

CRITICAL SUCCESS FACTORS FOR THE MARKETING OF LOGISTICS SERVICE PROVIDERS IN MAURITIUS

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ABSTRACT

Critical success factors are the areas in which organisations have to do well if they are to remain competitive and profitable. These factors should link directly into the organisation's strategy. They can provide the basis for meaningful, thought provoking discussion which describes the current situation and present a focus or goal for any change.

This research examines the factors that are considered important and critical from a customer's and business' perspective in the process of delivering logistics services.

The importance of these factors to the textile and non-textile manufacturing industries have been presented. The role of the logistics service provider / freight forwarder has also been explained.

The various relevant literatures, theoretical models and findings of previous studies dealing with this subject have been researched and presented.

Three propositions have been made based on the literature review and a questionnaire was developed to seek inputs from local users of logistics services so as to analyse the importance of these factors in the Mauritian context.

The overall findings suggest that companies from both the textile and non-textile sector value the importance of the following factors namely; Quality, Cost-Saving, Agility, Information Technology, Lead-time, Relationship, Reliability, Logistics Facilities, and Network of Agents. However, the textile and non textile companies value these factors, in the process of delivering logistics services, differently. Quality is an important dimension in this process while information technology is a factor which is not significantly different from all other factors.

DECLARATION

I, Mohammad Riaz Esmael declare that this research report is my own, unaided work. It is submitted in partial fulfilment of the requirements for the degree of Masters of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

.....
Mohammad Riaz Esmael
14th November 2005

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CHAPTER 1: INTRODUCTION

The aim of this research is to unveil the critical success factors for the marketing of Logistics Service Providers in Mauritius.

1.1 Background to the Research

Today's organisations face tremendous challenges in trying to build a place in the market. The world is turning into a global village and drastic changes accompanied by fierce competition are busy arriving. Companies need to remain focused in their endeavours to acquire and retain customers.

There is a growing need for these organisations to know well their market and their customers' requirements. In short, it is becoming increasingly important for firms to manage their marketing efforts. This will in turn ensure a sustainable growth and profitable future.

The objective is to translate these efforts into competitive advantage and offer their products and services to meet the needs of their end customers. The efforts deployed in this respect should neither be unfocused, diluted nor spread around thinly.

Too many companies pursue too many objectives. As the old adage says, "If everything is a priority, then nothing is a priority". Critical Success Factor approaches allow management to focus and harness the organisations energy on those elements that will make a difference. Knowing the difference between what is important, and what is a distraction, is the key for success.

1.1.1 Critical Success Factors defined

Critical success factors are the areas in which the organisation has to do well if they are to remain competitive and profitable. These factors should link directly into the organisation's strategy.

Critical Success Factors can provide the basis for meaningful, thought provoking discussion which describe the current situation and provide a focus or goal for any change. The critical success factors can be externally focused (such as technical advances by a competitor) or internally focused (such as poor customer satisfaction ratings).

They are important because they:

- Serve as the catalyst and the reason for the change.
- Become the focus of the change efforts.
- Give organisations a competitive advantage.

1.2 Introduction to the Research Topic

Moving from a purely agricultural and mono-crop based economy, Mauritius incorporated its first export processing zone (EPZ) in the late seventies. This sector exports manufactured garments as well as goods of non-textile nature. The EPZ has, since then, grown to become a major pillar of the economy. The geographical remoteness from their main consumer markets in Europe and the United States creates a need for the EPZ companies to use appropriate and cost effective mode of transport to get their products to destination.

In the business of reaching markets, manufacturers will always have their own reason for the mode of transport they choose, but there are good reasons for choosing airfreight. In an increasing competitive business environment, one important reason is to ensure that the goods are in the right place at the right time. Delays, in getting the products to market at the right time may result in heavy discounting. To achieve a reduced lead time, orders are sent to the buyers in consuming markets by air freight thus ensuring fast and to some extent overnight delivery. To make sure that these goods arrive on time, services from local logistics providers are sought.

Organisations face with many challenges as they try to maintain or improve their competitive advantage against their competitors, to bring their products to the end customers. In this respect, an area of particular importance is logistics. Applying the right logistics solutions or bringing changes in logistics have provided many enhancements in organisations' operations and competitive advantages in their own respective fields.

The role of the logistics service providers in the supply chain is therefore important. They ensure good coordination with the carriers and other industry stakeholders. They also bring their expertise, advice, solutions and global network of partners to satisfy the transportation needs of the customers.

In Mauritius, over seventy-five logistics service providers are competing to acquire a share of the market. The exporters therefore have a wide variety of

choice to outsource their logistics and freight forwarding activities. The logistics service provider has to make sure that the marketing strategy it adopts and applies is most appropriate to stay in business.

Given the above, it is important to analyse the factors in the process of delivering logistics services from a theory stand point and evaluate their importance from a customers' as well as business' perspective to determine the critical success factors in the Mauritian context. This will allow Logistics service providers to focus on these dimensions while formulating and implementing their marketing strategy.

Logistics service providers thus need to rise to the challenge in providing the right package based on the customers' requirements.

1.2.1 The Research Problem

The problem behind this research is to identify the critical success factors in the process of delivering logistics services and to analyse their importance in the Mauritian context from a customer's and business' perspective.

1.2.2 The Sub Problems

The main problem can be divided into the following sub-problems;

Sub-problem 1.

- From a business' and customers' perspective, what are the factors that are considered important in logistics services?

Sub-problem 2.

- Identify the relative importance of these critical success factors.

Sub-problem 3.

- What are the implications for marketing strategy for these service providers?

1.3 Rationale for the Research

With the increasing competition on a global basis and dismantling of protective nets for entrance of products on certain privileged markets, organisations are compelled to increase their competitiveness in order to stay in business. These organisations are always seeking for the best sets of criteria that can satisfy their requirements as far as logistics services are concerned. The main reason is to remain competitive in their respective markets and industries.

Given the above, the logistics service provider needs not only to become competitive but also to propose to those organisations, which are potential customers and at the same time rational and trained professionals, the right package in a cost-effective manner.

Daley & Murphy (2001) state that the International Freight Forwarding industry is experiencing tremendous volatility, in part from regulatory change, technological advances, customer pressures, and savvy competitors. The common business adage “the only constant is change” certainly applies to the International Freight Forwarding Industry.

The significance of this study is to unveil the critical success factors that logistics service providers in Mauritius will have to pay attention to while designing their marketing strategies.

While we are aware that other studies (Chiu, 1995; Gulley, 1998; Gunasekaran & Ngai, 2004), carried out in other locations identified some factors as critical, this study will attempt to verify to what extent these factors are critical for logistics service providers operating in Mauritius.

As a principle of marketing, business is driven by the customer (Kotler, 2000), therefore there is a need to ensure that the marketing strategy adopted and the actions taken fulfil the needs of the customers.

1.4 Subsequent chapters of the research report

The subsequent chapters of this research report are structured in the following way:

Chapter 2 is a comprehensive literature review of published articles on important factors in logistics services. The theoretical models that have been developed are described. Related articles on impact of information technology in the logistics industry as well as the aspect of quality of service in the logistics service industry are also analysed. A summary of the surveyed articles is also provided in this chapter to highlight the main insights.

Chapter 3 describes the research methods which have been used in this research. Questionnaire design, measurement as well as data collection method are explained.

