karnin and Walach, 2015:1). According to Folk, Bohen, Sanders and Johnson (2011:5), the POS system reflects the history of sold inventories. Hamister (2011:432) noted that information distortion is a challenge when using the POS system, especially if it is not linked to the

customers' systems, errors are bound to exist in demand planning (Ni and Fan, 2011:1531).

South Africa also has to deal with an influx of imports; a factor that has led to reduced employment (Ramdass, 2007:1). Imports are the merchandise or goods which enter a country (Ramdass, 2007:4). According to GGDA (2014:4), the increase of imports in the Gauteng clothing industry affects the proper implementation of demand planning processes in the industry. This has resulted in discrepancies in the demand planning of clothes, as additional clothing supplies in the country make it difficult to predict the market for clothes, and it also makes it difficult to deal with competition in the clothing industry.

The complexity of manufacturing processes in organisations results to inaccuracies in manufacturing estimations (Thomasset, 2010:471; Aksoy *et al.*, 2012:222). In order to know the quantities of clothes that will be required in future, estimations have to be implemented. The correct and accurate estimation of clothing requirements is crucial in the clothing industry. According to Bhardwaj and Fairhurst (2010:169), the failure to estimate future clothing styles will affect demand planning, as the industry will not be able to attract fashion-sensible customers. The late arrival of clothing materials causing a delay in the production schedule of clothes, is another factor that affects demand planning (Thomasset, 2010:471). Ordering fabrics from international suppliers might result in late fabric arrival which might delay the manufacturing planning processes in the SA clothing manufacturing industry. Nenni *et al.* (2013:1) confirm that clothing fabrics take time to arrive at manufacturing plants. Delays in fabric arrival result from supplier distances (Aksoy *et al.*, 2012:223; Thomasset, 2010:471), and this is a challenging issue in the SA clothing industry.

Moreover, the 2008 global recession destabilised the performance of the majority of organisations in South Africa, including the clothing industry (Nattrass and Seekings, 2012:9). According to Steytler and Powell (2010:6), the SA government suffered financially as a result of the global recession. Clothing industry factories, especially on the north coast of KwaZulu-Natal (KZN) suffered losses as a result of the international monetary crisis. These factories were exporting their clothing

products to the USA (Nattrass and Seekings, 2012:9). Table 1.1 presents a summary of factors which affect demand planning in the SA clothing industry.

**Table 1.1: Factors affecting demand planning in the SA clothing industry**

Sources	Factors	Description of factors
Maravelias (2012:1815); Aksoy <i>et al.</i> (2012:222); Gereffi and Frederick (2010:17)	Scheduling	Timely and correct plan, communication
Oberhofer (2012:70); Shen <i>et al.</i> (2013:266); Bhardwaj and Fairhurst (2010:166); Barnes and Lea-Greenwood (2010:762)	Fashion planning	Fashion trend, changing needs
Karnin and Walach (2015:1); Folk <i>et al.</i> (2011:5); Pretorius (2013:1); Hamister (2011:432); Chaudhry and Hodge (2012:70)	POS system	Data distortion, system integration
Ramdass (2007:1); Laudal (2010:72)	Imports of clothes	Oversupply of clothes, adjust planning, local support
Thomassey (2010:471); Aksoy <i>et al.</i> (2012:222); Bhardwaj and Fairhurst (2010:169)	Estimation of clothes	Complexity of clothes, challenge in estimations
Simos (2002:32); Nattrass and Seekings (2012:9); Sekerden (2011:7); Steytler and Powell (2010); Kim (2012:1286)	Recession	Demand decline, historical sales, adjust planning,
Nenni <i>et al.</i> (2013:1); Aksoy <i>et al.</i> (2012:223); Thomassey (2010:471); Nattrass and Seekings (2012:19)	Late arrival of clothes	Material arrival, supplier distance, sale session

Source: Researcher's own compilation

As reflected in Table 1.1, there are factors that affect demand planning in the clothing industry. These factors need to be managed properly to ensure the effective and efficient management of demand planning in the clothing industry, especially in South Africa, where the industry experiences fluctuations in the number of clothing manufacturers, manufacturing output, as well as in employment (GGDA, 2014:3; IQ Business, 2014:3; (Nattrass and Seekings, 2012:2; Vlok, 2006:229; Media Club South Africa, 2015).

### **1.3 PROBLEM STATEMENT**

Demand planning is critical in the clothing industry. Globally, the clothing industry is associated with a short period of garment existence, unstable customer needs and a variety of fashion styles with extensive lead times (Wong and Guo, 2010:614). According to Jonson and Tolstoy (2012:62), the proper application of demand planning activities is required for organisations to achieve a competitive advantage. Demand planning, however, is subject to discrepancies and complexities and this is one of the greatest challenges faced by the SA clothing industry (Aksoy *et al.*, 2012:222; Bhardwaj and Fairhurst, 2010:165).

The decline in the number of clothing manufacturers in South Africa and the effect of globalisation have contributed to complexities in estimations, scheduling, as well as lead time management (Sekerden, 2011:7). In addition, the influx of Chinese products into the country has affected the accuracy of demand planning in the clothing industry in South Africa (Rotunno *et al.*, 2012:2). Hence, the clothing industry has experienced a decline in the number of clothing organisations, a decline in the amount of manufacturing output, as well as fluctuations in employment as reflected in Section 1.2.3 (GGDA, 2014:3; IQ Business, 2014:3; Nattrass and Seekings, 2012:2).

Numerous studies have been conducted on demand planning in the clothing industry. Global authors, such as Priest (2005), Sen (2008), Wark (2006) and Steytler and Powell (2010:6), have explored selected components of demand planning, such as fashion, clothing estimations, and recession. In South Africa, authors, such as Vlok (2006), Nattrass and Seekings (2012) and Oberhofer (2012) have also explored various components of the SA clothing industry, for example,

clothing imports, wage setting implications and fashion designing. However, these studies have investigated selected components or elements of demand planning in the clothing industry. Hence, a gap exists and there is a need for an empirical investigation through a comprehensive study on demand planning practices in the clothing industry. Given the importance of demand planning to the competitive performance of the clothing industry, the study explored demand planning in the SA clothing industry, with specific reference to Gauteng, based on a cross-section study.

## 1.4 RESEARCH QUESTIONS

The main research question of the study can thus be stated as:

*Which demand planning practices are employed in the clothing industry in Gauteng, a province in South Africa?*

In order to answer the main research question, the following sub-questions needed to be answered:

- What are the demand planning approaches employed by various stakeholders in the Gauteng clothing industry?
- What are the factors that affect demand planning practices in the Gauteng clothing industry?
- What are the differences in demand planning among the key stakeholders in the Gauteng clothing industry?

## 1.5 RESEARCH OBJECTIVES

The main objective of the study can be stated as:

*To explore demand planning practices in the clothing industry in Gauteng, a province in South Africa.*

In order to achieve the main objective the following secondary objectives needed to be achieved:

- to determine the demand planning approaches employed by various stakeholders in the Gauteng clothing industry;

- to determine the factors affecting demand planning practices in the Gauteng clothing industry;
- to determine the differences in demand planning among the key stakeholders in the Gauteng clothing industry; and
- to make suggestions on how demand planning practices could be improved in the Gauteng clothing industry.

## **1.6 RESEARCH HYPOTHESES**

In order to answer the third research sub-objective, three (3) hypotheses were developed as follows:

### **Hypothesis 1**

- $H_1$ : There is a statistically significant difference between the three types of clothing industry stakeholders with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry.
- $H_{01}$ : There is no statistically significant difference between the three types of clothing industry stakeholders with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry.

### **Hypothesis 2**

- $H_2$ : There is a statistically significant difference between the groups of respondents who used 3-, 6- and 12-month plans, respectively, in planning the demand for basic clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry.
- $H_{02}$ : There is no statistically significant difference between the groups of respondents who used 3-, 6- and 12-month plans, respectively, in planning the demand for basic clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry.

### **Hypothesis 3**

- $H_3$ : There is a statistically significant difference between the groups of respondents who used 3-, 6- and 12-month plans, respectively, in planning the

demand for fashion clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry.

- $H_{03}$ : There is no statistically significant difference between the groups of respondents who used 3-, 6- and 12-month plans, respectively, in planning the demand for fashion clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry.

## **1.7 RATIONALE/SIGNIFICANCE OF THE STUDY**

This study was necessitated due to demand planning challenges facing the Gauteng clothing industry, as well as economic factors which contribute to inaccuracies in clothing demand planning. The specific contributions of the study are as follows:

- to make suggestions on how demand planning could be improved in the Gauteng clothing industry;
- to reveal demand planning approaches that are appropriate for relevant industry stakeholders; and
- to uncover the key factors affecting demand planning practices in the Gauteng clothing industry.

## **1.8 RESEARCH DESIGN AND METHODOLOGY**

This study is both exploratory and descriptive in nature. The research design and methodology provides a blueprint for how the study was conducted. This section of the chapter presents the research design, research approach, research strategy, population and sampling, data collection method, research instrument and measurement, as well as the data analysis techniques employed in the study.

### **1.8.1 Research design**

Three types of research design exist in scientific research (Veal, 2011:33), namely, exploratory, descriptive and explanatory design. In this study, both descriptive and explorative research design were employed. Descriptive research was used to determine the demand planning practices among key stakeholders in the Gauteng

clothing industry. Explorative research was used to gain an in-depth understanding of demand planning and to complement the descriptive research.

### **1.8.2 Research approach**

Two generic research approaches exist in scientific research, namely, the deductive and inductive research approaches (Leedy and Ormrod, 2014:17). In this study, both deductive and inductive research approaches were employed. Both approaches were used to understand the existing theory on demand planning practices and also to gain an in-depth understanding of the factors affecting demand planning in the Gauteng clothing industry.

Research can also be classified as qualitative, quantitative or both (mixed method) (Leedy and Ormrod, 2014:190). In a qualitative research approach, the researcher focuses on arguments, rather than figures, when collecting data, whereas in a quantitative research approach, the researcher focuses on statistical data collection (Quinlan, 2011:286). A mixed-method research involves the combination of both qualitative and quantitative research. In this study, a concurrent mixed method was used in order to obtain a better understanding of how demand planning is conducted in the Gauteng clothing industry.

### **1.8.3 Research strategy**

A research strategy is an idea that the researcher will have of how to answer the research questions of the study that is being conducted (Saunders, Lewis and Thornhill, 2012:173). A survey involves obtaining data on situations or occurrences or events (Leedy and Ormrod, 2014:195). In this study, the survey was conducted among clothing industry stakeholders in Gauteng.

### **1.8.4 Population and sampling**

In this section of the chapter, the population and sampling techniques employed in this study are discussed.

**Population:** A population of a study consists of representative people or organisations which can be counted in the study (Quinlan, 2011:143). This study focused on clothing industry stakeholders (fabric suppliers, clothing manufacturers and fashion designers). The population of this study constituted clothing industry stakeholders in Gauteng. In South Africa, the clothing industry is concentrated in

the Western Cape, KwaZulu-Natal, Free State and Gauteng. Gauteng was chosen because it was convenient and accessible to the researcher.

**Sampling:** A sample is a portion of the representation of a population (Cooper and Schindler, 2011:364). Two generic types of sampling in research are available, namely, probability sampling and non-probability sampling (Leedy and Ormrod, 2014:213). The current study employed a non-probability sampling technique. This means the researcher chose a sample size which was easily available and accessible. Four types of non-probability sampling can be identified in research, namely convenient sampling, judgement sampling, quota sampling and snowball sampling (Saunders *et al.*, 2012:281). Convenient sampling was employed in this study. A total sample of 56 key clothing industries was chosen. Managers, supervisors and specialists constituted the sample of the study.

### **1.8.5 Data collection method**

The data collection method explains how data was collected from the population of the clothing industry (Quinlan, 2011:147). There are two basic types of data collection sources in scientific research: the secondary and the primary data sources. In the current study, the data was collected using secondary and primary data sources (more detail on this is provided in the section below). The secondary data sources used in this study were explored during Phase 1 of the study (theoretical literature study). The researcher employed journal articles, books, documentations and newspapers to understand demand planning practices in the SA clothing industry. The primary data was collected through a semi-structured questionnaire, based on convenience sampling. The semi-structured questionnaires were emailed to the respondents who were based in the Pretoria and Johannesburg regions of Gauteng. Gauteng was chosen as the researcher had limited access to the respondents and also due to time restrictions.

### **1.8.6 Research instrument and measurement**

The research instrument is a tool used to collect and measure research data (Leedy and Ormrod, 2014:83). The research instrument used in this study was a semi-structured questionnaire.

### **1.8.7 Data analysis**

Data analysis involves defining data obtained from the research questionnaire, interpreting data and drawing conclusions from that (Quinlan, 2011:365). The structured questions were analysed descriptively and by inferential statistics, while content analysis was used for the comments added on the structured questionnaire (Section B, part two of the questionnaire only).

## **1.9 SCOPE OF THE STUDY**

The scope of the current study was limited to the Gauteng clothing industry. Three stakeholders, namely fabric suppliers, clothing manufacturers and fashion designers in the Gauteng clothing industry were chosen for the study. All three clothing stakeholders had influences on demand planning practices in the Gauteng clothing industry. As mentioned earlier in this chapter, the SA clothing industry is concentrated in the Western Cape, KwaZulu-Natal, Free State and Gauteng, and consists of 306 key clothing industry stakeholders (SACTWU, 2012). According to the data obtained from SACTWU (2012), there are 95 fabric suppliers and 139 clothing manufacturers. Data obtained from SA Fashion Week showed that in 2012, there were 72 fashion designers in Gauteng (Schreiber, 2013).

## **1.10 OUTLINE OF THE STUDY**

This study consists of five chapters as explained below:

**Chapter 1** began with an explanatory background to the study and provided direction on how demand planning is conducted. The chapter provided an overview of the rationale and aim of the study, the problem statement, research questions, primary and secondary objectives, the study hypotheses, research methods, research limitations, scope of the study and the study outline.

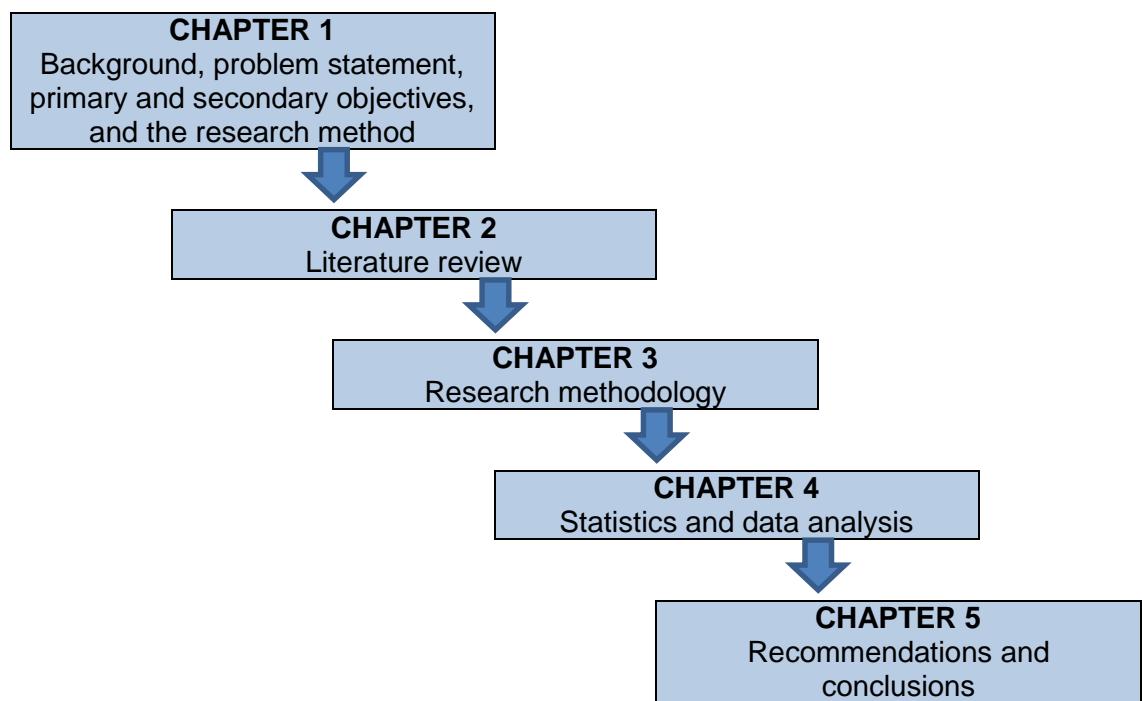
**Chapter 2** reports on a review of the available literature that was conducted from the perspective of demand planning, the approaches to demand planning and challenges affecting the demand of the SA clothing industry. Chapter 2 focuses on experiences by other researchers regarding the processes, and the factors affecting demand planning in the clothing industry.

**Chapter 3:** This chapter deals with the research methodology. Through the methodology, the study was able to determine the data collection processes to investigate and explore the factors affecting demand planning in the Gauteng clothing industry. The research design, approach and the mixed-method design, which adopts both qualitative and quantitative methods, were aligned to a survey research strategy. A sample was drawn from the three clothing industry stakeholders in Gauteng, namely fabric suppliers, clothing manufacturers and fashion designers. A semi-structured research questionnaire was used to collect empirical data. The data analysis and interpretation were conducted using the SPSS statistics software.

**Chapter 4** deals with the data analysis and interpretation of the statistical results, with results emanating from the data collected from the three stakeholders. The research questionnaire was divided into two sections: Section A consisted of the demographics and the job positions of the clothing industry stakeholders and Section B consisted of demand planning practices in the clothing industry. The data was coded in order to interpret and analyse it properly.

**Chapter 5** summarises the results, draws conclusions and, in line with the literature and the study objectives, makes recommendations. The research results relate to demand planning practices, followed by the demand planning approaches, as well as the factors affecting demand planning in the clothing industry. In Chapter 5, the results are discussed and conclusions are drawn from the main research objective.

Figure 1.1, on the next page, presents a summary structure of the study outline.



**Figure 1.1:** The study outline

# **CHAPTER 2: DEMAND PLANNING IN THE CLOTHING INDUSTRY**

## **2.1 INTRODUCTION**

Chapter 1 presented an overview of the study. This chapter reports on the related literature on demand planning, the approaches to demand planning, demand planning in the clothing industry, as well as key stakeholders in the SA clothing industry. The chapter concludes by presenting a discussion of the factors that affect demand planning in the SA clothing manufacturing industry.

## **2.2 DEMAND PLANNING IN PERSPECTIVE**

This section of the chapter reports on an exploration of the concept of demand planning. In the course of the section, the definition of demand planning, the background, components of demand planning, the process of demand planning, as well as the strategic importance of demand planning to organisations, will be discussed.

### **2.2.1 Definition and background**

Demand planning can be defined as an estimation of customer needs and other planning measures, as well as actions that illustrate planning with participants in the value chain (Rexhausen *et al.*, 2012:269). De Villiers *et al.* (2008:177) mentioned that demand planning is all about satisfying customer needs. Burt, Petcavage and Pinkerton (2012:331) asserted that demand planning as a process is used to predict, administer, smoothen, organise and ensure steadiness and to encourage demand and supply of items and services within organisations. Therefore, through the proper application of demand planning activities, customer needs can fully be met.

Demand planning existed for years and its importance is well documented. In 1980, the food industry in the USA realised the importance of demand planning and implemented the concept in their food production. General Motor Company realised the importance of demand planning after experiencing a loss of thousands of prospective clients in 1992 (Fisher, Hammond, Obermeyer and Raman, 1994:86).

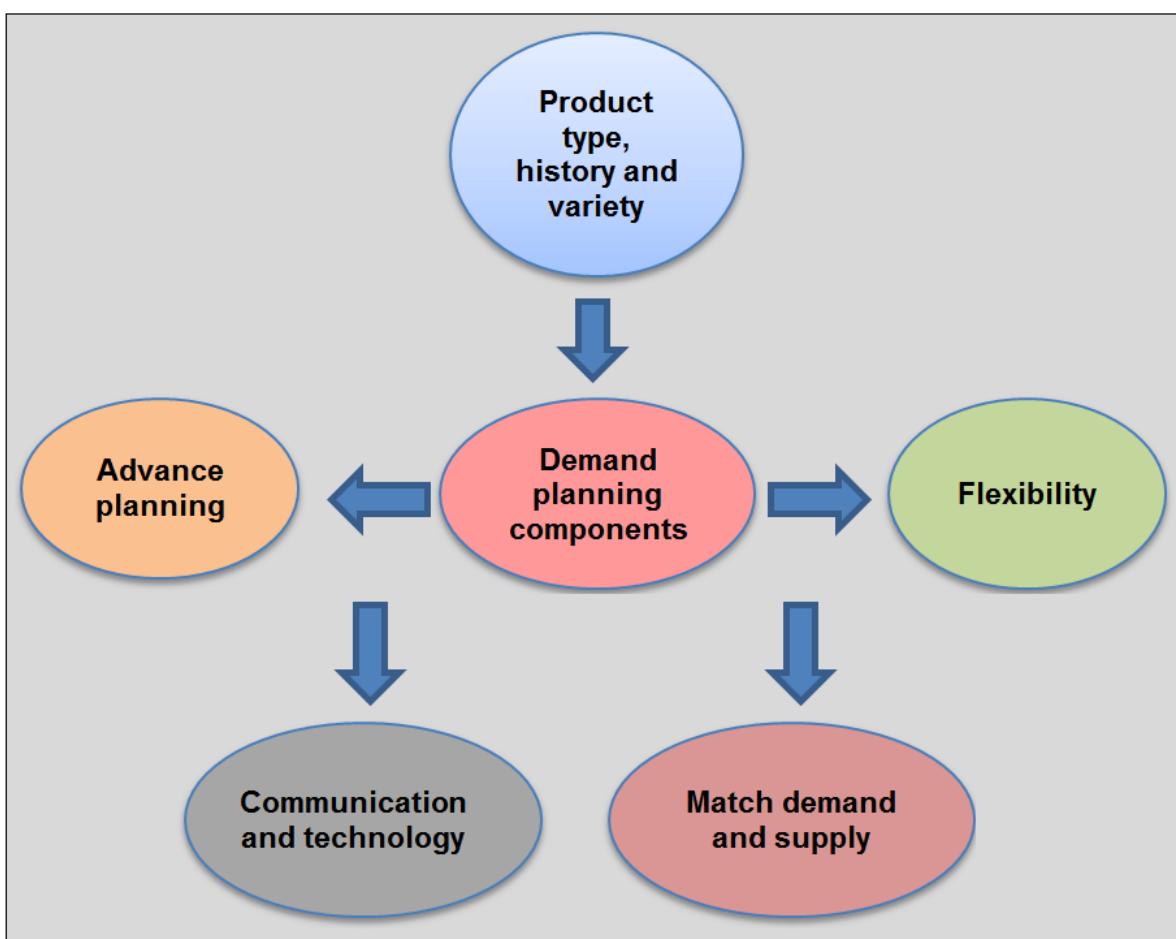
Black and Decker Corporation lost a turnover of ten million dollars within a year as a result of a high demand for their products which was not properly planned for by the company (Fisher *et al.*, 1994:86). Bhardwaj and Fairhurst (2010:165) stated that until the end of the 1980s, organisations were relying on their own knowledge when planning for customer demands. Also, global demand rivalry has forced organisations to become more flexible in demand planning (Aksoy *et al.*, 2012:223).

The importance of demand planning is acknowledged by organisations, but they still fail to apply proper demand planning due to uncertainties regarding the customers' demand (Oyatoye and Fabson, 2011:131). Proper demand planning exists when organisations are able to succeed in obtaining the correct items at reasonable costs and at the correct time. This is seen as fundamental for organisational endurance (Mason-Jones *et al.*, 2000:4061).

Demand planning is part of the SCM process, which creates added value for products by providing products according to the customers' needs and preferences (Priem and Swink, 2012:7). Authors, such as Esper *et al.* (2010:5), confirm that demand planning forms part of the supply chain (SC) process. Monczka, Handfield, Giunipero and Peterson (2014:13) define SCM as the advanced administration of a two-way flow and synchronisation of products and services, data and cash from unprocessed material over to customers. Esper *et al.* (2010:6) mentioned that the moment organisations begin to separate demand and supply activities there will be errors in aligning the product demand and supply. It is easy to plan and synchronise SC activities when demand planning and SCM are in line. Through the management of the supply chain process it becomes easy to plan for production demand and to satisfy customer needs on time (Larsson *et al.*, 2012:68). SCM assists organisations to make conclusions regarding customers' varying needs (Oyatote and Fabson, 2011:131).

SCM has existed for a long time, and organisations have been connected through various SC networks. The concept of SCM was presented in 1980, and since then it has increased in scope (Oyatoye and Fabson, 2011:132). Previously, SCM focused on organisations internally; however, currently it has broadened to focus externally on organisations globally (Oyatoye and Fabson, 2011:132).

According to Esper *et al.* (2010:5), combining demand planning with SC procedures assists in determining actual clients' needs. Monczka *et al.* (2014:12) explain that SC is a combination of three or more organisations that are openly connected directly by one or more up-streaming and down-streaming of goods and services, cash, as well as data from the supplier to the customer. Material and product movements required by customers are managed and maintained between organisations through the SC processes (Bhatnagar, 2012:1590). This on its own proves that demand planning and SC should work like a hand and a glove to improve organisational operations. Demand planning constitutes important components critical to satisfy customers' needs as are presented in Figure 2.1 below.



**Figure 2.1: Components of demand planning**

Source: Researcher's own compilation

As shown in Figure 2.1, the components of demand planning are the application of the product type and sales history, flexibility, the matching of demand and supply, the implementation of communication and technology, and advance planning.

These components are explained briefly below to facilitate how demand planning is implemented by organisations.

- ***Product type and sales history***

Certain processes need to be put in place for the proper implementation of demand planning. Planning according to different product types is important in demand planning (Chaudhry and Hodge, 2012:66; Jonsson and Tolstoy, 2014:61). Customers' needs vary, and for demand planning to be successfully implemented, firms should be in a position to satisfy such customers' varying needs. Pretorius (2013:1) states that where there are many product stock-keeping units (SKUs), the sales history and trends need careful monitoring when implementing demand planning. This highlights the importance of product sales history information when implementing demand planning. Xia and Wong (2014:120) noted that in situations where organisations do not have enough sales history information, the proper implementation of demand planning may cease to exist. Hence, the product type, product history and variety of product offerings are crucial components for the successful implementation of demand planning in organisations.

- ***Implementing flexibility in demand planning***

Flexibility in matching customers' demand, and in matching product demand with supply, is another component to consider in demand planning (Oyatoye and Fabson, 2011:133). Hence, demand planning, especially with fast-moving products, requires a great deal of flexibility (Barnes and Lea-Greenwood, 2010:762). Implementing flexibility in the response to satisfying customers' needs is a tool to improved demand planning of customer products (Mikati, 2009:5523).

- ***Matching the demand with the supply of products***

Matching product demand with material supply in production firms assists in preventing stock shortages, as well as the oversupply of stock (Nenni *et al.*, 2013:1). However, for demand planning implementation to be successful, it is imperative for organisations to be able to match product demand and supply. Following-up on product and material delays with suppliers may assist in matching the demand and supply of products. As suppliers of materials are informed about the delays in what has been ordered, suppliers are able to speed up the process of

delivering materials to firms (Oyatoye and Fabson, 2011:132). This might result in fast production processes and quicker fulfilment of customer needs. Matching the demand and the supply of products is energised by improved communication and technological processes (Surchi, 2011:258).

- ***Communication and technological implementation***

Communication is important in the implementation of demand planning, as the sharing of information between various participants in the SC improves the flexibility in communicating customers' needs. Information that is communicated among SC partners, and which is coupled with technological implementation, results in a quick response to customers' needs, and customers can obtain products ordered on time. This reduces material or product delay and allows organisations to match product demand with the supply (Oyatoye and Fabson, 2011:132). Technology has taken over the world, and the inclusion of components such as communication and technology facilitates information sharing amongst SC partners and leads to the advance planning of product demand.

- ***Advance planning implementation in demand planning***

Planning well ahead assists in fast-tracking the process of demand planning and improves planning in the midst of environmental changes (Bhardwaj and Fairhurst, 2010:165). According to Rajaguru and Matanda (2013:620), inconsistencies in the environment affect the existence of proper planning, cause delays in meeting the demand and discourage the right product offering. Also, the importance of ordering products or material well in advance prior to the selling season is another tool which may be used in advance demand planning (Bhardwaj and Fairhurst, 2010:165).

## **2.2.2 Importance of demand planning**

Demand planning is important to the competitiveness of firms globally (Seyoum, 2010:168). The competitive position of global firms can be improved through the implementation of proper demand planning. This competitive position can be achieved when the components of demand planning are properly implemented in organisations and when customers' requests are met on time (Annadurai and Uthayakumar, 2010:3466).

Competing organisation are able to win the market, increase turnover, grow the organisation, retain old customers and attract new customers (Seyoum, 2010:168). Furthermore, improved demand planning activities allow organisations to improve production outputs and create employment (Nattrass and Seekings, 2012:13). Competitive organisations constantly have to stay aggressive in their product offering and in their responses to changes in the market and economic environment, and need to remain flexible in implementing demand planning activities (Seyoum, 2010:168).

On-time response is seen as a competitive tool in organisations when it comes to demand planning, and it assists in minimising inventory stored in case customer demand arises (Annadurai and Uthayakumar, 2010:3466). Verifying and updating demand data assist in improving demand planning (Mamani and Moinzadeh, 2013:95). Having provided the overview of demand planning, the next section of the chapter presents demand planning in the clothing industry.

## **2.3 DEMAND PLANNING IN THE CLOTHING INDUSTRY**

This section explores demand planning in the clothing industry. In the course of the section, the background and the history of the clothing industry, the application of demand planning in the clothing industry, and the contribution of the clothing industry to the world are discussed.

### **2.3.1 The global clothing industry**

The clothing industry experienced rapid growth internationally in the 1970s (Gereffi and Frederick, 2010:2). In the 1990s, the clothing manufacturing industry grew rapidly in the United Kingdom (Ramdass, 2007:33). In 2008, the purchase of clothes internationally grew rapidly, for example, clothing sales boomed in the United States (USA), the European Union (EU), Japan and Russia (Gereffi and Frederick, 2010:3). Currently, an increase of clothing manufacturing is being observed in cities such as Paris, London and New York (Oberhofer, 2012:66). The cities previously mentioned are seen as the fastest-growing cities in terms of the manufacturing of various clothing styles. The increase of clothing purchases internationally confirms that it is important to plan for clothing demand in the clothing industry (Oberhofer, 2012:74).

The clothing industry is globally associated with the short period of garments' existence, unstable customer needs and a variety of fashion styles with extensive lead times (Wong and Guo, 2010:614). Reduced production periods exist in the clothing industry; hence, the industry is subject to intensive rivalry and requires a flexible garment production scheduling process (Jonsson and Tolstoy, 2014:62). The clothing industry can only survive when all the parties in the clothing value chain becomes flexible and are involved in the garment production process and in the delivery of the relevant fabrics needed in the production line (Gereffi and Frederick, 2010:21). Demand planning is crucial in the clothing industry, as shown in the section below, indicating the clothing industry's contribution to global wealth.

The clothing industry is important to the world as it makes a significant contribution to the economic wealth of the whole world (Vlok, 2006:231). Table 2.1 presents the sales and GDP contribution of the clothing industry in selected countries. The annual clothing sales and GDP contribution of countries such as the USA, Canada and the UK are presented. The annual contribution of clothing sales in the USA was statistically obtained from FashionUnited (2014). The annual Canadian clothing sales contributions from 2012 to 2014 were obtained from Statista (2015). The annual UK clothing sales contribution from fashion clothes for 2009 and 2014 were obtained from Statista (2015).

**Table 2.1:** Annual sales and GDP contribution of the clothing industry

Country	Year	Currency in Rand (ZAR)	Clothing sales as % of GDP
USA	2013	3 487.26 billion	2.16%
Canada	2012–2014	4 478.12 billion	8.60%
UK	2009	344.14 billion	1.72%
UK	2014	466.55 billion	1.43%

**Source:** Adapted from Statista (2015)

As indicated in the table above, in 2013, clothing sales in the USA contributed 2.16% to the GDP. Between 2012 and 2014, Canada contributed 8.60% to the GDP. In 2009, the United Kingdom contributed 1.72% to the GDP, and in 2014, the clothing industry contributed 1.43% to the GDP. As shown in Table 2.1, the USA

has the highest contribution of 2.16% to the GDP, if compared to the other countries presented in the table.

Furthermore, Wigley (2011:919) indicates that a leading clothing organisation in the UK, called *Next*, made a huge sales contribution in this industry. In the year 2000, the *Next* clothing organisation made an annual sales contribution of R14.976 billion. In 2005, the annual sales contribution of *Next* clothing increased to R33.049 billion and in 2010, this increased to R38.545 billion. The currency presented was converted from the UK currency to SA rand using the official average exchange rate per respective year (Official exchange rate = local currency unit per US dollar (US\$), period average; World Bank, 2015). The global sales statistics presented confirm that clothes are essential commodities around the world (Wigley, 2011:919). The clothing industry is therefore crucial and contributes to the world economic growth. Shen *et al.* (2013:266) confirm that, in order to meet the needs of customers, the interactions of the clothing SC participants have become of great importance.

### **2.3.2 The South African clothing industry**

Clothing industries in South Africa are situated in various provinces in the country, with the majority of the clothing industries situated in the Western Cape, KwaZulu-Natal (KZN), the Free State, as well as Gauteng (Vlok, 2006:227). According to Salm (2002:7), the SA clothing industry began to increase in volume and in product offering after the Second World War. The SA clothing industry started in Cape Town and then spread to Johannesburg in the 1920s and the 30s (Nattrass and Seekings, 2012:2). Natural clothing fabrics which come in different mixes are used around South Africa (Barnes, 2005:5). There are various stakeholders in the clothing industry who contribute towards the productivity of this industry. These stakeholders are fabric suppliers, fashion designers and clothing manufacturers. The SA clothing industry comprises of three key industry stakeholders. as briefly discussed below:

- ***Fabric suppliers***

Fabric suppliers in SA are the main contributors in the functioning of this industry as the production of clothes starts with fabric production (South Africa.info, 2015). Fabric production is crucial as clothing fabrics are needed to produce final garments

in various styles and colours. Fabrics are made from yarns and the yarns are plaited in order to make fabrics (Ny Fashion Center, 2015). The yarn is produced from cotton. South Africa is a top producer of wool, and the country is also one of the top five global countries producing mohair (South Africa.info, 2015). In addition, South Africa harvests 40 000 tonnes of cotton yearly (SouthAfrica.info, 2015). Salm (2002:17) says there are 3 400 cotton suppliers and 15 000 suppliers of wool in South Africa. Therefore, demand planning in the clothing industry should start with the fabric supplier, and progress right through to the manufacturing of clothes. However, it is important to manufacture clothes that are made according to the customers' needs regarding various fashions and to design clothes according to current fashion trends. This makes the services provided by fashion designers even more important in clothing manufacturing.

- ***Fashion designers***

Fashion designers in SA are more involved in the creation of various clothing brands than clothing manufacturers (Oberhofer, 2012:67). As fashion started in global cities such as Paris, London and New York (Oberhofer, 2012:65), these countries are seen as the main fashion trend setters.

Fashion production is growing, and it is controlled by market forces which consist of individual requirements and desires (Shen *et al.*, 2013:266). Fashion manufacturing tools have been separated into the international garment industry and the domestic clothing styles segment (Skov, 2011:138). Fashion centres which have been in existence for many decades in cities such as Paris, London and New York, are still operating today. These fashion centres are still dominating the fashion industry of various states and regions in terms of fashion clothes production (Skov, 2011:139).

However, global fashion has also resulted in the growth of fashion in African countries. African countries started to compete globally and to grow the domestic fashion markets (Oberhofer, 2012:83). There was also growth in the fashion industry in South Africa, and this gave birth to an increase in fashion designers in South Africa and other African countries (Oberhofer, 2012:83). South African fashion designers have recently started competing in the global fashion world (Oberhofer, 2012:67). According to Skov (2011:138), fashion centres, where fashion designing takes place, are localised, for example, fashion centres were

established in the city of Johannesburg where style makers, such as Stoned Cherrie, were established and developed (Oberhofer, 2012:71). The state initiative has assisted style makers such as Stone Cherrie to become a leading fashion brand in South Africa. Some fashion designers are operating as owners of small organisations where they run the fashion designing organisations, while other fashion designers are employed within the clothing production industry.