Chapter 4 presents the results of the analysis carried out for this present research.

Chapter 5 is more interpretative and highlights the findings. This chapter presents the results of the quantitative study. This includes the relevant statistical information.

Chapter 6 presents the conclusion and summarises the research. It also provides recommends to industry and suggestions the further research.

CHAPTER 2: LITERATURE REVIEW

This chapter looks into the important factors in logistics services. Conceptual models that have been developed are discussed and a summary of the available literature is proposed.

2.1 Important factors in logistics services

The international freight forwarder (Logistics service provider) has long been recognised as one of the key logistical intermediaries for facilitating cross-border trade. Because of their expertise in various aspects of cross-border trade, international freight forwarders tend to be utilised by most companies, regardless of size to facilitate their cross-border trade.

Logistics is usually concerned with the satisfying the supply of the customers' needs and wants in a marketing channel, distribution channel or a supply chain (Svensson 2002a).

Gunasekaran & Ngai (2004) define logistics as an operational process that includes the inputting, storing, transporting, and distribution of physical goods. They state that logistics has been playing a tremendous role in providing a competitive advantage for companies in networked economy and market. They further add that in the past ten years, companies have been successful in reducing lead-time along upstream stages of the supply chain. According to them companies outsource their logistics services because of the complexity of the logistics operations and to reduce the time needed for their product to reach the market.

On their side, Africk & Calkins (1994) defined third-party logistics as “ a relationship between a shipper and a third party (international freight forwarder or Logistics service provider) which compared with basic services, has more customised offerings, encompasses a broader number of services functions and is characterised by a longer-term more mutually beneficial relationship”.

The need for logistics services is growing and has expanded during the past decades encompassing both materials management and physical distribution activities and the development of supply-chain management (Stock, 2002).

Supply Chain Management might be seen as a business philosophy that strives to integrate the dependant activities, actors, and resources into marketing channels between the points of origin and consumption. This means that Supply Chain Management comprises different kinds of dependencies in, between and across companies in marketing channels (Svensson, 2002b).

Those who have lead their firm's supply chain practices recognize supply chain management's increasing strategic value to the corporation—they know how superior supply chain management (SCM) can cut costs, drive growth, and move the corporate strategy forward (Manrodt, Gibson & Rutner, 2005).

Supply chains should not “just happen”. To be effective and productive they must be deliberately designed and developed by logistics professionals.

Supply chains determine the ability of the organisations included in them to compete in the market place (Crimi & Kauffman, 2002). They further add that in an ideal supply chain, each member performs those things that are their core competencies and assign to other chain members those things that are not core competencies. According to them, the areas to determine the performance of the supply chain might include the following criteria and metrics;

- Total cost
- Quality
- Cycle time
- Reliability
- Specific product performance characteristics.

On his side, Gulley (1998) points out that getting the goods or samples or testing equipment to the right place at the right time is essential for good customer relations and just plain getting paid. Transporting merchandise is often complex, expensive, and highly susceptible to error, delays, and unplanned expenses. Taking and processing orders, even from established customers, can be equally complex and ruinous if not handled with care. According to him, a great freight forwarder (logistics service provider) should have many or all of the following characteristics,

- Willingness to take responsibility for ensuring documents is filled out accurately.
- Experience with a wide variety of situations.
- A good relationship with carriers.
- A good reputation with customs.
- A good track record in serving other customers in the particular industry sector.
- A good track record in serving the market to which the firm is selling.
- In-depth knowledge of tariffs and Inco-terms.
- Good working access to a network of related support services, such as packing firms, banks etc.
- A good report from their insurance company regarding claims.
- “Hazardous-Material” certification, if the product is hazardous material.
- Documentation on their expertise.
- Willingness to be flexible.
- Willingness to train the company.
- Willingness to refer the company to another freight forwarder when a shipment is out of its league.

In their literature survey on outsourcing of logistics functions, Razzaque & Sheng (1998) state that understanding the characteristics and capabilities of third-party logistics providers appear to be a logical first step in their selection process. They put forward that the following important criteria are commonly used in evaluation of third-party logistics providers:

- Ability to provide highly detailed logistics data before, during and following shipments.
- Business arrangements: e.g. incentives for performance, replacement of equipment.
- Business development: e.g. accounts gained and lost.
- Business experience: e.g. how long in business.
- Capabilities/competency: e.g. ability to meet firm's needs, provide a variety of service.
- Compatibility of third party's technology and the firms' requirements.
- High and improving standards: e.g. having a formal quality process.
- Location: e.g. near manufacturing facilities.
- Management structure.
- Opportunities to develop long-term relationships.
- Price.
- Reliability
- Reputation.
- Service quality.
- Speed.
- Supplier certification.
- Support services.
- Systems flexibility.

They further add that success of outsourcing depends on a user-provider relationship based on mutual trust and faith.

Christopher & Towill (2001) expanded the ideas developed by Hill (1993) in relation to the concept of “order qualifiers” and “order winners” which basically states that it is important for every business to understand what the baseline is for entering into competitive arena – these are the “order qualifiers”. To win the order requires specific capabilities and these are termed the “order winners”.

They relate that the connection between these ideas of “qualifiers” and “winners” and the “agile” is critical. They explain that when service and customer value enhancement are prime requirements for market winning the likelihood is that agility will become the critical dimension.

While there are many markets where order winner is availability, there has been an emergence of the agile paradigm typified by quick response. They further describe agility as a business-wide capability that embraces organisational structures, information systems, logistics processes and in particular, mindsets. A key characteristic of an agile organisation is flexibility (Christopher & Towill, 2001).

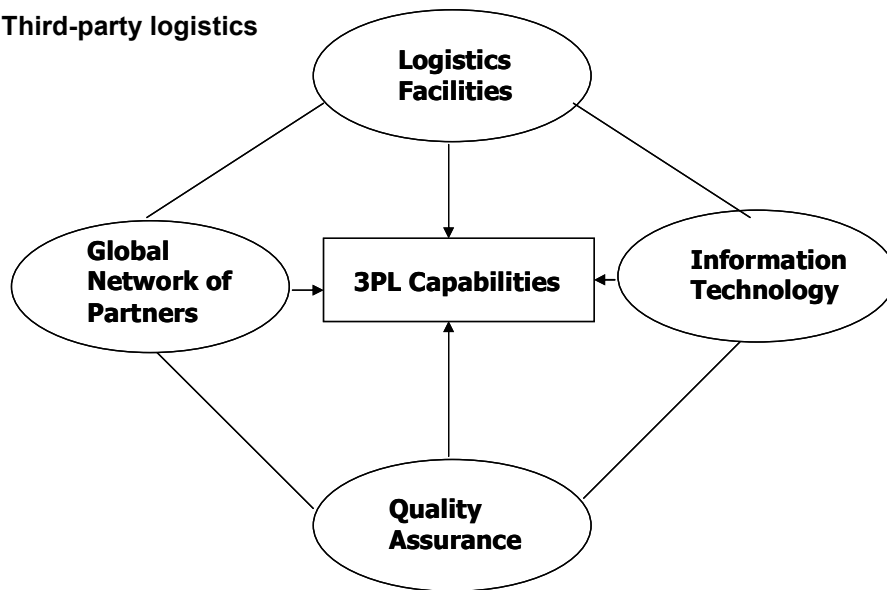
Earlier Christopher (2000) made a clear distinction between speed (meeting customer demand in the context of shortened delivery lead times), leanness (doing more with less) and agility (responding quickly to changes in demand in both volume and variety).

Chiu (1995) identified the critical success factors in effective logistics management as including good planning in a logistics system, a well-designed distribution system, prudent selection of allied companies, close relationship with trading partners, good logistics investment analysis, the elimination of communication barriers to logistics management and continuous improvement in logistics.

Gunasekaran & Ngai (2004) suggested a conceptual model for 3PL (Third Party Logistics) as described in figure 1 with four major factors for 3PL management:

1. Logistics facilities
2. A global network of partners
3. Information technology
4. Quality assurance

Figure 1 Third-party logistics



Source: Gunasekaran & Ngai (2004)

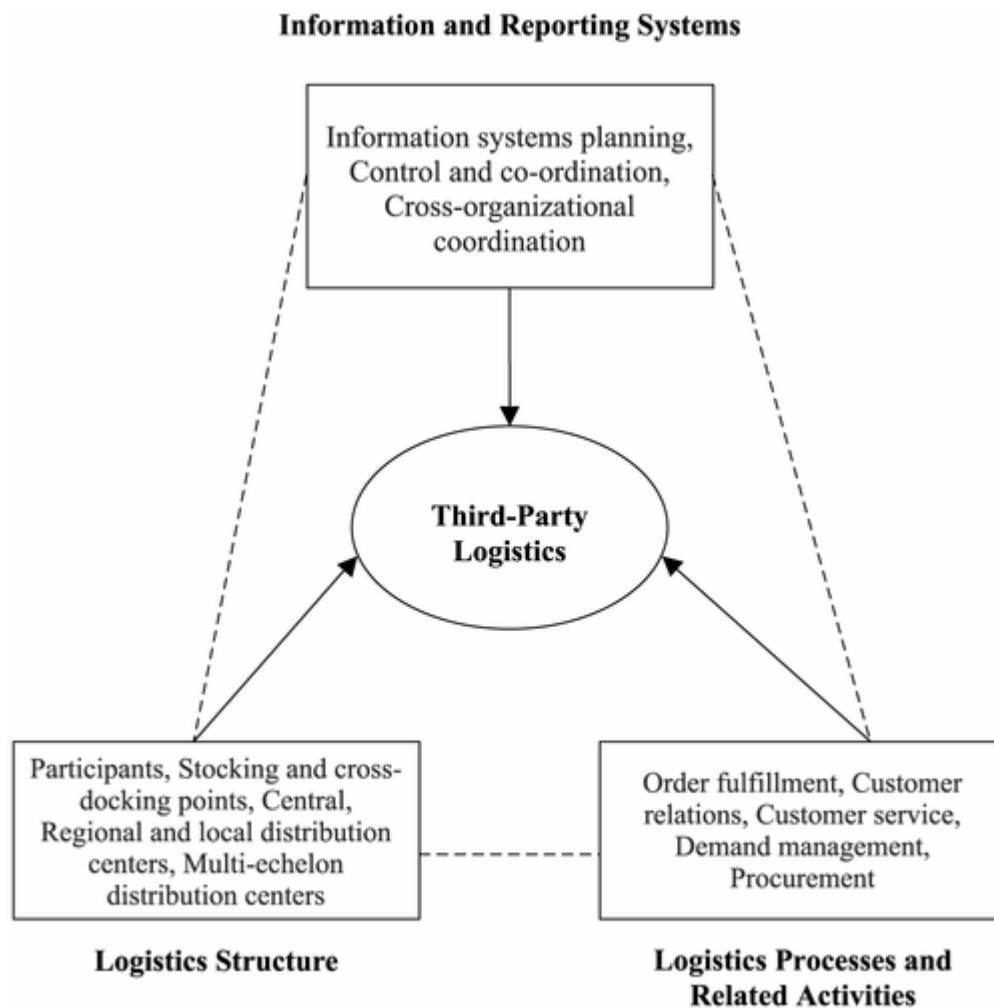
They suggest that with professional management, the quality of service can be assured by a network of global partners who offer different types of logistics services and customers with suitable strategic alliances, making available the required logistics facilities, such as warehouses, transportations fleets, human resources and the application of information technologies that include EDI, internet and e-commerce.

They further add that third-party logistics services should include:

- Order management
- Warehousing and distribution
- Customer services
- The management of returns
- Transportation

Another conceptual model (Figure 2) for logistics supply chain management was presented by Aldin & Stahre (2003) with special focus on third party logistics. The model consists of three major components which are logistics structure, logistics processes and related activities and information reporting system. They suggest that all three components are essential for a successful 3PL operation.

Figure 2 Conceptual Model



Source: Aldin and Stahre (2003)

Source: Aldin & Stahre (2003)

In their study carried out at Tolam Logistics, a Hong Kong based company, Gunasekaran & Ngai (2003) highlighted the lessons that have been learnt and suggested that the following elements can be useful for other small to medium sized logistics service providers.

- A long-term relationship with clients and their loyalty is important.
- Networking with people along the value chain and establish communication.
- The 'localisation' of services combined with the delivery of goods.'
- Strategic alliances with clients
- Customer relationship management (CRM) focusing on clients to make sure that there is no communication gap.
- Value-added services
- Excellent reverse logistics
- Simple costing system.

2.1.1 Value Added Services

Cook (2002) states that a key factor in choosing the right forwarder (logistics service provider) is the value-added services that a forwarder offers. For instance, while entering a totally new market, the right forwarder will be in a position to provide significant amount of data the firm will need. Another potential value-added service is providing EDI capability that would reduce cost and provide shipping data in a timely manner.

This is further confirmed by Knemeyer & Murphy (2004). They state that third party logistics service providers can add value by creating operational efficiencies and/or by sharing resources among customers.

However, Daley & Murphy (2001) argue that International airfreight forwarding companies (logistics service providers) can strive for competitive advantage in numerous ways to include "value-added activities," being a "low cost provider", or have a "customer service focus". While International freight forwarding management determines the method(s) for achieving competitive advantage, the customer determines the ultimate success of these pursuits.

They further add that, what the forwarder defines as “value added activities” may be of little “value” to the customers and therefore not worthy of higher prices.

2.1.2 Relationship

Kotler (2000) states that Relationship Marketing has the aim of building long-term mutually satisfying relations with key parties namely: the customers, the suppliers and distributors.

In a Business to Business environment, private exchanges can offer competitive advantages to most large suppliers. It is an arrangement that helps focus activity on process rather than price (Hoffman, Keedy & Roberts 2002).

Service relationships occur when the customer has repeated contact with the same provider, whereas in a service encounter, the customer interacts with a different provider each time. Pseudo relationships occur when a customer interacts with a different provider each time, but within a single company. While in discrete exchanges, individual transactions are assumed to be independent of past and future relations between the parties, in relational exchange, transactions take place in a historical and social context. It is even argued that relationship marketing aims at retaining profitable customers by catering to their individual needs. In a service relationship, customers expect to receive relational benefits as a result of having cultivated long-term relationships with a service provider (Mattlila 2001).

Long-term relationships between buyers and sellers tend to be more successful than transactional agreements and the dimensions such as trust and communications can enhance relationship success (Knemeyer & Murphy 2004).

Consumers of services tend to exhibit a great propensity to maintain long-term relationships with service providers (Brand & Cronin, 1997).