- ***Clothing manufacturers***

The clothing manufacturing industry in South Africa plays a critical role, as clothes are one of the basic requirements of all human beings (Staritz and Morris, 2013:9). Authors such as Nattrass and Seekings (2012:6) and Staritz and Morris (2013:9) posit the view that some of these clothing factories are known as the cut, trim and make (CTM) industry. The CTM factories are accountable for cutting and trimming clothing fabrics and for making complete garments according to clients' requirements. The clothing production factories have the opportunity to outsource the clothing manufacturing to the CTM factories in order to meet the clothing demands; however, the manufacturers have the final say regarding the design of clothes they require (Staritz and Morris, 2013:9). As indicated previously in this section, key stakeholders in the clothing industry, such as fabric suppliers, fashion designers and clothing manufacturers, are critical in the production operation of the clothing industry.

Although the key stakeholders in the clothing industry perform various functions, each one of them has special attributes which make a valuable contribution towards improving the industry's productivity.

From the discussions on the key stakeholders above, it is evident that fabric suppliers, fashion designers as well as clothing manufacturers each have a unique character and perform various roles and responsibilities towards clothing production.

The distinctive activities of the clothing industry stakeholders are summarised below in Table 2.2.

**Table 2.2: Distinctive activities of the clothing industry stakeholders**

Clothing industry stakeholder	Key activities
Fabric suppliers	<ul style="list-style-type: none"> <li>▪ Cotton and wool producers</li> <li>▪ Yarn processing to clothing fabric</li> <li>▪ Clothing fabric production</li> <li>▪ Supply clothing manufacturers and fashion designers</li> </ul>
Fashion designers	<ul style="list-style-type: none"> <li>▪ Design various fashion brands</li> <li>▪ Produce unique fashion designs</li> <li>▪ Cater for unique customer fashion styles</li> </ul>
Clothing manufacturers	<ul style="list-style-type: none"> <li>▪ Knitting and sewing clothing fabric</li> <li>▪ Final clothing garment producers</li> <li>▪ Cater for both basic and fashion clothes</li> </ul>

**Source:** GGDA (2014:2), Thomassey (2010:471), Oberhofer (2012:65), Chaudhary (2011:2).

As reflected in Table 2.2, each stakeholder in the clothing industry has unique activities, which add value to demand planning and production improvement in this industry. The expertise of all three clothing industry stakeholders is required for the functioning of this industry. Their expertise also contributes towards improving the economic wealth of the country. The flow and administration of the clothing production make a significant contribution to the economic wealth of the country. As will be shown in the next section, the SA clothing industry contributes greatly to the GDP.

### **2.3.3 Contribution of the clothing industry to SA economy**

In this section, the contribution of the SA clothing industry to the GDP of the country, the contribution of the SA clothing industry to employment, the sales contribution of the SA clothing industry, and the decline of the SA clothing industry are discussed.

- ***Contribution of the clothing industry to the gross domestic product (GDP)***

Between May 2012 and May 2013, the clothing industry contributed 13% to the manufacturing output of South Africa, and in 2013, it contributed 14% to the manufacturing output of South Africa (About education, 2014). This makes clothing manufacturing organisations a significant contributor to the GDP of the country. For

a region, the GDP is the value of all the products and services produced within the region or state (About education, 2014). As important as this industry is to the country's economic wealth, it continues to decline. This decline has led to a reduction in employment and some of the organisations had to close down.

- ***Contribution of the clothing industry to employment***

Employment in the clothing industry has fluctuated over the years, and this trend has resulted in a drastic reduction in the number of SA clothing manufacturing firms. The annual employment figures are presented in Table 2.3.

**Table 2.3: Trend in the reduction of employment in the clothing industry**

Year	Employment
1950	50 000
1980	170 000
1996	228 053
2005	142 865
2013	80 000

**Source:** Adapted from (Nattrass and Seekings, 2012:2; Vlok, 2006:229; Media Club South Africa, 2015:14)

As indicated in Table 2.3, there were 50 000 workers employed in the SA clothing industry in 1950, and this increased to the highest number being employed in 1996. In 2013, despite the tremendous growth in the SA population, there were only 80 000 workers employed in the SA clothing industry. In the midst of a decline in employment in this industry, the sales contribution of the clothing industry shows that the industry is still fighting for survival.

- ***The decline of the SA clothing industry***

The status of the SA clothing industry reflects a low-income market, and low productivity (Nattrass and Seekings, 2012:7; Rogerson, 2000:691). Due to low productivity and the fact that the clothing industry is a low-income market, it is crucial to plan for the demand in the clothing industry. According to Hong (2015:323) clothes are seen as highly recommended products, which symbolise the status quo of individuals (Hong, 2015:323).

The number of SA clothing manufacturers is on the decline and the majority of factories are leaving South Africa to invest in bordering countries (Ramdass, 2007:57). The reason, according to Nattrass and Seekings (2012:7), is that global trade and recession have caused certain clothing manufacturers to relocate some of their manufacturing operations to other less expensive locations due to the intense local competition and global economic downturn. In some cases, the clothing factories experienced serious challenges resulting from these global factors, and some of the clothing factories decided to terminate their clothing manufacturing operations (Nattrass and Seekings, 2012:7). The discussion indicates that better approaches to demand planning in the clothing industry are required as will be discussed in the next section.

## **2.4 APPROACHES TO DEMAND PLANNING**

Demand planning approaches are critical in the decision-making processes of production organisations (Belmokhtar *et al.*, 2010:1). Production organisations often adopt certain approaches in reducing the complexity of production processes when planning for customer demands (Albey and Bilge, 2011:3320). Demand planning approaches, such as modelling uncertainties, aggregation and disaggregation processes, and replacing random processing with their averages are commonly used in production organisations (Nielsen and Steger-Jensen, 2008:59). Production organisations realise that for these approaches to succeed in reducing production complexities, there is a need to establish a hierarchical and an optimal approach to production decision-making (Nielsen and Steger-Jensen, 2008:58). Hierarchical and optimal approaches are demand planning approaches which are perceived to assist production organisations in making appropriate decisions regarding the production planning of product demand. Hence, in the current study, the hierarchical and optimal approaches were selected as the production improvement decisions when planning for customer demand.

### **2.4.1 Hierarchical demand planning approach**

According to Albey and Bilge (2011:3319), the hierarchical approach as a production planning approach was introduced by Bertrand and Wortmann, as well as Wijngaard in 1990. Nielsen and Steger-Jensen (2008:2) assert that the

hierarchical approach is a demand planning approach which assumes that data and ideas can be combined across various operational dimensions or through supply linkages without any intervention. Pycraft *et al.* (2013:13) confirm that when planning for demand in a manufacturing plant, it is important to consider the following three groups that form part of the demand satisfaction process:

- external suppliers,
- internal suppliers, and
- internal customers.

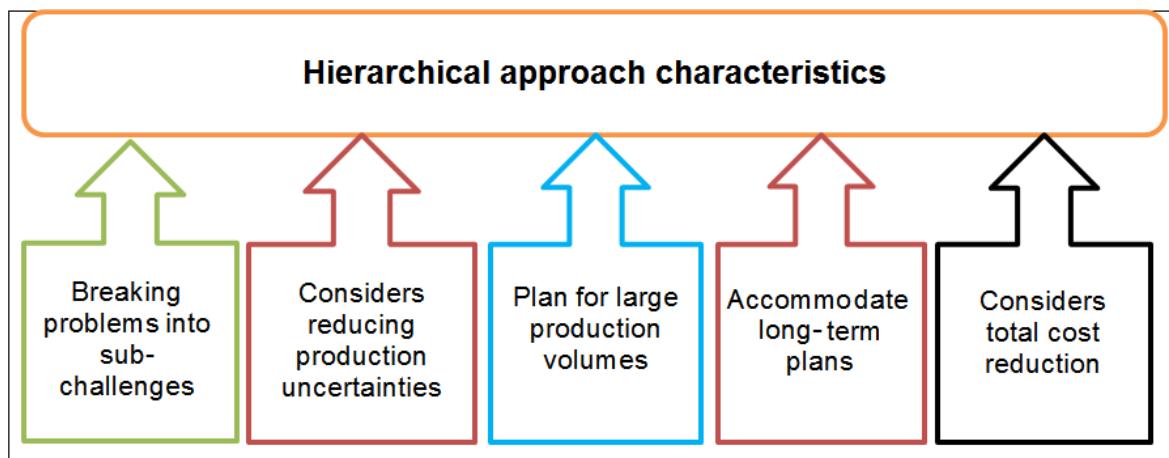
These three groups link together in the production demand planning process. Hence, Pycraft *et al.* (2013:13) consider each linkage in the process of demand planning as a hierarchical approach to demand planning. This confirms that there is a need for production decision plans to be separated across various organisational dimensions and SC networks in order for demand planning to improve. The hierarchical approach is considered relevant in assisting organisations with separate production decisions across the value chain linkages (Pycraft *et al.*, 2013:13). This implies that the hierarchical planning approach is based on a decision which includes all the dimensions in the production planning of products.

The hierarchical approach plans to solve the problem using various dimensions in the product planning decision-making process (Belmokhtar *et al.*, 2010:1). This demand planning approach tool separates operation process challenges into smaller sub-challenges that can be managed with a suitable managing tool, gathering products and subsequently separating them into smaller sub-units (Belmakhtar *et al.*, 2010:1; Sethi *et al.*, 2002:6).

According to Belmakhtar *et al.* (2010:1), the hierarchical approach aims to reduce operational uncertainties, as this approach assists in determining the necessary resources required in the value chain network in order to meet the product needs of specific product groups. Albey and Bilge (2011:3322) assert that the hierarchical approach takes into account the manufacturing equipment, material handling, backlogging, actual manufacturing and the inherent cost.

This approach accepts that production decisions should combine various dimensions in the organisation, or partners in the product value chain (Nielsen and Steger-Jensen, 2008:2).

The hierarchical approach combines the volume of production per product group, for a specific production in an unlimited period, and should incorporate several plans (Nielsen and Steger-Jensen, 2008:2). The hierarchical approach operates effectively in a stable production process. Nielsen and Steger-Jensen (2008:58) allude that the hierarchical approach is suggested in intermediate to large-volume operations and aims to minimise the total cost of production. A summary of the hierarchical approach's characteristics on production demand planning is presented in Figure 2.2 below:



**Figure 2.2: Hierarchical characteristics of production demand planning**

**Source:** Belmakhtar *et al.* (2010); Nielsen and Steger-Jensen (2008); Sethi *et al.* (2002)

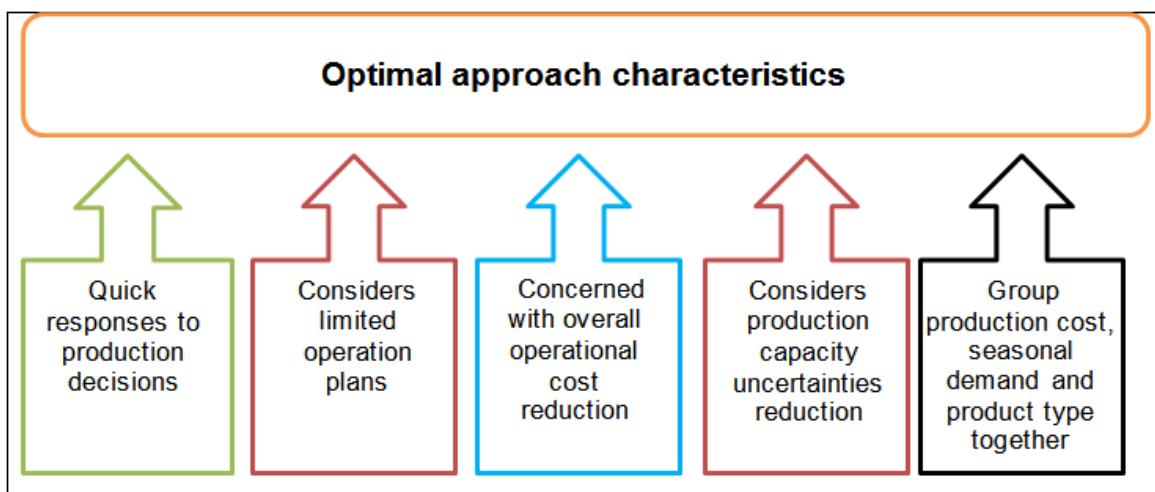
#### 2.4.2 Optimal demand planning approach

The optimal approach is also one of the demand management approaches which assist in the production decision-making of organisations (Albey and Bilge, 2011:3320). According to Nielsen and Steger-Jesen (2008:57), organisations face vigorous interventions across various operational dimensions inside the organisations and in the SC network. Hence, the optimal approach is crucial to ensure quick responses in production decision-making processes. Albey and Bilge (2011:3320) alluded that it is crucial to have an idea regarding production-changing aspects in order to evaluate the production capacity when planning for product

demand. Production flexibility control is important in the decision-making regarding product demand planning (Sethi *et al.*, 2002:6).

The optimal approach is a relevant tool that can be used to address short manufacturing plans, multiple production processes, and also in anticipating real capacity utilisation (Sethi *et al.*, 2002:6). Challenges with regard to scheduling and time, capacity anticipated, equipment and manufacturing blockages, as well as short-term planning challenges, need quick intervention and operational control decisions (Albey and Bilge, 2011:3322). The optimal approach is there to address such challenges pertaining to manufacturing scheduling in a flexible manner.

Sethi *et al.* (2002:6) asserted that the optimal approach to demand planning is concerned with gaining operational ideas over a limited perspective in order to satisfy a deterministic demand. The production capability is mostly considered in comparison to the demand for production. The production capacity is demonstrated as an uncertainty in an optimal approach. Sethi *et al.* (2002:6) explain that the optimal approach aims to reduce the overall costs of operation and stock holding. Nielsen and Steger-Jensen (2008:58) affirmed that the optimal approach proposes that products of similar production cost, inventory cost, seasonal demand and product type be grouped together in the production process. This approach considers cost reduction in a flexible production run when planning for product demand. Figure 2.3 presents a summary of the characteristics for the optimal approach.



**Figure 2.3: Optimal approach characteristics**

**Source:** Belmakhtar *et al.* (2010); Nielsen and Steger-Jensen (2008); Sethi *et al.* (2002)

### 2.4.3 Hierarchical vs optimal demand planning

The hierarchical and optimal approaches to demand planning assist manufacturing organisations in the decision-making of individual processes, information planning, and material and production capacity utilisation (Belmokhtar *et al.*, 2010:1). However, there are distinctions between these two approaches. The distinct characteristics of hierarchical and optimal demand planning approaches are explained in Table 2.4.

**Table 2.4: Hierarchical vs optimal demand planning approaches**

Attributes	Hierarchical demand planning approach (HDPA)	Optimal demand planning approach (ODPA)
<b>Production planning</b>	<ul style="list-style-type: none"> <li>▪ The HDPA separates operation processes challenges into smaller sub-challenges through the use of a suitable managing tool.</li> <li>▪ The HDPA combines products and subsequently separates them into smaller groups.</li> <li>▪ The HDPA considers production plans over an extended period.</li> <li>▪ The HDPA operates effectively in a stable production process.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The ODPA is interested in gaining a production plan over a limited period in order to satisfy a deterministic demand.</li> <li>▪ The ODPA lowers stockholding.</li> <li>▪ The ODPA incorporates backorders in the production decision-making process.</li> <li>▪ The ODPA groups production cost, seasonal demand and product type together.</li> <li>▪ The ODPA considers the fact that the environment is dynamic.</li> </ul>
<b>Uncertainty prevention</b>	<ul style="list-style-type: none"> <li>▪ The HDPA indicates uncertainties in the operation planning problem through flow processes.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The ODPA considers demand to be an unlimited state.</li> <li>▪ The ODPA examines stochastic demand in a separate time setting.</li> </ul>
<b>Forecasting</b>	<ul style="list-style-type: none"> <li>▪ The HDPA considers production demand estimation and revising estimations during the planning period.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The ODPA considers quick production demand estimations, thus considering maximum utilisation of the production facility.</li> <li>▪ The ODPA aims to find an optimal forecast on aggregate data.</li> </ul>
<b>Production machine capabilities</b>	<ul style="list-style-type: none"> <li>▪ The HDPA considers multiple uses of production equipment. Producing a different product in demand using machines in</li> </ul>	<ul style="list-style-type: none"> <li>▪ The ODPA considers production of single or parallel equipment this way:</li> <li>▪ The ODPA acknowledges that</li> </ul>

<b>Attributes</b>	<b>Hierarchical demand planning approach (HDPA)</b>	<b>Optimal demand planning approach (ODPA)</b>
	<ul style="list-style-type: none"> <li>▪ general</li> <li>▪ The HDPA considers network arrangement as machines may break and may need to be repaired.</li> </ul>	<ul style="list-style-type: none"> <li>▪ production equipment produces at a maximum rate if the inventory level is less than the threshold;</li> <li>▪ The ODPA produces on demand if the stock level is equivalent to the threshold;</li> <li>▪ The ODPA will not produce if the stock level goes beyond the threshold.</li> </ul>

**Source:** Adapted from Sethi *et al.* (2002) and Nielsen and Steger-Jensen (2008)

Table 2.4 explains the distinction between the hierarchical and the optimal approaches. As indicated in Table 2.4, both the hierarchical and the optimal demand planning approaches might be considered effective when making production planning decisions on clothing categories in the clothing industry. However, the hierarchical demand planning approach seems to operate effectively on large-scale stable operation processes with minimal uncertainties (Nielsen and Steger-Jensen, 2008:2). On the other hand, the optimal demand planning approach seems to function more efficiently on small flexible production operations with lots of production uncertainties (Sethi *et al.*, 2002:6). Thomassey (2010:471) indicated that, in terms of clothing manufacturing, basic clothes are stable and constitute long manufacturing processes, while fashion clothes constitute constant changes and require short manufacturing processes (Ait-Alla *et al.*, 2014:3). Therefore, the hierarchical demand planning approach may be a suitable approach when making production decisions about basic clothes, while the optimal demand planning approach may be considered a suitable approach to be implemented in the manufacturing decisions for fashion clothes.

Hence, the adoption of these demand planning approaches depends on product offering. When implementing demand planning approaches, organisations should consider the various factors that affect demand planning practices in the clothing industry.

## **2.5 FACTORS AFFECTING DEMAND PLANNING PRACTICES IN THE CLOTHING INDUSTRY**

This section presents the factors which affect demand practices in the clothing industry.

Seyoum (2010:170) believed that there are certain factors which contribute to huge variances when demand planning is implemented in the clothing manufacturing industry. The following factors are seen as challenging when planning for the demand of clothes:

- the scheduling of clothes,
- planning for fashion,
- the POS system usage,
- clothing imports,
- clothing estimations,
- global recession, and
- the lead time of clothes.

These factors also affect accurate demand planning in the SA clothing industry and may be the causes of failures in demand planning. Aksoy *et al.* (2012:223), for example, claimed that errors in the POS system and multifaceted production can complicate clothing forecasts. Aksoy *et al.* (2012:223) added that past clothing sales data that is disturbed, as well as fashion and environmental factors and the transportation of clothes greatly affect the performance of the clothing industry.

Nattrass and Seekings (2012:7) asserted that various factors, such as the global recession and clothing imports, have affected demand planning in the clothing industry. On the same issue, Bhardwaj and Fairhurst (2010:165) mentioned that the late arrival of fabrics affects demand planning in the manufacturing of clothes. The available literature also suggests that information sharing through the POS system facilitates demand planning in the SA clothing industry (Fisher *et al.*, 2000:122). On the other hand, (Pretorius, 2013:3) confirmed one of the retail organisations in SA is experiencing constant changes in customer demand which affects operations and contributes to variances in estimations.

These challenging factors which also affect the SA clothing industry are discussed in detail, starting with the incorrect scheduling of customer order manufacturing.

### **2.5.1 Incorrect scheduling of manufacturing**

Clothing scheduling is important in the clothing industry. Before clothes can be manufactured, there should be a plan regarding the resource utilisation, manufacturing implementation time, fabric acquisition and production capabilities (Maravelias, 2012:1815) as briefly discussed below.

- ***Scheduling in perspective***

Scheduling is important in the clothing industry and it forms a big part of ensuring service delivery, which plays a crucial role in the clothing industry (Yimer and Demirli, 2010:414). Since the beginning of the 1950s scheduling has widely been practised in various organisations, including production organisations, and it has its own challenges (Maravelias, 2012:1812). Clothing manufacturing scheduling plays a major role in the SA clothing industry and is a challenging aspect of operations. According to Maravelias (2012:1815), these challenging aspects are the implementation time, fabric acquisition, resource utilisation and production capabilities. According to Mikati (2009:55310), as well as Pan and Nagi, (2010:668), improved scheduling should be coupled with faster manufacturing (Mikati, 2009:5531; Pan and Nagi, 2010:668).

Improved scheduling should also be coupled with the manufacturing of recent products which please customers (Surchi, 2011:258). Esper *et al.* (2010:9) affirmed that scheduling plans provide a road map for manufacturing implementation. Scheduling should be associated with stock monitoring (Annadurai and Uthayakumar, 2010:3465). Incapacity stock should be minimised in scheduling plans (Annadurai and Uthayakumar, 2010:3465).

The clothing industry relies on effective manufacturing scheduling implementation. Improved demand planning will prevail as scheduling plans improve service delivery and result in cost savings (Yimer and Demirli, 2010:414). Likewise, planning for material supply should be aligned with delivery schedules (Ayala *et al.*, 2011:1). Material usage plays a major role in planning for clothing styles (Gu and Liu, 2010:1). It is important to reduce production time so that production can be in line

with the demand and supply of clothes (Wang *et al.*, 2012:463). According to Nattrass and Seekings (2012: 20), the majority of SA clothing manufacturers buy fabrics from international suppliers. This may cause delays in production planning time and demand uncertainties.

Ramdass and Pretorius (2011:167) explain that demand planning should involve scheduling that is aligned with the exact quantity requirements and time in meeting the needs of customers. However, proper demand planning in the SA clothing industry is distracted by the complexity of the clothing manufacturing process.

According to Media Club South Africa, 2015:14) the manufacturing process of clothes involves various stages as discussed in the section below.

- ***Scheduling of clothing demand in the manufacturing industry***

In order to produce completed garments, the scheduling of manufacturing planning processes should take place. The following are aspects that should be taken into consideration during this process:

- The complexity of the clothing manufacturing process
- Teamwork in clothing manufacturing
- Communication and technological usage in the clothing manufacturing process
- Correct scheduling manufacturing plan

Each of these aspects will be briefly discussed below.

- ***The complexity of the clothing manufacturing process***

As mentioned in Section 1.2.2, the manufacturing of clothes involves various stages and creates manufacturing complexities which are also problematic in the SA clothing industry and affect demand planning (Pretorius, 2013:1). This creates challenges for clothing manufacturers when planning for material scheduling as there are many stages involved in the manufacturing process of clothes, such as fibre and yarn processing, including the production of fabrics itself (Aksoy *et al.*, 2012:222; Chaudhary, 2011:6). For example, according to the Media Club South Africa (2015:14), the manufacturing process of clothes involves various manufacturing stages, such as spinning, weaving, knitting, tinting and finishing. Thereafter, the manufacturing process continues, as clothing types like jeans,

shirts, skirts, tracksuits and jerseys have to be produced (Nattrass and Seekings, 2012:18). Furthermore, the processes of producing fashion clothes in South Africa require various details with a short lead time (Nattrass and Seekings, 2012:17).

Authors like Gereffi and Frederick (2010:12) and Wang *et al.* (2012: 461) agreed that the various stages involved in the clothing manufacturing process create complexity in the production process. Apart from the various stages involved in the manufacturing process, Morstard, Teunter and Koster (2011:139) asserted that clothes involve many stock keeping units (SKUs) and span a range of seasons, which make scheduling quite complex, as 95% of these SKUs change every season. This problematic process of clothing scheduling highlights the importance of staff working together in demand planning in the SA clothing industry. When staff members begin to work together in the manufacturing process, the complexities in the clothing manufacturing process can be largely alleviated.

- **Teamwork in clothing manufacturing**

Team effort in the clothing industry is considered of great importance as it assists clothing participants to communicate in terms of scheduling of customers' clothing needs (Morstard *et al.*, 2011:140). Appropriate demand planning also relies on departments working together in fulfilling customers' needs (Esper *et al.*, 2010:11). Again, effective scheduling of production material should entail technical knowledge and the capability of organisations to distribute and utilise resources (Rexhausen *et al.*, 2012:271). Through effective teamwork, it can become easy to conduct follow-ups on material shortages in the clothing industry to improve demand planning. However, Fisher *et al.* (2000:120) argued that most clothing stores do not conduct follow-ups on inventory shortages. For example, material shipment delays need to be followed up immediately (Mamani and Moinzadeh, 2013:95). The solution to this problem could be in the form of follow-ups on inventory shortages in order to support SC activities in the clothing industry and to be able to manage stock rates.

Teamwork in the clothing industry assists the industry to follow up on stock shortages on time and to improve the manufacturing process of clothes. Nenni *et al.* (2013:3) declared that it is crucial to modify the manufacturing process of various fashion clothes, colours and clothing styles. As mentioned previously in Section

1.2.2, the demand for clothes will continue to exist in the clothing industry as individuals need clothes to cover their bodies.

Laudal (2010:67) confirmed that the clothing market demand is quite broad. Hence, correct scheduling time needs to be applicable to the clothing industry. Scheduling of the demand for clothing should happen at the correct time and the correct clothing needs should be provided to customers (Xia and Wong, 2014:119). Hence, teamwork established through efficient and effective communication in the clothing SC, results in improved demand planning in the clothing manufacturing industry. Communication of the clothing manufacturing schedule in the industry is fast-tracked when it is coupled with the usage of technology (Laudal, 2010:68) as shown in the next section.

- **Communication and use of technology in the clothing manufacturing process**

Communication is important in the clothing industry, and suppliers and manufacturers should share information regarding material to ensure item availability (Yimer and Demirli, 2010:413). Sharing clothing data among suppliers and manufacturers improves demand planning in the clothing industry. Communicating information on time between manufacturers and retailers reduces unnecessary inaccuracies in inventories (Hamister, 2011:431).

Inaccuracies in inventories are the result of communication barriers in the clothing industry. According to Laudal (2010:67), there are information barriers in the clothing industry as a whole which hinder the success of the demand planning process. Esper *et al.* (2010:10) commented that organisations fail to recognise their customers, and there is no manufacturer and customer communication in most organisations. Communication of information in the clothing industry must be coupled with constant follow-up and querying of material shortages (Mamani and Moinzadeh, 2013:95).

Clothing manufacturers should be flexible in communicating product information, as this will assist in preventing demand planning errors (Esper *et al.*, 2010:9). The process of revising communication errors requires a continuous reviewing of the scheduling process to avoid failures and demand planning mistakes (Morstard *et al.*, 2011:140). Communication of information within the clothing organisation

results in enhanced competitive benefits (Lannone *et al.*, 2013:3). This also raises the importance of using technological devices to communicate in the SA clothing manufacturing organisations.

Technology assists organisations to maintain a better competitive position (Pantano, Lazzolino and Migliano, 2013:225). According to Pantano and Viassone (2014:43), technological implementation in organisations leads to modified data. Technological integration also assists in improving communication between stakeholders in the clothing industry (Laudal, 2010:68). Organisations need to invest in technological advancement to be able to compete globally (Pantano *et al.*, 2013:225). The importance of technological communication in the clothing industry is recognised in terms of speeding up the flow of data in the SA clothing industry (Moodley and Morris, 2004:169).

Technology assists in ensuring that there is a constant flow of data pertaining to customer requests among different stakeholders (William, 2015:19). Thomassey (2010:471) confirmed that combined material and data transmission improves SCM. In the clothing industry, scheduling of production should be linked with system network integration (Bhardwaj and Fairhurst, 2010:169). Scheduling must also be aligned with batch production, quality and just-in-time (JIT) production (Olhager, 2010:864).

The sharing of clothing data among participants in the organisation improves clothing manufacturing scheduling (Pan and Nagi, 2010:669; Surchi, 2011:258). The scheduling of clothes should also involve the correct product plan and the correct time for customers' needs (Bhardwaj and Fairhurst, 2010:170). Olhager (2010:864) suggested that production organisations should devote most of the time to improving production operation systems in order to improve the spreading of data and to improve production plans. There is arguably still a need to integrate the different technological systems that exist in the clothing sector as well as in demand planning. Ayala *et al.* (2011:2) seemed to agree that spread of data through the integration of the various technological systems between partners in the SC is crucial in order to have control over the entire stock in the manufacturing industry.

Many scholars, including De Villiers *et al.* (2008:10), concurred that the use of wireless technological network cables, which started in the 2000s, facilitated

improvements in the operations in SC network scheduling activities. This technological network in the SA clothing industry should assist with flexibility when spreading manufacturing data (William, 2015:19; Jianling, 2004:53).

The matter of flexibility in spreading data and the use of computer technology integration in the clothing manufacturing organisations are seen as subjects of interest in the SA clothing industry (Moodley and Morris, 2004:169). Without the appropriate usage and integration of communication technologies in the SA clothing manufacturing industries, the process of demand planning is doomed.

Apart from technological integration, scheduling of clothes in the manufacturing industry should entail the use of correct information as detailed below.

- **Correct scheduling manufacturing plan**

A correct and timely manufacturing schedule in the clothing industry requires that the manufacturing plan of clothes should be expedited as quickly as possible. The manufacturing scheduling time should be short, especially with regard to fashion clothes. According to Bhardwaj and Fairhurst (2010:167), clothing styles have a short life span and require small manufacturing sets. Burt *et al.* (2012:331) asserted that the administration of customer demand consists of reduced scheduling plans and should accommodate emergency plans.

For this reason, manufacturing scheduling processes in the SA clothing should be reduced in order satisfying customers' needs on time (Ramdass, 2007:44). In addition, Ait-Alla *et al.* (2014:2) stated that clothing styles normally last for a limited period when compared to basic clothing garments, which exist for extended periods. Ait-Alla *et al.* (2014:1) mentioned that conducting correct demand planning for clothing products has become a challenge, as the latest assortment of garment styles on offer changed twice to ten times in a single period. Ni and Fan (2011:1529) confirmed that clothing styles last four seasons, and the production plan should accommodate these seasons.

Due to constant changes in the demand for clothes, a short-term manufacturing schedule in the SA clothing industry should exist. Chaudhry and Hodge (2012:69) asserted that an advanced clothing manufacturing scheduling plan should span a period of between five to six months. This implies that the SA clothing

manufacturing scheduling plan for the industry should be reduced, as Oberhofer (2010:66) indicated that fashion production is evolving in African countries and in SA.

Aksoy *et al.* (2012:225) confirmed that demand planning of fashion clothes should not take long, for example, it should take a week or three months to plan for fashion clothes. Thomassey (2010:471) pointed out that basic clothes are sold yearly, whereas fashion clothes are sold during specific times and over a short period. According to Wang *et al.* (2012:462), fashion clothes last for a short period. Short planning period should exist when scheduling the production of fashion clothes (Wong and Guo, 2010:614).

Small-scale production scheduling plans should be promoted to improve demand planning (Acar *et al.*, 2010:3247; Mikati, 2009:5523). Furthermore, manufacturing scheduling time in the SA clothing industry should be minimised. Laudal (2010:68) asserted that operating on tight scheduling times is also crucial. As indicated in this section, fashion clothes in the SA clothing industry require a short planning period. Hence, planning for fashion clothes in the SA clothing industry is one of the challenging factors which affect the existence of proper demand planning (Business Intelligence, 2014:3).

### **2.5.2 Planning for fashion clothes**

The clothing industry is driven by customers desiring the latest fashion brands and demanding the latest fashion trends.

- ***Fashion trends***

Fashion clothes consists of new clothing designs that have a relatively short life cycle. According to Rogerson (Williams, 2015:12), demand planning in the SA fashion industry is disturbed by ever-changing customer fashion styles, while manufacturers strive to predict customer demand patterns with a level of great accuracy (Ramdass, 2007:73). Nattrass and Seekings, 2012: 17) posit that fashion styles change constantly; hence, it is not easy to conduct demand planning on fashion clothes. This requires fashion producers to obtain some form of education in fashion garments (De Aguiar, Sigal, Treuille and Hodgins (2010:106). Customer hesitations on fashion clothes have increased (Shen *et al.*, 2013:266), and Gu and

Liu (2010:1) allude that it takes 18 to 24 months before a new fashion style is launched, new colours are presented from between 12 and 18 months, and then it will take six months for the presentation of the new fashion styles, which the clothing industry can adopt to produce the latest styles. This requires clothing manufacturers to be up to date with new fashion colour launches.

Fashion changes constantly, and as a result, clothing retailers may be left with a large amount of stock that has not been sold at the end of the garments' sale period (Barnes and Lea-Greenwood, 2010: 762). Shen and Li (2015:1172) confirmed that from 25% to 40% of garments are left unsold each sale period. This raises the importance of monitoring fashion movements, which are normally referred to as 'trends', by SA clothing producers (Jainling, 2004:35). According to Cho and Lee (2005:18) a trend is a new fashion style that is influenced by the community, politics and cultural changes. Fashion trends are also influenced by customers impulsively buying clothing (Nenni *et al.*, 2013:2).

Fashion movements in the clothing industry are seen as key transformation. Cho and Lee (2005:17) agreed that fashion movements are definite signs of key transformations with the potential of arousing the needs of clients regarding various fashion styles. Cho and Lee (2005:17) elaborated and said that changes in clothing material styles in the clothing industry will change the expressions of retailers and influence the buying patterns, and clothing manufacturers will be in the position to satisfy and accommodate such changes. Constant changes in fashion styles leave SA clothing retailers with a large variety of choices to make regarding garment styles. Ramdass (2007:44) affirmed that the pressures of staying current when producing fashion styles in SA will result in continuous alterations to the manufacturing processes. This requires that SA garment fashion producers learn more about fashion styles and attend fashion shows to enhance the SA fashion market.

- ***Fashion education***

Fashion exhibitions exert a great influence on the clothing styles being manufactured (Oberhofer, 2012:67). The manufacturing of SA fashion clothes requires a certain level of expertise to enable it to respond adequately to fashion styles and it also requires sophisticated production machines and complex

production processes to accommodate the various clothing styles (Nattrass and Seekings, 2012:22). De Aguiar *et al.* (2010:106) confirmed that knowledge of customers' styles requires a certain skill.

Stakeholders of the clothing industries in SA should attend fashion exhibitions, especially since customers are exposed the latest fashion styles in fashion magazines and via the internet (Oberhofer, 2012:67). Gu and Liu (2010:1) mentioned that domestic fashion analysts can obtain information about the latest available colours from training materials and internet websites that deal with international clothing styles. However, these training materials and internet websites are difficult to understand and follow (Gu and Liu. 2010:1). Furthermore, the selling of clothing styles within the sale season is an issue of concern, which affects operations of the SA clothing industry. This matter is confirmed by Bhardwaj and Fairhurst (2010:168) who asserted that the clothing industry is challenged when it comes to selling clothing styles within the sale season. Bhardwaj and Fairhurst (2010:165) elaborated that customer needs should be planned in line with fashion styles before the fashion season starts. Therefore, the skill of designing fashion styles in the clothing industry is raised as a crucial matter in this study.

Ramdass (2007:73) states that SA domestic designers should learn more about global fashion styles in order to expand clothing manufacturing ideas locally. Fashion education is required in the SA clothing industry, and SA clothing producers should attend training on fashion styles. According to Ramdass (2007:73 Kunene, 2008:119), SA fashion designers and manufacturers should attend fashion teaching institutions. In addition, projects to improve the clothing industry are required. Oberhofer (2012:69) holds that there is an increase in local clothing production as fashion centres are established in Gauteng.

All in all, studying fashion globally will provide SA clothing manufacturers with the opportunity to create new fashion styles in order to influence retailers' buying patterns and offer improvement in the operation process of the clothing industry. Moreover, this will require SA clothing manufacturers to become familiar with changes in fashion styles. In addition, the fashion clothing industry can obtain education fashion not only globally, but in their own countries as well, as the

knowledge obtained assists in enhancing the economy of that country (Oberhofer, 2012:84).

It is therefore clear that most authors are in agreement that the constant evolution of customers' needs creates doubts in the demand planning of SA clothing producers. Hence, demand planning for fashion clothes in the SA clothing industry should happen as quickly as possible and in a short space of time, as fashion trends change at a fast rate. In order to be in line with fashion clothes, planning for fashion clothes and fashion education is crucial in the SA clothing industry. Apart from challenges posed by fashion clothes, a lack of access to the POS system of retail clothing stores by SA clothing manufacturers adds to the challenge of demand planning.

### **2.5.3 The point of sale (POS) system**

The POS system used by retail clothing sellers was indicated as a demand planning tool which can assist clothing manufacturers to plan for future clothing needs (Thomassey, 2010:479).