However, Pires & Staton (2000) argue that service purchase decisions by inexperienced ethnic consumers are constrained by limited knowledge of the marketplace, communication and a time and budget constraint that may restrict the choices available to them. There is a decreased incentive to search for information and to switch service providers and consequently, greater loyalty.

In order to manage this customer relationship, a lot of effort has been deployed by firms. This has led to development of sophisticated software like the Customer Relationship Management (CRM) that helps organisations in this endeavour.

CRM is the system that allows companies to plan and analyze marketing campaigns, to identify sales leads, and to manage their customer contacts and call centres. They point out that some companies using CRM programs report double-digit gains in revenues, customer satisfaction, and employee productivity, along with dramatic savings in customer acquisition costs. However good the CRM can be, if the companies have not set clear objectives for customer metrics, they will still be unclear about the initiatives they can or they should take (Ebner, Hu, Levitt & Mccrory, 2002).

Turnbull (1999) suggests that an understanding of the organisational buying process is fundamental to the development of appropriate business-to-business marketing strategy. He further adds that the organisational buyer is influenced by a wide variety of factors both from outside and within the organisation. Understanding these factors and their interrelationships is critical to the competitive positioning of the business.

Different models have been developed to clarify the relationship between various inputs, such as selling, previous experience or competitor activities, and outputs which are the purchase or rejection of a product or service from a particular source.

Although various models have been developed, it is argued that no single model adequately explains all the complexities of the organisational buying process. However, understanding the dynamics of organisational buying behaviour is essential to all strategic and tactical planning in business to business marketing. The action of the business to business marketer is based on the probable response of organisational buyers in relation to adaptation of price, product, distribution, product, distribution, advertising, promotion (Turnbull, 1999).

While physical goods are pre-produced in a factory, services are produced in a process in which consumers interact with the production resources of the service firm. This brings the consumption of services to be fundamentally different from consuming a product. It further brings the consumption of the service process to be a critical part of the service experience (Grönroos, 1998).

It can be seen in figure 3 that the most important change from the product marketing situation is the fact that the product is missing in service-oriented marketing situation.

Figure 3 The service-oriented perspective: process consumption and marketing



Source: Grönroos (1997)

2.2 The impact of Information Technology in the logistics industry

For many customers logistics is becoming more strategic and moving from a back-office function to being a critical success factor for competitiveness in their own industry segments. Customers are becoming more educated and are investing more readily in information technology for their supply chain and logistics systems to integrate all parties. They are doing this to realise reduced costs and gain in process efficiency (Siu, 2005).

The use of Information Technology (IT) in logistics is growing all over the world and so in the number of logistics service providers. These providers are acquiring new knowledge, skills and technologies. However, with the rapid turn in obsolescence, Logistics service providers are concerned about the timing that tangible benefit can be derived and therefore financial justifications become a key barrier to full scale IT implementation.

The use of information technology has significantly influenced logistics strategic practices and organisational structure choices in recent years (Bowersox & Daugerthy, 1995). According to them, many firms have been able to leverage logistics information technology to gain competitive advantage. They identified four paradigm shifts or changes in strategic practices resulting from information technology:

- Development of more transparent logistics organisation structure.
- Creation of more strategic alliances.
- Increased and more focused emphasis on performance measurement.
- Greater reliance on time-based strategies.

Gunasekaran & Ngai (2004) note that the rapidly increasing use of e-commerce requires a new approach: agility in logistics. They also add that a suitable logistics information system is required so that the customer's requirements can be embedded in the company's logistics service operations. They reckon that in order to provide speed to market and a fast, flexible customer response, a new logistics system is needed. This will help to provide a seamless delivery process and the tracking of materials in transit.

In addition to excellence in business processes and focus on industry-specific markets, IT systems are considered to be the new competitive weapons for the logistics industry. The IT automates the basic operational processes (such as order entry, order tracking, order scheduling etc.) of Logistics service providers (Piplani, Pokharel & Tan, 2004).

A key determinant of business performance is the effectiveness of logistics function in ensuring the smooth flow of materials, products and information throughout a company's supply chain (Sum, Toe & Ng, 2001).

A motivating factor for the use of IT by the Logistics Service Provider is the benefit of integration of supply chain activities among the various business partners. IT can be used to update customer companies on the status of cargo so that they can plan their production more efficiently.

The business of getting goods to market is therefore set to become more competitive. International and Chinese companies are already assessing the opportunities. Large state-owned transportation and logistics providers, drawing on their massive assets and strong relations with local manufacturers, will seek partnerships with leading foreign companies that can contribute value added logistics capabilities. Smaller, private local logistics companies that have a reputation for flexibility and a willingness to serve the needs of customers, as well as good IT support systems, could be acquisition targets for foreign players wishing to build presence quickly (Shaw & Weng, 2002)

Companies must share information and strategy not only within divisions, but also with outside suppliers and alliance partners. In this new marketplace, integration, that is shared information ideas and even common infrastructure makes the difference between industry leaders and followers (Asmus, 2000). He further adds that as the movements within the supply chain is accelerated, a new level of visibility and control within the organisation will be necessary to manage inventory in motion. A whirlwind of changes is challenging everyone's notions about what it takes to remain competitive.

Clearly the impact of IT helps to gain on productivity, costs and visibility. Bowman (2004), reports that retailer store, Dollar General Corporation, undercuts competitor even as it spends heavily on new systems to enhance transportation, warehousing and supplier links.

The use of internet in Supply chain management and logistics is rapidly increasing. The key ingredient for success in managing a supply chain is fast, accurate information from a wide range of operating areas, including transportation, inventory, purchasing, customer services, production scheduling, order processing and vendor operations. Using the internet provides numerous cost-saving opportunities for supply chains (Gunasekaran & Ngai, 2004).

In the courier industry, the service providers have been providing extensive level of information about the product itself with the help on integrated IT solutions that increased visibility. They pursued their efforts in providing updated real time information on the whereabouts of the consignment (track & trace) as well as event tracking at different milestones until final physical delivery. The service associated with DHL, for example, has grown to such an extent that customers are commonly using the 'DHL'. This IT endeavour has helped in bringing the 'top of the mind' concept. Shippers will often use the term 'DHL it' when they have to send an urgent document overseas.

2.3 Quality of service in the logistics service delivery

Gaining a quality advantage over competitors has become increasingly important because achieving lower costs, the other competitive route to gaining competitive advantage, has simply intensified competition in many industries (Luchs, 1990). He further adds that while serving the customer needs in a better way than one's competitor, a firm achieve a quality advantage that can be cashed in two ways;

- By charging higher prices than competitor without compromising one's market share and volume.
- Forsake a premium or charge only a modest one thereby offering one's customer a better value.

A higher quality product at market prices, whether the product is a good or a service, is always a competitive advantage (Dahringer, 1991).

From the customers' point of view, in process consumption the solutions to their problems are formed by a set of resources needed to create a good customer-perceived service quality and value. The firm must have competencies to acquire and/or develop the resources needed and to manage and implement service process in a way that creates value for each customer (Grönroos, 1998).

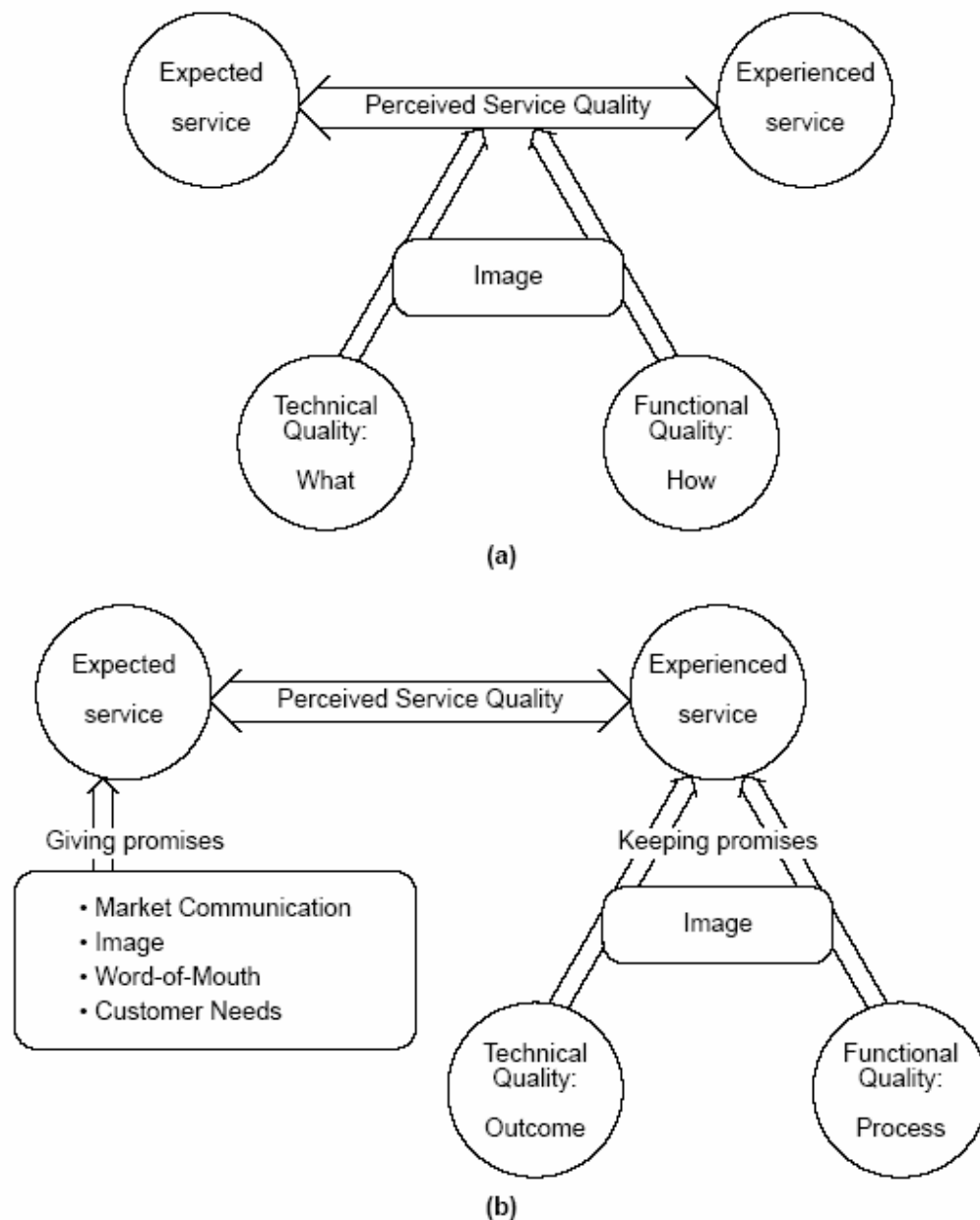
He further adds that to create good perceived quality of a service, the firm must manage the service process as well as all resources needed in that process. This process being an open process where the customer not only sees and experiences how the process functions but also takes part in it and interacts with the resources that the firm directly control.

Emerson & Grimm (1998) argue that customer service is complex, comprised of multifaceted elements such as order cycle time and overall product quality. The effect of each element is important information for managers, so that limited resources can be devoted to the most critical customer service elements.

However in a study carried out by Sink, Langley & Gibson (1996), they highlighted the responses from focus groups regarding important provider-evaluation factors, differentiating characteristics and internal attributes. The study revealed that providers should not attempt to develop and market a standard offering or "canned" solution for potential customers. Focus group participants reported that they view their logistical needs and problems as unique, requiring individual attention and custom solutions. Providers must attempt to diagnose and conceptualise the potential client's needs, ask the proper questions and tailor their offerings to meet and exceed customer expectations.

More research in this field has lead to the development of the basis perceived quality model (Fig.4) that itself lead to the introduction of the disconfirmation concept as it felt theoretically obvious that quality perception is a function of what the customer expects of the process as well as of what fact is experienced.

Figure 4 Perceived service quality



Source: Adapted from Grönroos (1983, p. 28; 1990, p. 47)

Source: Gronroos (1983)

In the above figure, the original perceived service quality model from 1982 is (a) and in (b) is the extended model where the quality dimensions and the disconfirmation notion are put into their marketing context.

Edgett & Parkinson (1993) state that heterogeneity in the services marketing concerns the potential for high variability in the performance of services. The quality and essence of a service can vary from producer to producer, from customer to customer, and from day to day. Heterogeneity in service output is a particular problem for labour intensive services.

However, on their side, Mittal & Lassar (1998) state that reliability has been recognised as “the most influential determinant of overall service quality or of customer satisfaction with the service”.

2.4 Summary

Logistics service, whether viewed simply as a service of moving freight from a point of origin to a point of destination or in a more complex environment such as the supply chain, is increasingly becoming an important dimension for companies competing to get their products to the end consumer. The literature review has emphasised the importance of some dimensions/factors that are considered important from a customers’ perspective. Among these elements are;

Dimensions	Source
Quality	Crimi & Kauffman, 2002; Razzaque & Sheng, 1998; Dahinger, 1991; Chiu, 1995; Luchs, 1990; Gronroos, 1998; Emerson & Grimm, 1998; Edgett & Parkinson, 1993.
Agility (Flexibility)	Gulley, 1998; Razzaque & Sheng, 1998; Christopher & Towill, 2001; Shaw & Weng, 2002; Gunasekaram & Ngai, 2004;
Cost reduction	Manrodt, Gibson & Rutner, 2005; Crimi & Kauffman, 2002; Razzaque & Sheng, 1998.
Network of partners	Gulley, 1998; Chiu, 1995.

Reliability (Reputation)	Gulley, 1998; Crimi & Kauffman,2002; Emerson & Grimm, 1998; Gunasekaram & Ngai, 2004; Razzaque & Sheng, 1998; Shaw & Weng, 2002;
Information Technology – Track & Trace	Bowersox & Daugherty, 1995; Razzaque & Sheng, 1998; Chiu, 1995; Piplani, Pokharel & Tan, 2004; Sum, Teo & Ng, 2001; Asmus, 2000; Bowman, 2004; Gunasekaran & Ngai, 2004
Time (Cycle & Lead)	Crimi & Kauffman,2002; Emerson & Grimm, 1998; ; Gunasekaram & Ngai, 2004;
Relationship (trust)	Razzaque & Sheng, 1998; Gulley, 1998; Matilla, 2001; africk & Calkins, 1994; Bran & Conin, 1997; Kotler, 2000; Hoffman, Keedy & Roberts, 2002.
Logistics facilities	Gunasekaran & Ngai, 2004; Aldin & Share, 2003.