- ***Incorrect usage of the point-of-sale (POS) system***

The POS system is used as a demand planning tool, which provides past clothing sales data to clothing manufacturers for correct clothing manufacturing estimations (Larsson, 2002:20). POS is defined as an automated system used by retail outlets to process the sale of items bought by customers (Karnin and Walach, 2015:1). According to Folk *et al.* (2011:5), the POS system supplies historical information of stock sold. Karnin and Walach (2015:1) mentioned that electronic detectors connected to the POS system are used to identify items purchased and record them as customers' sales are being processed. The correct items must be recorded in the POS system of SA retail stores. In terms of garments, recording the POS system should identify the size, shade and design of the garments, and keep records of the sale and product in the system.

The SA clothing industry uses the information entered into the POS system to plan for future demand of clothes (William (2015: 19); incorrect garment codes entered on the POS system thus results in demand planning errors. A lack of access to the POS system of retail stores by the clothing producers is highlighted as a challenge

in this study. Larsson (2002:20) argued that at times, production industries send agents to retail shops to collect sales data or they purchase the same data from advertising organisations. This happens due to a lack of access to the POS systems of retailer clothing stores and it creates data discrepancies when demand planning is applied in the clothing manufacturing firms. Nenni *et al.* (2013:4) argued that the lack of past sales information results in demand planning errors. It is generally clear that clothing retailers use the POS system to sell products (Chang, Kuo, Chen, Chen and Chung, 2012:585) and this fact was affirmed by William (2015:19) who indicated that SA clothing retail stores use the POS system to sell products.

Information captured on the POS system of clothing retailers must be verified to ensure that items are captured accurately (Karnin and Walach (2015:4). This implies that SA clothing manufacturers should also verify sales information obtained from the SA clothing retail stores. Karnin and Walach (2015:4) said that items captured on the POS system must be verified by cash register operators, and that training to operate the POS system will reduce incorrect sales capturing at the retail store level. In addition to testing the correctness of clothing sales data, it is important to integrate the POS system of retailers with the demand planning system of the clothing manufacturers. Hence, the importance of technological integration was mentioned in Section 2.5.1.2. As mentioned in Section 1.2.5, there is a lack of technological integration of the retail stores and clothing manufacturers.

- ***Lack of integration of manufacturers and retail customers' systems***

Technological system integration is also important in the clothing industry. For example, if information is shared between retail clothing stores and the clothing manufacturers, demand planning can be improved. Technology assists in sharing information easily between SC partners, and the POS system is presented as one of the technological systems which can assist SC partners to share information (Rajaguru and Matanda, 2013:622).

The POS system is the technological tool which can assist SCs to quickly communicate sale information in the clothing industry (Folk *et al.*, 2011:1). To reiterate, technological enhancement in the POS system of retailers leads to modified data (Pantano and Viassone, 2014:43). Technological machines assist in

improving customer service (Zhu, Nakata, Sivakumar and Grewal, 2013:15). The POS system is one of the machines which can assist the retail clothing industry in improving its service to its customers. This service technology also assists SA clothing manufacturers to obtain sales data from retail clothing stores.

The SA clothing industry should be linked through the POS system, which in turn assists in sharing demand information (William, 2015:19). In most clothing organisations, there is an agreement that the retailer's POS system should be linked to the demand planning system that is generally used by the SA clothing manufacturers to record and communicate clothing manufacturing activities and processes. Chaudhry and Hodge (2012:70), and Williams (2015:19) confirmed that the retailers' POS systems should be linked to the demand planning system of clothing manufacturers. Williams (2015:19) indicated that the POS system of SA retailers may be linked with the ordering system of clothing manufacturers and fabric suppliers. This assists in improving data access and product delivery actions in the SA clothing industry.

When the POS system is linked to the planning systems of other SC stakeholders, SC partners are able to share sales data that was saved on the POS system (Folk *et al.*, 2011: 13). Further, Folk *et al.* (2011:2) agreed that retailers rely on data recorded on the POS system to assist them when compiling orders to replenish products. Furthermore, organisations use an electronic data interchange (EDI) system to facilitate and speed up the ordering of goods, as information is shared among SC stakeholders (Chang *et al.*, 2012:583). This implies that linking the POS system of retailers with the EDI system of manufacturers assists in creating a database of customers' current and future product needs (Bhatnagar, 2012:1596). Folk *et al.* (2011:1) explained that the current technology is available to communicate both current and product history sales information to organisations.

Computers and technology have gained greater prominence in the operations of organisations and big corporations, including the SA clothing industry (William, 2011:19). Technology serves as an important instrument in the administration of organisations' associations (Rajaguru and Matanda, 2013:620). The use of technological equipment is also encouraged by Sander (2012:22), who mentioned that technical equipment will enable improvements in the SC network activities of

organisations, by ensuring quick access to products in the supply network. EDI technology is also useful in linking information in the SA clothing industry, and EDI technological tools seem to have come at the right time in the SA clothing industry. Bowersox *et al.*, (2013:81) define the approach to using the EDI system as:

*"...direct computer to computer exchange of organisations' documents in standard formats to facilitate high volume transactions, ... the EDI system can exchange demand data from one organisation to the next organisation through the use of technology without posting the information electronically, or without sending a person to deliver the information or using a facsimile machine."*

Ayala *et al.* (2011:4) asserted that the sharing of manufacturing data through the integration of the demand planning systems of SC partners is vital in order to ensure control over the entire stock in the manufacturing industry. Technology has gained great importance in terms of demand planning for the SA clothing manufacturing industry, as it assists in the speedy communication of clothing material data. However, even if technological systems are integrated, there are still demand planning challenges for SA clothing manufacturers that are caused by information distortion in the technology systems.

- ***Information distortion in the POS system***

A study by Fisher *et al.* has shown that, even with the use of a POS system in the clothing industry, there could still be distortion of information on the POS system as a result of incorrect processes being followed when garments are exchanged at retail store level (Fisher *et al.*, 2000:121). As an example, Fisher *et al.* (2000:121) explained that, in instances where a client exchanges an incorrect garment size for the correct one, staff would generally allow the client to take the correct clothing size without recording the transaction on the system, especially if the client is in a hurry, following one of the principles of customer service stating that the customer is king. As a result, clothing stores have challenges recording and managing the correct information on garment sales. Furthermore, information on the POS system can be interrupted when the hardware is malfunctioning. That causes the system's memory to malfunction (Cananda, 2015:4).

This can make it difficult for clothing manufacturers to have access to the correct sales information from domestic retail stores and it complicates demand planning.

Hence, POS data needs to be updated (Thomassey, 2010:479). Oyatoye and Fabson (2011:131) posit that having insufficient data when planning for customer needs may result in discrepancies. According to Larsson (2002:19) some clothing stores obtain historical sales information manually. Pretorius (2013:1) alluded that human mistakes are bound to happen when manual sale recording is involved. Human error defiles the accuracy of information being shared, especially when sales are being manually recorded, and results in demand discrepancies. Hamister (2011:432) said that sharing correct and valid information among SC partners assists in preventing information distortion and prevents demand planning errors.

Apart from demand discrepancies which exist on the POS systems of SA retail stores, the influx of clothing imports in the SA clothing industry also results in demand planning discrepancies (Media Club South Africa, 2015:6).

#### **2.5.4 Influx of clothing imports**

The influx of clothing imports, which emanates from low-tariff agreements between countries, is disheartening in terms of manufacturing operations in the clothing industry.

- ***History of global imports***

Importation of clothes is rising globally (Laudal, 2010:70) and the rising of imports affects demand planning in the SA clothing industry (Nattrass and Seekings, 2012:24). The growth of organisations internationally has made it easier and more convenient for industries to purchase items globally (Jonsson and Tolstoy, 2014:56).

According to Laudal (2010:70) and Ahmed (2013:2), quotas in the clothing industry were restricted from 1974 to 1994. Barnes (2005:9) mentioned that the Multi-Fibre Arrangement (MFA) came to an end globally in 2004 and this led to the removal of quotas in 2005, which allowed countries globally to trade with each other. Jonsson and Tolstoy (2014:62) stated that although there had been strong rivalry in the global clothing industry, the appearance of imports worsened this rivalry. Rotunno *et al.* (2012:2) stated that after the tariffs and duties on clothes had been scrapped in 2005, the imports from other countries, such as East Asia, started growing in the

United States and this has allowed China to dominate in the clothing industry globally.

Trade barrier elimination has not only affected the clothing industry in the United States, it has also affected the clothing industry in developing countries (Seyoum, 2010:150), with China also dominating in the clothing industries of developing countries. This is because the production of Chinese clothes is associated with minimum labour expenses. China has the benefit of being able to produce more clothes at minimum wage, and thus maintaining low costs (Nattrass and Seekings, 2012:8). China's competitive advantage has led to developing countries struggling to compete with them (Seyoum, 2010:168). This has also led to China dominating in the sub-Saharan Africa (SSA) region, as it produces cheap products and exports them to countries worldwide (Kaplinsky, McCormick and Morris, 2010:1). Trade liberation has led to an influx of clothing imports in South Africa (Ramdass, 2007:6). The SA clothing industry is also suffering as a result of cheap imports from China (Media Club South Africa, 2015:6). Bhardwaj and Fairhurst (2010:166) confirmed that the global clothing industry has suffered as a result of the high imports in fashion clothes for ladies, and this has resulted in the loss of sales in the clothing industry.

- ***Trade liberation affecting SA and the clothing industry***

International trade is affecting the economy of growing countries (Laudal, 2010:72). The SA clothing industry is negatively affected by the influx of Chinese imports (Trade Law Chambers, 2016:1), for example, Chinese clothing imports have caused job losses in the SA clothing manufacturing factories. China is able to dominate the clothing industry as China is productive and their labour rates are low when compared to South Africa (Nattrass and Seekings, 2012:8). In 2003, the minimum labour rates in China ranged from R106 to R236.76 per week and this increased, in the same year, to R301.95 (Nattrass and Seekings, 2012:8). In comparison, in October 2006 and September 2007, the labour rates in South Africa were as follows: in the non-metro areas, the rate was R 300.00 per week, in an urban area such as Durban, it was R300.00 and in Cape Town, it was R500.00. The minimum labour rate in Lesotho was R170.00 (Nattrass and Seeking, 2012:8). Some of the SA clothing factories had to relocate to Lesotho to take advantage of

the low minimum wage in Lesotho (Nattrass and Seeking, 2012:8; Staritz and Morris, 2013:15). Therefore, the growth of cheap clothing imports has forced SA clothing manufacturers to relocate their operations to Lesotho and Swaziland (Gereffi and Lee, 2012:28). The wage rates of the SA clothing manufacturing industry are restricted by government and this affects the profitability of this industry (Nattrass and Seekings, 2012:14).

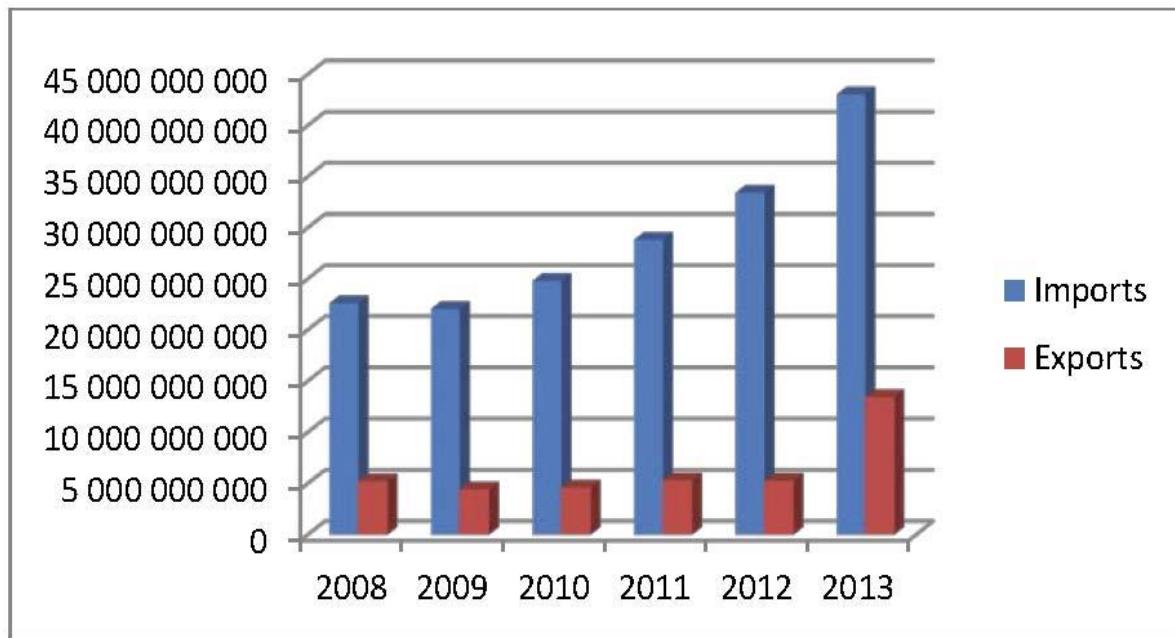
Apart from the low wage rates associated with Chinese clothing production, the Chinese manufacturing industry is not exposed to independent labour action (Laudal, 2010:72), while the SA clothing industry is characterised by high labour union action (Nattrass and Seekings, 2012:6). Labour unions influence how clothing manufacturers allocate labour forces and wages (Nattrass and Seekings, 2012:6). This has an effect on the production environment and affects the profitability of SA clothing manufacturers (Staritz and Morris, 2013:15). Low wage rates and the lack of labour unions in China give the Chinese clothing producers high production output competency and low cost competency. (Nattrass and Seekings, 2012:6). The intense competition by China has caused demand planning to become extremely challenging in the SA clothing industry.

- ***Competition in clothing***

Healthy competition is promoted in the clothing industry; however, the influx of Chinese imports has disturbed healthy competition in this industry and has caused the country to suffer financial losses (Media Club South Africa, 2015:14). In South Africa, the price index of clothing apparel dropped by 5% in 2000 and 2005 due to the increase in Chinese imports (Kaplinsky *et al.*, 2010:13). International trade has allowed organisations to purchase products globally and this has caused a growth in competition in this industry (Trade Law Chambers, 2016:2). Kunene (2008:3) affirms that the clothing industry is characterised by intense competition. Therefore, the industry must become flexible in attending to variations of customer clothing demand (Jainling, 2004: 35).

According to Sander (2012:20), the increase in imports contributed to an increase in market access and to increased competition, which creates alternative choices for clothing manufacturers and customers. In the case of the SA clothing industry, the competency of the Chinese clothing producers has caused losses for SA clothing

factories (Nattrass and Seekings, 2012:13). Sander (2012:24) agrees that the influx of clothing imports has reduced the selling price of garments in South Africa and in other parts of the world. Figure 2.4 indicates the increase in the imports in South African textiles, clothing and leather goods trade with the world in ZAR bn.



**Figure 2.4:** South African trade in textiles, clothing and leather goods in ZAR bn

**Source:** GGDA (2014:4)

As indicated in Figure 2.4, the imports into South Africa of textiles, clothing and leather goods trade in rand value shows a huge increase. In 2008, the value of imports into South Africa of textiles, clothing and leather goods was 20 billion ZAR and in 2013, the value of these imports increased to almost 45 billion ZAR. This increase in imports in the clothing industry affects the proper implementation of demand planning processes in the industry.

- ***Lack of government support and local support***

SA retail clothing customers buy clothes imported from China as these are economical to purchase when compared to the clothes produced by SA clothing manufacturers (Media Club South Africa, 2015:14). SA clothing customers have shifted from buying local clothes to buying clothes from international producers (Kaplinsky *et al.*, 2010:6). In addition, there is minimal state support for the clothing manufacturing industry (Laudal, 2010:73). However, Staritz and Morris (2013:13) affirm that SA clothing manufacturing firms that relocated to Lesotho are still

providing services to local retail clothing stores such as Woolworths, Edgars, Foschini and Mr Price in South Africa. Local suppliers are more flexible than global suppliers in supplying product requirements and are able to make constant product replenishment in a number of sizes because they are closer to the customers (Monckza *et al.*, 2014:255).

However, there is a glimmer of hope in certain parts of the country. Oberhofer (2012:70) mentions that the local government of Johannesburg, sponsored by the SA government, is establishing monetary support for Gauteng clothing designers. Clothing manufacturing experts agree that Chinese clothing manufacturers are dominating the global financial system and are becoming leaders in the clothing industry (Ramdass, 2007:6; Seyoum, 2010:168). Nattrass and Seekings (2012:27) and Ramdass (2007:1) indicated that the Chinese are selling clothes in large quantities to South Africa. This means that demand planning on future clothing in the SA clothing industry will have to be adjusted to accommodate the existence of new competitors, such as China. However, Nattrass and Seekings (2012:27) reiterate that the Department of Trade and Industry (dti) in South Africa has invested R1 billion to support programmes in the SA clothing industry.

The situation of managing global imports is a challenge to SA manufacturing industries. Ramdass (2007:6) mentioned that the SA government made the decision to eliminate trade operating barriers, and allowed domestic and international countries to trade together. Not only is international trade a challenge to the SA clothing industry; securing financial support in the SA clothing sector is also a daunting challenge. Bhatnagar (2012:1590) says that it is quite challenging for developing countries to plan for customer demand because they lack infrastructure which can assist them to compete and meet customers' needs.

Proper financial support is required for demand planning processes to function effectively in the SA clothing manufacturing industry. However, as stated previously, the local government in Johannesburg has established fashion centres to promote and support local designers (Oberhofer, 2012:70). This proves that the SA government is willing to take steps to support the SA clothing industry. For example, Ramdass, (2007:65) states that the dti is making efforts to renegotiate the amount of clothes China is selling in South Africa and to ultimately effect

reductions. However, it seems like this process is lagging. Reductions in the amount of clothes that China is selling in South Africa will eliminate the monopoly that China seems to enjoy over emerging economies like South Africa.

From the literature sources discussed in this section, it is clear that SA clothing manufacturers are at a great disadvantage due to the fact that they cannot compete with big foreign organisations (Media Club South Africa, 2015:14). Demand planning at local clothing manufacturers needs to improve to be able to compete internationally. Without proper demand planning in the SA clothing industry, there will be huge losses in sales which can result in surplus stock (Oyatoye and Fabson, 2011:131).

Apart from clothing imports, the estimation of future clothes is another factor affecting the accuracy of demand planning.

### **2.5.5 Estimation of clothes**

When planning for clothing demands, available past sales history is used to plan for clothing customer needs (Yesil, Kaya and Siradag, 2012:1) Sander (2012:206) explains that demand estimations are also known as forecasting or predicting demand trends. Therefore, clothing estimations are important when planning for product demand.

- ***Estimation of clothing in perspective***

Demand estimation signifies that there is a necessity for material or products (Monczka *et al.*, 2014:58). SCM in the fashion industry can only thrive when forecasting is accurate (Ren, Choi and Liu, nd:1) and conducting estimations on clothing styles is difficult because past sales of new styles are hardly ever available (Yesil *et al.*, 2012:1). Nenni *et al.* (2013:1) said it is impossible to conduct an accurate estimation on garment styles because clothing styles change quite often. This raises concerns about how the history of garments sales is obtained and applied in the clothing industry when estimating clothing garments. According to Esper *et al.* (2010:8), product history plays a major role when conducting future estimations. However, Morlidge (2010:7) mentioned that the product history on its own does not assist in achieving the accuracy of future estimations as the product history possesses incomplete information. Proper demand planning in the clothing

industry constitutes a balance between the supply and demand of products. This prevails when proper estimation exists.

Estimation inaccuracy has an effect on stock shortages and an oversupply of stock (Nenni *et al.*, 2013:1). Demand planning failures result from the inappropriate use of estimation methods (Ayala *et al.*, 2011:1). Hence, it is important to implement appropriate estimation methods (Nenni *et al.*, 2013:2; Wong and Gou, 2010:615; Xia and Wong, 2014:119). Choosing the correct method of estimations alleviates demand planning errors. According to Ni and Fan (2011:1529), it is crucial to estimate in the clothing industry as this assists demand planning of the clothing production. However, incorrect sales and the unavailability of sales data result in estimation errors (Ni and Fan, 2011:1529). Nenni *et al.* (2013:1) commented that estimations for clothing styles are challenging. This challenge of forecasting exists in the fashion industry.

- ***Estimating clothing demand in the clothing industry***

According to Jainling (2004:35), it is crucial to estimate for future clothing manufacturing in SA. According to Sander (2012:208), future estimations influence the whole plan of SC participants in the supply network. Pretorius (2013:1) commented that historical sales data of the SA industries on its own does not assist in improving accurate estimations. Experts in future estimations, such as William, (2015:2), agreed that historical sales information should be considered along with changes in the economy, as well as the demand changing patterns. In addition, historical sales information consists of inadequate figure resulting from human errors, therefore it is difficult to estimate using historical sales information (Pretorius, 2013:1). Hence, Pretorius (2013:1) and William (2015:19) suggested that when implementing forecasting, firms should avoid using only historical sales data, but should also accommodate seasonal trends which may affect the accuracy of the demand estimations. In addition, the complexity of product ranges and seasonal trends are reasons for estimation errors to prevail (Pretorius, 2013:1). Production of clothing in SA is also complex due to the multiple production processes involved in clothing production (Media Club South Africa, 2015:6). Also, authors like Oberhofer (2012:84) affirmed it is challenging to forecast for clothing needs due to multiple clothing styles being produced. This will require clothing

manufacturers to select a reliable method when estimating clothes (Nenni *et al.*, 2013:4).

SA clothing producers should adopt the use of estimation methods which are applicable to the clothing industry. In addition, clothing forecasts need to be adjusted to accommodate social factors as well (Ni and Fan, 2011:1536). Xia and Wong (2014:120) also indicated that the lack of adequate past sales information results in estimation errors and unreliable forecasting methods. This eventually disturbs the reliability of demand estimated figures in the SA clothing industry. However, Ni and Fan (2011:1529) reiterated that estimators need the required expertise when conducting future estimations. A lack of forecasting expertise and problems experienced when dealing with huge volumes of data are the reasons for estimation errors (Aksoy *et al.*, 2012:224).

Apart from a lack of expertise in conducting future estimations, the implementation of clothing estimations should be based on current fashion style information in the SA clothing industry. Barnes and Lea-Greenwood (2010:762), as well as Gu and Liu (2010:1) confirmed that when estimating clothing styles, the estimations should be implemented based on current fashion style information. Estimations in the clothing industry should involve specifics such as colour and size which are crucial (Nenni *et al.*, 2013:5; Wong and Guo, 2010:614). Therefore, estimations in the SA clothing industry should be implemented using the correct, reliable methods and data, and forecasting for each product should be applied as per the garment colour and size. This also makes future estimations become more challenging (Ni and Fan, 2011:1529). Morlidge (2010:11) concluded that cautious calculations in estimating operational activities are required in order to weigh the consistency of forecasted figures. The verification of sales figures in the SA clothing industry is seen as a crucial aspect when future estimations are implemented.

- ***Verify sales data accurately prior to estimating***

In order to ensure accurate estimated figures of clothing in the SA clothing industry, the verification of sales data becomes important. Pretorius (2013:1) urged that it is crucial to remove inaccurate sales data to improve estimation accuracy. This requires that the system used to estimate future demand be reorganised to accommodate sudden environmental changes. Jainling (2004:2) mentioned that it is

important to reduce the level of errors while estimating customer needs. Estimation figures are consolidated with organisational plans and trends (Pretorius, 2013:2). Pretorius (2013:1) reiterated that when estimating customer demand, what has been ordered must be aligned with previous sales, per style, colour, size and season.

Further, the author William (2011:131) testified that mistakes in demand estimations exist due to the incorrect communication of information. William (2015:12) believed that customer purchases should be estimated with great caution as this will reduce forecasting errors.

Apart from the challenge of clothing forecasting in the SA clothing industry, the global recession is another challenging factor which affects demand planning in the SA clothing industry.

### **2.5.6 Recession impact on the clothing industry**

Uncontrollable economic situations affect the efficiency and effectiveness of demand planning in the SA clothing industry. The global economic conditions, such as the recession, seem to have an effect on demand planning for the clothing industry.

- ***The effect of the global recession on the SA clothing industry***

The international monetary crisis, which resulted from the global recession, also affected the SA clothing industry. A global recession seems to be one of the variables which are difficult to consider when planning for future clothing demands, and this makes demand planning a daunting aspect to implement. The consumption of clothes began to drop between 1990 and 2000 as a result of the global monetary crisis which resulted from the US home equity loan disaster (Kim, 2012:1286). The monetary crisis resulted in a decrease in the need for clothes which were seen as luxury items during a global recession (Kim, 2012:1286).

Anderssen (2011:11) mentioned that there was a sales decline in one of the leading SA clothing retail stores as a result of the global recession. The global economic downturn had a negative effect on operations in the SA clothing industry, and it also affected the efficient functioning of demand planning activities in SA clothing firms.

The SA clothing manufacturing industries are mainly situated in three provinces: Western Cape, KZN and Gauteng (Barnes, 2005:5).

The manufacturing operations of these SA industries were deeply affected as a result of the global recession (Nattrass and Seekings, 2012:9). In 2008, the number of factories in the SA clothing industry on the KZN north coast decreased as a result of the international monetary crisis which originated in America because these factories were exporting their clothing products to America (Nattrass and Seekings, 2012:9). Steytler and Powell (2010:4) confirmed that the Western Cape and Gauteng suffered financially as a result of the global recession because the government of the country could not manage to provide financial support to these provinces.

The volume of orders by clothing retail stores is crucial for SA clothing manufacturing factories to continue their operations. Therefore, the production operations of the SA clothing manufacturers are affected when retail stores limit the purchasing of orders, thus affecting the demand planning processes of the clothing manufacturing industry. Thomassey (2010:472) agreed that demand planning in the clothing industry gets affected by environmental economic factors. The global recession is one of the environmental factors which affect demand planning in the SA clothing industry (Business Unity South Africa (BUSA) 2012:1). Lannone *et al.* (2013:2) mentioned that the clothing industry is gradually recovering after an economic slump that occurred in 2010. However, BUSA (2012:1) believed that the global recession will continue to affect the SA economy.

During a period of global recession, it becomes difficult to estimate clothes that will be required in the SA clothing industry in future as the demand for clothes decline. A study on the SA clothing industry suggests that SA clothing manufacturing industries should operate within minimum logistics operation lines (Cuts TDG Project, n.d:14).

As a result, estimated manufacturing operation figures in SA clothing firms do not produce accurate results as the demand is reduced during a recession period. Ayala *et al.* (2011:1) confirmed that vigorous economic trends cause additional problems for demand planning and predictions of stock, which result in errors. This

also affects the importance of reducing the cost of production during unreliable economic conditions (Ait-Alla *et al.*, 2014:3).

To summarise, various authors suggest that when conducting demand planning in the SA clothing industry, economic situations such as the global recession should be taken into consideration. The reviewed literature sources in this section clearly states that SA customers will search for bargains during a recession. Thus, SA clothing manufacturers will have to adjust their plans for clothing production as clothes become nonessential items and of lower priority to customers during a recession.

Apart from economic variables such as the global recession, the long lead time that exists in the production of clothes remains a challenge to demand planning in the SA clothing industry.

### **2.5.7 The effect of long lead time for fabrics**

Clothing demand planning requires the consideration of cloth material lead time to plan appropriately.

- ***Lead time in organisations***

Lead time is defined as a time set for the arrival of material or products (De Villiers *et al.*, 2008:3). The timely delivery of products is considered important in any operating organisation (Slotnick, 2011:527). On-time arrival of fabrics used to manufacture clothes is crucial in clothing manufacturing industries (Mamani and Moinzadeh, 2013:95). Hence, production organisations need to be aware of product shipments that are still on their way from suppliers (Acar *et al.*, 2010:3253). According to Mikati (2009:5523), improved material lead time enhances customer service, and material arrival delays should therefore be queried.

Lead time of products may take longer than expected and this requires organisations to track products which are delayed (Mamani and Moinzadeh, 2013:95). This has a serious effect on the flexibility of demand planning in the manufacturing organisation, as production cannot continue when there are delays in production materials.

Industries with a flexible value chain process may be able to minimise the delivery time of products; therefore, it is important to improve the value chain processes of products in order to improve demand planning (Liu and Papageorgiou, 2013:369). Flexibility in the SC process of the SA clothing industry is seen as crucial.

- ***Lead time in the SA clothing manufacturing organisations***

Shortage of clothing products in African countries is a challenge (Oberhofer, 2012:84). Improving the value chain process will assist in preventing product shortages in the SA clothing industry. Certain fabrics used in the manufacturing of clothes by local factories derive from international countries such as China (Seyoum, 2010:170). Ordering fabrics from international suppliers might result in extensive lead times and can affect the proper implementation of demand planning in the SA clothing manufacturing industry. Williams (2015:2) confirmed that the lead time of clothes is quite long.

Extended lead times in the clothing industry have an impact on demand planning (Moodley and Morris, 2004:160). The extended lead time of clothing fabric is a challenging issue in the SA clothing industry due to SA clothing manufacturers ordering clothing materials from international fabric suppliers (Nattrass and Seekings, 2012:19).

The ordering of clothing fabrics from international fabric suppliers causes delays in the SA clothing industry and it prolongs the manufacturing processes, which lead to demand planning failures. Manufacturing delays in the SA clothing industry caused by long supplier lead times may cause the clothing industry to lose some of its customers as customers may opt for other available garments as substitutes. De Villiers *et al.* (2008:178) confirmed that such delays in manufacturing and delivery of fabrics might have serious repercussions in the industry as some factories are likely to lose valuable customers as a result of delays. Hence, suppliers of fabric should have stringent control over the lead time in the clothing production. SA garment firms, however, lack control over the administration of the arrival of clothing material.

- ***Managing the arrival of clothes***

The late arrival of products due to supplier distance results in variations in demand planning (Williams, 2015:2). In spite of delays caused by the distance of suppliers, SA clothing industries continue to buy clothes internationally (Kaplan, 2004:637; Economic overview, 2013:2). This, according to Barnes (2005:5), is done in the hope of reducing lead time and of obtaining flexibility in product delivery services. Lead time in fashion clothes should be minimised. This will require clothing organisations to communicate and form supply chain partnerships (Rogerson, 2006:226). The lead time for clothes must further be reduced to accommodate seasonal clothing needs (William, 2015:4). Clothing manufacturers must purchase and receive material cloth to produce before the sale season starts. Barnes (2005:5) confirmed that lead time must accommodate stringent transport plans.

This means that SA clothing manufacturers should have delivery agreement contracts with fabric suppliers to prevent production material delay (Jainling, 2004:48). The literature sources in this section clearly state that SA clothing manufacturers must follow up on fabric delays, and they emphasise the ordering of clothing fabrics from local clothing fabric sellers and the timely ordering of clothing fabrics. Authors agree that this can assist in improving demand planning in the SA clothing industry, as clothing items will be available in the due season and there will be no lost customer purchases. Table 2.5 presents a summary of all the factors which affect demand planning in the SA clothing industry. These factors may result in improper demand planning.

**Table 2.5: Summary of factors affecting demand planning in the clothing industry**

Factors	Description of factors
<b>Scheduling</b>	
Production process management	▪ Reduces errors, improves planning
Historical clothing sales	▪ Plan according to demand, reduce stockpiling
Revised scheduling	▪ Rectifies mistakes, improves planning
Teamwork	▪ Quick planning
Communication	▪ Improves follow-up, reduces queries

<b>Factors</b>	<b>Description of factors</b>
Technology	<ul style="list-style-type: none"> <li>▪ Improves communication, reduces errors and delays</li> </ul>
Multifaceted production process and products	<ul style="list-style-type: none"> <li>▪ Complicates planning, results in long planning, errors and delays</li> </ul>
Clothing sale season	<ul style="list-style-type: none"> <li>▪ Advance ordering</li> </ul>
Basic clothes production plan	<ul style="list-style-type: none"> <li>▪ Long plans, long production run</li> </ul>
Fashion clothes production plans	<ul style="list-style-type: none"> <li>▪ Short plans, short production run</li> </ul>
<b>Fashion planning</b>	
Varying fashion trends	<ul style="list-style-type: none"> <li>▪ Challenge in demand planning, unsold styles</li> </ul>
Fashion education	<ul style="list-style-type: none"> <li>▪ Lack of skills, errors in fashion predictions, late orders, loss of sales</li> </ul>
Study fashion movements	<ul style="list-style-type: none"> <li>▪ Improve demand planning and process flexibility</li> </ul>
<b>The POS system characteristics</b>	
The history of sales data	<ul style="list-style-type: none"> <li>▪ Assists with accurate demand planning</li> </ul>
System integration	<ul style="list-style-type: none"> <li>▪ Improves planning errors</li> </ul>
Data distortion	<ul style="list-style-type: none"> <li>▪ Inaccurate planning</li> </ul>
Data verification	<ul style="list-style-type: none"> <li>▪ Prevents mistakes</li> </ul>
Colour, size and styles	<ul style="list-style-type: none"> <li>▪ Correct colour, size and style capturing</li> </ul>
Manual capture of sales data	<ul style="list-style-type: none"> <li>▪ Errors in demand planning</li> </ul>
<b>Clothing imports</b>	
Reduced tariffs	<ul style="list-style-type: none"> <li>▪ Production loss, oversupply of clothes</li> </ul>
Increased clothing competition	<ul style="list-style-type: none"> <li>▪ Reduced turnover, job losses, closure of clothing firms</li> </ul>
Influx of Chinese imports	<ul style="list-style-type: none"> <li>▪ Increased competition, oversupply of clothes</li> </ul>
Lack of government support	<ul style="list-style-type: none"> <li>▪ Reduced productivity and infrastructure</li> </ul>
Lack of clothing retailers' support	<ul style="list-style-type: none"> <li>▪ Lost customers and reduced profitability</li> </ul>
<b>Clothing forecasting characteristics</b>	
Complexity of clothes	<ul style="list-style-type: none"> <li>▪ Demand planning challenges</li> </ul>
Forecasting methods	<ul style="list-style-type: none"> <li>▪ Appropriate method selection</li> </ul>
Forecasting errors	<ul style="list-style-type: none"> <li>▪ Inappropriate demand planning</li> </ul>

<b>Factors</b>	<b>Description of factors</b>
Investigation of errors	<ul style="list-style-type: none"> <li>▪ Reduces forecasting errors</li> </ul>
Skill to forecast	<ul style="list-style-type: none"> <li>▪ Improves forecasting and eliminates estimation errors</li> </ul>
<b>Global recession characteristics</b>	
Unstable economy	<ul style="list-style-type: none"> <li>▪ Demand uncertainty</li> </ul>
Unreliable historical sales data	<ul style="list-style-type: none"> <li>▪ Demand predictions errors</li> </ul>
Decline in clothing demand	<ul style="list-style-type: none"> <li>▪ Sales losses, job losses, reduced number of clothing firms</li> </ul>
Manufacturing plan adjustments	<ul style="list-style-type: none"> <li>▪ Prevent high stock levels and reduce demand planning</li> </ul>
<b>Clothing lead time</b>	
International clothes ordering	<ul style="list-style-type: none"> <li>▪ Long lead time and manufacturing delays</li> </ul>
Local clothing ordering	<ul style="list-style-type: none"> <li>▪ Production flexibility and improve customer service</li> </ul>
Fabric order made before the selling season	<ul style="list-style-type: none"> <li>▪ Quick deliveries, production flexibility, improved service, reduced inventory and increased profit</li> </ul>
Lack of control on fabric arrival	<ul style="list-style-type: none"> <li>▪ Manufacturing delay, out-of-stock situations, lost customers and financial loss</li> </ul>
Late ordering of fashion clothes	<ul style="list-style-type: none"> <li>▪ Unsold stock and stockpiling and errors</li> </ul>
Tight lead time schedule	<ul style="list-style-type: none"> <li>▪ On-time demand planning, prevents stock losses, customer order delays, delays query success</li> </ul>
On-time delivery agreement	<ul style="list-style-type: none"> <li>▪ On-time demand planning, prevents stock losses, customer order delays</li> </ul>

**Source:** Researcher's own compilation

## 2.6 CONCLUSION

The aim of this chapter was to report on a literature review of how demand planning can be improved in the SA clothing manufacturing industry. The theoretical review of the study provided a discussion on the implementation of demand and how this affects the clothing industry globally and in South Africa. Significant factors contributing to challenges in demand planning were identified. Certain scholars from the literature clearly state that ordering of clothing fabrics by the SA clothing industry should be implemented in a timely fashion before the season of selling clothes begins in order to avoid delivery delays and interruptions in the SA clothing

operation processes. The study also revealed that short-term fabric scheduling and forecasting plans should exist in the manufacturing of clothes in the SA clothing industry, more especially in terms of fashion clothes, as fashion styles constantly change.

In order to prevent the distortion of clothing sales information in the SA clothing industry, the POS system used in clothing retail stores should be linked to the systems of clothing manufacturers. This will assist in improving the flow of information, including demand planning, as the SA manufacturers will have the correct sales information in place. At the same time, SA clothing manufacturers are to test the correctness of sales information before future clothing estimations are conducted. There is also a need for SA clothing organisations to attend training on fabrics and to enrol at fashion institutes in order to improve their skills and to stay competitive and to improve demand planning in the organisation.