However, in the developments of their conceptual model on critical success factors, Gunasekaran & Ngai (2004) suggest four critical success factors which are logistics facilities, a global network of partners, information technology and quality assurance.

Visibility over the supply chain to track movement of materials is important and companies are investing in this area to acquire competitive advantage. The impact of IT is becoming evident in the logistics environment yet logistics companies are still facing the challenge of pay back on investment due to rapid obsolescence.

Relationship is seen as an important dimension and even more pronounced in a service environment where attributes such as trust and reliability have been mentioned.

Quality of service is equally important and it has even been quoted that this dimension is a qualifier and therefore critical.

2.5 Research proposition

2.5.1 Proposition 1.

From a business' and customers' perspective, Critical Success Factors are;

- Logistics facilities
- A global network of partners
- Information Technology
- Quality of service

This is based on the conceptual model proposed by Gunasekaram & Ngai (2004), the dimensions of which encompass the model that was suggested by Aldin & Stahre (2003).

2.5.2 Proposition 2.

Visibility on the supply chain through 'IT' integration has raised itself from a qualifying criterion to become a winning one. This factor is significantly different from other factors.

2.5.3 Proposition 3.

Different segments will value the importance of the factors differently.

CHAPTER 3: RESEARCH METHODOLOGY

This chapter discusses how the study was conducted. Propositions have been made in Section 2.5. The data collection method and the type of statistical analysis used are explained.

3.1 The Research Method

This research questioned and surveyed from a customer's and business' perspective, information on critical factors in logistics services in Mauritius. An extensive search of the literature was first made to determine the information available on critical success factors in logistics service delivery. Then information was gathered by means of a self completed questionnaire

3.1.1 Questionnaire design

The instrument that was used for the survey was in the form of a questionnaire. A specimen appears in Appendix C. The questionnaire was divided into three sections.

The first part requested for background information on the respondent and on the company, e.g. the respondent's job title, the type of product exported by the company, the amount of cargo exported.

Respondents also had to state their opinion on various statements based on a Likert scale. The scale ranged from 1(strongly disagree), 2 (disagree), 3 (no opinion/ undecided), 4 (agree) and 5 (strongly agree).

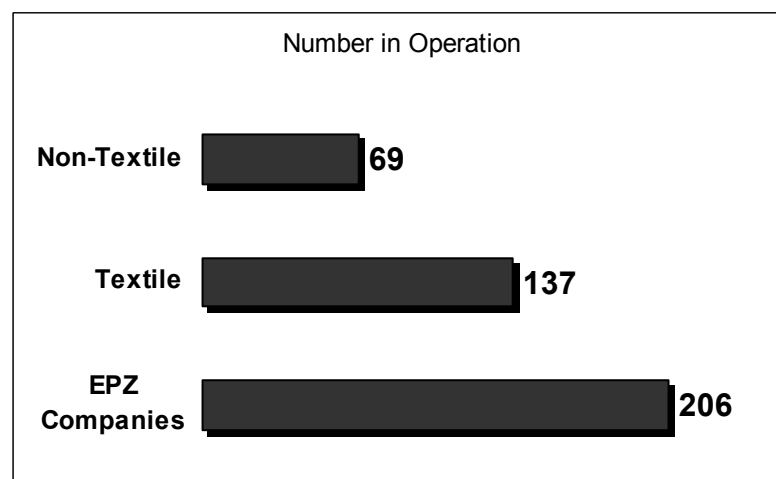
In the second part of the questionnaire, each respondent was given one hundred marks and was asked to allocate an amount out of the hundred marks to each of the nine different factors. A short description accompanied each factor to ensure that all respondents have the same understanding of the meaning.

The third part was left for respondents to fill in should they need an abstract of the findings of the present study.

3.2 The Research Population

The population consisted of the two hundred and six manufacturers and exporters operating in the Export Processing Zone (EPZ) sector in Mauritius. These companies use the services of logistics service providers for their transportation needs. The EPZ companies are not isolated into any physical location on the island. These manufacturing and exporting companies represent a substantial portion of exports revenue of Mauritius and they represent the biggest outsourcer for transportation and logistics.

Figure 5 EPZ Companies in operation



The companies are from two distinct groups, that is, those manufacturing textile products, called textile industries and those manufacturing and producing goods other than textiles, called non-textile companies. Sixty seven percent of these EPZ companies, representing a total number of one hundred and thirty seven, operate in textile production. The remaining thirty-three percent represents those sixty-nine companies which manufacture or produce non-textile goods.

3.3 The Research Sample

3.3.1 Sample size and selection

Questionnaire was sent to all qualifying companies of the export processing zone and the resulting sample was a self selecting sample.

3.4 Data collection

Questionnaires were sent to respondents by e-mail and were complemented by posted mail where respondents did not have e-mail facility. The questionnaire was accompanied by a cover letter both from the researcher (Appendix 'B') and an endorsement letter from DCDM business school to demonstrate legitimacy of the survey.

Follow up calls were made to some companies to ensure that responses are received within reasonable time.

3.5 Reliability and validity

Leedy & Omrod (2001) state that the validity and reliability of one's measurement instruments influence the extent to which one can learn something about the phenomenon one is studying.

The validity of a measurement instrument is the extent to which the instrument measures what is supposed to measure.

The reliability is the consistency with which a measuring instrument yields a certain result when the entity being measured has not changed.

3.5.1 Internal validity

The internal validity of a research study is the extent to which its design and the data that it yields allow the researcher to draw accurate conclusions about cause-and-effect and other relationships within the data (Leedy & Omrod, 2001:103).

The researcher ensured that the data collected helped to explain the critical success factors for marketing of logistics service providers in Mauritius. Precautions such as non-disclosure of the aim of the research were taken to avoid respondents to have any preconceived idea of what the output could be from the questionnaire design thus eliminating the element of bias.

3.5.2 External validity

The external validity of a research study is the extent to which its results apply to situations beyond the study itself, in other words, the extent to which the conclusion drawn can be generalised to other context.

The fact that the sample is greater than thirty and that the sample was not a biased one, ensures that the test yielded reproducible results.

3.5.3 Reliability

The reliability of a measurement is the consistency with which the measuring instrument yields a certain result when the entity being measured has not changed (Leedy & Ormrod, 2001). The researcher ensured the reliability by adopting a systematic approach ~~visà-~~ vis all the respondents.

3.6 Pilot test

The first draft specimen of the questionnaire was sent to a small number of shipping managers and logistics decision makers from the exporting firms.

The aim was;

- To understand whether any ambiguity in the statements existed.
- To make sure that the language and/or any technical term used is easily understood.
- To ascertain that the written instructions are simple and clear to understand.

This pilot test was done on a face-to-face basis to collect as many information as possible to ensure that the instrument was proper for the survey.

The feedback obtained did not suggest any change to be brought to the questionnaire. There was consensus that the questionnaire was clear enough and did not contain any ambiguity.

3.7 Data analysis

From the inputs received, Number Cruncher Statistical Software (NCSS) and Microsoft Excel were used for the crunching and analysis of the collected data.