The chapter confirms that when there is an economic recession, the purchasing power of customers declines in relation to the decline in their incomes. SA clothing customers will compromise by rather buying other essential products. As a result, the sales of clothes decline during a recession. This affects the demand planning of clothing garments in the SA clothing industry. Therefore, demand plans need to be adjusted during a period of economic recession to accommodate the decline in the purchase of clothes.

# CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

## 3.1 INTRODUCTION

Previous chapters presented the introduction and background of the study (Chapter 1) and the theoretical review of demand planning in the clothing industry (Chapter 2). This chapter presents the research design and methodology employed in this study. The research design and methodology give direction to the researcher on how the research plan and process of the study should be implemented in order to achieve the aim and objectives of the study (Quinlan, 2011:175). The research design, research approach, research strategy, population and sampling, data collection, research instrument and data analysis employed in the study are discussed in this chapter.

## 3.2 RESEARCH DESIGN

The research design provides direction on how a research is to be conducted (Saunders *et al.*, 2012:159). Three types of research design exist in scientific research (Veal, 2011:33), namely, descriptive, exploratory and explanatory research as briefly explained below:

- **Descriptive research design:** a descriptive research design aims to illustrate the nature and the occurrence of situations or events (Saunders *et al.*, 2012:171). In this design, the researcher seeks to define the nature of the situation with an attempt to find solutions to the problems that may exist (Leedy and Ormord, 2014:212). In a descriptive research design, the researcher may want to reveal a certain characteristic of a certain representative group (Van Zyl, 2014:12). Descriptive research attempts to find a solution to the problem using the available data. It is important that when collecting research data, only data that is meaningful should be collected (Leedy and Ormord, 2014:226).
- **Explorative research design:** an explorative research design is used when a researcher makes an investigation into a problem with the aim of finding more information about the problem (Cooper and Schindler, 2011:98). In an

explorative research design, the best tool that a researcher may use is to ask open questions in order to obtain in-depth information (Saunders *et al.*, 2012:171). When conducting explorative research, the researcher uses qualitative techniques to obtain information on issues associated with the topic being studied (Leedy and Ormrod, 2014:270). Exploratory research uses open-ended questions to find reasons for the occurrences and to gain a deeper understanding of the problem (Saunders *et al.*, 2012:171). It can be used to reveal the complexity of certain occurrences (Leedy and Ormrod, 2014:142).

- **Explanatory research design:** an explanatory research design analyses the occurrence or problem in order to explain the association between variables (Saunders *et al.*, 2012:172). An explanatory research design comes in two stages, where the quantitative data is collected first and in the next stage the researcher will conduct follow-ups and request the participants to vest their thoughts on questions which were asked previously (Leedy and Ormrod, 2014:270)

In this study, both descriptive and explorative research designs were employed since the study seeks to determine demand planning practices and factors affecting the accuracy of demand planning among key stakeholders in the Gauteng clothing industry. The study seeks to gain an in-depth understanding of the approaches implemented by the clothing industry, as well as factors resulting in errors when planning for customer demands, in order to suggest areas of improvement (Cooper and Schindler, 2011:98).

### 3.3 RESEARCH APPROACH

The research approach is concerned with the design that the researcher adopts when conducting a research project (Saunders *et al.*, 2012:143). Two generic research approaches in scientific research are the deductive and inductive research approaches (Leedy and Ormrod, 2014:17) as briefly explained below:

- **Deductive research approach:** a deductive research approach involves research reasoning in a way of assuming occurrences or events which claim to be factual (Leedy and Ormrod, 2014:17). A deductive research approach compares theoretical arguments and tests the reality of theories using

appropriate data to measure and analyse concepts (Saunders *et al.*, 2012:143). In a deductive research approach, the researcher uses the hypothesis or prior knowledge to clarify a certain problem or discover the problem solution (Grix, 2004:164).

- **Inductive research approach:** the inductive approach focuses on people's experiences and draws decisions based on the research findings (Leedy and Ormrod, 2014:19). The research used in the inductive approach is mostly concerned with the context in which occurrences are taking place (Saunders *et al.*, 2012:146). In an inductive research approach, the researcher makes observations of the pre-established reality or statement and eventually draws conclusions from the observations (Leedy and Ormord, 2014:18).

Table 3.1 presents a summary of the attributes of the deductive versus the inductive approach.

**Table 3.1: Attributes of deductive and inductive research approaches**

Deductive	Inductive
Pre-established truth	People's experiences
Non-logical reasoning	Logical reasoning
Observation	Opinion
Existing theory and quantitative data	Existing theory and qualitative data
Research depends on what is researched	Gain meanings from human understanding

**Source:** Adapted from Leedy and Ormrod (2014:18)

In this study, both deductive and inductive research approaches were employed. Both approaches were used to understand the existing theory on demand planning practices, and also to gain an in-depth understanding of the factors affecting demand planning in the Gauteng clothing industry.

Research can also be classified as qualitative, quantitative or both (called mixed-method research (Leedy and Ormrod, 2014:190). These research approaches are briefly explained below:

- **Qualitative research approach:** In the qualitative research approach, a researcher will study certain behaviours through interactions and observations

of the audience (Maree, 2007:51). The qualitative research approach focuses on how people view certain environment or the world and draw conclusion from people's views or experiences (Maree, 2007:50). It involves taking notes or making video recordings in order to pick up different approaches in which human and non-human beings behave and respond (Quinlan, 2011:286). It has to do with the interpretation of beliefs and ideas between various individuals, groups and associations (Saunders *et al.*, 2012:163).

- **Quantitative research approach:** In a quantitative research approach, the researcher focuses on certain activities, and each action is calculated to establish the occurrence (Quinlan, 2011:286). It involves testing certain activities or variables mathematically by using rating scales or questionnaires (Leedy and Ormrod, 2014:97). The quantitative research approach draws conclusion from the variables or activities which were scientifically tested (Maree, 2007:8). In a quantitative research approach, conclusions are drawn based on information about people's attributes, organisation and other events or occurrences (Saunders *et al.*, 2012:162).
- **Mixed-method (qualitative and quantitative) approach:** The mixed-method research approach comprises a combination of both qualitative and quantitative research. Mixed-method research includes the collecting, understanding and explaining of both qualitative and quantitative data, as well as the integration of the findings of the data (Leedy and Ormrod, 2014:270). The researcher may begin by testing the quantitative research to test variables, activities or occurrence and follows it by further qualitative research to establish a clear reasoning for the occurrence (Saunders *et al.*, 2012:164).

Table 3.2 presents the distinguishing attributes of the qualitative and quantitative research approaches.

**Table 3.2: Distinguishing attributes of quantitative and qualitative research approaches**

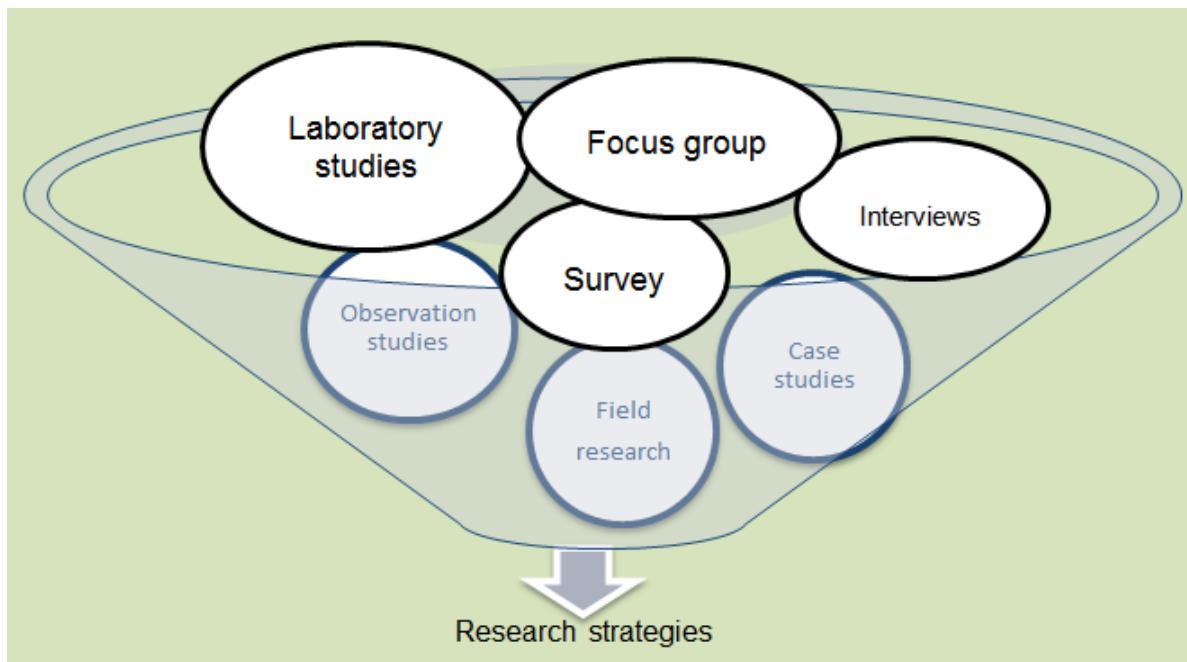
Quantitative	Qualitative
Structured questionnaires	Interviews and semi-structured questionnaires
Fill-in questionnaires	Note taking/video recording
Focus on causal relationships between variables	Focus on deeper understanding of context
Focus on the process and meanings that are measured	Focus on measurements and analyse causal relationships between variables

Source: Adapted from Leedy and Ormrod (2014:196)

In this study, a mixed-method research approach (qualitative and quantitative) was used. There are two types of mixed methods, namely concurrent and sequential mixed methods (Saunders *et al.*, 2012:167). A concurrent mixed method is used when both qualitative and quantitative data are collected simultaneously (Saunders *et al.*, 2012:167). In a sequential mixed method, the researcher will firstly collect quantitative data and then collect qualitative data at a later stage of the research study (Saunders *et al.*, 2012:167). In this study, a concurrent mixed method was used in order to obtain a better understanding of how demand planning is conducted in the Gauteng clothing industry. However, in this study, the focus fell on quantitative methods which were more dominant.

### **3.4 RESEARCH STRATEGY**

A research strategy is an idea that a researcher will have on how to answer the research questions of the study being conducted (Saunders *et al.*, 2012:173). Research strategies could be observation, case studies, field research, surveys, interviews, focus groups and laboratory studies, which are all implementable in various research studies (Mouton, 2001:148; Smith, 2010: 52). As indicated by Saunders *et al.* (2012:173), a research strategy indicates a plan that the researcher will adopt in responding to the research questions or in addressing the research objectives. Figure 3.1 illustrates the various types of strategies used in research.



**Figure 3.1: Research strategies**

The research strategy employed in this study is a survey. A survey is a common and popular approach in business and management research which answers the research questions and objectives of the study using statistical data collection methods (Saunders *et al.*, 2012:176). In a survey, the researcher chooses a representative of a certain population before managing the questionnaire or conducting the interviews (Maree, 2007:9). A survey involves obtaining data about individuals or groups, namely data about their attributes, opinions, behaviour or past experiences (Leedy and Ormrod, 2014:195). Surveys allow the researcher to collect data from a specific population group easily and inexpensively (Saunders *et al.*, 2012:176). A survey was seen as an appropriate tool to adopt to obtain a range of information regarding demand planning practices as well as factors affecting the clothing industry stakeholders in Gauteng.

### 3.5 POPULATION AND SAMPLING

In this section of the chapter, the population and sampling techniques employed in the study are discussed.

### **3.5.1 Population of the study**

A population of a study comprises representative people or organisations, which can be counted in the study (Quinlan, 2011:143). It is a complete cluster of people or organisations which are represented in the study (Saunders *et al.*, 2012:260). The population of this study constituted clothing industry stakeholders in Gauteng (fabric suppliers, clothing manufacturers and fashion designers). In South Africa, the clothing industry is concentrated in the Western Cape, KwaZulu-Natal, Free State and Gauteng. There are 306 clothing industry stakeholders in Gauteng of which 95 are fabric suppliers, 139 clothing manufacturers and 72 fashion designers (SACTWU, 2012; Schreiber, 2013). Gauteng was chosen for this study because it was convenient and accessible to the researcher. In Gauteng, most of the clothing industry stakeholders are in the cities of Johannesburg and Pretoria (SACTWU, 2012; Schreiber, 2013). These stakeholders were selected as they are the key partners in the clothing value chain.

### **3.5.2 Sampling**

A sample can be defined as the portion of the representation of a population (Cooper and Schindler, 2011:364). There are two major types of sampling in research: probability sampling and non-probability sampling, as briefly explained below:

- **Probability sampling:** in probability sampling, chances of any member of the population being selected are identified (Leedy and Ormrod, 2014:213). It is crucial to identify a suitable sample frame when conducting probability sampling (Saunders *et al.*, 2012:260).
- **Non-probability sampling:** in non-probability sampling, the chances of selecting any population member are limited or unidentified as the total number of the population is not known (Van Zyl, 2014:96). A non-probability sampling provides a range of different methods that may be used to select sample, it includes an element of subjectivity (Saunders *et al.*, 2012:260).

The study employed a non-probability sampling technique.

Four types of non-probability sampling can be identified in research: convenient sampling, judgement sampling, quota sampling, and snowball sampling (Saunders *et al.*, 2012:281), as briefly discussed below:

- **Convenient sampling:** in convenient sampling, a sample that is easily accessible to the researcher is chosen (Saunders *et al.*, 2012: 291).
- **Judgement sampling:** in judgement sampling, a sample is chosen that the researcher assumes best represents the population (Quinlan, 2011:213).
- **Quota sampling:** in quota sampling, a sample which represents a certain subgroup of the population is non-randomly chosen. In quota sampling, the researcher chooses the participants to include in the research (Saunders *et al.*, 2012: 285).
- **Snowball sampling:** snowball sampling is used when it is not easy to identify the anticipated population. This method focuses on participants who volunteered to be part of the research and provided referrals to other participants (Quinlan, 2011:213).
- **Purposive sampling:** purposive sampling may be used when dealing with a small sample of participants, it is most appropriate in a case study research when one desires to choose cases that are enlightening (Saunders *et al.*, 2012: 291). In a purposive sampling, participants are chosen when collecting data in the study (Maree, 2007:79).

The study followed a convenience non-probability sampling technique, as explained by Etikan, Musa and Alkassim (2015:1). According to Etikan *et al.* (2015:1), the convenience sampling technique can be used when selecting a population which poses many restrictions due to the particular nature of the population. Convenience sampling may be applied in a great population and it is beneficial when the researcher has inadequate resources, time and workforce. Sanders *et al.* (2012:291) mentioned that in convenience sampling, data may be collected in a short period of time. The researcher is in full-time employment and was unable to visit all the clothing stakeholders. Therefore, to enable the researcher to get a representative sample within a reasonable time, convenience sampling was used.

Following the rationale for the use of the convenience sampling technique, 56 semi-structured questionnaires were distributed to key stakeholders consisting of 18 fabric suppliers, 26 clothing manufacturers and 12 fashion designers. The respondents were conveniently selected based their expertise in the application of demand planning in their organisations and constituted managers, supervisors and specialists.

### **3.6 DATA COLLECTION METHOD**

The data collection method explains how data was collected from the population (Quinlan, 2011:147). There are two basic types of data collection sources in scientific research, secondary and primary data sources (Quinlan, 2011:244). The data for the current study was collected using secondary and primary data sources, which are explained below:

#### **3.6.1 Primary data sources**

The primary data sources comprise data which is collected by the researcher for the purpose of the research at hand (Quinlan, 2011:242). The primary data is regarded as the data that a researcher must collect when conducting investigations for the study (David and Sutton, 2011:15; Smith, 2010: 446). Primary data for the current study was collected through a semi-structured questionnaire, based on convenience sampling. The semi-structured questionnaire was sent by email to the respondents who are all based in Pretoria and Johannesburg.

#### **3.6.2 Secondary data sources**

The secondary data sources comprise the existing theory in a particular research study (Quinlan, 2011:240). The secondary data is the existing data on the study (David and Sutton, 2011:15; Smith, 2010:446). Secondary data sources used in this study were explored during the literature review of the study. The researcher employed journal articles, books, documentations, and newspapers to understand demand planning practices in the SA clothing industry. The primary data is regarded as the data that a researcher must collect when conducting investigations for the study; and the secondary data is the existing data on the study (David and Sutton, 2011:15; Smith, 2010:446).

### **3.7 RESEARCH INSTRUMENT AND MEASUREMENT**

The research instrument is a tool used to collect and measure research data. It aims to acquire facts on a subject of interest to the research topic (Leedy and Ormrod, 2014:83). There are various research instruments that a researcher may implement when conducting a research study.

In this study, the research instrument was a semi-structured questionnaire (consisting of structured and open-ended questions). The semi-structured questionnaire was structured into two major sections: Section A required information about the demographics of the clothing industry stakeholders, while section B required information on demand planning practices.

According to Leedy and Ormond, (2014:86) the research instrument can be measured using four measuring scales as explained below:

- **Nominal scale:** a nominal scale which is a measure that organises situations or items according to groups or classes based on their likeness and variations. (McBurney and White, 2004:123).
- **Ordinal scale:** in an ordinal scale items or situations are classed according to sizing order (McBurney and White, 2004:123). This scale permits the researcher to rank data (Leedy and Ormond, 2014:86).
- **Interval scale:** the interval scale has to do with numbers and measurable casual variables (Wegner, 2012:11). The interval may be employed on statistics that are not permissible with nominal ordinal data (Leedy and Ormond, 2014:88).
- **Ratio scales:** are used to calculate the absolute change to data or variables (Saunders *et al.*, 2012:475)

This study adopted the ordinal scale as it employed a Likert scale of 5 which ranged from 'strongly agree', 'agree', 'neither agree nor disagree', 'disagree' and 'strongly disagree'. The semi-structured questionnaire was measured using a 5-point Likert-type scale in response format with an ordinal scale ranging from 1 ("strongly agree") to 2 ("agree"), 3 ("neither agree nor disagree"), 4 ("disagree") and 5 ("strongly disagree"). The researcher employed the 5-point Likert scale to measure how the clothing industry stakeholders feel or think about certain aspects when employing

demand planning practices in the Gauteng clothing industry. The measuring instruments employed in the research determined the statistical process that may be used in processing data (Leedy and Ormrod, 2014:86).

## **3.8 DATA ANALYSIS**

Data analysis involves defining data obtained from the research questionnaire, interpreting data and drawing conclusions from that with the aim of realising valuable information, proposing conclusions, and supporting decision-making. (Quinlan, 2011:365). The structured questions were analysed descriptively and by using inferential statistics, while a content analysis was used to analyse the substantiated responses of the open-ended questions (Section B, part two of the questionnaire only). Research data may be analysed statistically using descriptively statistics and inferential statistics. In the case where documents and material are to be analysed, a content analysis may be applicable when analysing data (Ormord and Leedy, 2014:152).

### **3.8.1 Descriptive statistics**

Descriptive statistics define information and allocate scores to describe certain behaviour (Saunders *et al.*, 2012:502). Descriptive statistics is a shared name for a number of statistic methods that are used to classify and summarise data in a significant manner (Maree, 2007:183). Descriptive statistics was used in order to analyse the quantitative data obtained from the respondents (Zikmund, Babin, Carr and Griffin (2013:66). Tables and graphs were used in the study to interpret data and to understand data (Saunders, Lewis and Thornhill, 2009:428). The tables and graphs were labelled to prevent the misunderstanding of data as presented in Section 4.9 in Chapter 4. The descriptive statistics were then followed by the inferential statistics as discussed in the next section.

### **3.8.2 Inferential statistics**

In inferential statistics, the researcher tries to reach assumptions that extend further than the data (Quinlan, 2011:399). In order to understand demand planning practices among the clothing industry stakeholders; statistical significant differences that existed between the three groups of clothing industry stakeholders, namely the fabric suppliers, clothing manufacturers and the fashion designers were tested.

The Kruskal–Wallis test was used to test the statistically significant differences that existed between the three groups of clothing industry stakeholders on all the items in the questionnaire. It is useful to apply this test when the sample from the population is small, or on variables which are ranked (Aaker, Kumar and Day, 2007:445). The Kruskal–Wallis test is used for two or more independent samples (Aaker *et al.*, 2007:445). The Kruskal–Wallis test was relevant in testing the relationship between variables tested since the current study used a small sample of N=56 consisting of 18 fabric suppliers, 26 clothing manufacturers and 12 fashion designers as presented in Chapter 4 (Section 4.3).

### **3.8.3 Content analysis**

According to Quinlan (2011:185), content analysis is used to evaluate the content of any writing. Content analysis has to do with determining groups or wording or pictures used in a text, and then counting the number of instances in which they are used (Quinlan, 2011:185). Content analysis is described as a group of systematic approaches ranging from native, explanatory analyses to systematic, strict word-based analyses (Graham, 2012).

The participants were requested to substantiate the responses of the open-ended questions. Their responses on the application of demand planning in the clothing industry were collected, typed, analysed and categorised according to themes. The themes represent the stakeholder's views on how demand planning is conducted. The comments on the responses in the semi-structured questionnaire were analysed and aligned with the literature and the research objectives, as shown in Table 4.9 (Chapter 4).

There are three generic forms of content analysis, namely conventional analysis, direct content analysis and summative content analysis (Graham, 2012). The study used a conventional content analysis to discover new information provided by the clothing industry stakeholders' responses on each section of the semi-structured questionnaire. After considering the implications of the responses, various recommendations relevant to the processes of demand planning in the clothing industry were made.

## **3.9 QUALITY OF RESEARCH DATA**

In research, it is critical to ensure the quality of the research data. This can be done through the testing of the reliability and validity of the measuring instrument.

### **3.9.1 Reliability**

A valid and reliable research instrument leads to appropriate conclusions from the data and will thus solve the research problem in a credible fashion (Leedy and Ormrod, 2010:91). Reliability measures the correctness and severity of the measuring instrument employed (Cooper and Schindler, 2011:280). The research questionnaire was designed and it was firstly tested for reliability to ensure that it covered the research objective to investigate demand planning in the Gauteng clothing industry. The researcher conducted a pilot test to ensure that the research instrument was correctly designed and that it tested what it was supposed to test (Cooper and Schindler, 2011:280).

#### **3.9.1.1 Pilot test**

The pilot test was conducted using three managers from the clothing industry to test the relevancy of each question in the research questionnaire. According to Cooper and Schindler (2011:89), the pilot study is implemented to discover the flaws of the research design or instrument and to give commission data of a probability sample. The pilot test allows the researcher to obtain certain valuation on the validity and the possible reliability of the data that will be collected (Saunders *et al.*, 2012:451). Questions or items were modified and refined after receiving the feedback from the pilot test to ensure that questions or items suited the general understanding of individuals.

### **3.9.2 Validity**

According to Leedy and Ormrod (2014:91), validity implies consistency applied in ensuring that corrective measuring instruments are implemented in the study. Cooper and Schindler (2011:280) mentioned that there are two types of validity, namely internal validity, which measures whether the research instrument tests what it is designed to test, and external validity, which measures whether data obtained can be generalised across various people groups, locations and periods.

The consistency of the measuring scales was tested statistically using Kruskal-Wallis values.

### **3.10 ETHICAL CONSIDERATIONS**

Voluntary and anonymous questionnaires were emailed or hand-delivered to a sample of 56 respondents in the Gauteng clothing industry after obtaining permission from the Department of TELT and from the Department of Postgraduate Studies at Unisa in 2011. The certificate of ethical clearance is presented as Appendix B. The research proposal and the questionnaire were reviewed and approved by the ethics team. Semi-structured research questionnaires were either emailed or hand-delivered to the respondents. Cooper and Schindler (2011:252) declare that a questionnaire emailed through a personal computer provides more privacy than other methods of communication. A letter informing the respondents that the questionnaire was voluntary and that the information was to be used for the purpose of completing a master's degree was sent and signed by the respondents. A consent form was also sent to the respondents to confirm that they agree to complete the questionnaire. The research process followed in the study is summarised in Table 3.3 on the next page.

### **3.11 THE RESEARCH PROCESS FOLLOWED IN THE STUDY**

Table 3.3 summarises the research process used in this study, namely the purpose of the study, design and approach, strategy, population, sampling, quality research, data collection method, data analysis, ethical considerations, study limitations and research timeline.

**Table 3.3: Summary of the research process**

<b>The purpose of the study</b>	To explore demand planning practices in the Gauteng clothing industry
<b>The research design</b>	Descriptive and exploratory
<b>Research approach</b>	Both deductive and inductive; quantitative and qualitative approach (mixed method)
<b>Research strategy</b>	A survey conducted to collect data in the Gauteng clothing industry
<b>Population</b>	The clothing population of 306 consisting of fabric suppliers, fashion designers and clothing manufacturers in Gauteng
<b>Sampling</b>	Convenient sampling (56 respondents)
<b>Quality research</b>	Achieved through reliability and validity
<b>Data collection method</b>	Semi-structured questionnaire
<b>Data analysis</b>	Descriptive statistics, using SPSS, inferential statistics and content analysis
<b>Research ethics</b>	Achieved through informed consent, confidentiality and university ethics approval
<b>Study limitation</b>	Closed down and relocation of clothing organisations and refusal to complete the questionnaire

**Source:** Adapted from Ambe (2012:188)

### **3.12 CONCLUSION**

This chapter discussed the research design and methodology followed in the study. The research design employed a descriptive and exploratory method following a mixed-method approach. A semi-structured research questionnaire was used to collect data. The data was analysed using descriptive statistics and SPSS, inferential statistics (non-parametric test); and the analysis of the content of open-ended data in the semi-structured questionnaire. This chapter also discussed the quality of the research study.

Chapter 4 deals with the data analysis and interpretation of the results of the study.

## **CHAPTER 4: DATA ANALYSIS AND INTERPRETATION**

### **4.1 INTRODUCTION**

Chapter 3 presented the research design and methodology employed in this study. This chapter now presents the data analysis and interpretation of the results, with the aim of understanding demand planning practices in the Gauteng clothing industry. The target population of the study comprised fabric suppliers, clothing manufacturers and fashion designers, who are the key stakeholders in the Gauteng clothing industry. The total realised sample consisted of 56 respondents. The findings of the study are presented as per the different sections in the questionnaire. The questionnaire consisted of two major sections. The first section dealt with the demographics, while the second section dealt with demand planning practices in the Gauteng clothing industry.

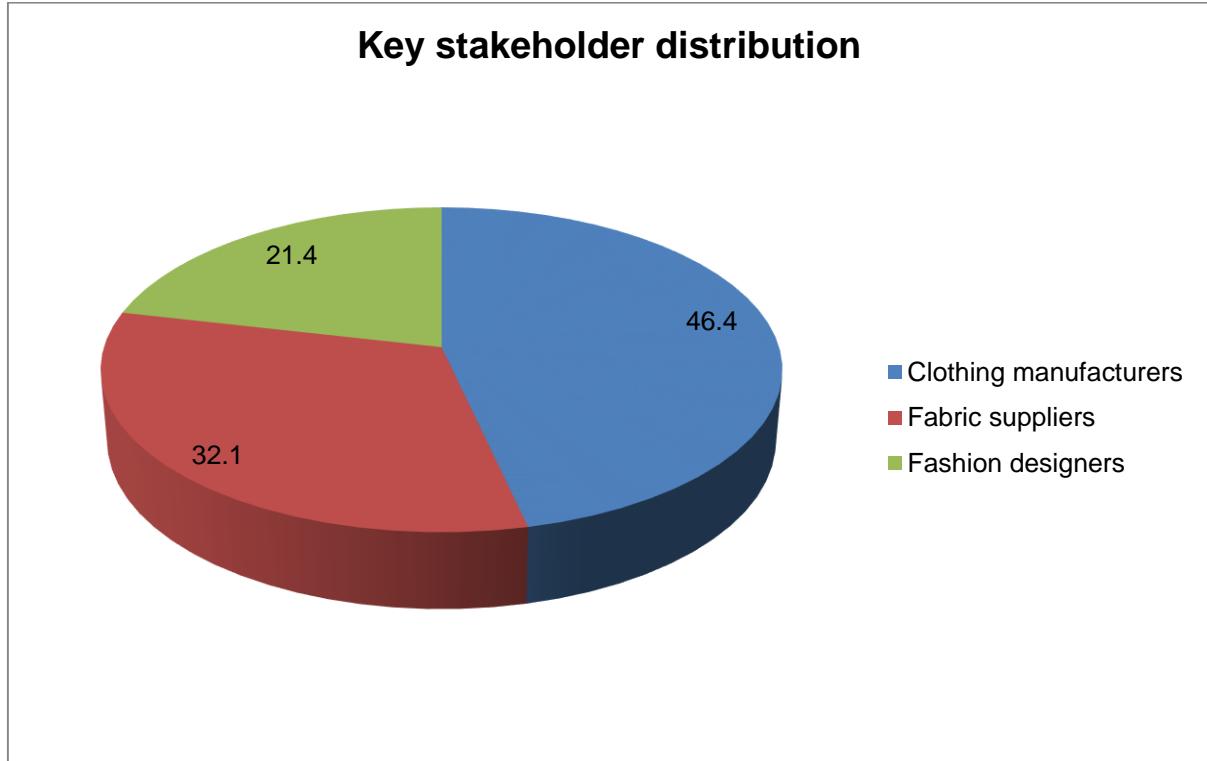
The demand planning practices questions were measured using a five-point Likert-type response-format scale with 1 indicating 'strongly agree' and 5 'strongly disagree'. All sub-sections in Section B of the research questionnaire included a column where the respondents were allowed to write additional comments regarding the questions asked. The research questionnaires were emailed or hand-delivered to the respondents. Microsoft Excel and the statistical software package (SPSS) were used to analyse and interpret data. Descriptive and inferential statistics were used to analyse the data. The presentation of the findings begins with the demographic profile of the respondents, after which the level of agreement of the respondents regarding the statements of demand planning practices is presented.

### **4.2 DEMOGRAPHICS**

This section of the chapter presents the demographic profile of the respondents. The findings are presented using pie charts.

#### **4.2.1 Key clothing stakeholders**

This section presents the distribution of the key stakeholders represented in the study. Figure 4.1 presents the distribution of the key stakeholders in percentages.



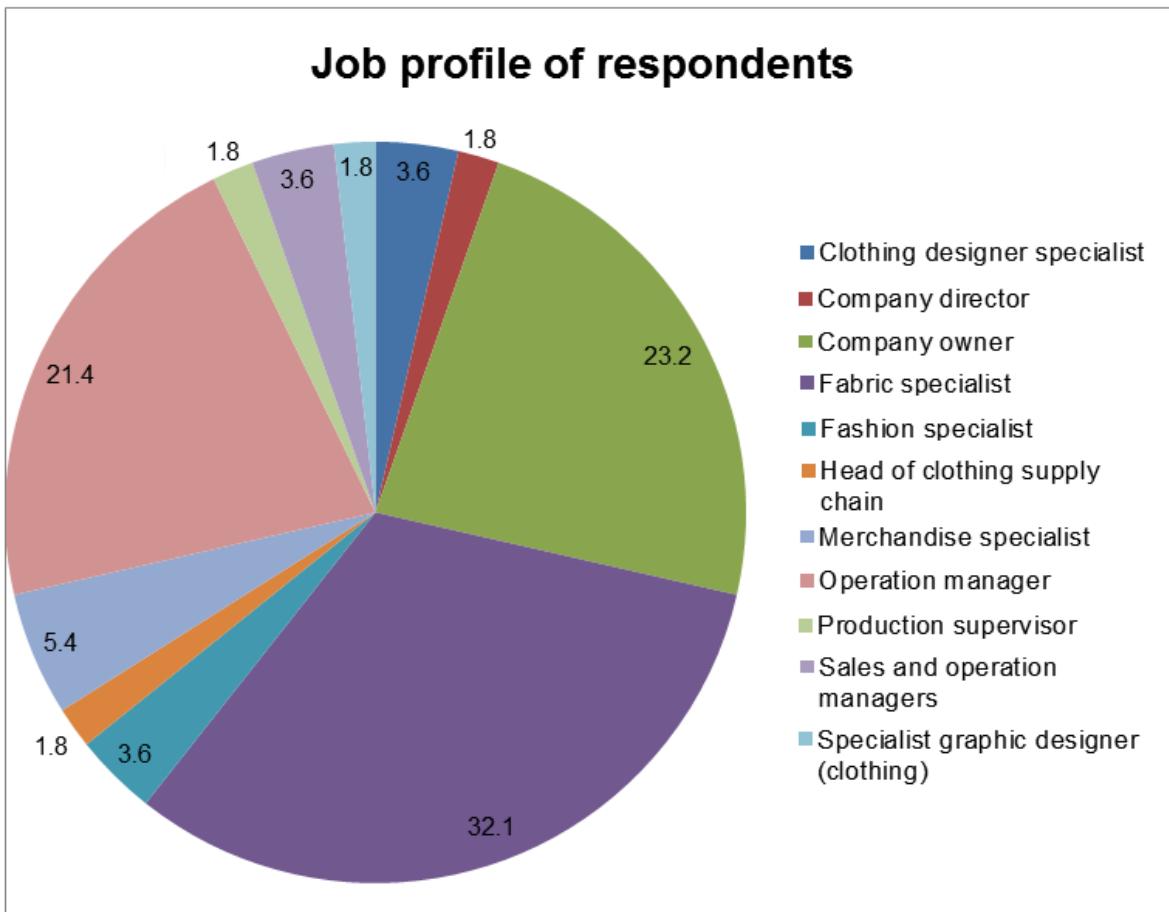
**Figure 4.1: The clothing industry stakeholder distribution (in %)**

Source: Author's own compilation

As shown in Figure 4.1, there are three stakeholders in the clothing industry. The clothing industry is made up of 46.4% clothing manufacturers, 32.1% were fabric suppliers while 21.4% were fashion designers. Therefore, almost half of the respondents in the study were clothing manufacturers.

#### **4.2.2 Job profiles**

This section presents the job profiles of the respondents as reflected in Figure 4.2.



**Figure 4.2: Job positions of respondents (in %)**

Source: Author's own compilation

As indicated in Figure 4.2, the clothing industry stakeholders held various positions. The majority (32.1%) of the clothing industry stakeholders were fabric specialists. The second largest groups were company owners (23.2%) and operational managers (21.4%).

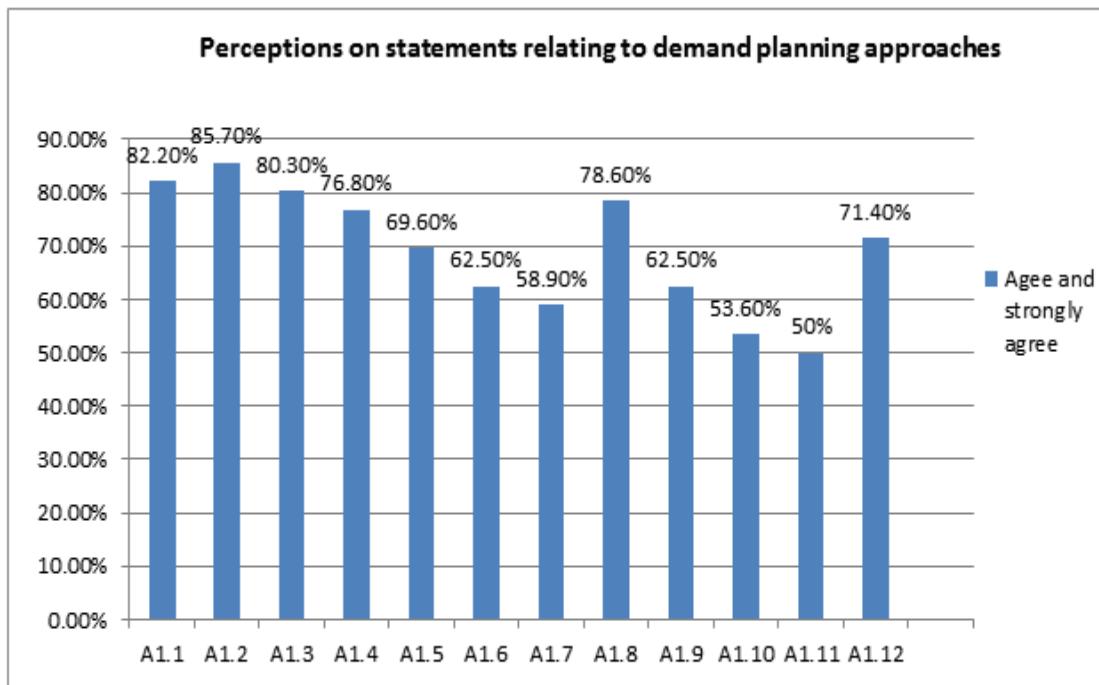
## 4.3 DEMAND PLANNING PRACTICES IN THE CLOTHING INDUSTRY

This section of the chapter presents the findings of the second section of the questionnaire. The data was analysed descriptively using SPSS software and the results are presented in figures and tables.

### 4.3.1 Demand planning approaches

This section presents a summary of the perceptions of the respondents regarding demand planning approaches. In order to determine the demand planning

approaches adopted by the respondents, they were presented with 12 statements that related to the characteristics of demand planning approaches. More than 49% of the respondents 'agreed' and 'strongly agreed' with the factors that are perceived to have an influence in demand planning. Figure 4.3 presents the percentage of respondents who were in agreement with the statements.



**Figure 4.3: Perceptions on statements regarding demand planning approaches (in %)**

Table 4.1 presents the description of the statements identified in Figure 4.3.

**Table 4.1: Description of statements in Figure 4.3 relating to demand planning approaches**

Statements	Description of statements	Demand planning approaches
A1.1	Continual reviewing of the product process of the supply of clothes is important.	Hierarchical Optimal
A1.2	It is important for manufacturers to inform retail stores about stock shortage or any production problems.	Optimal
A1.3	It is necessary to conduct follow-ups on material shortages with suppliers.	Hierarchical Optimal
A1.4	Manufacturing process can only be finalised when customers' orders and specifications are confirmed.	Optimal
A1.5	The manufacturing of clothes must be completed before the sales season starts.	Optimal

<b>Statements</b>	<b>Description of statements</b>	<b>Demand planning approaches</b>
<b>A1.6</b>	It is important to have short manufacturing plans on fashion clothes.	Optimal
<b>A1.7</b>	Long manufacturing plans may exist on basic clothes.	Hierarchical
<b>A1.8</b>	Having manufacturers who think upfront and react to market changes is crucial.	Optimal
<b>A1.9</b>	Storing garment details according to size, colour and design is crucial.	Hierarchical Optimal
<b>A1.10</b>	There is a lack of capital equipment in the clothing manufacturing industries of South Africa.	Hierarchical Optimal
<b>A1.11</b>	Basic clothes are stable and result in low variances when predicting future demand.	Hierarchical
<b>A1.12</b>	During a period of recession, it is crucial to manufacture clothes in small batches.	Optimal

**Source:** Compiled from questionnaire

This study considered the hierarchical and optimal approaches as key approaches when implementing demand planning. The literature study in Chapter 2 indicated that the hierarchical approach operates effectively with large volumes and stable production processes (see Section 2.4.1). Over half (58.9%) of the respondents 'agreed' with the statement which related to the hierarchical approach, namely that long manufacturing plans on basic clothes may exist. This was followed by the level of agreement with regard to the statement on basic clothes which are stable and result in low variances when predicting future demand (50%). The literature review in Chapter 2 highlighted that an optimal demand planning approach is interested in gaining a production plan over a limited period in order to satisfy the actual demand as well as seasonal demand (see Section 2.4.2). The optimal demand planning approach also considers flexibility and quick responses to environmental changes.

Statements and the level of agreement in terms of the percentage of responses which relate to the optimal approach are indicated below:

- The importance of manufacturers to inform retail stores about stock shortage or any production problems (85.7%);

- The manufacturing process can only be finalised when customers' orders and specifications are confirmed (76.8%);
- The manufacturing of clothes which must be completed before the sales season starts (69.6%);
- The importance of having short manufacturing plans on fashion clothes (62.5%);
- Having manufacturers who think upfront and react to market changes is crucial (78.6%); and
- The importance of manufacturing in small batches during a period of recession (71.4%).

According to the literature review of demand planning approaches in Chapter 2, both the hierarchical and optimal demand planning approaches aim at separating operational process challenges into smaller sub-challenges. Both the hierarchical and the optimal demand planning approach use a suitable managing tool by gathering product groups in the production process and subsequently separating groups of products into smaller sub-units in line with the production stages and available machinery (see Table 2.5). The level of agreement with statements relating to both the hierarchical and the optimal approach were:

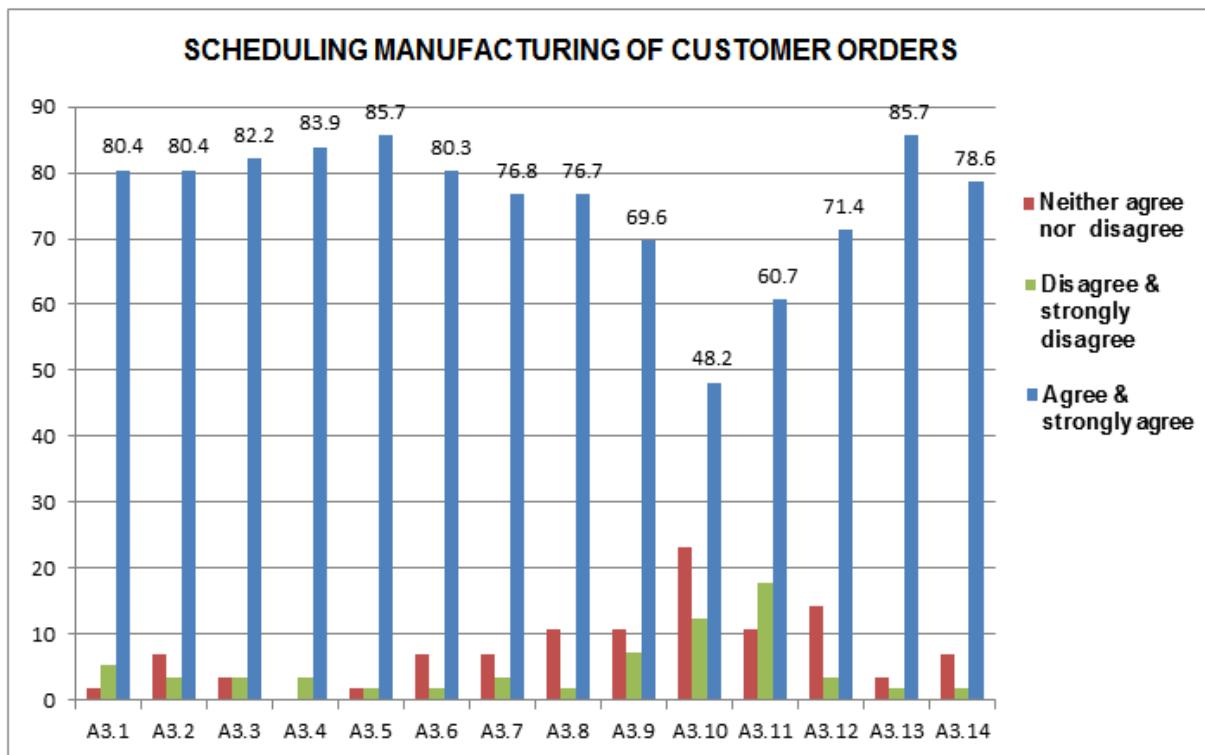
- Continual reviewing of the product process of the supply of clothes (82.2%);
- The importance of storing garment details according to size, colour and design (62.5%); and
- The lack of capital equipment in SA clothing manufacturing industries (53.6%).

### **4.3.2 Factors affecting demand planning**

This section presents the perceptions of respondents on the factors affecting demand planning in the clothing industry. Respondents were asked to indicate their level of agreement regarding the following factors that affect demand planning in the clothing industry: scheduling, planning for fashion, point-of-sale (POS) system, imports of clothes, estimating future clothing requirements, influence of a recession and the effect of the late arrival of clothes.

#### **4.3.2.1 Scheduling manufacturing of customers' orders**

Respondents were asked to indicate their level of agreement with 14 statements relating to the scheduling of the manufacturing of customers' orders. Figure 4.4 below shows the percentage of respondents who 'strongly disagreed' or 'disagreed', who 'neither agreed nor disagreed' and who 'agreed' or 'strongly agreed' with statements regarding the scheduling of the manufacturing of customers' orders.



**Figure 4.4: Perception of respondents on scheduling manufacturing of customers' orders (in %)**

Source: Author's own compilation

\* Note: some of the percentages do not add up to 100% on account of missing values, as some of the respondents did not answer specific statements relating to factors affecting demand planning.

Table 4.2, on the next page, presents the description of the statements illustrated in Figure 4.4.

**Table 4.2: Description of statements relating to scheduling manufacturing of customer orders**

<b>Statements</b>	<b>Description of statement</b>
<b>A2.1</b>	Historical clothing sales information is considered.
<b>A2.2</b>	The development of a team that plans for customer needs is crucial.
<b>A2.3</b>	Continual reviewing of the product process of the supply of clothes is important.
<b>A2.4</b>	Manufacturing processes which are not properly managed will result in continuous rework.
<b>A2.5</b>	It is important for manufacturers to inform retail stores about stock shortages or any production problems.
<b>A2.6</b>	It is necessary to conduct follow-up on material shortages with suppliers.
<b>A2.7</b>	Manufacturing processes can only be finalised when customers' orders and specifications are confirmed.
<b>A2.8</b>	Fabric orders must be placed before the sales season starts.
<b>A2.9</b>	The manufacturing of clothes must be completed before the sales season starts.
<b>A2.10</b>	Retailers' demand for low cost charges on orders should be accommodated.
<b>A2.11</b>	Clothing materials or fabrics needed in manufacturing process may arrive late.
<b>A2.12</b>	Meeting customers' orders on time gets affected by late arrival of clothing materials or fabrics.
<b>A2.13</b>	Communicating customers' orders in terms of size, colour and clothing styles is crucial.
<b>A2.14</b>	Manufacturers should communicate orders with the retail stores before manufacturing begins.

**Source:** Questionnaire

As is shown in the graph (see Figure 4.4), a large majority (above 70%) of the clothing industry stakeholders 'agreed' or 'strongly agreed' with 11 of the 14 procedures that need to be followed when scheduling the clothing manufacturing of customers' orders. However, with regard to the statement regarding retailers' demand for low cost charges on orders should be accommodated, only 48.2% of the respondents 'agreed' or 'strongly agreed' with the statement indicating that more

than half of the responses were neutral or in disagreement with the statement. In addition, just 60.7% of the respondents 'agreed' or 'strongly agreed' with the statements on clothing materials or fabrics needed in manufacturing process may arrive late, also indicating that a high 40% of the respondents were neutral or in disagreement with this statement.

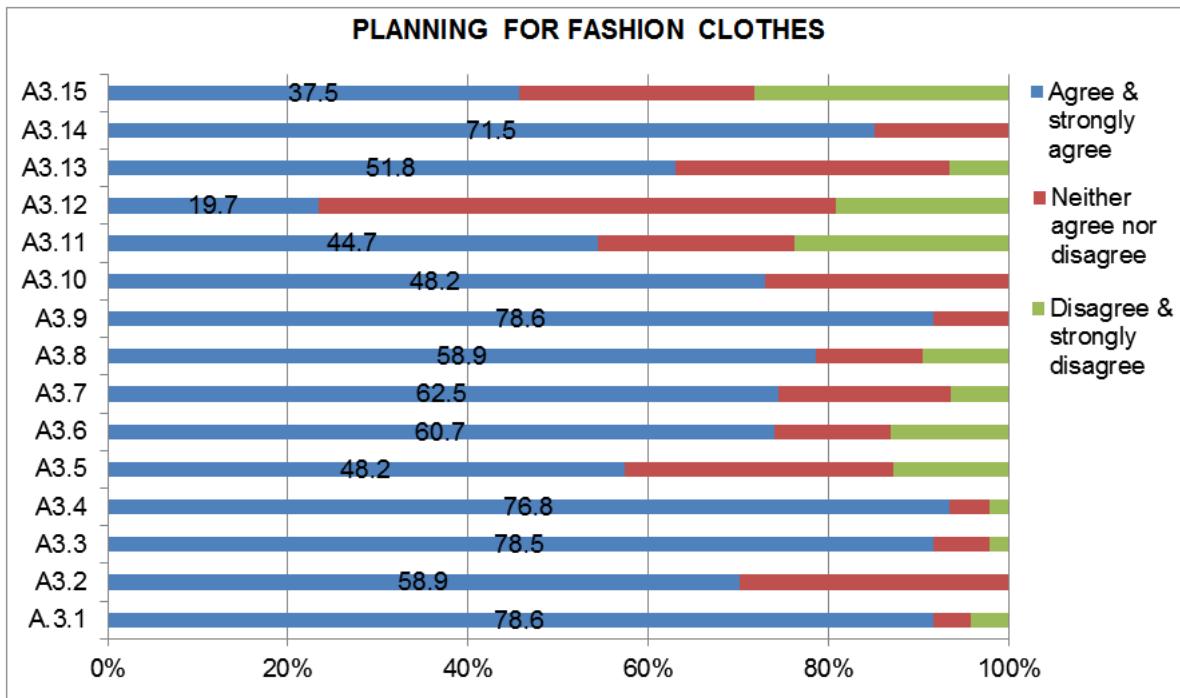
There was strong agreement (85.7%) that communicating customers' orders in terms of size, colour and clothing styles is crucial, and that follow-ups should be conducted with suppliers on material shortages (80.3%). A very high level of agreement (85.7%) was also found with regard to the importance of manufacturers informing retail stores about stock shortage or any production problems, as well as the continual review of the product process of the supply of clothes (82.2%)

The following statements had very high levels of agreement:

- Communicating customers' orders in terms of size and colour (85.7%);
- Follow-ups on material shortages with suppliers (80.3%);
- Manufacturers informing retail stores about stock shortages or any production problems (85.7%); and
- Continual review of the product process of the supply of clothes (82.2%).

#### ***4.3.2.2 Planning for fashion clothes***

Respondents were asked to indicate their level of agreement with 15 statements relating to planning for fashion clothes. Figure 4.5 below shows the percentage of respondents who 'strongly disagreed' or 'disagreed', who 'neither agreed nor disagreed' and who 'agreed' or 'strongly agreed' with the statements regarding planning for fashion clothes. Figure 4.5 presents the perceptions of the respondents expressed in percentages, while Table 4.3 presents the descriptions of the statement in Figure 4.5.



**Figure 4.5:** Perception of the respondent regarding planning for fashion clothes (in %)

**Table 4.3:** Description of the statements relating to planning for fashion clothes

Statement	Description of statements
A3.1	Customers' changing needs regarding fashion clothes should be considered when planning and estimating future clothing needs.
A3.2	The expertise of estimators in manufacturing should be considered when planning and estimating future customer needs.
A3.3	Monitoring fashion movements is important.
A3.4	Historical sales information should be updated continuously for timely and accurate planning to exist.
A3.5	It is not easy to plan for fashion clothes because their life span is short.
A3.6	It is easy to plan for basic clothes, because their life span is long.
A3.7	It is important to have short manufacturing plans for fashion clothes.
A3.8	Long manufacturing plans may exist for basic clothes.
A3.9	Having manufacturers who think upfront and react to market changes is crucial.
A3.10	Recognising fashion trends has never been easy due to multiple styling levels available.

<b>Statement</b>	<b>Description of statements</b>
<b>A3.11</b>	It is not easy to plan for fashion clothes due to constant changes that exist in fashion.
<b>A3.12</b>	Fashion styles may change 8–10 times a year.
<b>A3.13</b>	Manufacturers take lots of pressure from retail stores demanding more fashion variety.
<b>A3.14</b>	Tracking and recording of customer changes on clothing needs are crucial.
<b>A3.15</b>	It is not easy to keep track of fashion trends due to constant changes in fashion.

**Source:** Questionnaire

Although the level of agreement varied, respondents indicated agreement with more than 50% of the statements.

Statements with a low level of agreement were:

- It is not easy to plan for fashion clothes due to constant changes that exist in fashion (44.7%).
- Fashion styles may change 8–10 times a year (19.7%).
- It is not easy to keep track of fashion trends due to constant changes in fashion (37.5%).
- Recognising fashion trends has never been easy due to the multiple styling levels available (48.2%).
- It is not easy to plan for fashion clothes because their life span is short (48.2%).

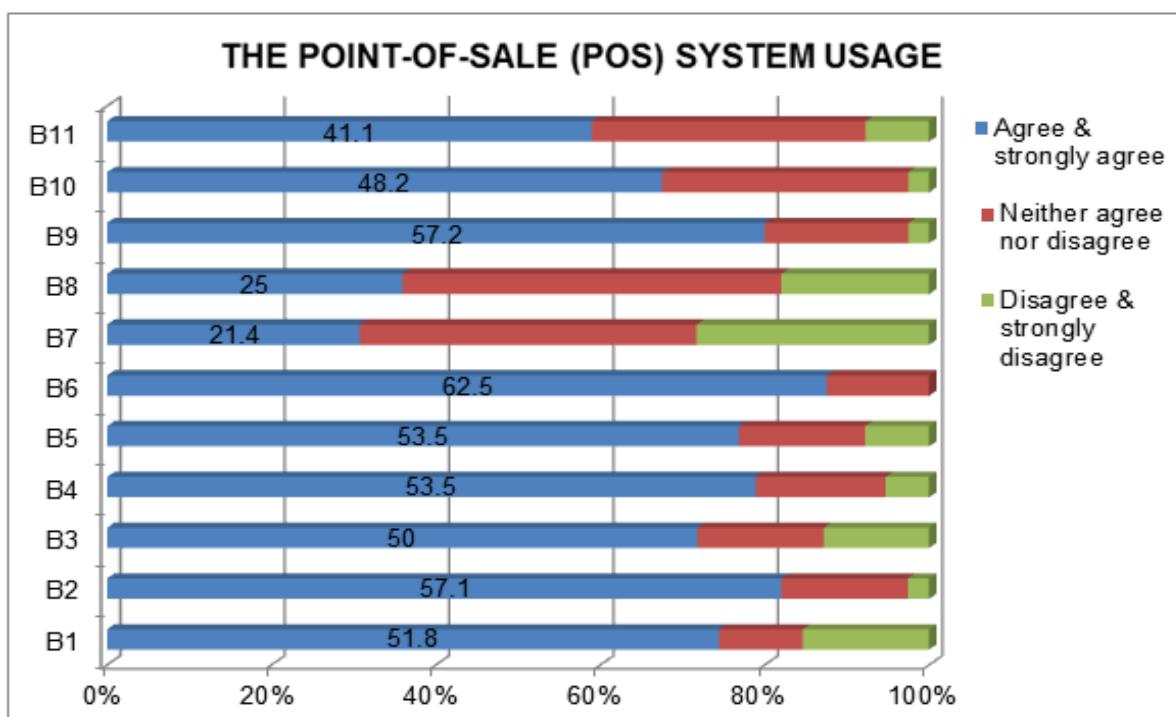
The following statements had very high levels of agreement:

- Customer changing needs on fashion clothes should be considered when planning and estimating future clothing needs (78.6%),
- Having manufacturers who think upfront and react to market changes is crucial (78.6%),
- Monitoring fashion movements is important (78.5%),
- Historical sales information should be updated continuously for timely and accurate planning to exist, (76.8%)

- Tracking and recording of customer changes on clothing needs are crucial (71.5%).

#### **4.3.2.3 Usage of the point-of-sale (POS) system**

Respondents were asked to indicate their level of agreement regarding 11 statements relating to the POS system. Figure 4.6 below shows the percentage of respondents who 'strongly disagreed' or 'disagreed', who 'neither agreed nor disagreed' and who 'agreed' or 'strongly agreed' with statements regarding the POS system usage. Figure 4.6 presents the perceptions of the respondents expressed in percentages, while Table 4.4 presents the description of the statements reflected in Figure 4.6.



**Figure 4.6:** Perception of the respondents regarding the point-of-sale (POS) system (in %)

**Table 4.4: Description of statements in Figure 4.6 relating to the point-of-sale (POS) system**

<b>Statements</b>	<b>Description of statements</b>
<b>B1</b>	Manufacturers can use data on the POS system of retail stores to plan future clothing needs.
<b>B2</b>	The POS system information of retail/customers provides history about clothing sales.
<b>B3</b>	Access to the POS system information of retail stores/customers is crucial for manufacturers.
<b>B4</b>	Incorrect sales information captured in the POS system will result in incorrect manufacturing plans.
<b>B5</b>	A clothing manufacturer should store historical sales information of clothes on the mainframe computer.
<b>B6</b>	Storing garment details according to size, colour and design are crucial.
<b>B7</b>	Historical sales information used by manufacturers to plan future clothing needs can be purchased from marketing or advertising firms.
<b>B8</b>	Manufacturing factories can send company representatives to gather or collect historical sales information from retail stores manually.
<b>B9</b>	Having a system that communicates clothing information between participants in the clothing industry faster is crucial.
<b>B10</b>	Sharing of sales information between suppliers, manufacturers and the end-user customers is crucial.
<b>B11</b>	Test the accuracy of historical sales information on a monthly basis before the planning for future clothing production begins.

**Source:** Questionnaire

In terms of the perception of the respondents regarding the POS system illustrated in Figure 4.6, on average, half (50%) of the respondents were in agreement with seven of the 11 statements relating to the usage of the POS system.

These statements were:

- Having a system that communicates clothing information between participants in the clothing industry faster is crucial (57.2%).
- Incorrect sales information captured in the POS system will result in incorrect manufacturing plans (53.5%).

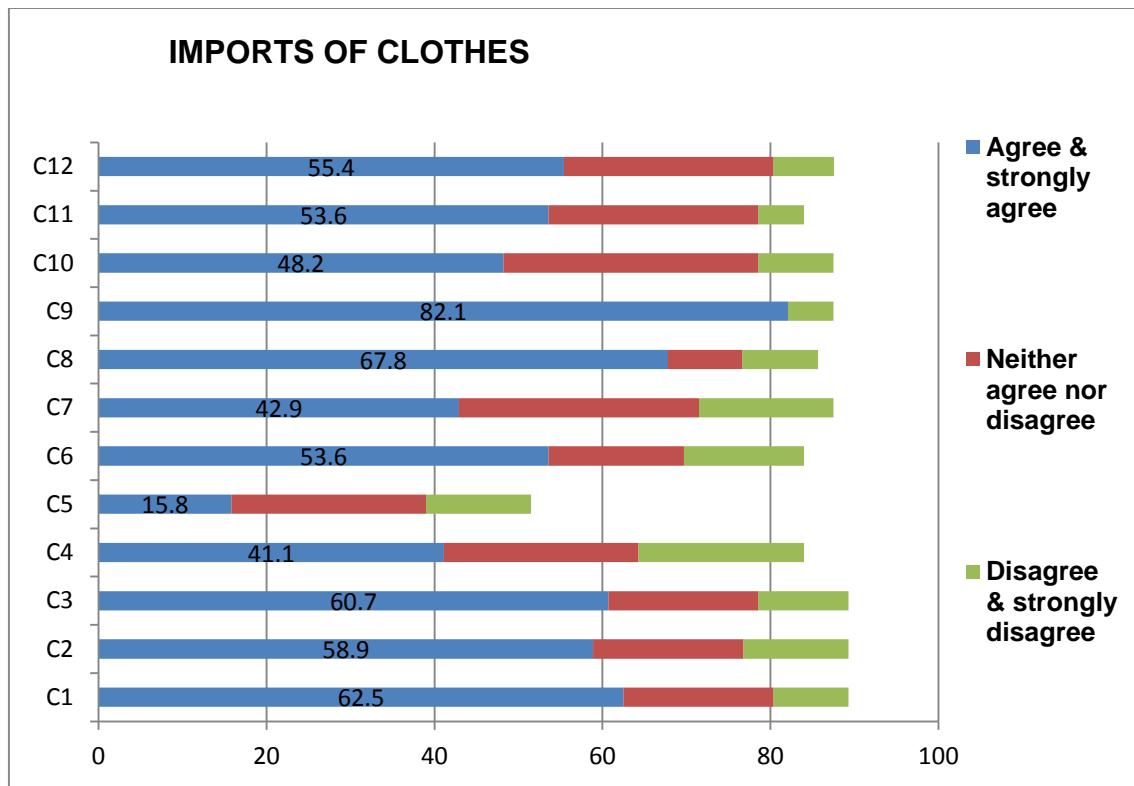
- A clothing manufacturer should store historical sales information of clothes on the mainframe computer (53.7%).
- Manufacturers can use data on the POS system of retail stores to plan future clothing needs (51.8%).
- The POS system information of retail/customers provides a history about clothing sales (57.1%).
- Access to the POS system information of retail stores/customers is crucial for manufacturers (50%).
- The importance of sharing sales information between suppliers, manufacturers and the end-user customers (48.2%).

Storing garment details according to size, colour and design is crucial, and this statement had a slightly higher level of agreement (62.5%). A low level of agreement was reflected for testing the accuracy of historical sales information on a monthly basis before the planning for future clothing production begins (41.1%). An alarming response (over 70%) of the clothing industry stakeholders revealed a neutral reaction or disagreement with regard to the following statements.

- Historical sales information used by manufacturers to plan future clothing needs can be purchased from marketing or advertising firms (only 21.4% agreement).
- Manufacturing factories can send company representatives to gather or collect historical sales information from retail stores manually (only 25% agreement).

#### ***4.3.2.4 Imports of clothes***

When it comes to the imports of clothes, respondents were asked to indicate their level of agreement regarding 12 statements relating to clothing imports. Figure 4.7 below shows the percentage of respondents who 'strongly disagreed' or 'disagreed', who 'neither agreed nor disagreed' and who 'agreed' or 'strongly agreed' with the statements on the importation of clothes. Figure 4.7 presents the perceptions of the respondents expressed in percentages, while Table 4.5 presents the description of the statements in Figure 4.7.



**Figure 4.7:** Perception of the respondents regarding the imports of clothes (in %)

**Table 4.5:** Description of statements regarding the imports of clothes

Statements	Description of statements
C1	The influx of illegal and legal imports into South Africa results in inaccurate planning in manufacturing processes.
C2	The implementation of low tariffs agreements on imports rates by the South African government has contributed to an oversupply of clothes in the country.
C3	Chinese imports contribute to an oversupply of clothes in the clothing manufacturing firms.
C4	Manufacturing firms do not have enough resources to supply large volume of orders to the clothing retail stores in South Africa.
C5	The oversupply of clothes has resulted in high levels of unsold stock for manufacturers and wholesalers and in retail stores.
C6	There is a lack of demand for SA clothes because of a high number of Chinese clothing imports.
C7	Manufacturing processes need to be reduced to avoid piling up of clothes in manufacturing factories.

<b>Statements</b>	<b>Description of statements</b>
<b>C8</b>	There is a need for government subsidies in the SA clothing manufacturing industry.
<b>C9</b>	There is a need for SA clothing retailers and wholesalers to support local clothing manufacturers.
<b>C10</b>	Currently, the SA government is not financing the clothing manufacturing industry.
<b>C11</b>	There is a lack of capital equipment in the SA clothing manufacturing industries.
<b>C12</b>	Currently, SA retailers are not supporting local clothing manufacturers.

**Source:** Questionnaire

The statement with the highest level of agreement was regarding the need for SA clothing retailers and wholesalers to support local clothing manufacturers (82.1%). In addition, the majority (67.8%) of the clothing industry stakeholders were in agreement that the SA government should support local clothing manufacturers by subsidising the clothing manufacturing industry. However, less than half of the respondents (48.2%) were in agreement that the SA government is currently not financing the clothing manufacturing industry, while only (41.1%) of the clothing industry stakeholders were in agreement that manufacturing firms do not have enough resources to supply large volumes of orders to the clothing retail stores. In addition, only 42.9% were in agreement that manufacturing processes need to be reduced to avoid clothes piling up in manufacturing factories.

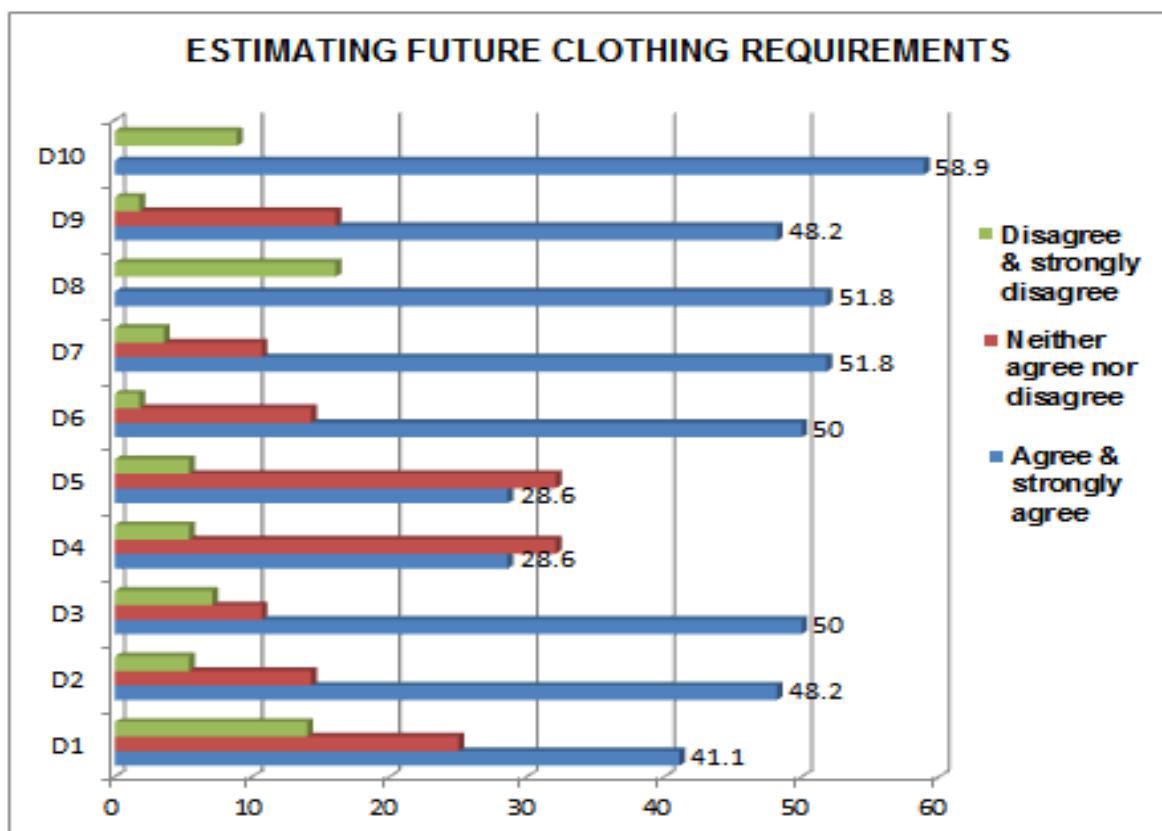
In terms of the influx of clothing imports, more than half of the respondents were in agreement that:

- The influx of illegal and legal imports into South Africa results in inaccurate planning in manufacturing processes (62.5%).
- Implementation of low-tariff agreements on import rates by the SA government has contributed to an oversupply of clothes in the country (58.9%).
- Chinese imports contribute to the oversupply of clothes in the clothing manufacturing industry (60.7%).
- There is a lack of demand for SA clothes because of the high number of Chinese clothing imports (53.6%).

In addition, the responses of the clothing industry stakeholders on the above statements relating to the influx of clothing imports, match the arguments indicated in the study of the literature (Chapter 2) pertaining to the influx of clothing imports.

#### **4.3.2.5 Estimating future clothing requirements**

The estimations of future clothing requirements was one of the factors that was perceived to have an effect on demand planning. Respondents were asked to indicate their level of agreement on ten (10) statements relating to estimating future clothing requirements, ranging from 1 = strongly agree to 5 = strongly disagree. Figure 4.8 below shows the percentage of respondents who 'strongly disagreed' or 'disagreed', 'neither agreed nor disagreed' and who 'agreed' or 'strongly agreed' with the clothing industry stakeholders regarding estimating future clothing requirements. Figure 4.8 presents the perceptions of the respondents expressed in percentages, while Table 4.6 presents the description of the statements in Figure 4.8.



**Figure 4.8: Perception of the respondents regarding estimating future clothing requirements (in %)**

**Table 4.6: Description of statements regarding estimations of future clothing requirements**

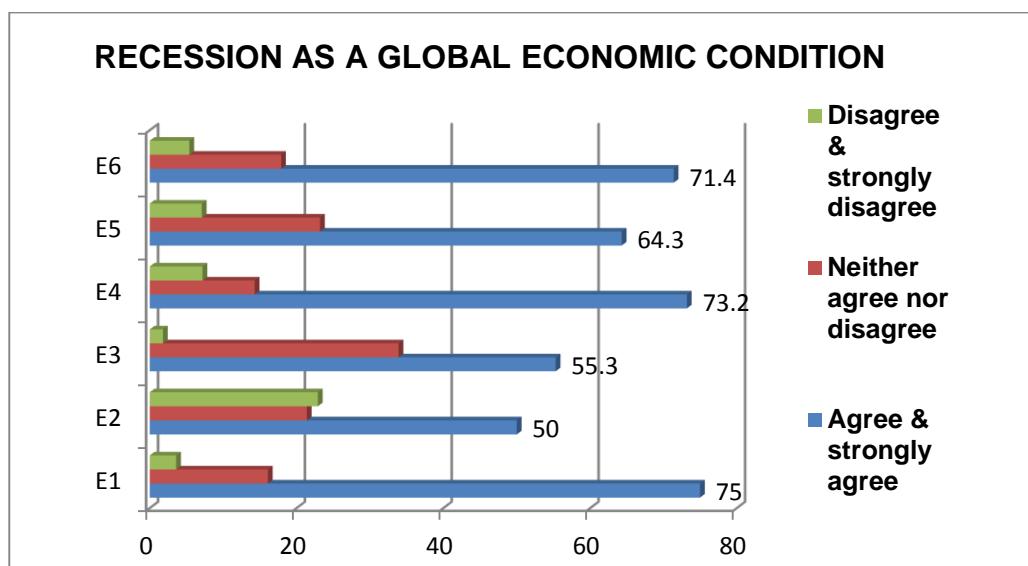
<b>Statements</b>	<b>Description of statements</b>
<b>D1</b>	Implementing different methods of estimation for basic and fashion clothing styles is required.
<b>D2</b>	Attendance of international trade exhibitions in order to plan ahead of season.
<b>D3</b>	Estimators of clothes should obtain formal training to improve their skills.
<b>D4</b>	The tool used for estimating future clothing needs can lose track of clothing sales information.
<b>D5</b>	Fashion clothes change constantly and result in errors when estimating trends.
<b>D6</b>	Basic clothes are stable and result in low variances when predicting the future demand.
<b>D7</b>	Manufacturers should conduct estimations of future customer needs according to the number of sizes which was sold previously.
<b>D8</b>	Variance that exists on future clothing estimations should be investigated.
<b>D9</b>	Manufacturers should conduct estimations of future customer needs on each clothing style.
<b>D10</b>	Balancing the demand and supply of clothes is crucial to avoid high or low estimations.

**Source:** Questionnaire

Figure 4.8 indicates that, on average, half (50%) of the respondents were in agreement with seven (7) of the ten (10) steps listed on the estimation of future clothing requirements. The highest level of agreement (58.9%) was with the statement relating to the importance of balancing the demand and supply of clothes to avoid high or low estimations. Furthermore, 51.8% were in agreement with the statement which says that basic clothes are stable and result in low variances when estimating clothes, as well as with the statement indicating that manufacturing firms should conduct estimations on future customer needs according to the number of sizes which was sold previously (51.8%). In addition, clothing estimators should obtain formal training to improve their skills. Surprisingly, only 28.2% of the clothing industry stakeholders were in agreement that fashion clothes change constantly and result in errors when estimating trends, and that the tool used for estimating future clothing needs can lose track of clothing sales information.

#### **4.3.2.6 Recession as global an economic condition**

Respondents were asked to indicate their level of agreement with six (6) statements relating to the recession. Figure 4.9 below shows the percentage of respondents who 'strongly disagreed' or 'disagreed', who 'neither agreed nor disagreed' and who 'agreed' or 'strongly agreed' with the clothing industry stakeholders regarding the recession as a global economic condition. Figure 4.9 presents the perceptions of the respondents expressed in percentages, while Table 4.7 presents the description of the statements in Figure 4.9.



**Figure 4.9:** Perception of the respondents regarding recession (in %)

**Table 4.7:** Description of statements in Figure 4.9 regarding recession

Statements	Description of statements
<b>E1</b>	When the SA economy is stable, clothes will sell in large numbers.
<b>E2</b>	The use of historical clothing sales data does not assist in estimating accurate future clothing needs.
<b>E3</b>	Before a recession, the use of historical sales data contributes to the level of accuracy when estimating future clothing needs.
<b>E4</b>	The purchase of non-essential items, such as clothing, decreased as a result of the recession.
<b>E5</b>	During the period of a recession, it is crucial to reduce future customers' orders as customers' needs decline.
<b>E6</b>	During the period of a recession, it is crucial to manufacture clothes in small batches.