Since the data collected from part I of the questionnaire were from a likert scale, therefore the data were of ordinal nature. It was inappropriate to do arithmetic calculations unless the data are reconverted and rescaled

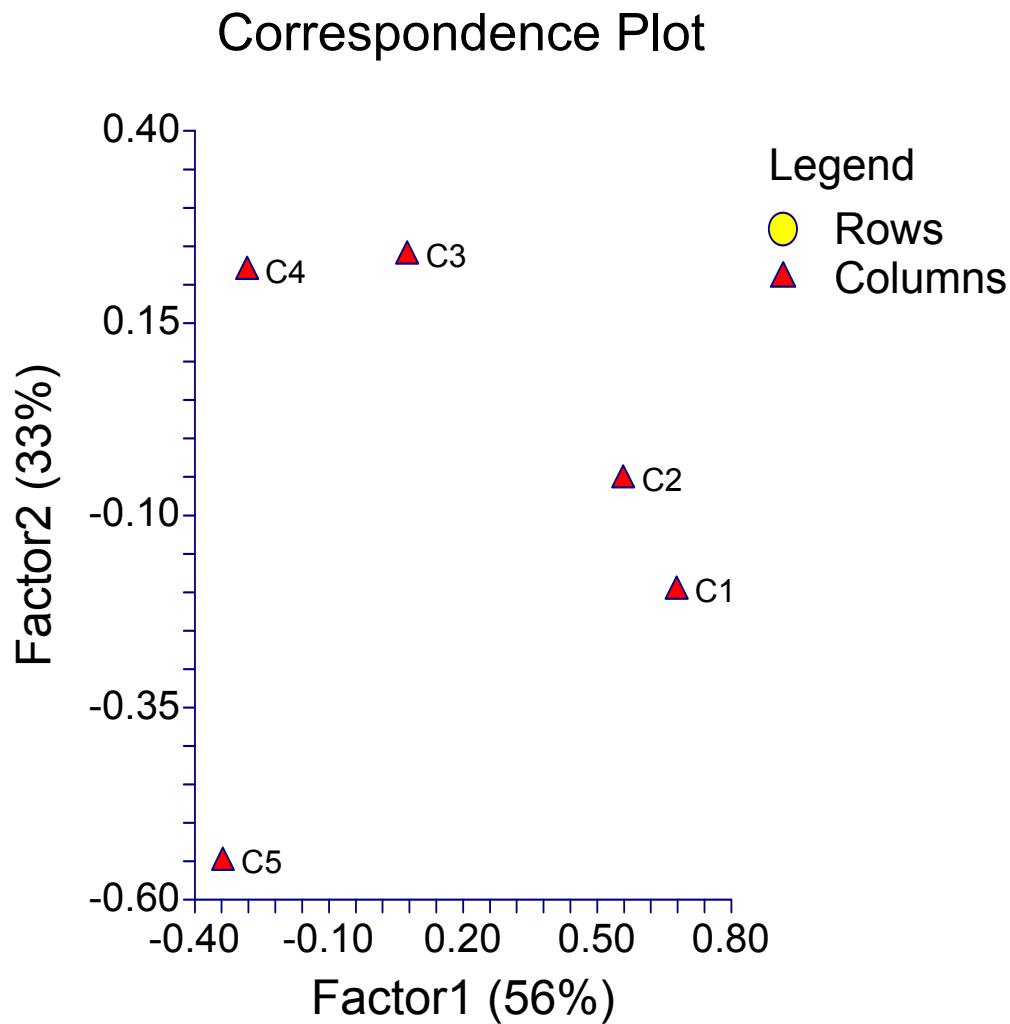
Bendixen & Sandler (1995) state that a researcher is on a dangerous ground in assuming that the data from a likert scale behave as an interval scale rather than an ordinal scale. They propose the recalling of these data using correspondence analysis techniques.

As a consequence, the data obtained from the field were rescaled using the prescribed correspondence analysis technique (Appendix 'C').

Table i Rescaled value

		X	Y	$\Delta X/\sqrt{\epsilon_1}$	$\Delta Y/\sqrt{\epsilon_2}$	D	Rescaled Value
1	Strongly Disagree	0.677	-0.199				1
2	Disagree	0.558	-0.054	0.314	-0.497	0.588	1.406
3	Neutral	0.075	0.237	1.273	-0.997	1.617	2.523
4	Agree	-0.283	0.217	0.944	0.069	0.946	3.177
5	Strongly Agree	-0.337	-0.552	0.142	2.635	2.639	5.000
						5.790	

Table ii Correspondence Plot



C1 Strongly Disagree. **C2** Disagree. **C3** Neutral
C4 Agree. **C5** Strongly Agree

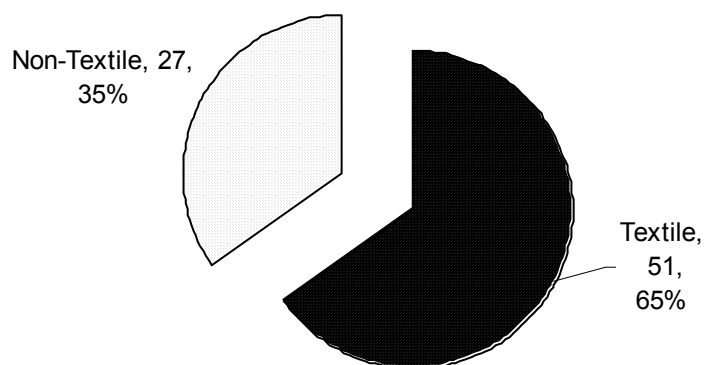
CHAPTER 4: PRESENTATION OF RESULTS

Results of the data analysis are presented in this chapter. As already mentioned in the previous chapter, Microsoft Excel software and NCSS were used to crunch the available data.

4.1 The response

By the deadline date, seventy-eight responses had been received which represent a response rate of thirty-seven percent. Fifty-one responses were received from the textile manufacturing companies which represent a response rate of thirty-seven percent of the textile companies' responses and twenty-seven from non-textile manufacturing companies representing a response rate of thirty-nine percent of the non-textile companies' responses. Responses from textile manufacturing companies represented fifty-one percent of the total responses received while the non-textile represented thirty-five percent (Figure 6).

Figure 6 The Response



Source: Field Research

4.1.1 Mean calculation of responses on the Likert Scale

The results obtained from the Likert scale on the first part of the questionnaire have been rescaled using the correspondence analysis technique. The mean was then calculated with the rescaled values for the overall respondents. The same exercise was done for textile & non-textile segments separately. The results are reproduced in Table iii below. Standard deviations were also calculated from the rescaled values and the result obtained are represented in the figure 7 below.