**Source:** Questionnaire

Figure 4.9 reflects that the majority (over 70%) of the clothing industry respondents were in agreement ('agreed' or 'strongly agreed') with three of the statements relating to the recession. The highest levels of agreement were with statements stating that:

- When the SA economy is stable, clothes will sell in large numbers (75%).
- The purchase of non-essential items, such as clothing, decreased as a result of the recession (73.2%).
- During the period of a recession, it is crucial to manufacture clothes in small batches (71.4%).

For the other three statements, half or above half of the respondents were in agreement as shown below:

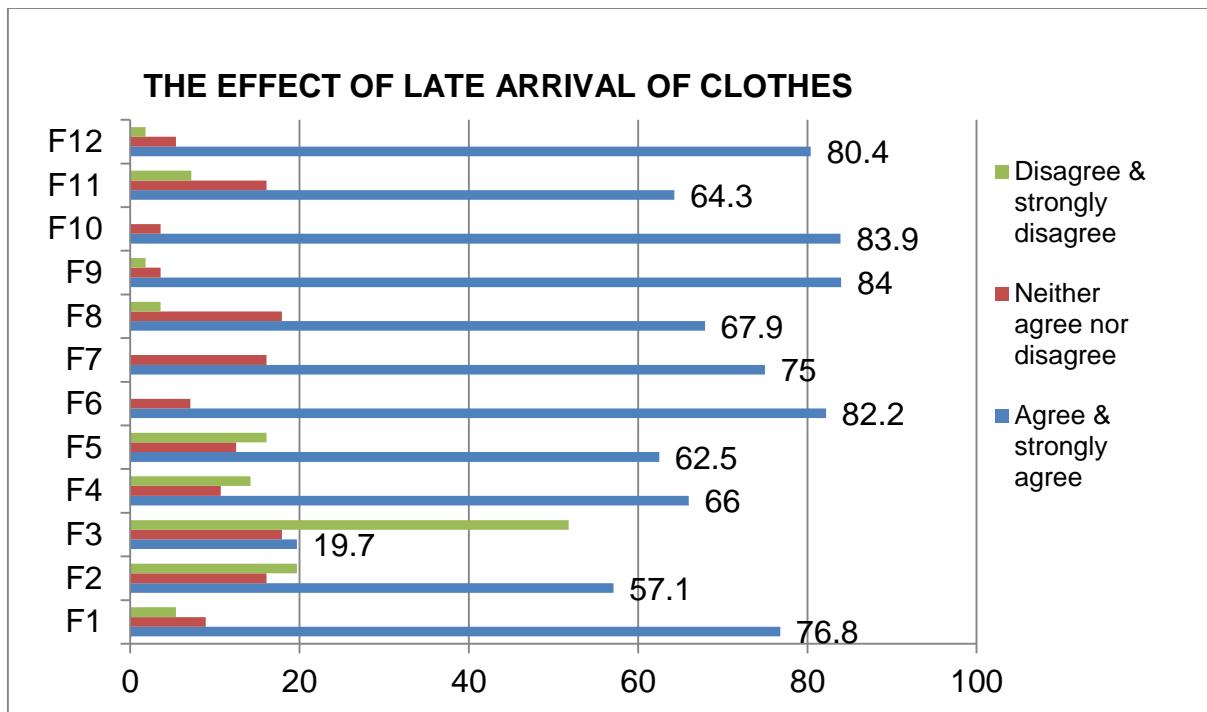
- During the period of a recession, it is crucial to reduce future customers' orders as customers' needs decline (64.3%).
- Before a recession, the use of historical sales data contributes to the level of accuracy when estimating future clothing needs (55.3%).
- The use of historical clothing sales data does not assist in estimating accurate future clothing needs (50%).

#### **4.3.2.7    *The effect of the late arrival of clothes***

Respondents were asked to indicate their level of agreement with 12 statements relating to the effect of the late arrival of clothes.

Figure 4.10 below shows the percentage of respondents who 'strongly disagreed' or 'disagreed', 'neither agreed nor disagreed' and who 'agreed' or 'strongly agreed' with the clothing industry stakeholders regarding the effect of the late arrival of clothes.

Figure 4.10 presents the perceptions of the respondents expressed in percentages, while Table 4.8 presents the description of the statements illustrated in Figure 4.10.



**Figure 4.10:** Perception of the respondents regarding the impact of late arrival of clothes (in %)

**Table 4.8:** Description of statements on the effect of late arrival of clothes

Statements	Description of statements
<b>F1</b>	Manufacturers should order fabrics from both local and international suppliers.
<b>F2</b>	It is not possible to have control over the timely arrival of fabrics.
<b>F3</b>	Fabrics and clothing material used in clothing manufacturing can only be purchased overseas.
<b>F4</b>	Fabrics and clothing material used in clothing manufacturing can be purchased from local suppliers.
<b>F5</b>	Orders placed with overseas suppliers may arrive too late for manufacturing.
<b>F6.</b>	Late arrival of clothing materials or fabrics should be considered when estimating future clothing needs.
<b>F7</b>	The timely arrival of clothing material or fabrics may reduce the level of errors when estimations on future customer needs are implemented.
<b>F8</b>	Operating within tight schedules and waiting periods will assist manufacturers to manufacture in advance.
<b>F9</b>	On-time deliveries assist in ensuring quick manufacturing processes.

<b>Statements</b>	<b>Description of statements</b>
<b>F10</b>	On-time agreements should be made with suppliers of fabrics to reduce late arrival of fabrics.
<b>F11</b>	Clothing material or fabric orders may arrive while the sales season has started.
<b>F12</b>	Ordering fabrics before the sales season starts is crucial to avoid losing sales on clothing garments.

**Source:** Questionnaire

As indicated in Figure 4.10 the majority (over 57%) of the respondents were in agreement with eleven (11) of the twelve (12) statements relating to the effect of late arrival of clothes, as listed below:

- Manufacturers should order fabrics from both local and international suppliers (76.6%).
- It is not possible to have control over the timely arrival of fabrics (51.7%).
- Fabrics and clothing material used in clothing manufacturing can be purchased from local suppliers (66%).
- Orders placed with overseas suppliers may arrive late for manufacturing (62.5%).
- Late arrival of clothing materials or fabrics should be considered when estimating future clothing needs (82.2%).
- The timely arrival of clothing material or fabrics may reduce the level of errors when estimations on future customer needs are implemented (75%).
- Operating within tight schedules and waiting periods will assist manufacturers in manufacturing process (67.9%).
- On-time deliveries assist in ensuring quick manufacturing processes (84%).
- On-time agreements should be made with suppliers of fabrics to reduce late arrival of fabrics (83.3%).
- Clothing material or fabric orders may arrive when the sales season has already started (64.3%).
- Ordering fabrics before the sales season starts is crucial to avoid lost sales on clothing garments (80.4%).

It is important to note that amongst the twelve (12) statements which were tested in Figure 4.10, the clothing industry stakeholders were in strong disagreement with only one statement. The clothing industry stakeholders were neutral or in disagreement with the statement regarding fabrics and clothing material used in clothing manufacturing which can only be purchased overseas (19.7%).

#### **4.3.2.8 Description of open-ended data**

This section presents a summary of research findings based on the open-ended data, categorised according to themes. From the analysis, seven (7) major themes were established as described in Table 4.9 below, which displays the comments of the clothing industry stakeholders on statements relating to factors affecting demand planning in this industry.

**Table 4.9: Description of open-ended questions**

<b>Themes</b>	<b>Description of themes</b>
Scheduling of clothing manufacturing of customers' orders	<ul style="list-style-type: none"> <li>▪ The local textile industry can be competitive if they work closely with clothing retail sectors</li> <li>▪ Clothing fabrics take long to arrive.</li> </ul>
Planning for fashion clothes	<ul style="list-style-type: none"> <li>▪ Fashion designers choose to follow trends and styles that suit the label.</li> <li>▪ Fashion is considered to be an industry more global than local.</li> <li>▪ Fashion styles do not change quite often.</li> <li>▪ There are four seasons for fashion clothes</li> <li>▪ Fashion details make fashion planning a challenge.</li> <li>▪ Designers design ahead of season.</li> <li>▪ There is information available on the internet regarding fashion trends.</li> <li>▪ Designer wear does not need to follow trends as designers produce unique brands.</li> <li>▪ Clothing stores follow trends and need to attend overseas fashion trends</li> </ul>
POS system usage	<ul style="list-style-type: none"> <li>▪ Some clothing industry stakeholders are not considering clothing sales statistics.</li> </ul>
Imports of clothes	<ul style="list-style-type: none"> <li>▪ SA manufacturers' quality is worse than the Chinese and there is a lack of capabilities.</li> <li>▪ SA clothing retailers and wholesalers need to support local clothing manufacturers.</li> <li>▪ SA government is not protecting the industry and is contributing</li> </ul>

Themes	Description of themes
	<p>to the downfall of local clothing production organisations.</p> <ul style="list-style-type: none"> <li>▪ SA government's funds are not easily accessible and they are not enough.</li> <li>▪ The influx of cheap imports has damaged the industry.</li> <li>▪ It is expensive to manufacture clothes in SA.</li> <li>▪ A lack of understanding of the industry by the new generation was observed.</li> <li>▪ Imports cause clothing manufacturers to close organisations.</li> <li>▪ Some local retailers are supporting local designers.</li> <li>▪ Funders are not available in the clothing industry.</li> <li>▪ SA government initiatives such as the Industrial Development Corporation (IDC) and the dti are trying to improve the situation.</li> <li>▪ Clothes take long to arrive.</li> </ul>
Estimation of future clothing requirements	<ul style="list-style-type: none"> <li>▪ Meeting the demand for clothing is crucial.</li> <li>▪ Dead stock is discouraged.</li> <li>▪ Estimators should obtain formal fashion training.</li> <li>▪ Background on fashion is recognised as crucial.</li> <li>▪ Overseas fashion shows are ahead of SA fashion.</li> <li>▪ Trade exhibition attendance is encouraged.</li> <li>▪ Fabric suppliers are to follow trends and keep customers informed about trends.</li> </ul>
Recession as a global economic condition	<ul style="list-style-type: none"> <li>▪ SA production of garments has declined partly due to the recession.</li> </ul>
Effect of late arrival of clothes	<ul style="list-style-type: none"> <li>▪ Fabric ordered from overseas arrives late.</li> <li>▪ Late deliveries are expected only during clothing sales season.</li> <li>▪ Communication on clothing fabrics is important.</li> <li>▪ It may take three months to receive orders.</li> <li>▪ June is a perfect time to order summer fabrics.</li> <li>▪ Late fabric arrival may delay clothing production.</li> <li>▪ Lead time may reduce when SA suppliers can offer fabric variety.</li> </ul>

**Source:** Questionnaire

As shown in Table 4.9, the respondents indicated that to achieve competitiveness, local clothing and textile industries should work closely with local retail clothing stores. Fashion was perceived as challenging due to details and trimming needed

on fashion clothes. Clothing manufacturers seem to follow trends and estimation figures provided by fashion designers. This is so because fashion designers produce unique brands. Trade exhibitions are promoted in order to plan ahead of season. The comments indicated that delays of fabric arrival happen when the sale season of garments has already started.

The importance of meeting customers' demand was highlighted, while keeping dead stock was discouraged. It was indicated that material fabrics take three months to arrive and this causes production delays. The quality of fabrics produced in South Africa was questioned, as well as the capability of new generations in the SA clothing market. Furthermore, it was commended that SA clothing fabrics are expensive. Local government support, customer support and lack of funders in the clothing industry were seen as factors forming a bottleneck in the Gauteng clothing industry. Even though SA government departments are trying to provide funds to local clothing industries, this was seen as insufficient.

#### **4.3.3 Conclusion on the factors affecting demand planning**

The overall findings indicated that scheduling the manufacturing of customer orders was perceived as the most important factor to consider when planning for clothing demand. From this finding, it was specified that more than half (above 50%) of the respondents perceived planning for fashion clothes, clothing imports, the recession and the effect of the late arrival of fabrics as factors which affect demand planning. The findings also highlight that half (above 50%) of the respondents perceived POS system usage, and estimations of customer clothing requirements as factors which have effects on demand planning.

Scheduling the manufacturing of customer orders was seen as the factor with the most profound influence on demand planning. The findings also specify that the POS system usage and the estimations of customer clothing requirements are factors with the least effect on demand planning. From the research findings, it is clear that these factors may be the reasons for, or they may contribute, to the challenges faced by the clothing industry with regard to demand planning.

The next section presents the differences between the three clothing stakeholders with regard to factors affecting demand planning in the Gauteng clothing industry.

## **4.4 DIFFERENCES IN DEMAND PLANNING PRACTICES AMONG KEY CLOTHING INDUSTRY STAKEHOLDERS**

In this section of the chapter differences in demand planning practices among the key clothing industry stakeholders (fabric suppliers, clothing manufacturers and fashion designers) are discussed.

### **4.4.1 Introduction**

This section of the chapter discusses statistically significant differences in demand planning practices among the key stakeholders of the Gauteng clothing industry. The Kruskal–Wallis one-way analysis of variance by ranks non-parametric test (Aaker *et al.*, 2007:445) was used to test for statistically significant differences. The test was chosen due to the small sample sizes of each group of the clothing industry stakeholders and due to the data being measured on an ordinal scale. The Kruskal–Wallis test was thus used to test the hypotheses regarding:

- Statistically significant differences between the three types of clothing industry stakeholders with regard to factors affecting demand planning in the clothing industry;
- Statistically significant differences between the groups of respondents who used 3-, 6- and 12-months plans respectively in planning demand for basic clothing with regard to factors affecting demand planning in the clothing industry; and
- Statistically significant differences between the groups of respondents who used 3-, 6- and 12-month plans respectively in planning demand for fashion clothing with regard to factors affecting demand planning in the clothing industry.

These three hypotheses were tested as indicated below.

### **4.4.2 Statistically significant differences between types of clothing industry stakeholders**

The statistical significant difference between the types of clothing industry stakeholders such as fabric suppliers, fashion designers and clothing manufacturers was tested.

The first hypothesis tested was:

$H_{01}$ : There was no statistically significant difference between the three types of clothing industry stakeholders with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements;
- the global recession; and
- the late arrival of clothes.

$H_1$ : There is a statistically significant difference between the three types of clothing industry stakeholders with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements;
- the global recession; and
- the late arrival of clothes.

Each statement was tested separately. Table 4.10, on the next page, lists the statements where statistically significant differences existed between clothing stakeholders with regard to the factors affecting demand planning. The Kruskal–Wallis test's chi-square test value, the p-value and the relevant level of significance are shown for each statement.

**Table 4.10: Statistically significant differences between the clothing stakeholders**

	Chi-square	P-value	(%) level of significance
<b>Scheduling clothing manufacturing of customers' orders</b>			
Continual reviewing of the product process of the supply of clothes is important.	5.081	0.079	10%
It is important that manufacturers inform retail stores about stock shortage or any production problems.	6.185	0.045	5%
Retailers' demand for low-cost charges on orders should be accommodated.	6.425	0.040	5%
Meeting customers' orders on time gets affected by the late arrival of clothing materials or fabrics.	5.915	0.052	10%
<b>Planning for fashion clothes</b>			
Manufacturers take much pressure from retail stores demanding more fashion variety.	7.573	0.023	5%
<b>The POS system usage</b>			
Access to the POS system information of retail stores/customers is crucial for manufacturers.	5.203	0.074	10%
<b>Imports of clothes</b>			
The influx of illegal and legal imports into South Africa results in inaccurate planning in manufacturing processes.	9.688	0.008	1%
Manufacturing processes need to be reduced to avoid piling up of clothes in manufacturing factories.	4.742	0.093	10%

	Chi-square	P-value	(%) level of significance
<b>Estimating future clothing requirements</b>			
Attendance of international trade exhibitions in order to plan ahead of season.	6.241	0.044	5%
Estimators of clothes should obtain formal training to improve their skills.	7.192	0.027	5%
Fashion clothes change constantly and result in errors when estimating trends.	6.440	0.040	5%
<b>Global recession</b>			
When the SA economy is stable, clothes will sell in large numbers.	5.454	0.065	10%
The use of historical clothing sales data does not assist in estimating accurate future clothing needs.	17.337	0.000	1%
Before a recession, the use of historical sales data contributes to the level of accuracy when estimating future clothing needs.	8.400	0.015	5%
The purchase of non-essential items, such as clothing, fell as a result of the recession.	5.147	0.076	10%
During a recession, it is crucial to reduce future customer orders as customers' needs decline.	9.903	0.007	1%
During the period of recession, it is crucial to manufacture clothes in small batches.	13.342	0.001	1%
<b>Late arrival of clothes</b>			
Fabrics and clothing material used in clothing manufacturing can be purchased from local suppliers.	5.512	0.064	10%

For the statements where statistical significances difference existed, the mean ranks furthermore indicate that:

#### ***4.4.2.1 Scheduling of customers' orders***

- Fabric suppliers tended to disagree more regarding the statement that it is more important to review the product process of the supply of clothes continually (mean rank=31.25), than clothing manufacturers and fashion designers did (mean ranks of 24.62 and 20.18 respectively).
- Clothing manufacturers tended to agree more that it is important to inform retail stores about stock shortage or any production problems (mean rank=21.26), than fabric suppliers and fashion designers (mean ranks of 28.25 and 31.64 respectively).
- Fabric suppliers tended to agree more that retailers' demands on low-cost charges on orders should be accommodated (mean rank=16.35), than clothing manufacturers and fashion designers (mean ranks of 26.15 and 28.80 respectively).
- Clothing manufacturers tended to agree more that meeting customers' orders on time gets affected by late arrival of clothing materials or fabrics (mean rank=21.27), than fabric suppliers and fashion designers (mean ranks of 28.42 and 32.05 respectively).

#### ***4.4.2.2 Planning for fashion clothes***

Fabric suppliers tended to agree that clothing manufacturers are taking much pressure from retail stores demanding more fashion variety (mean=15.17) than clothing manufacturers and fashion designers (mean ranks of 25.25 and 28.63 respectively).

#### ***4.4.2.3 The POS system usage***

Fabric suppliers tended to agree that it is more important for manufacturers to have access to the POS system information of retail stores/customers (mean rank=13.60) than fashion designers and clothing manufacturers (mean ranks of 20.06 and 23.02 respectively).

#### **4.4.2.4 *Imports of clothes***

- Clothing manufacturers tended to disagree more that the influx of illegal and legal imports into South Africa results in inaccurate planning in manufacturing processes (mean rank=31.48), than fashion designers and fabric suppliers (mean ranks of 21.50 and 17.96 respectively)
- Clothing manufacturers tended to disagree more that the manufacturing processes need to be reduced to avoid piling up of clothes in manufacturing factories (mean rank=29.08), than fashion designers and fabric suppliers (mean ranks of 23.00 and 19.57 respectively)

#### **4.4.2.5 *Estimating future clothing requirements***

- Fabric suppliers tended to disagree more that the attendance of international trade exhibitions is crucial in order to plan ahead for the season (mean rank=28.29), than fashion designers and clothing manufacturers (mean ranks of 18.44 and 17.20 respectively)
- Fashion designers and clothing manufacturers tended to agree more that estimators of clothes should obtain formal training to improve their skills (mean ranks of 16.63 and 17.67 respectively), than fabric suppliers (mean rank=28.79).
- Fabric suppliers tended to agree more than fashion designers and clothing manufacturers (mean ranks of 17.56 and 21.95 respectively) that fashion clothes change constantly and can result in errors when estimating trends (mean rank=11.36).

From the above research findings, it can be reasoned that when clothing stakeholders attend clothing fashion shows and obtain formal education they may gain fashion knowledge and estimate more appropriately for future clothes in order to stay ahead. However, clothing manufacturers and fashion designers feel that constant fashion changes do not contribute to estimation errors.

#### **4.4.2.6 *Recession as a global economic condition***

- Clothing manufacturers tended to disagree more than fashion designers and fabric suppliers (mean ranks of 23.41 and 22.16 respectively) with the fact that when the SA economy is stable, clothes will sell in large numbers (mean=31.50).

- Fabric suppliers tended to agree more than fashion designers and clothing manufacturers (mean ranks of 25.24 and 34.83 respectively) that the use of historical clothing sales data does not assist in estimating accurate future clothing needs during a recession (mean rank=15.34).
- Clothing manufacturers and fashion designers tended to disagree more than fabric suppliers (mean rank=17.88) that the use of historical sales data contributes to the level of accuracy when estimating future clothing needs before a recession (mean ranks of 29.77 and 29.59 respectively).
- Clothing manufacturers tended to disagree more than fashion designers and fabric suppliers (mean ranks of 23.64 and 22.44 respectively) that the purchase of non-essential items, such as clothing, decreases as a result of a recession (mean=31.23).
- Fabric suppliers tended to agree more than clothing manufacturers and fashion designers (mean ranks of 32.25 and 27.45 respectively) that it is crucial to reduce future customers' orders during a period of recession, as customers' needs decline (mean ranks=18.16).
- Clothing manufacturers tended to disagree more than fashion designers and fabric suppliers (22.86 and 18.50 respectively) that during a period of recession, it is crucial to manufacture clothes in small batches (mean rank=33.98).

#### **4.4.2.7    *Late arrival of clothes***

Clothing manufacturers tended to disagree more than fashion designers and fabric suppliers (mean ranks of 24.45 and 20.27 respectively) that fabrics and clothing material used in clothing manufacturing can be purchased from local suppliers (mean=29.90).

The next section presents the second set of hypotheses, which tested for statistically significant differences between the group of three clothing industry stakeholders who used 3-, 6- and 12-month plans, respectively, in the planning demand for basic clothing regarding factors affecting demand planning in the clothing industry.

#### **4.4.3 Differences between the groups of clothing industry stakeholders**

This section reports on whether there were statistically significant differences between the groups of respondents who used 3-, 6- and 12-month plans, respectively, in planning the demand for basic clothing with regard to factors affecting demand planning. The hypotheses tested were as follows:

$H_0$ : There was no statistically significant difference between the groups of respondents who used 3-, 6- and 12-month plans respectively in planning the demand for basic clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements;
- the global recession; and
- the late arrival of clothes.

$H_1$ : There was a statistically significant difference between the groups of respondents who used 3-, 6- and 12-month plans respectively in planning the demand for basic clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements;
- the global recession; and
- the late arrival of clothes.

Each statement was tested separately. Table 4.11 lists the statements where statistically significant differences existed between the groups of respondents who used 3-, 6- and 12-month plans, respectively, in planning the demand for basic clothing with regard to factors affecting demand planning. The Kruskal–Wallis test's chi-square test value, the p-value and the relevant level of significance are shown for each statement.

**Table 4.11: The statements with statistically significant differences between groups of respondents**

Scheduling clothing manufacturing of customers' orders	Chi-square	P-value	(%) level of significance
The manufacturing process can only be finalised when customers' orders and specifications are confirmed.	6.048	0.049	5%
Fabrics or material orders must be placed before the sale season starts.	5.898	0.052	10%
<b>Planning for fashion clothes</b>			
Fashion styles may change 8–10 times a year.	6.635	0.036	5%
<b>The POS system usage</b>			
Manufacturing factories can send company representatives to gather or collect historical sales information from retail stores manually.	6.101	0.047	5%
<b>Estimating future clothing requirements</b>			
Implementing different methods of estimation for basic and fashion clothing styles is required.	5.542	0.063	10%
Basic clothes are stable and result in low variances when predicting future demand.	5.261	0.072	10%
Manufacturers should conduct estimations of future customer needs on each of the clothing styles.	6.552	0.038	5%
Balancing the demand and supply of clothes is crucial to avoid high or low estimations.	5.327	0.070	10%
<b>Recession as a global economic condition</b>			
When the SA economy is stable, clothes will sell in large numbers.	8.306	0.016	5%

There were statistically significant differences between the groups of respondents who used 3-, 6- and 12-month plans, respectively, in planning demand for basic clothing with regard to some specific statements related to factors affecting demand planning in the clothing industry. Furthermore, the mean ranks indicated:

- ***Scheduling of clothing manufacturing of customers' orders***

The group that used a 12 month-plan tended to agree more than the group that used 6-month and 3-month plans (mean ranks of 22.26 and 20.63 respectively). The group agree that the manufacturing process that can only be finalised when customers' orders and specifications are confirmed (mean rank=9.50).

The group that used a 12-month plan also tended to agree more than the groups that used 3-month and 6-month plans (mean ranks of 19.69 and 23.68 respectively). The group agree that fabrics or material orders must be placed before the sale season starts (mean rank=11.00).

- ***Planning for fashion clothes***

The group that used a 6-month plan 'agreed' more than the groups that used 3-month and 12-month plans (mean ranks of 19.43 and 29.50 respectively) that fashion styles may change 8–10 times a year (mean rank=16.78).

- ***The use of the POS system***

The group that used a 6-month plan 'agreed' more than the groups that used 3-month and 12-month plans (mean ranks of 17.50 and 22.25 respectively). The group agreed that manufacturing factories can send company representatives to gather or collect historical sales information from retail stores manually (mean ranks=11.86).

- ***Estimating future clothing requirements***

The group that used a 12-month plan 'agreed' more than the groups that used 3-month and 6-month plans (mean ranks of 16.00 and 18.50 respectively) that different methods should be implemented when estimating for basic and fashion clothing styles (mean rank=9.00).

The group that used a 12-month plan tended to agree more than the groups that used 6-month and 3-month plans (mean ranks of 15.07 and 20.33 respectively) that basic clothes are stable and result in low variances when predicting the future demand (mean rank=11.60).

The group that used a 12-month plan tended to agree more than the groups that used 6-month and 3-month plans (mean ranks of 17.67 and 18.54 respectively) that manufacturers should conduct estimations of future customer needs on each clothing style (mean rank=8.10).

The group that used a 6-month plan tended to disagree more than the groups that used a 3-month and 12-month plan (mean ranks of 13.42 and 15.70 respectively). The group disagree that balancing the demand and supply of clothes is crucial to avoid high or low estimations (mean rank=20.53).

- ***Recession as a global economic condition***

The group that used a 12-month plan tended to disagree that when the SA economy is stable clothes will sell in large numbers (mean rank=28.60) followed by the group that used a 6-month plan (mean rank=20.64). The group that used a 3-month plan tended to agree with the statement (mean rank=15.10).

The third hypothesis, which tested the significant differences regarding factors affecting demand planning in the clothing industry between the group of three clothing industry stakeholders that used a 3-, 6- and 12-month plan, respectively, in planning the demand for fashion clothing, is presented in the next section.

#### **4.4.4 Factors affecting demand planning in the clothing industry**

This section reports on whether there were statistical differences between the groups of respondents that used 3-, 6- and 12-month plans respectively in planning demand for fashion clothing with regard to factors affecting demand planning. The hypotheses tested were as follows:

$H_{03}$ : There was no statistically significant difference between the groups of respondents that used 3-, 6- and 12-month plans, respectively, in planning the demand for fashion clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements;
- the global recession; and
- the late arrival of clothes.

$H_3$ : There was a statistically significant difference between the groups of respondents that used 3-, 6- and 12-month plans respectively in planning the demand for fashion clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements;
- the global recession; and
- the late arrival of clothes.

Each hypothesis was tested separately. Table 4.12, on the next page, lists the statements where statistically significant differences existed between the clothing stakeholders that used 3-, 6- and 12-month plans respectively in planning the demand for fashion clothing with regard to factors affecting demand planning in the clothing industry. The Kruskal–Wallis test's chi-square test value, the p-value and the relevant level of significance are shown for each statement.

**Table 4.12: Statements with statistically significant differences for fashion clothing with regard to factors affecting demand planning**

Planning for fashion clothes	Chi-square	P-value	(%) level of significance	
Monitoring fashion movements is important.	7.784	0.020	5%	
<b>Estimating future clothing requirements</b>				
Implementing different methods of estimation for basic and fashion clothing styles is required.	4.697	0.096	10%	
Attendance of international trade exhibitions in order to plan ahead of season is important.	13.882	0.001	1%	
Estimators of clothes should obtain formal training to improve their skills.	4.631	0.099	10%	
Manufacturers should conduct estimations of future customer needs according to the numbers of sizes which were sold previously.	6.036	0.049	5%	
<b>Planning for fashion clothes</b>				
Monitoring fashion movements is important.	7.784	0.020	5%	
<b>Recession – an unfavourable economic condition</b>				
During the period of a recession, it is crucial to manufacture clothes in small batches.	4.709	0.095	10%	
<b>Late arrival of clothes</b>				
Operating within tight schedules and waiting periods will assist manufacturers to manufacture in advance.	4.618	0.099	10%	

There were statistically significant differences between the groups of respondents that used 3-, 6- and 12-month plans, respectively, in planning demand for fashion clothing with regard to some specific statements related to the factors affecting demand planning in the clothing industry, as briefly explained below:

- ***Planning for fashion clothes***

The groups that used a 6-month plan and a 12-month plan tended to agree that monitoring fashion movements is important (mean rank=16.45 and 17.25 respectively). The group that used a 3-month plan tended to disagree most with the statement (mean rank=25.79).

- ***Estimating future clothing requirements***

The group that used a 6-month plan tended to agree more than the groups that used 12-month and 3-month plans (mean ranks of 18.00 and 19.25, respectively) that different methods of estimation for basic and fashion clothing styles be implemented (mean rank=12.87).

The group that used a 6-month plan tended to agree that attendance of international trade exhibitions is crucial in order to plan ahead of season (mean rank=11.40) followed by the group that used a 12-month plan (mean rank=14.25). The group that used a 3-month plan tended to disagree with the statement (mean rank=23.79).

The group that used a 6-month plan tended to agree more than the groups that used 3-month and 12-month plans (mean ranks of 19.32 and 22.25, respectively) that estimators of clothes should obtain formal training to improve their skills (mean rank=13.43).

The group that used a 6-month plan tended to agree more than the groups that used 12-month and 3-month plans (mean ranks of 19.88 and 20.43, respectively). The group agree that manufacturers should conduct estimations of future customer needs according to the numbers of sizes which were sold previously (mean rank=13.03).

- ***Recession as a global economic condition***

The groups that used 12-month and 6-month plans tended to disagree more than the group that used a 3-month plan (mean rank=15.13) that it is important to manufacture clothes in small batches during the period of a recession (mean rank=of 22.63 and 22.29, respectively).

- ***Late arrival of clothes***

The group that used a 12-month plan tended to agree more than the groups that used a 6-month and a 3-month plan (mean ranks of 17.56 and 20.17 respectively) that operating within tight schedules and waiting periods will assist manufacturers to manufacturer in advance (mean rank=9.25 ).

## **4.5 CONCLUSION**

This chapter presented a detailed discussion of the analysis and interpretation of research data collected from the questionnaires. The responses of the three clothing industry stakeholders, namely fabric suppliers, clothing manufacturers and fashion designers, with regard to demand planning practices in the Gauteng clothing industry were presented in this chapter. The descriptive statistical analyses, as well as the inferential statistics analyses were presented in this chapter. The descriptive analyses were discussed in Section 4.3, and the discussions of the non-parametric tests were presented in Section 4.4.

The findings of the research, conclusions and recommendations are discussed in Chapter 5.

# **CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS**

## **5.1 INTRODUCTION**

This chapter presents the discussion, conclusion and recommendation of the study. The chapter starts by revisiting the research questions and objectives. This is followed by a summary of the study and conclusions drawn from the findings. The chapter concludes by providing the contribution by the study and recommendations for effective demand planning implementation within the clothing industry.

## **5.2 REVISITING THE RESEARCH QUESTIONS AND OBJECTIVES**

In Section 1.4, Chapter 1, the research questions and objectives were presented. The main research question of the study was stated as:

*Which demand planning practices are employed in the clothing industry of Gauteng, a province in South Africa?*

In order to answer the main research question, the following sub-questions (see Section 1.4.1, Chapter 1) were answered:

- What are the demand planning approaches employed by various stakeholders in the Gauteng clothing industry?
- What are the factors that affect demand planning practices in the Gauteng clothing industry?
- What are the differences in demand planning among the key stakeholders in the Gauteng clothing industry?

The main objective of the study (see Section 1.5, Chapter 1) was stated as:

*To explore demand planning practices in the clothing industry of Gauteng, a province in South Africa.*

In order to achieve the main objective, the following secondary objectives (see Section 1.5, Chapter 1) needed to be achieved:

- To determine demand planning approaches employed by various stakeholders in the Gauteng clothing industry;
- To determine the factors affecting demand planning practices in the Gauteng clothing industry;
- To determine the differences in demand planning among the key stakeholders in the Gauteng clothing industry; and
- To make suggestions on how demand planning practices in the Gauteng clothing industry could be improved.

In order to achieve the third research objective, hypotheses were determined, as stated below:

### **Hypothesis 1**

- $H_1$ : There is a statistically significant difference between the three types of clothing industry stakeholders with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry.
- $H_{01}$ : There is no statistically significant difference between the three types of clothing industry stakeholders with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry.

### **Hypothesis 2**

- ( $H_2$ ): There is a statistically significant difference between the groups of respondents who used 3-, 6- and 12-month plans respectively in planning the demand for basic clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry.
- ( $H_{02}$ ): There is no statistically significant difference between the groups of respondents who used 3-, 6- and 12-month plans respectively in planning the demand for basic clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry.

### **Hypothesis 3**

- ( $H_3$ ): There is a statistically significant difference between the groups of respondents who used 3-, 6- and 12-month plans respectively in planning the

demand for fashion clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry.

- ( $H_{03}$ ): There is no statistically significant difference between the groups of respondents who used 3-, 6- and 12-month plans respectively in planning the demand for fashion clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry.

## 5.3 DISCUSSION OF THE RESULTS

In this section the results are discussed in alignment with the research questions. In order to discuss the main research question of the study, the secondary research questions are first discussed as reflected below.

### 5.3.1 Research sub-question 1

***What are the demand planning approaches employed by various stakeholders in the Gauteng clothing industry?***

Two general types of approaches to demand planning practices were considered in this study. Respondents were asked to indicate the level of agreement regarding the demand planning approaches they employ based on 12 statements related to demand planning approaches. The results indicated in (see Section 4.3.1) Figure 4.3 shows that the demand planning practices of the key clothing industry stakeholders followed both the hierarchical and the optimal approaches. These two types of demand planning approaches were perceived to assist in improving manufacturing performance. Furthermore, the approaches in resolving production process challenges by sub-dividing operational challenges into small sub-challenges were used (see Section 4.3.1). The hierarchical demand planning approach was seen to be applicable on basic clothes, as basic clothes constitute large-scale stable operation processes with minimal uncertainties (see Section 4.3.1). The optimal demand planning approach was seen as applicable on fashion clothes as fashion clothes are perceived to constitute small flexible production operations with many production uncertainties (see Section 4.3.1). The optimal demand planning approach was seen as appropriate for implementation in the context of fashion clothes as it accommodates seasonal demand changes and the

various fashion seasons. However, it is important to indicate that the adoption of these demand planning approaches depends on the product offering.

### **5.3.2 Research sub-question 2**

#### ***What are the factors that affect demand planning practices in the Gauteng clothing industry?***

The aim of this sub-question was to determine the factors affecting demand planning in the clothing industry. This research question was addressed in Section 2.5. As indicated in Chapter 2 (Section 2.5.1.2), despite the importance of demand planning in the Gauteng clothing industry; the industry faces numerous challenges (Aksoy *et al.*, 2012:223). Based on responses to this question, factors such as scheduling, the manufacturing of customer orders, planning for fashion clothes, the POS system usage, influx of clothing imports, estimation of clothing requirements, recession as an unfavourable economic condition and the impact of late arrival of clothes affect demand planning in the Gauteng clothing industry. These factors and their effect are discussed in the section below:

- Scheduling of manufacturing customer orders:***

From the results, it was clear that scheduling customer clothing orders affects demand planning in the Gauteng clothing industry. As indicated in Figure 4.4, the respondents highlighted that clothing manufacturers should conduct follow-ups on material shortages in order to improve demand planning. This can be done through communication between all parties involved in clothing supply. This is aligned with Section 2.5.1.2 of the literature study which emphasised the importance of communication when scheduling manufacturing of customer orders. As indicated in Section 4.3.3 and Table 4.9, the respondents noted that when scheduling clothing manufacturing of customer orders, the local textile and clothing industry proved competitive if they work with clothing retail sectors. The results in Figure 4.4 revealed that clothing manufacturing processes can only be finalised when customers' orders and specifications are confirmed. Ordering fabric in advance – that is before the sale season starts – was acknowledged and clothing material delays were discouraged. This was also explained in Section 2.5.1.2. Hence,

scheduling manufacturing of customer orders was indicated as a vital factor that should be considered when engaging in demand planning.

- ***Planning for fashion clothes:***

Some of the responses reflected in Table 4.5 indicated that planning for fashion clothes is a challenge due to their short life span when compared to basic clothes. This was in agreement with Section 2.5.1.2, which indicates that basic clothes are sold annually (or yearly), whereas fashion clothes are sold over a short period. It was underlined that clothing estimators need some form of experience. The overall results in Figure 4.4 showed that most of the respondents (above 50%) indicated that planning for fashion clothes is a vital factor that should be considered when engaging in demand planning.

- ***The point-of-sale (POS) system usage:***

With regards to POS, the research results revealed that clothing manufacturers need to have access to the POS system of retail customers in order to plan for actual clothing demands (Figure 4.6). Half of the respondents (50%) indicated that the POS system is a critical demand planning factor. The importance of storing garment details according to size, colour and design was strongly emphasised (see Section 2.5.3.1). The purchase of past sales history data from marketing or advertising agencies was strongly discouraged. Over 60% of the clothing industry stakeholders did not do constant verification of POS information.

Figure 4.6 indicates that the majority (over 60%) of the clothing industry stakeholders disagreed that historical sales information used by manufacturers to plan future clothing needs can be purchased from marketing or advertising agencies. This is in agreement with the literature study which indicated in Section 2.6.2.4 that manual sales data contributed to distortion of data. Some of the comments reflected in Table 4.9 and which were made by some of the clothing industry respondents indicated that they did not have time to view clothing sales statistics as they believed that clothing knowledge and quality offerings were the most crucial elements to focus on.

- ***The influx of clothing imports:***

The results reflected in Figure 4.7 showed that the influx of clothing imports into South Africa result in inaccurate planning in manufacturing processes. More than 55% of the respondents 'agreed' (see Figure 4.7) that the implementation of low-tariff agreements on import rates by the SA government has contributed to an oversupply of clothes in the country. Most of the respondents (60.7%) indicated in Figure 4.7 that Chinese imports contributed to the oversupply of clothes in the SA clothing manufacturing industry, and especially in Gauteng. A lack of local clothing industry support was indicated in Section 2.5.4.1 in the literature study. However, some of the comments made by respondents (see Table 4.9) indicated that even though local clothing manufacturers want to support local clothing suppliers, SA fabric suppliers do not have the capacity to meet their demands.

Some respondents further indicated that the quality of clothing fabrics in SA is not satisfactory when compared to the quality of fabrics bought from competitors such as China. Less than 50% of the respondents (see Figure 4.7) highlighted a need to reduce manufacturing processes to avoid piling up of clothes in manufacturing factories, while more than 55% did not agree with this view. Some of the respondents (see Table 4.9) highlighted that the new generation in the clothing industry is reactive in attending to customers' needs. This makes it difficult for local customers to support proudly SA clothing garments. The respondents indicated that they find themselves buying imported clothes in order to take advantage of low-cost garments purchase.

Hence, a strong request is indicated in Figure 4.7 (65%) for SA government subsidies in the clothing industry. Over 54% of the clothing industry stakeholders were in agreement with the statements on clothing imports.

- ***Estimating future clothing requirements:***

As specified in the results on Figure 4.8, balancing the demand and supply of clothes to avoid high or low estimations was seen as highly important. The results clearly reveal that basic clothes are stable and result in low variances when estimating clothes. There is an agreement between the literature study (see Section 2.5.5.1) and the responses in Figure 4.8 that when it comes to clothing estimations,

the estimation must be implemented in accordance with the numbers of sizes previously sold. However, most (more than 70%) of the responses in Figure 4.8 disagreed that the tool used to estimate future clothing needs can lose track of clothing sales information. In addition, more than 70% of the respondents (see Figure 4.8) disagreed that constant fashion changes cause errors when estimating trends. Most of the respondents 'agreed' that variances in future clothing estimations should be investigated.

- ***Recession as a global economic condition:***

Most of the respondents (75%) (see Figure 4.9) 'agreed' that when the SA economy is stable, clothes will sell in large numbers. They indicated that the purchase of non-essential items, such as clothing, decreases as a result of a recession. The importance of small-batch manufacturing during a period of recession was emphasised in the responses reflected in Figure 4.9. This is in line with the literature study (see Section 2.5.6.1) which confirms that the recession causes additional problems in demand planning and results in errors in stock predictions. Additional comments are reflected in Table 4.9, namely that due to increased clothing imports and the recession, some branches of the clothing industry have relocated or closed down their production operations. The research results reflected in Figure 4.9 show that more than 50% of the clothing industry respondents were in agreement ('agreed' or 'strongly agreed') with statements relating to the recession.

- ***The effect of late arrival of clothes:***

Most respondents (more than 57%), 'agreed' with the statements on the effect of the late arrival of clothes (see Figure 4.9). The respondents 'agreed' that on-time deliveries assist in ensuring quick manufacturing processes (see Figure 4.10). This aligns with the literature study (see Section 2.5.7.2) which states that clothing lead time should be reduced, especially regarding fashion clothes. Similarly, the research results reported in Figure 4.10 revealed that the clothing industry is putting pressure on fabric suppliers in terms of meeting delivery times to improve timely production and demand planning. Most respondents (see Figure 4.10) indicated that they could order fabrics from both local and international suppliers. However, this may discourage the performance of the local clothing industry. Some additional

comments from the respondents (see Table 4.9) indicated that fabric ordered from outside South Africa routinely arrives late.

The respondents (see Figure 4.9) 'agreed' that fabric material orders should be placed before the sales season starts to avoid lost sales. However, the comments reflected in Table 4.9 indicated that not all fabric may arrive during the sales season; it is only for later deliveries not for the start of the season. In addition to comments reflected in Table 4.9, it was confirmed that lead time can only be reduced if SA suppliers can deliver the variety of fabrics needed by local manufacturers and designers instead of them having to buy fabrics overseas. Some respondents (see Table 4.9) remarked that summer fabric orders must be placed in June and winter fabric orders should be made from February to avoid manufacturing delays and sales losses.

### **5.3.3 Research sub-question 3**

***What are the differences in demand planning among the key stakeholders in the Gauteng clothing industry?***

To answer the research question, hypotheses were formulated with regard to the significant difference between the three types of clothing industry stakeholders on factors affecting demand planning in the clothing industry. Three hypotheses were formulated as discussed below.

#### **5.3.3.1 Hypothesis 1**

**Hypothesis 1 was formulated as follows:**

$H_{01}$ : There was no statistically significant difference between the three types of clothing industry stakeholders with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements;

- the global recession; and
- the late arrival of clothes.

$H_1$ : There is a statistically significant difference between the three types of clothing industry stakeholders with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements;
- the global recession; and
- the late arrival of clothes.

The results indicated that there was a statistically significant difference between the three types of clothing industry stakeholders with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements; and
- global recession as well as the late arrival of clothes.

The findings of the study show that there were significant differences in the areas of manufacturing as briefly discussed below.

- ***Scheduling clothing manufacturing of customers' orders:***

Fabric suppliers tended to disagree more than clothing manufacturers and fashion designers that it is important to continually review the product process of the supply of clothes, and that a retailer's demand for low-cost charges on orders should be

accommodated. Clothing manufacturers tended to agree more than fabric suppliers and fashion designers that it is important to inform retail stores about stock shortages or any production problems, and that the late arrival of clothing materials affects their ability to meet customers' orders on time.

- ***Planning for fashion clothes:***

Fabric suppliers tended to agree more than clothing manufacturers and fashion designers that clothing manufacturers were taking much pressure from retail stores demanding more fashion variety.

- ***The POS system usage:***

Fabric suppliers tended to agree more than fashion designers and clothing manufacturers that it is important for manufacturers to have access to the POS system information of retail stores/customers.

- ***Imports of clothes:***

Clothing manufacturers tended to disagree more than fashion designers and fabric suppliers that the influx of illegal and legal imports into South Africa result in inaccurate planning in manufacturing processes; and manufacturing processes need to be reduced to avoid piling up of clothes in manufacturing factories

- ***The estimation of customers' future clothing requirements:***

Clothing manufacturers tended to agree more than fabric suppliers and fashion designers that the attendance of international trade exhibitions is crucial in order to plan ahead for the season.

Fashion designers and clothing manufacturers tended to agree more than fabric suppliers that estimators of clothes should obtain formal training to improve their skills

Fabric suppliers tended to agree more than fashion designers and clothing manufacturers that fashion clothes constantly change and result in errors when estimating trends.

- ***Recession as a global economic condition:***

Clothing manufacturers tended to disagree more than fashion designers and fabric suppliers that when the SA economy is stable, clothes will sell in large numbers, the purchase of non-essential items, such as clothing, decrease as a result of a recession and that during a recession, it is crucial to manufacture clothes in small batches.

Fabric suppliers tended to agree more than fashion designers and clothing manufacturers that the use of historical clothing sales data does not assist in estimating accurate future clothing needs during a recession and that it is crucial to reduce future customer orders during a period of recession, as customers' needs decline

Clothing manufacturers and fashion designers tended to disagree more than fabric suppliers that the use of historical sales data contributes to the level of accuracy when estimating future clothing needs before a recession.

- ***The effect of late arrival of clothes:***

Clothing manufacturers tended to disagree more than fashion designers and fabric suppliers that fabrics and clothing material used in clothing manufacturing can be purchased from local suppliers.

#### **5.3.3.2 Hypothesis 2**

**Hypothesis 2 was formulated as follows:**

$H_02$ : There was no statistically significant difference between the groups of respondents who used 3-, 6- and 12-month plans, respectively, in planning the demand for basic clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements;

- the global recession; and
- the late arrival of clothes.

$H_2$ : There was a statistically significant difference between the groups of respondents who used 3-, 6- and 12-month plans, respectively, in planning the demand for basic clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements;
- the global recession; and
- the late arrival of clothes.

The results reflected that there was a statistically significant difference between the groups of respondents that used 3-, 6- and 12-month plans, respectively, in planning demand for basic clothes in terms of factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the POS system usage;
- clothing imports;
- estimation of future clothing requirements;
- recession as a global economic condition; and
- the effect of late arrival of clothes.

The findings of the study show that there were significant differences in the area of:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the POS system usage;

- estimation of future clothing requirements; and
- recession as a global economic condition as briefly provided below:

The results indicated the following:

- ***Scheduling of clothing manufacturing of customers' orders:***

The group that used a 12-month plan tended to agree more than the groups that used the 6-month and 3-month plan that manufacturing processes can only be finalised when customers' orders and specifications are confirmed; the group also agreed that fabrics or material orders must be placed before the sale season starts.

- ***Planning for fashion clothes:***

The group that used a 6-month plan 'agreed' more than the groups that used 12-month and 3-month plans that fashion styles might change 8 to 10 times a year.

- ***The POS system usage:***

The group that used a 6-month plan 'agreed' more than the groups that used 3-month and 12-month plans that manufacturing factories can send company representatives to gather or collect historical sales information from retail stores manually.

- ***Estimating future clothing requirements:***

The group that used a 12-month plan 'agreed' more than the groups that used 3-month and 6-month plans that different methods should be implemented when estimating for basic and fashion clothing styles; the group also agreed that basic clothes are stable and result in low variances when predicting the future demand; and that manufacturers should conduct estimations of future customers' needs on each clothing style:

The group that used a 6-month plan 'agreed' more than the groups that used 3-month and 12-month plans that balancing the demand and supply of clothes is crucial to avoid high or low estimations.

- ***Recession an economic condition:***

The group that used a 12-month plan tended to disagree more than the group that used a 6-month plan that when the SA economy is stable clothes will sell in large numbers. The group that used a 3-month plan tended to agree with the statement

#### **5.3.3.3 Hypothesis 3**

**Hypothesis 3 was formulated as follows:**

$H_03$ : There was no statistically significant difference between the groups of respondents that used 3-, 6- and 12-month plans, respectively, in planning the demand for fashion clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements;
- the global recession; and
- the late arrival of clothes.

$H_3$ : There was a statistically significant difference between the groups of respondents that used 3-, 6- and 12-month plans, respectively, in planning the demand for fashion clothing with regard to each of the statements describing each of the factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the usage of the POS system;
- clothing imports;
- estimation of future clothing requirements;
- the global recession; and
- the late arrival of clothes.

The alternative hypothesis revealed that there was a statistically significant difference between the groups of respondents that used 3-, 6- and 12-month plans, respectively, in planning the demand for fashion clothing with regard to factors affecting demand planning in the clothing industry, namely:

- scheduling clothing manufacturing of customers' orders;
- planning for fashion clothes;
- the POS system usage;
- clothing imports;
- estimation of future clothing requirements;
- the global recession; and
- the effect of late arrival of clothes.

The findings of the study showed that there were significant differences in the areas of planning for fashion clothes, estimation of future clothing requirements, recession as a global economic condition and the effect of late arrival of clothes as briefly provided below:

- ***Planning for fashion clothes:***

The group that used a 6-month plan tended to agree more than the group that used a 12-month plan that monitoring fashion movement is important than the groups that used 3-month plan tended to disagree most with the statements.

- ***Estimating future clothing requirements:***

The group that used a 6-month plan tended to agree more than the group that used 12-month and 3-month plans that different methods of estimation for basic and fashion clothing styles be implemented and that attendance of international trade exhibitions is crucial in order to plan ahead of season. The group that used a 6-month plan also agreed that estimators of clothes should obtain formal training to improve and that manufacturers should conduct estimations of future customers' needs according to the number of sizes which were sold previously.

- ***Recession as a global economic condition:***

The groups that used a 12-month and 6-month plan tended to disagree more than the group that used a 3-month plan that it is important to manufacture clothes in small batches during periods of recession.

- ***The effect of late arrival of clothes:***

The group that used a 12-month plan tended to agree more that operating within tight schedules and waiting periods will assist manufacturers to manufacture in advance than the group that used a 6-month and 3-month plan

## **5.4 PRIMARY RESEARCH QUESTION**

Regarding the main research question, the results revealed that the key demand planning practices in the Gauteng clothing industry are production planning, uncertainty prevention, forecasting and production machine capabilities. These practices are the key attributes of hierarchical and optimal demand planning approaches. As indicated in Table 2.1, the hierarchical approach considers production plans over an extended period, while the optimal approach is interested in gaining a production plan over a limited period in order to satisfy demand. The hierarchical demand planning approach is perceived to be more effective when planning for basic clothing production because their planning horizon takes up to twelve months. The optimal demand planning approach is perceived to be more functional for fashion clothing production because their planning horizon takes up to six months.

The results also revealed that there were factors affecting how demand planning practices were conducted in the clothing industry. The results showed that certain factors have a significant effect on clothing demand planning, such as:

- scheduling manufacturing of customers' orders;
- planning for fashion clothes;
- the POS system usage;
- clothing imports;
- estimating future clothing requirements;

- recession; and
- the effect of the late arrival of clothes.

All the processes indicated scheduling of customer manufacturing orders as the most important factor in demand planning in the clothing industry.

Finally, the results further showed that there were differences in the factors that affect demand planning practices among the fabric suppliers, clothing manufacturers and fashion designers. Clothing manufacturers tended to believe that clothing manufacturing can be purchased from local suppliers. It can be assumed that clothing manufacturers purchase fabrics from both local and international suppliers. Similarly, fabric suppliers believe fabric should be purchased from local suppliers as they believe that clothing manufacturers should support local fabric producers. It is crucial to note fabric designers do not plan according to past clothing sales of specific brands as they focus on designing new different brands continually.

## **5.5 SUMMARY AND CONCLUSION**

This section of the chapter provides a summary of the study and conclusions reached regarding the research objectives.

### **5.5.1 Summary of the research study**

This study aimed to explore demand planning practices in the Gauteng clothing industry. Three stakeholders, namely fabric suppliers, clothing manufacturers and fashion designers in the Gauteng clothing industry were chosen for the study. All three clothing stakeholders had influences on demand planning practices in the Gauteng clothing industry. This study comprised chapters as explained below:

Chapter 1 started with an explanatory background to the study to provide direction on how demand planning is conducted. The chapter provided an overview of the rationale and aim of the study, the problem statement, research questions, primary and secondary objectives, the study hypothesis, research methods, research limitations, scope of the study and the study outline.

Chapter 2 comprised the literature review, which was conducted on the perspective of demand planning, the approaches to demand planning and challenges affecting the demand planning in the clothing industry, as well as the SA clothing industry. Chapter 2 dealt with studies conducted by other researchers regarding the processes and factors affecting demand planning in the clothing industry.

Chapter 3 dealt with the research methodology. Through the methodology, the study was able to determine the data collection processes to investigate and explore factors affecting demand planning in the Gauteng clothing industry. The research design, approach, the mixed method – which in this study adopted both qualitative and quantitative methods – was aligned with a survey research strategy. A sample was drawn from the three Gauteng clothing industry stakeholders, namely fabric suppliers, clothing manufacturers and fashion designers. A semi-structured research questionnaire was used to collect empirical data. The data analysis and interpretation were conducted using the SPSS statistics software.

Chapter 4 dealt with the data analysis and interpretation of statistical results, as well as the results emanating from the data collected from the three groups of stakeholders. The research questionnaire was divided into two sections: Section A consisted of the demographics and the job profiles of the clothing industry stakeholders and Section B consisted of demand planning practices in the clothing industry. The data was coded in order to interpret it properly and data was analysed.

Chapter 5 summarised the findings, drew conclusions and made recommendations in line with the literature review and the study objectives. The research findings involved demand planning practices, demand planning approaches, as well as the factors affecting demand planning in the clothing industry. In Chapter 5, the results are discussed and conclusions are drawn from the main research objective.

### **5.5.2 Conclusions relating to the research objectives**

The first research question was to determine demand planning approaches employed by various stakeholders in the Gauteng clothing industry. In order to determine the demand planning approaches adopted by the respondents, 12 statements which related to the characteristics of demand planning approaches, were selected from all the factors which are perceived to have an effect on demand

planning. The results as indicated in Figure 4.10 showed that the clothing industry stakeholders adopted both the hierarchical and the optimal demand planning approaches in their organisational operations to make operational decisions across their organisations. Both demand planning approaches planned to solve the problem using various dimensions in the product planning decision-making process (see Section 2.2.5). The hierarchical demand planning approaches appeared effectively implemented regarding basic clothes which are associated with a 12-month production planning period. The optimal demand planning approach was considered to be effectively implemented regarding fashion clothes associated with short manufacturing plans, namely 3- to 6-month plans.

The second research objective was to determine the factors affecting demand planning practices in the Gauteng clothing industry. The research results revealed that factors such as scheduling, planning for fashion, the POS system, imports of clothes, estimating future clothing requirements, recession and the effect of late arrival of clothes influenced demand in the Gauteng clothing industry. The overall results indicated that scheduling the manufacturing of customers' orders is regarded as an important factor to consider when planning for clothing demand. In scheduling the clothing manufacturing, the importance of communication and teamwork were all acknowledged.

The results also indicated that more than half of the respondents (over 50%) perceived planning for fashion clothes, clothing imports, the recession and the effect of the late arrival of clothes as factors which influence demand planning. The results further highlighted that 50% of the respondents perceived POS system usage and estimations of customer clothing requirements as factors which influence demand planning. From the research results, it is clear that all these factors may contribute to the challenges faced by the clothing industry with regard to demand planning.

The third sub-research objective was to determine the differences in demand planning among the key stakeholders in the clothing industry. To answer the research question, hypotheses were established (see Section 4.3). The clothing industry stakeholders followed different practices in demand planning. However, clothing manufacturers and fashion designers seemed to agree that obtaining

formal training to improve their skills is crucial for clothing estimators, and that fashion estimations constitute errors. There were different demand planning practices at different planning horizons for the key stakeholders in the clothing industry. However, the demand planning horizons of the group that used 12-month and 6-month plans were in agreement, namely, that during the recession period, small-batch manufacturing should be practised.

### **5.5.3 Primary research objective**

From the discussion of the secondary research objectives, conclusions can be drawn in terms of the primary research objective of the study, which was to explore demand planning practices in the Gauteng clothing industry. Regarding the primary objective, the results revealed that the key demand planning practices in the Gauteng clothing industry are production planning, uncertainty prevention, estimations and production machine capabilities. These practices are the key attributes of hierarchical and optimal demand planning approaches. Both approaches to demand planning, namely the hierarchical and the optimal approaches, were perceived as vital when making manufacturing production decisions regarding clothes. The results also revealed that there were factors affecting how demand planning practices were conducted in the clothing industry. The results showed that factors, such as scheduling the manufacturing of customers' orders, planning for fashion clothes, the POS system usage, clothing imports, estimating future clothing requirements, the recession and the effect of late arrival of clothes, have a significant influence on clothing demand planning. Finally, the results further indicated that there were differences in the factors that affect demand planning practices among fabric suppliers, clothing manufacturers and fashion designers.

## **5.6 RESEARCH CONTRIBUTION AND RECOMMENDATIONS**

This section will focus on the contribution made by the research study and the recommendations that can be made as a result of the findings of the research study.

### **5.6.1 Conclusion**

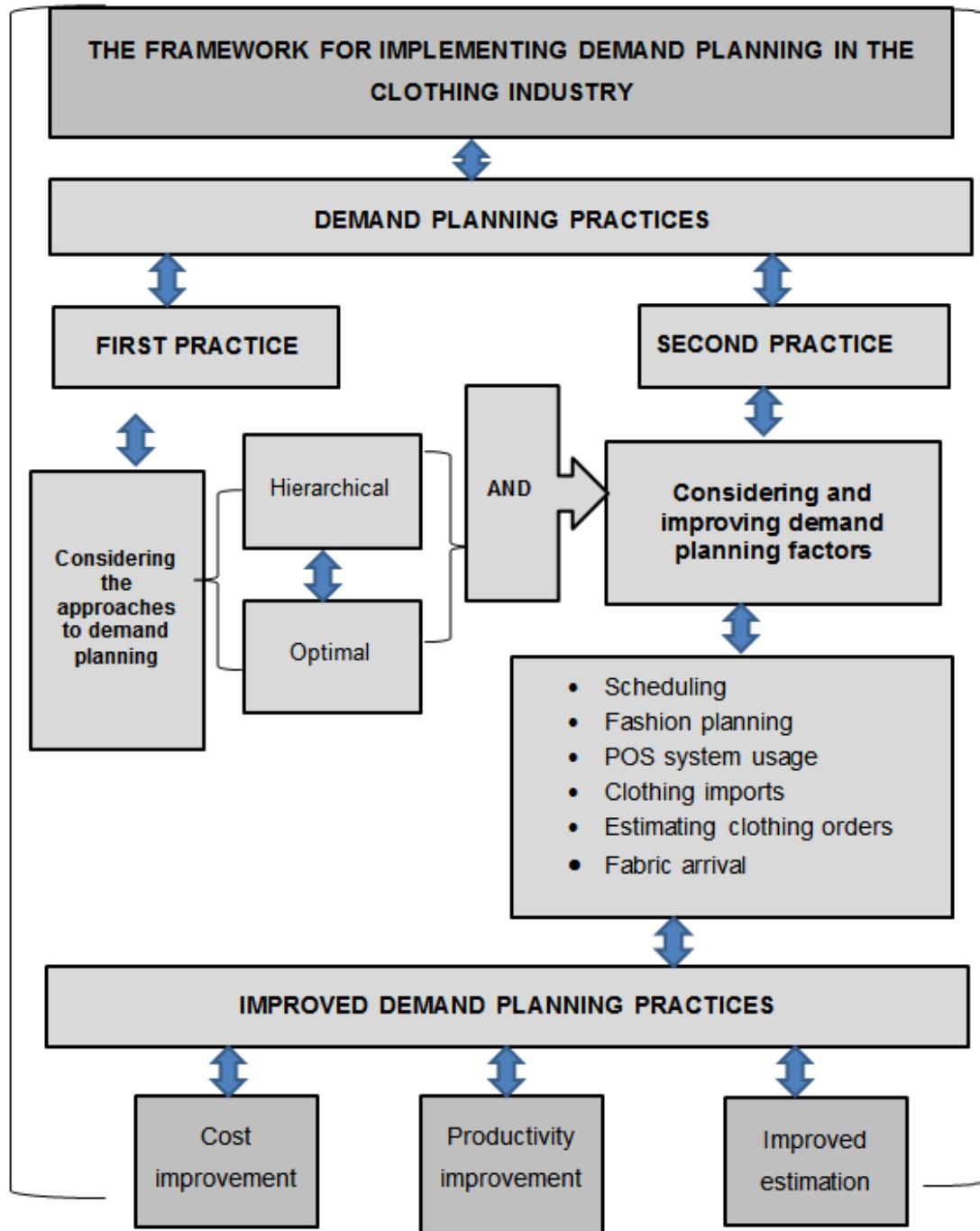
This study contributes to the existing body of knowledge about demand planning in general and in the clothing industry. Numerous studies (see Section 1.3) have been conducted on demand planning in the clothing industry. However, these studies investigated selected components or elements of demand planning in the clothing industry. Hence, a gap existed and there was a need for an empirical investigation by means of a comprehensive study of demand planning in the clothing industry. Given the importance of demand planning to the competitive performance of the clothing industry, this study intended to investigate demand planning in the SA clothing industry, with specific reference to Gauteng.

Clothing organisations can test the approaches to demand planning and the factors which affect demand planning in order to improve demand planning in their organisations. This study can contribute to the body of knowledge on logistics in the following ways:

- It revealed some of the demand planning approaches, such as the hierarchical and optimal approaches, which might bring about improvements to demand planning, which may be applicable to basic clothing as well as fashion clothing production decisions in the Gauteng clothing industry;
- It revealed that the hierarchical demand planning approach seems to be more effective for basic clothes as they have a planning horizon of twelve months;
- It revealed that the optimal demand planning approach seems to be more effective for fashion clothes since they have a planning horizon of six months;
- It uncovered some factors that affect demand planning practices in the Gauteng clothing industry; and
- It highlights how to consider and handle each factor separately when conducting demand planning in clothing manufacturing.

### **5.6.2 Recommendations**

In order to improve demand planning practices in the Gauteng clothing industry, a framework for implementing demand planning is recommended for the Gauteng clothing industry. This framework is reflected in Figure 5.1 on the next page.



**Figure 5.1: Recommended framework for adoption by the Gauteng clothing industry**

As indicated in Figure 5.1, to be able to effectively implement demand planning, it is recommended that hierarchical and optimal demand planning approaches should be considered in the Gauteng clothing industry. These approaches are to be implemented in line with the type of product offering. For example, when planning basic clothes, the hierarchical demand planning approach is recommended, whereas the optimal demand planning approach is recommended for fashion clothes demand planning. The clothing industry stakeholders use the optimal and

demand planning approaches to prevent uncertainties in the manufacturing operation of clothes. The key clothing industry stakeholders should apply the optimal demand planning approach to:

- improve demand forecast of clothing needs, especially regarding fashion clothes which change more often than basic clothes;
- produce according to a maximum rate of the clothing stock level; and
- produce clothing garments on demand if the stock level is equivalent to the threshold;

The key clothing industry stakeholders should also consider improvements regarding factors affecting demand planning practices in the Gauteng clothing industry. Therefore, the following recommendations are made:

- ***When scheduling clothing customers' needs:***

Scheduling clothing manufacturing for customers' needs should be considered important when practising demand planning in the Gauteng clothing industry. Hence, the key clothing industry stakeholders in Gauteng should acknowledge that:

- communication is a key factor amongst all parties involved in clothing production and supply;
- clothing manufacturing should be completed based on confirmed customers' orders;
- clothing sales history, seasonality and lead time are important in the manufacturing scheduling of clothes;
- training in fashion clothes will assist clothing organisations to monitor fashion movements and to plan ahead;
- fashion clothes can change over six months, while basic clothes may change over 12 months or longer. Hence, there should be shorter term plans for fashion clothes than for basic clothes; and
- the trimming on clothes and the garment design complicate fashion and result in manufacturing delays.

- ***Managing the POS system:***

The POS system is considered a demand planning tool that is used in the clothing industry to plan for future customers' clothing needs. This requires that the key clothing industry stakeholders in Gauteng should acknowledge that access to retail clothing stores' POS system is crucial in planning for future clothing demands; and information regarding past sold fashion garments needs to be updated timeously by clothing manufacturers.

- ***Managing clothing imports:***

Clothing imports are regarded as economic factors which affect the demand planning in clothing industries. The Gauteng clothing industry is also affected by the influx of clothing imports into the country. This compels the SA government to increase financial as well as infrastructural support to the SA clothing industry; and increase support to the Gauteng clothing industry, as inadequate capital and equipment to function productively hamper production and result in an inability to remain competitive.

SA clothing customers have an important role to play in supporting the local clothing industry in that they are required to purchase proudly South African clothes. At the same time, local fabric suppliers need to improve the quality of clothing fabrics in order to win SA customers.

- ***Improving clothing estimations***

In order to improve and avoid imbalances in demand planning in the Gauteng clothing industry, clothing estimations should be conducted. Hence, the key clothing industry stakeholders should note that different estimation methods should apply to basic and fashion clothes; clothing estimators should attend formal training in order to improve their skills; estimations of fashion clothes require careful consideration and attention when compared to basic clothes; and that it is important to analyse previous clothing sales statistics in order to make valid judgements regarding clothing projections.

- ***Managing the recession:***

The recession is indicated as an unfavourable economic condition which has a negative effect on the operation of clothing industries. The key clothing industry stakeholders should recognise that:

- during the period of recession, past sales history does not produce good estimation results;
- clothing sales decline during the recession period;
- small-batch clothing manufacturing should exist in terms of fashion clothes when there is an economic slump;
- fashion clothes may be seen as luxury items during a period of economic downturn; and
- the desire for basic clothes may exist during the recession as clothes are basic needs for human beings.

- ***Managing clothing lead times:***

The timely arrival of fabric cloth is crucial to avoid clothing manufacturing delays. Hence, the key clothing industry stakeholders are advised to operate under the minimum lead time clause or in agreement with suppliers and order clothes twelve months prior to the selling season of specific clothing brands.:

## **5.7 LIMITATIONS OF THE STUDY**

This study may contribute to the improvement of demand planning practices in the Gauteng clothing industry. However, there are certain limitations that need to be stated:

- Since the study focused on 56 stakeholders in the Gauteng clothing industry, it is not possible to generalise to other clothing industries. The importance is to draw lessons from the experiences of the Gauteng clothing industry.
- Access to information and participants was difficult in the clothing industry as some clothing vendors did not have contact details and others had closed down operations.

- A conceptual framework for demand planning practices in the Gauteng clothing industry was developed; however, the workability of the framework had not been tested for reliability and dependability.

## **5.8 SUGGESTIONS FOR FUTURE RESEARCH**

This study explored demand planning practices in the Gauteng clothing industry. The study is limited to the key clothing industry stakeholders (fabric suppliers, clothing manufacturers and fashion designers). It is recommended that similar studies be conducted in the SA clothing industry and that the clothing industries in other countries also engage in similar studies.

## REFERENCE LIST

- Aaker, D.A., Kumar, V. & Day, G.S. 2007. *Marketing research*. 9th edition. Chichester: Wiley.
- About education. 2014. *Definition of GDP / Gross Domestic Product*. Retrieved from: <http://economics.about.com/cs/economicsglossary/g/gdp.htm> [Accessed on 15 October 2014].
- Acar, Y., Kadipasaoglu, S. & Schipperijn, P. 2010. 'A decision support framework for global supply chain modelling: An assessment of the impact of demand, supply and lead-time uncertainties and performance'. *International Journal of Production Research*, 48(11):3245–3268.
- Ahmed, R. 2013. 'An analysis of the change and volatility in the apparel industry of Bangladesh after MFA era'. *Journal of Textile and Apparel Technology and Management*, 8(1):1–11.
- Ait-Alla, A., Teucke, M., Lütjen, M., Baheshti-Kashi, S. & Karimi, H.R. 2014. 'Robust production planning in fashion apparel industry under demand uncertainty via conditional value at risk.' *Mathematical Problems in Engineering*, 2014.1-10.
- Aksoy, A., Azturk, N & Sucky, E. 2012. 'A decision support system for demand forecasting in the clothing industry'. *International Journal of Clothing Science and Technology*, 24(4):221–236.
- Albey, E. & Bilge, Ü. 2011. 'A hierarchical approach to FMS planning and control with simulation-based capacity anticipation'. *International Journal of Production Research*, 49(11):3319–3342.
- Ambe, I.M. 2012. 'Determining supply chain practices and strategies of light vehicle manufacturers in South Africa'. DCom thesis. Pretoria: University of South Africa.
- Anderssen, S. 2011. 'Clothing retailers seek new growth drivers'. *Kagiso Asset Management Quarterly Newsletter*, October: 11–12.
- Annadurai, K. & Uthayakumar, R. 2010. 'Reducing lost-sales rate in (T, R, L) inventory model with controllable lead time'. *Applied Mathematical Modelling*, 34(11):3465–3477.
- Ayala, R., Murray, M.P. & Villalobos, M.A. 2011. *Network-based supply chain management method*. United States Patent, US8086506, 1-10.

- Babbie, E. 1989. *The Practice of Social Research*. 5th Edition. United States of America, California: Wordsworth Publishing Company ,Inc.
- Barnes, J. 2005. *A strategic assessment of the South African clothing sector: For the National Economic Development and Labour Council (NEDLAC)*. Hillcrest: Benchmarking & Manufacturing Analysts.
- Barnes, L. & Lea-Greenwood, G. 2010. 'Fast fashion in the retail store environment'. *International Journal of Retail & Distribution Management*, 38(10):760–772.
- Belmokhtar, S., Herrera, C. & Thomas, A. 2010. 'A general approach for hierarchical production planning considering stability'. In Proceedings of the 3<sup>rd</sup> International Conference on Information Systems, Logistics and Supply Chain. *Creating Value through Green Supply Chain*. Casablanca: CDROM, 1-7.
- Bhardwaj, V. & Fairhurst, A. 2010. 'Fast fashion: Response to change in the fashion industry'. *The International Review of Retail Distribution and Consumer Research*, 20(1):165–173.
- Bhatnagar, A. 2012. 'Supply chain challenges for organised retailing in India'. *International Journal of Management Research and Review*, 2(9):1590–1598.
- Biller, S., Meerkov, S.M. & Yan, C. 2013. 'Raw material release to ensure desired production lead time in Bernoulli serial lines'. *International Journal of Production Research*, 51(14):4349–4364.
- Bowersox, D.J., Closs, D.J., Cooper, M.B. & Bowersox, J.C. 2013. *Supply chain logistics management*. 4th edition. New York, NY: McGraw-Hill Irwin.
- Burt, D.N., Petcavage, D.S. & Pinkerton, R.L. 2012. *Proactive purchasing in the supply chain: The key to world-class procurement*. McGraw-Hill Professional.
- BUSA (Business Unity South Africa). 2012. *Economic business outlook for South Africa*. Retrieved from: [http://www.busa.org.za/docs/ECONOMIC%20\\_OUTLOOK%202012\(2\).pdf](http://www.busa.org.za/docs/ECONOMIC%20_OUTLOOK%202012(2).pdf) [Accessed on 25 July 2012].
- Cananda, T.M. 2015. *Initiating a service call for a hardware malfunction in a point of sale system*. United States Patent, US8983862. Retrieved from: <http://www.google.ch/patents/US8983862> [Accessed on 25 July 2015].
- Cardoso, S.R., Barbosa-Póvoa, A.P.F. & Relvas, S. 2013. 'Design and planning of supply chains with integration of reverse logistics activities under demand uncertainty'. *European Journal of Operational Research*, 226(3):436–451.

- Castelli, C.M. & Brun, A. 2010. 'Alignment of retail channels in fashion supply chain: An empirical study of Italian fashion retailers'. *International Journal of Retail & Distribution Management*, 38(1):24–44.
- Chang, C., Kuo, H., Chen, C., Chen, T. & Chung, P. 2012. 'Ergonomic techniques for a mobile e-invoice system: Operational requirements of an information management system'. *Human Factors and Ergonomics in Manufacturing and Service Industries*, 23(6):582–589.
- Chaudhary, A. 2011. 'Changing structure of Indian textile industry after MFA (Multi Fiber Agreement) phase out: A global perspective.' *Far East Journal of Psychology and Business*, 2(2):1–23.
- Chaudhry, H. & Hodge, G. 2012. Postponement and supply chain structure: Case from the textile and apparel industry. *Journal of Fashion Marketing and Management*, 16(1):64–80.
- Cho, H. & Lee, J. 2005. 'Development of macroscopic model on recent fashion trends on the basis of consumer emotion'. *International Journal of Consumer Studies*, 29(1):17–33.
- Cooper, D.R. & Schindler, P.S. 2011. *Business research methods*. Eleventh edition. New York: McGraw-Hill/ Irwin.
- Crocker, B., Jessop, D. & Morrison, A. 2012. *Inbound logistics management: Storage and supply of materials for modern supply chain*. England: Pearson Education.
- Cuts TDP Project. N.d. *Case study: The clothing industry in South Africa*. Institute for Global Dialogue. Retrieved from: [http://www.cuts\\_cittee.org/tdp/pdf/case-study-the-clothing-industry-in-south-africa-pdf](http://www.cuts_cittee.org/tdp/pdf/case-study-the-clothing-industry-in-south-africa-pdf) [Accessed on 12 April 2012].
- David, M & Sutton, C. 2011. *Social Research. An Introduction*. 2<sup>nd</sup> ed. London: Sage Publications Ltd.
- De Aguiar, E., Sigal, L., Treuille, A. & Hodgins, J.K. 2010. 'Stable spaces for real-time clothing'. *ACM Transactions on Graphics (TOG)*, 29(4):106 :1-9.
- De Villiers, G., Nieman, G. & Niemann, W. 2008. *Strategic logistics management: A supply chain management approach*. 4<sup>th</sup> ed. Hatfield: Van Schaik.
- Economic overview. 2013. 'Recent development in the global and South African economies'. *Industrial Development Corporation*, 1-13.

- Esper, T.L., Ellinger, A.E., Stank, T.P., Flint, D.J. & Moon, M. 2010. 'Demand and supply integration: A conceptual framework of value creation through knowledge management'. *Journal of the Academy of Marketing Science*, 38(1):5–18.
- Etikan, I., Musa, S.A., Alkassim, R.S. 2015. ;Comparison of convenience and purposive sampling;. *American Journal of Theoretical and Applied Statistics*, 5(1):1-4.
- FashionUnited. 2014. *Global fashion industry statistics – International apparel*. Retrieved from: <https://www.fashionunited.com/global-fashion-industry-statistics-international-apparel> [Accessed on 12 June 2015].
- Fisher, M.L., Hammond, J.H., Obermeyer, W.R. & Raman, A. 1994. *Making supply meet demand in an uncertain world*. Boston: Harvard University.
- Fisher, M.L., Raman, A. & McClelland, A.S. 2000. ;Rocket science retailing is almost here – Are you ready?; *Harvard Business Review*, 78(4):115–124.
- Folk, A.B., Bohen, D.C., Sanders, W.T. & Johnson, S.A. 2011. *Back office integration with cash handling devices and point of sale devices*. United States Patent, US 007900829 BI, 1-16.
- Gereffi, G. & Frederick, S. 2010. 'The global apparel value chain, trade and the crisis: Challenges and opportunities for developing countries'. *World Bank Policy Research Working Paper Series no. WPS5281*. US: Trade and integration team, Development Research Group.
- Gereffi, G. & Lee, J. 2012. 'Why the world suddenly cares about global supply chains'. *Journal of Supply Chain Management*, 48(3):24–32.
- GGDA (Gauteng Growth and Development Agency). 2014. Business Intelligence. *Sector fact sheet: textile, clothing, leather and footwear*. Retrieved from <http://www.lemmasijura.co.za/ggdasite/index.php/knowledge-centre/publications/category/28-sector-reports>. [Accessed on 15 September 2015].
- Graham, J. 2012. *Content analysis: A brief overview*. Emoyeni Consultations. Workshop offered at the University of South Africa, Pretoria, July 2012.
- Grix, J. 2004. *The foundation of research*. Hounds Mills: Palgrave Macmillan.
- Gu, W. & Liu, X. 2010. 'System of color resource management for fashion color forecasting'. *Management and Service Science (MASS), 2010 International Conference on 2010*, IEEE, 1-4.

- Hamister, J.W. 2011. 'Supply chain management practices in small retailers'. *The Journal of Retail & Distribution Management*, 40(6):427–450.
- Havemann, J. 2009. 'The financial crisis of 2008: Year in Review 2008'. *Britannica book of the year*. Retrieved from: <http://www.britannica.com/print/article/1484264>. [Accessed on 12 January 2016].
- Hong, I.B. 2015. 'Understanding the consumer's online merchant selection process: The roles of product involvement, perceived risk, and trust expectation'. *International Journal of Information Management*, 35(3):322–336.
- Hua, G., Wang, S. & Cheng, T.E. 2010. 'Price and lead time decisions in dual-channel supply chains'. *European Journal of Operational Research*, 205(1):113–126.
- Hugo, W.M.J. & Badenhorst-Weiss, J.A. 2011. *Purchasing and supply management*. Pretoria: Van Schaik.
- IQ Business. 2014. *Clothing, textile, footwear and leather sector: A profile of the clothing, textile, footwear and leather sub-sectors*. Fibre Processing & Manufacturing Sector Education and Training Authority.
- Isenheim, M. 2006. *Quotas on textiles and clothing: A review*. Retrieved from: <http://www.grin.com/en/e-book/51307/quotas-on-textiles-and-clothing-a-review> [Accessed on 30 August 2012].
- Jansen, M. & Von Uexkull, E. 2010. *Trade and employment in the global crisis*. Geneva: International Labour Office; New Delhi: Academic Foundation.
- Jianling. W.U. 2004. 'Supply chain management in selected clothing retail businesses'. Master's in Business Administration (MBA). Potchefstroom: North West University, 1-107.
- Jonsson, A. & Tolstoy, D. 2014. 'A thematic analysis of research on global sourcing and international purchasing in retail and firms'. *International Journal of Retail & Distribution Management*, 42(1):56–83.
- Kaplan, D. 2004. 'Manufacturing in South Africa over the last decade: A review of industrial performance and policy'. *Development Southern Africa*, 21(4):623-636.
- Kaplinsky, R., McCormick, D. & Morris, M. 2010. 'Impacts and challenges of a growing relationship between China and Sub Saharan Africa'. In V. Padayachee (ed.). *The political economy of Africa*. London: Routledge, pp. 1-20.

- Karnin, E.D. & Walach, E. 2015. *Point of sale system with item image capture and deferred invoicing capability*. Retrieved from: <http://www.google.com/patents/US8818875>. Patent Application Publication. Pub.no US8818875B2. [Accessed on 15 September 2015].
- Kelter, L.A. 2009. 'Substantial job losses in 2008: Weakness broadens and deepens across industries'. *Monthly Labor Review*, March:20-33.
- Kim, K. 2012. 'Demand analysis of clothing and footwear: The effect of price, total consumption expenditures and economic crisis'. *Journal of Korean Society of Clothing and Textiles*, 36(12):1285–1296.
- Koprulu, A & Albayrakoglu, M.M. 2007. Supply chain management in the Textile Industry: A supplier selection model with the analytical hierarchy process. *ISAHP*, 2007:3-6)
- Kunene, T.R. 2008. 'A critical analysis of entrepreneurial and business skills in SMEs in the textile and clothing industry in Johannesburg, South Africa'. DCom thesis. University of Pretoria.
- Lannone, R., Ingenito, A., Martino, G., Miranda, S., Pepe, C. & Riemma, S. 2013. 'Merchandise and replenishment planning optimisation for fashion retail'. *International Journal of Engineering Business Management*, 5(26):1–14.
- Larsson, J., Peterson, J. & Mattila, H. 2012. 'The knit on demand supply chain'. *AUTEX Research Journal*, 12(3):67–75.
- Larsson, M. 2002. 'Forecasts improve with scanner data: A Swedish grocery supplier's journey'. *Journal of Business Forecasting Methods and Systems*, 21(4):19–21.
- Laudal, T. 2010. 'An attempt to determine the CSR potential of the international clothing business'. *Journal of Business Ethics*, 96(1):63–77.
- Lee, C.K., Choy, K.L., Ho, T.S. & Law, K.M.Y. 2013. 'A RFID-based resource allocation system for garment manufacturing'. *Expert Systems with Applications*, 40(2):784–799.
- Leedy, P.D. & Ormrod, J.E. 2010. *Practical research: Planning and design*. 9th edition. Boston, MA: Pearson Education International.
- Leedy, P.D. & Ormrod, J.E. 2014. *Practical research: Planning and design*. 10th edition. USA: Pearson Education.

- Leu, S. & Yang, C. 1999. 'GA-based multicriteria optimal model for construction scheduling'. *Journal of Construction Engineering and Management*, 125:420-427.
- Lui, S. & Papageorgiou, L.G. 2013. 'Multiobjectives optimisation of production, distribution and capacity planning of global supply chains in the process industry'. *Omega*, 41(2):369–382.
- Mamani, H. & Moinzadeh, K. 2013. 'Lead time management through expediting in a continuous review inventory system.' *Production and Operations Management*, 23(1):95–109.
- Maravelias, C.T. 2012. 'General framework and modelling approach classification for chemical production schedule'. *American Institute of Chemical Engineers*, 58(6):1812–1828.
- Maree, K. 2007. *First steps in research*. 1st edition. Pretoria: Van Schaik Publishers.
- Mason-Jones, R., Naylor, B. & Towill, D.R. 2000. 'Lean, agile or leagile? Matching your supply chain to the marketplace'. *International Journal of Production Research*, 38(17):4061–4070.
- McBurney, D.H. & White, T.L. 2004. *Research methods*. 6<sup>th</sup> ed. USA: Thomson Wadsworth.
- Media Club South Africa. N.d. *South Africa's economy: Key sectors*. Retrieved from: <http://www.mediaclubsouthafrica.com/africa/37-economy/economy-bg/111-sa-economy-key-sectors> [Accessed on 8 April 2015].
- Mikati, N. 2009. 'Dependence of lead time on batch size studied by system dynamics model'. *International Journal of Production Research*, 48(18):5523–5532.
- Monczka, R.M., Handfield, R.B., Giunipero, L.C. & Peterson, J.L. 2014. *Purchasing and supply management*. 6<sup>th</sup> ed. USA: Cengage Learning.
- Moodley, S & Morris, M. 2004. 'Does e-commerce fulfil its promise for developing country (South Africa) garment export producers?' *Oxford development studies*, 32(2):155–178).
- Moon, K. K., Yi, C. Y. and Ngai, W. W.T. 2012. 'An Instrument for Measuring Supply Chain Flexibility for the Textile and Clothing Organisations'. *European Journal of Operational Research*, 222 (2):191-203.

- Morridge, S. 2010. 'Using forecasting to steer the business: Six principles'. *Foresight*, (16), Winter: 4–11.
- Morstard, J., Teunter, R. & Koster, R. 2011. 'Forecasting demand for single-period products: A case study in the apparel industry'. *European Journal of Operational Research*, 211(1):139–147.
- Mouton, J. 2001. *How to succeed in your master's and doctoral studies: A South African guide and resource book*. Pretoria: Van Schaik.
- Nattrass, N. & Seekings, J. 2012. 'Differentiation within the South African clothing industry: Implications for wage setting and employment'. CSSR. Working Paper no. 307. *Centre for Social Science Research*, 1-29.
- Nenni, M.E., Guistiniano, L. & Pirolo, L. 2013. 'Demand forecasting in the fashion industry: A review'. *International Journal of Engineering Business Management: Special Issue on Innovations in Fashion Industry*, 5 (37):1–6.
- Ni, Y. & Fan, F. 2011. 'A two-stage dynamic sales forecasting model for the fashion retail'. *Expert Systems with Applications*, 38(3):1529–1536.
- Nielsen, P. & Steger-Jensen, K. 2006. 'The need for a holistic demand planning framework'. *International Conference on Information Systems, Logistics and Supply Chain*. Aalborg Oest Denmark: Aalborg University, 1-5.
- Nielsen, P. & Steger-Jensen, K. 2008. 'Demand planning & control – Handling multiple perspectives through a holistic approach to hierarchical planning'. In T. Koch (ed.). *Lean business systems and beyond*. Boston, MA: Springer, 57–65.
- Nordas, H.K. 2004. 'The global textile and clothing industry post the agreement on textile and clothing'. Discussion Paper No 5. Geneva, Switzerland: *World Trade Organisation*.
- NY Fashion Center. 2015. *The history of fabric and textiles*. Retrieved from: <https://www.nyfashioncenterfabrics.com/pages/history-of-fabric-and-textiles>. [Accessed on 1 October 2015].
- Oberhofer, M.A. 2012. 'Fashioning African cities: The case of Johannesburg, Lagos and Douala'. *Streetnotes*, 20(01):65–89.
- Oh, L., Teo, H. & Sambamurthy, V. 2012. 'The effect of retail channel integration through the use of information technologies on firm performance'. *Journal of Operations Management*, 30(5):368–381.

- Olhager, J. 2010. 'The role of the customer order decoupling point in production and supply chain management'. *Computer in Industry*, 61(9):863–868.
- Oliva, R. & Watson, N. 2011. 'Cross-functional alignment in supply chain planning: A case study of sales and operations planning'. *Journal of Operations Management*, 29(5):434–448.
- Oyatoye, E.O. & Fabson, T.V.O. 2011. 'Information distortion in supply chain: A simulation approach to quantifying the bullwhip effect'. *Journal of Emerging Trends in Economics and Management Sciences*, 2(2):131–141.
- Pan, F. & Nagi, R. 2010. 'Robust supply chain design under uncertain demand in agile manufacturing'. *Computers & Operations Research*, 37(4):668–683.
- Pantano, E. & Viassone, M. 2014. 'Demand pull and technology push perspective in technology-based innovation for the point of sale: The retailer evaluation'. *Journal of Retail and consumer Services*, 21(1):43–47.
- Pantano, E., Lazzolino, G. & Migliano, G. 2013. 'Obsolescence risk in advanced technologies for retailing: A management perspective'. *Journal of Retailing and Consumer Service*, 20(2):225–233.
- Pretorius, G. 2013. 'Improving planning at L'Oréal South Africa: A case study'. Paper presented at the SAPICS 35<sup>th</sup> Annual Conference and Exhibition, Sun City, 2-4 June.
- Priem, R.L. & Swink, M. 2012. 'A demand-side perspective on supply chain management'. *Journal of Supply Chain Management*, 48(2):7–13.
- Priest, A. 2005. 'Uniformity and differentiation in fashion'. *International Journal of Clothing Science and Technology*, 17(3/4):253–263.
- Pycraft, M., Sigh, H., Philela, K., Slack, N., Chambers, S. & Johnston, R. 2013. *Operations management: Global and southern African perspectives*. 2nd edition. Cape Town: Pearson Education South Africa.
- Quinlan, C. 2011. *Business research methods*. UK: South Western Cengage Learning.
- Rajaguru, R. & Matanda, M.J. 2013. 'Effects of inter-organisational compatibility on supply chain capabilities: Exploring the mediating role of Inter-organisational Information Systems (IOIS) integration'. *Industrial Marketing Management*, 42(4):620–632.

- Ramanathan, U. & Muyldermans, L. 2010. 'Identifying demand factors for promotional planning and forecasting: A case of a soft drink company in the UK'. *International Journal of Production Economics*, 128(2):538–545.
- Ramdass, K and Pretorius, L. 2011. 'Implementation of modular manufacturing in the clothing industry in KwaZulu-Natal: A case study'. *South African Journal of Industrial Engineering*, 22(1):167-181.
- Ramdass, K. 2007. 'Engineering management framework for the SA clothing industry with the focus on KwaZulu-Natal'. Unpublished DPhil thesis. Johannesburg: University of Johannesburg, 1-218.
- Rao, V. & Joshi, H.G. 2010. 'Entrepreneurship training in the apparel and fashion design sector through distance mode: A strategy for facing the challenge of growing unemployment in India.' *International Journal of Education Research and Technology*, 1(2):99–108.
- Ren, S., Choi, T. & Liu, N. N.d. 'A panel data approach for fashion sales forecasting'. Hong Kong: Business Division, *Institute of Textiles and Clothing*, The Hong Kong Polytechnic University.
- Rexhausen, D., Pibernik, R. & Kaiser, G. 2012. 'Customer-facing supply chain practices: The impact of demand and distribution management on supply chain success'. *Journal of Operations Management*, 30(4):269–281.
- Rogerson, C.M. 2000. 'Successful SMEs in South Africa: The case of clothing producers in the Witwatersrand'. *Development South Africa*, 17(5):687–716.
- Rogerson, C.M. 2006. 'Developing the fashion industry in Africa: The case of Johannesburg'. *Urban Forum*, 17(3):215–240.
- Rotunno, L., Vézina, P. & Wang, Z. 2012. 'The rise and fall of (Chinese) Africa exports.' *CSAE Working Paper WPS/2012-12*. Oxford: Centre for the Study of African Economies, University of Oxford.
- SACTWU (South African Clothing and Textile Workers Union). 2012. *Manufacturing address list for sale. NBC (Northern) FMR064G*. Johannesburg: SACTWU.
- Salm, A. 2002. *South African garment industry subsector study*. South Africa: The ComMark Trust.
- Sander, N.R. 2012. *Supply chain management: A global perspective*. United States of America: Wiley and Sons, Inc.

- Saunders, M., Lewis, P. & Thornhill, A. 2009. *Research methods for business students*. 5th edition. England: Pearson Education.
- Saunders, M., Lewis, P. & Thornhill, A. 2012. *Research methods for business students*. 6th edition. England: Pearson Education.
- Schreiber, G. 2013. *South African fashion handbook*. Cape Town: Schreiber Media.
- Sekerden, F. 2011. 'Status of textile and clothing imports and exports in Turkey'. *Fibres and Textile in Eastern Europe*, 19(3):7–9.
- Sethi, S.P., Yan, H., Zhang, H. & Zhang, Q. 2002. 'Optimal and hierarchical controls in dynamic stochastic manufacturing systems: A survey'. *Manufacturing & Service Operations Management*, 4(2):133–170.
- Seyoum, B. 2010.' Trade liberalisation in textiles and clothing and developing countries: An analysis with special emphasis on the US import market'. *The International Trade Journal*, 24(2):149–181.
- Shen, B. & Li, Q. 2015. 'Impact of returning unsold products in retail outsourcing fashion supply chain: A sustainability analysis'. *Sustainability*, 7(2):1172–1185.
- Shen, B., Choi, T., Wang, Y. & Lo, C.K.Y. 2013. 'The coordination of fashion supply chains with a risk-averse supplier under the markdown money policy'. *IEEE Transactions on Systems, Man, and Cybernetics*, 43(2):266–276.
- Simos, E.O. 2002. 'International economic outlook'. *International Journal of Business Forecasting*, 21(1):32–38.
- Skov, L. 2011. 'Dreams of small nations in polycentric fashion word'. *Fashion Theory*, 15(2):137–156.
- Slotnick, S.A. 2011. 'Optimal and heuristic lead-time quotation for an integrated steel mill with a minimum batch size'. *European Journal of Operational Research*, 210(3):527–536.
- Smith, S.L.J. 2010. *Practical tourism research*. London: Cambridge University Press.
- Soon, Q.H. & Udin, A.M. 2010. 'Supply chain management from the perspective of value chain flexibility: An exploratory study.' *Journal of Manufacturing Technology Management*, 22(4):506–526.

SouthAfrica.info. 2015. *South Africa's textile industry*. Retrieved from <http://www.southafrica.info/business/economy/sectors/textiles-overview.htm> [Accessed on 1 October 2015].

Staritz, C. & Morris, M. 2013. 'Local embeddedness, upgrading and skill development: Global value chains and foreign direct investment in Lesotho's apparel industry'. *Economic and Social Upgrading in Global Production Network Working Paper no 20*. South Africa: University of Cape Town.

Statista. 2015. 'Value of the fashion industry in the United Kingdom (UK) in 2009 and 2014, by direct and indirect economic contribution\* (in billion gbp)'. Retrieved from: <http://www.statista.com/statistics/431661/sales-of-retail-trade-in-canada/> [Accessed on 12 June 2015].

Steytler, N. & Powell, D. 2010. 'The impact of the global financial crisis on decentralised government in South Africa'. Paper presented at the *Annual Conference of the International Association of Centres for Federal Studies*, Philadelphia, PA, 16–18 September.

Surchi, M. 2011. 'The temporary store: A new marketing tool for fashion brands'. *Journal of Fashion Marketing and Management*, 15(2):257–270.

Thomasset, S. 2010. 'Sales forecasting in the clothing industry: The key success factor of the supply chain management'. *International Journal of Production Economics*, 128(2):470–483.

Trade Law Chambers. 2016. 'New assistance programme for the SA Clothing and Textile industry a stitch in time'. Retrieved from: <http://tradelawchambers.com/raxo-what-s-on/33-new-assistance-programme-for-the-sa-clothing-and-textile-industry-a-stitch-in-time.html>. [Accessed on 14 October 2016], 1-4.

Van Zyl, L.E. 2014. *Research methodology for the economic and management sciences*. Harlow: Pearson Education.

Veal, A.J. 2011. *Research methods for leisure and tourism: A practical guide*. 4th edition. Sydney University of Technology: Pearson Education.

Vlckova, V. & Patak, M. 2010. 'Role of demand planning in business process managing'. In *6<sup>th</sup> International Scientific Conference, Business and Management 2010*, 14 May, Vilnius, Lithuania.

- Vlok, E. 2006. 'The future of the textile and clothing industry in sub-Saharan Africa: The Textile and clothing industry in South Africa'. *Bonn: Friedrich-Ebert-Stiftung*, 229:227-236.
- Wang, K., Gou, Q., Sun, J. & Yue, X. 2012. 'Coordination of a fashion and textile supply chain with demand variations'. *Journal of Systems Science and Systems Engineering*, 21(4):461–479.
- Wark, M. 2006. 'Fashion the future: Fashion, clothing, and manufacturing of post-Fordist culture'. *Cultural Studies*, 5(1):61–76.
- Wegner, T. 2012. *Applied Business Statistics. Methods and Excel-based Applications*. 3rd Edition. Cape Town: Juta & Company Ltd.
- Wigley, S.M. 2011. 'A conceptual model of diversification in apparel retailing: The case of Next plc'. *The Journal of the Textile Institute*, 102(11):917–934.
- Williams, W. 2015. 'Investigation into the critical success factors for the implementation of a quick response supply chain strategy in the South African fashion apparel sector'. Master's in Business Administration (MBA). University of Stellenbosch, 1-97.
- Wong, W.K. & Guo, Z.X. 2010. 'A hybrid intelligent model for medium-term sales forecasting in fashion retail supply chains using extreme learning machine and harmony search algorithm'. *International Journal of Production Economics*, 128(2):614–624.
- World Bank. 2015. *Official exchange rate (LCU per US\$, period average)*. Retrieved from: [www.data.worldbank.org](http://www.data.worldbank.org) [Accessed on 22 June 2015].
- Xia, M. & Wong, W.K. 2014. 'A seasonal discrete grey forecasting model for fashion retailing'. *Knowledge-Based Systems*, 57:119–126.
- Yesil, E., Kaya, M. & Siradag, S. 2012. 'Fuzzy forecasting combiner design for fast fashion demand forecasting'. *Innovations in Intelligent Systems and Applications (INISTA), 2012 International Symposium*, IEEE, pp. 1-5.
- Yimer, A.D. & Demirli, K. 2010. 'A generic approach to two-phase optimisation of dynamic supply chain scheduling'. *Computers & Industrial Engineering*, 58(3):411–422.
- Zhu, Z., Nakata, C., Sivakumar, K. & Grewal, D. 2013. 'Fix it or leave it? Customer recovery from self-service technology failures'. *Journal of Retailing*, 89(1):15–29.

Zikmund, W.G., Babin, B.J., Carr, J.C. and Griffin, M. 2013. *Business research methods*.  
Canada: South-Western Cengage Learning.

# APPENDIX A: RESEARCH QUESTIONNAIRE

## EXPLORING DEMAND PLANNING PRACTICES IN THE SOUTH AFRICAN CLOTHING INDUSTRY WITH REFERENCE TO GAUTENG

### SECTION A: DEMOGRAPHICS

A.1: Indicate below your type of organisational operation and your job position.

Type of organisational operation	
Job position	

### SECTION B: DEMAND PLANNING PRACTICES

#### Section B1: DEMAND PLANNING APPROACHES

To what extent do you agree or disagree with the following statements? Make a tick (X) where it is applicable.

The response scale is as follows:

1 = strongly agree=SA

2 = agree = A

3 = neither agree nor disagree= NAND

4 = disagree= D

5 = strongly disagree= SD

STATEMENTS	SA	A	NAND	D	SD
	1	2	3	4	5
1. Continual reviewing of the product process of the supply of clothes is important.					
2. It is important for manufacturers to inform retail stores about stock shortage or any production problems.					
3. It is necessary to conduct follow-up on material shortages with suppliers.					
4. Manufacturing process can only be finalised when customers' orders and specifications are confirmed.					

STATEMENTS	SA	A	NAND	D	SD
	1	2	3	4	5
5. The manufacturing of clothes must be completed before the sales season starts.					
6. It is important to have short manufacturing plans on fashion clothes.					
7. Long manufacturing plans may exist on basic clothes.					
8. Having manufacturers who think upfront and react to market changes is crucial.					
9. Storing garment details according to size, colour and design is crucial.					
10. There is a lack of capital equipment in clothing manufacturing industries of South Africa.					
11. Basic clothes are stable and result in low variances when predicting future demand.					
12. During a period of recession, it is crucial to manufacture clothes in small batches.					

## **Section B2: FACTORS AFFECTING DEMAND PLANNING IN THE CLOTHING INDUSTRY.**

**To what extent do you agree or disagree with the following statements? Make a tick (X) where it is applicable.**

The response scale is as follows:

1 = strongly Agree=SA

2 = agree = A

3 = neither agree nor disagree= NAND

4 = disagree= D

5 = strongly disagree= SD

**When scheduling clothing manufacturing of customer's orders.**

STATEMENTS	SA	A	NAND	D	SD
	1	2	3	4	5
1. Historical clothing sales information is considered.					
2. The development of a team that plans for customer needs is crucial.					
3. Continual reviewing of the product process of the supply of clothes is important.					
4. Manufacturing processes which are not properly managed will result to continuous rework.					
5. It is important for manufacturers to inform retail stores about stock shortage or any production problems.					
6. It is necessary to conduct follow up on material shortages with suppliers.					
7. Manufacturing process can only be finalised when customer's orders and specifications are confirmed.					
8. Fabrics or material orders must be placed before the sale season starts.					

STATEMENTS	SA	A	NAND	D	SD
	1	2	3	4	5
9. The manufacturing of clothes must be completed before the sales season starts.					
10. Retailer's demand on low cost charges on orders should be accommodated.					
11. Clothing materials or fabrics needed in manufacturing process may arrive late.					
12. Meeting customer's order on time gets affected by late arrival of clothing materials or fabrics.					
13. Communicating customer orders in terms of size, colour and clothing styles is crucial.					
14. Manufacturers should communicate orders with the retail stores before manufacturing begins.					
<b>Any other comments, Please elaborate</b>					

**Select a plan that is appropriate to your organisation when planning for the future demand of basic clothes. Make a tick (X) where it is applicable.**

<b>12 months plan</b>	<b>6 months plan</b>	<b>3 months plan</b>

**Select a plan that is appropriate when planning for future demand of fashion clothing. Make a tick (X) where it is applicable.**

<b>1 months plan</b>	<b>2 months plan</b>	<b>3 months plan</b>	<b>4 months plan</b>	<b>5 months plan</b>	<b>6 months plan</b>	<b>8 months plan</b>	<b>12 months plan</b>

**To what extent do you agree or disagree with the following statements? Make a tick (X) where it is applicable.**

1 = strongly Agree=SA

2 = agree = A

3 = neither agree nor disagree= NAND

4 = disagree= D

5 = strongly disagree= SD

**When planning for fashion clothes.**

STATEMENTS	SA	A	NAND	D	SD
	1	2	3	4	5
1. Customer changing needs on fashion clothes should be considered when planning and estimating future clothing needs.					
2. The expertise of estimators in manufacturing should be considered when planning and estimating future customer needs.					
3. Monitoring fashion movements is important.					
4. Historical sales information should be updated continuously for timely and accurate planning to exist.					

STATEMENTS	SA	A	NAND	D	SD
	1	2	3	4	5
5. It is not easy to plan for fashion clothes because their life span is short.					
6. It is easy to plan for basic clothes, because their life span is long.					
7. It is important to have short manufacturing plans on fashion clothes.					
8. Long manufacturing plans may exist on basic clothes.					
9. Having manufacturers that thinks upfront and reacts to market changes is crucial.					
10. Recognising fashion trends have never been easy due to multiple styling levels available.					
11. It is not easy to plan for fashion clothes due to constant changes that exist in fashion.					
12. Fashion styles may change 8-10 times in a year.					
13. Manufacturers take lots of pressure from retail stores demanding more fashion variety.					
14. Tracking and recording of customer changes on clothing needs is crucial.					
15. It is not easy to keep track of fashion trends due to constant changes in fashion.					

**Any other comments, Please elaborate**

**To what extent do you agree with the following statements? Make a tick (X) where it is applicable.**

1 = strongly Agree=SA

2 = agree = A

3 = neither agree nor disagree= NAND

4 = disagree= D

5 = strongly disagree= SD

#### **The Point of Sales (POS) system usage**

<b>STATEMENT</b>	<b>SA</b>	<b>A</b>	<b>NAND</b>	<b>D</b>	<b>SD</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
1. Manufacturers can use data on the Point of Sale (POS) system of retail stores to plan future clothing needs.					
2. The Point of Sale (POS) system information of retail /customers provides history about clothing sales.					
3. Access to the Point of Sale System information of retailer stores/ customers is crucial for manufacturers.					
4. Incorrect sales information captured in the Point of Sale system will result to incorrect manufacturing plans.					
5. A clothing manufacturer should store historical sales information of clothes in the mainframe computer.					

<b>STATEMENT</b>	<b>SA</b>	<b>A</b>	<b>NAND</b>	<b>D</b>	<b>SD</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
6. Storing garment details according to size, colour and design is crucial.					
7. Historical sales information used by manufacturers to plan future clothing needs can be purchased from marketing or advertising firm.					
8. Manufacturing factories can send company representative to gather or collect historical sales information from retail stores manually.					
9. Having a system that communicates clothing information faster between participants in the clothing industry is crucial.					
10. Sharing of sales information between suppliers, manufacturers and the end user customers is crucial.					
11. Test the accuracy of historical sales information on monthly basis before planning on future clothing production begins.					
<b>Any other comments, Please elaborate</b>					

**To what extent do you agree with the following statements? Make a tick (X) where it is applicable.**

1 = strongly Agree=SA

2 = agree = A

3 = -neither agree nor disagree= NAND

4 = disagree= D

5 = strongly disagree= SD

### Clothing imports

STATEMENTS	SA	A	NAND	D	SD
	1	2	3	4	5
1. The flooding of illegal and legal imports in the country South Africa results to inaccurate planning in manufacturing processes.					
2. The implementation of low tariffs agreements on imports rates by the South African government has contributed to oversupply of clothes in the country.					
3. Chinese imports contribute to oversupply of clothes in the clothing manufacturing firm.					
4. Manufacturing firm does not have enough resources to supply large volume of orders to the clothing retail stores in South Africa.					
5. The oversupply of clothes has resulted to high level of unsold stock in manufacturers, wholesalers and in retail stores.					
6. There is a lack of demand for SA clothes because of a high number of Chinese clothing imports.					

<b>STATEMENTS</b>	<b>SA</b>	<b>A</b>	<b>NAND</b>	<b>D</b>	<b>SD</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
7. Manufacturing processes needs to be reduced to avoid pilling of clothes in manufacturing factories.					
8. There is a need for government subsidies in the clothing manufacturing industry of South Africa.					
9. There is a need for South African clothing retailers and wholesalers to support local clothing manufacturers.					
10. Currently the South African government is not financing clothing manufacturing industry.					
11. There is lack of capital equipment in clothing manufacturing industries of south Africa.					
12. Currently South African retailers are not supporting local clothing manufacturers.					
<b>Any other comments, Please elaborate</b>					

**To what extent do you agree with the following statements? Make a tick (X) where it is applicable.**

1 = strongly agree=SA

2 = Agree = A

3 = neither agree nor disagree= NAND

4 = disagree= D

5 = strongly disagree= SD

**Estimating future clothing requirements is challenge and requires considering the following aspects.**

STATEMENTS	SA	A	NAN D	D	SD
	1	2	3	4	5
1. Implementing different method of estimation for basic and fashion clothing styles.					
2. Attendance of international trade exhibitions in order to plan ahead of season.					
3. Estimators of clothes should obtain formal training to improve their skills.					
4. The tool used for estimating future clothing needs can lose track of clothing sales information					
5. Fashion clothes changes constantly and results to errors when estimating trends.					
6. Basic clothes are stable and result in low variances when predicting the future demand.					
7. Manufacturers should conduct estimations of future customer needs according to quantities of sizes which were sold previously.					
8. Variance that exists on future clothing estimations should be investigated.					

STATEMENTS	SA	A	NAN D	D	SD
	1	2	3	4	5
9. Manufacturers should conduct estimations of future customer needs on each clothing styles.					
10. Balancing the demand and supply of clothes is crucial to avoid high or low estimations.					

**Any other comments, Please elaborate**

**To what extent do you agree with the following statements? Make a tick (X) where it is applicable.**

1 = strongly agree= SA

2 = agree = A

3 = neither agree nor disagree= NAND

4 = disagree= D

5 = strongly disagree= SD

**Recession is an unfavourable economic condition**

STATEMENTS	SA	A	NAND	D	SD
	1	2	3	4	5
1. When the SA economy is stable clothes will sell in large numbers.					
2. The use of historical clothing sales data does not assist in estimating accurate future clothing needs.					
3. Before recession the use of historical sales data contributed to the level of accuracy when estimating future clothing needs.					
4. The purchase of non-essential items such as clothing fell as a result of recession.					
5. During the period of recession, it is crucial to reduce future customer orders as customer's needs declines.					
6. During the period of recession, it is crucial to manufacture clothes in small batches.					

**Any other comments, Please elaborate**

**To what extent do you agree with the following statements? Make a tick (X) where it is applicable.**

1 = strongly agree= SA

2 = agree = A

3 = neither agree nor disagree= NAND

4 = disagree= D

5 = strongly disagree= SD

**Late arrival of clothes may affect the accuracy of planning of clothing industry and requires considering the following aspects.**

STATEMENTS	SA	A	NAND	D	SD
	1	2	3	4	5
1. Manufacturers should order fabrics from both local and international suppliers.					
2. It is not possible to have control on timely the arrival of fabrics.					
3. Fabrics and clothing material used in clothing manufacturing can only be purchased overseas.					
4. Fabrics and clothing material used in clothing manufacturing can be purchased from local suppliers.					
5. Orders placed with oversee suppliers may arrive late for manufacturing.					
6. Late arrival of clothing materials or fabrics should be considered when estimating future clothing needs					
7. Timely arrival of clothing material or fabrics may reduce the level of errors when estimations on future customer needs. Are implemented.					

<b>STATEMENTS</b>	<b>SA</b>	<b>A</b>	<b>NAND</b>	<b>D</b>	<b>SD</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
8. Operating within tight schedules and waiting periods will assists manufacturers to manufacturer in advance.					
9. On time deliveries assist in ensuring quick manufacturing processes.					
10. On time agreements should be made with suppliers of fabrics to reduce late arrival of fabrics.					
11. Clothing material or fabrics orders may arrive while the sales season has started.					
12. Ordering fabrics before the sales season starts is crucial to avoid lost sales on clothing garments					

**Any other comments, Please elaborate**

## APPENDIX B: ETHICAL CLEARANCE



FROM: Prof A Brits  
Department of Transport Economics, Logistics and Tourism

TO: Prof E Udjo  
CEMS Ethical Committee

RE: ETHICAL CLEARANCE

DATE: 31 August 2011

STUDENT: Mrs N J Matsoma (3431-4377)

TOPIC: Logistics approaches in planning future demand of clothing manufacturers of Gauteng.

Dear Prof E Udjo

This serves to confirm that Mrs Matsoma may continue with her research study. We have reviewed the research proposal, the research questionnaires and the ethical clearance summary sheet was approved. We are satisfied that they meet the ethical standards as set in the Department of Transport Economics, Logistics and Tourism under the College of Economic and Management Sciences and that it is in compliance with the UNISA policy on research ethics.

Sincerely,

Prof A. Brits

On behalf of the Department of Transport Economics, Logistics and Tourism

## APPENDIX C: DECLARATON OF PROFESSIONAL EDIT



Dear Mrs N J Matsoma

This letter is to record that I have completed a language edit of your dissertation entitled 'INVESTIGATING DEMAND PLANNING PRACTICES IN THE GAUTENG CLOTHING INDUSTRY'.

The edit that I carried out included the following:

- |   |   |
|---|---|
| -Spelling   | -Grammar  |
| -Vocabulary   | -Punctuation                                    |
| -Pronoun matches  | -Word usage                                     |
| -Sentence structure   | -Correct acronyms (matching your supplied list) |
| -Formatting   | -Captions and labels for figures and tables     |
| -Spot checking of ten in-text references                      |   |
| -Generation of Table of Contents, Lists of Figures and Tables |   |

The edit that I carried out excluded the following:

- Content
- Correctness or truth of information (unless obvious)
- Correctness/spelling of specific technical terms and words (unless obvious)
- Correctness/spelling of unfamiliar names and proper nouns (unless obvious)
- Correctness of specific formulae or symbols, or illustrations.

Yours sincerely

A handwritten signature in black ink, appearing to read "Retha Burger".

**Retha Burger**

28 December 2016