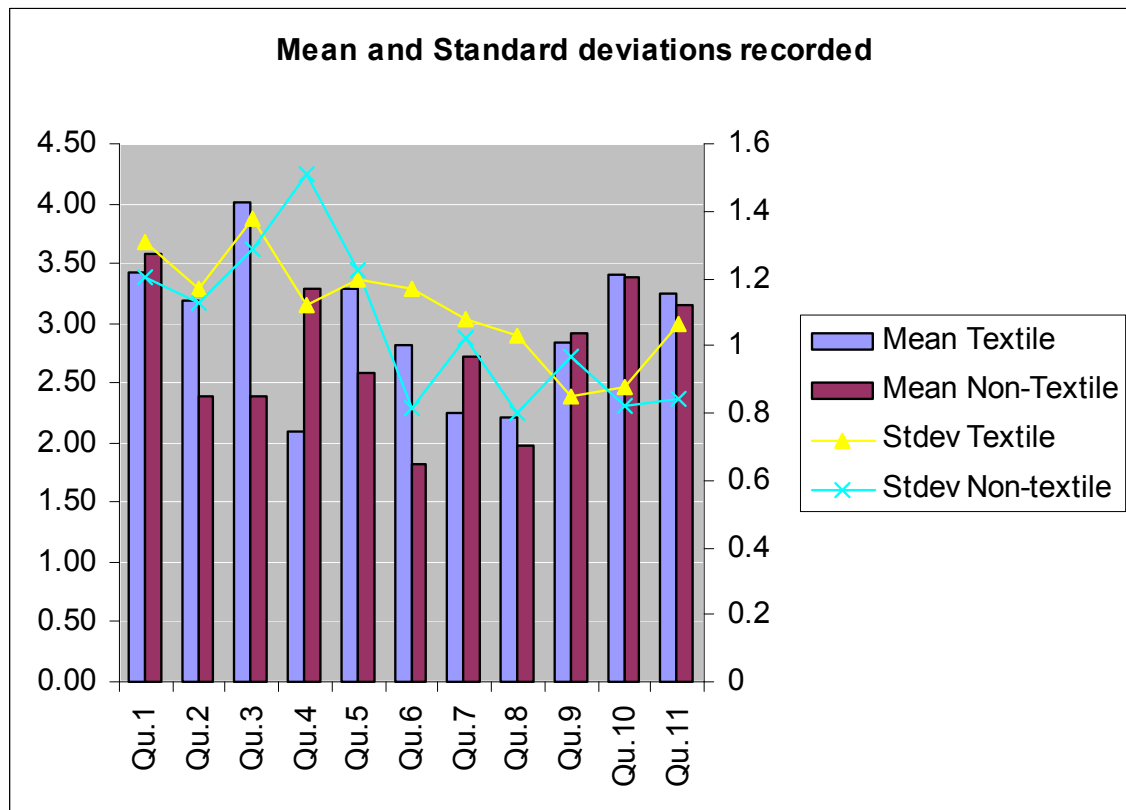
The variation in the responses observed, measured by the calculated mean and standard deviation (Appendix 'E'), does not show significant difference between the two distinct segments of the respondents.

Table iii Mean Calculation

	Overall	Textile	Non Textile
Question 1	3.48	3.42	3.58
Question 2	2.92	3.20	2.38
Question 3	3.45	4.01	2.38
Question 4	2.51	2.10	3.29
Question 5	3.04	3.28	2.58
Question 6	2.47	2.81	1.82
Question 7	2.41	2.25	2.71
Question 8	2.13	2.22	1.98
Question 9	2.87	2.84	2.92
Question 10	3.41	3.41	3.39
Question 11	3.22	3.26	3.16

Source: Field Research

Figure 7 Mean and Standard Deviations recorded



Source: Field Research

Each of the eleven statements given to the respondents on the first part of the questionnaire is reproduced below with the mean that was recorded during the survey. The table includes the mean for the overall EPZ companies as well as the two segments namely; the textile and non-textile.

1. Air freight is an essential transportation mode for our products.

	Overall	Textile	Non Textile
Mean	3.48	3.42	3.58

From the responses gathered it is can be stated that the exporting industry in general agrees that air freight is an essential mode of transportation.

2. We export our products by air freight due to delay in production.

	Overall	Textile	Non Textile
Mean	2.92	3.20	2.38

While the overall average shows that manufacturers export their products by air due to delay in production, the non-textile manufactures on their side tend to disagree with this statement.

3. We prefer to send our cargo by sea because it is cheaper.

	Overall	Textile	Non Textile
Mean	3.45	4.01	2.38

On average the manufacturers prefer to send their cargo by sea because it is cheaper. However, non-textile exporters tend to disagree with this statement.

4. We export our products by air freight because of the nature of our products.

	Overall	Textile	Non Textile
Mean	2.51	2.10	3.29

Overall the manufacturers disagree with this statement. However, the non-textile manufacturers, on their side, agree that they export their cargo by air because of its nature.

5. We export our products by air freight only in case of emergency.

	Overall	Textile	Non Textile
Mean	3.04	3.28	2.58

On average, the overall manufacturers have no opinion on this. However when taken separately the textile manufacturers agree that they send their cargo by air freight only in case of emergency while the non-textile manufacturers disagree with this.

6. We are instructed to work with the freight forwarder nominated by the buyer.

	Overall	Textile	Non Textile
Mean	2.47	2.81	1.82

The non-textile manufacturers do not agree with this while the textile manufacturers are undecided on this point. Overall, the manufacturers disagree with this.

7. We always work with our own appointed freight forwarder.

	Overall	Textile	Non Textile
Mean	2.41	2.25	2.71

The non-textile manufacturers are undecided on this point whereas the textile manufacturers disagree on this point. Overall, the manufacturers disagree with this.

8. We have always worked with our present freight forwarder no matter what.

	Overall	Textile	Non Textile
Mean	2.13	2.22	1.98

Both the textile and non-textile manufacturers disagree with the fact that they always work with their present freight forwarder.

9. Our freight forwarder provides us with all the logistics service we need.

	Overall	Textile	Non Textile
Mean	2.87	2.84	2.92

On average, the whole industry is undecided on this point.

10. The better the service level is from a service provider the higher the propensity will be to that service provider to get more business.

	Overall	Textile	Non Textile
Mean	3.41	3.41	3.39

Whether textile or non-textile, all the manufacturers on average agree that the better the service the higher the propensity will be to that service provider to get business.

11. Internet based tracking and tracing of the movement of our goods is of paramount importance. We will give more business to the service provider who offers this feature.

	Overall	Textile	Non Textile
Mean	3.22	3.26	3.16

On average the industry agrees with this statement that internet track and trace is important. However, the non-textile sector has no opinion whereas the textile sector agrees to this statement.

4.1.2 Allocation of marks to factors

On the second part of the questionnaire, the respondents were given nine factors namely;

- Quality of service
- Information Technology
- Relationship
- Agility
- Cost Saving
- Reliability
- Logistics facilities
- Global Network Partners
- Lead Time

They were given a total of one hundred marks and were asked to allocate a specific mark to each of the nine factors. The greater the score, the more important that factor would represent. The respondents were also instructed to ensure that the sum of all scores attributed was equal to one hundred. A short description of each factor was provided to ensure that all respondents have the same understanding.

All the respondents allocated a specific mark to each of the nine factors. The number of times that a zero was allocated to a factor by was seventeen out of a total of 702 possibilities which represents 2.4 percent.

The result obtained from the survey revealed the order of importance as follow

Table iv Mean Rating of Factors (Overall)

	Factors	Mean Rating Overall
1	Quality	17.1
2	Cost Saving	14.68
3	Relationship	12.62
4	Reliability	10.68
5	Agility	10.58
6	IT	10.33
7	Lead Time	9.19
8	Logistics	8.76
9	Network	6.06

Source: Field Research

However, the variation in the responses observed, measured by the calculated mean and standard deviation (Appendix 'E'), does now show significant difference overall between the two distinct segments of the respondents. The results for textile and non textile companies are nevertheless shown and analysed separately below

Figure 8 Mean and Standard Deviations recorded

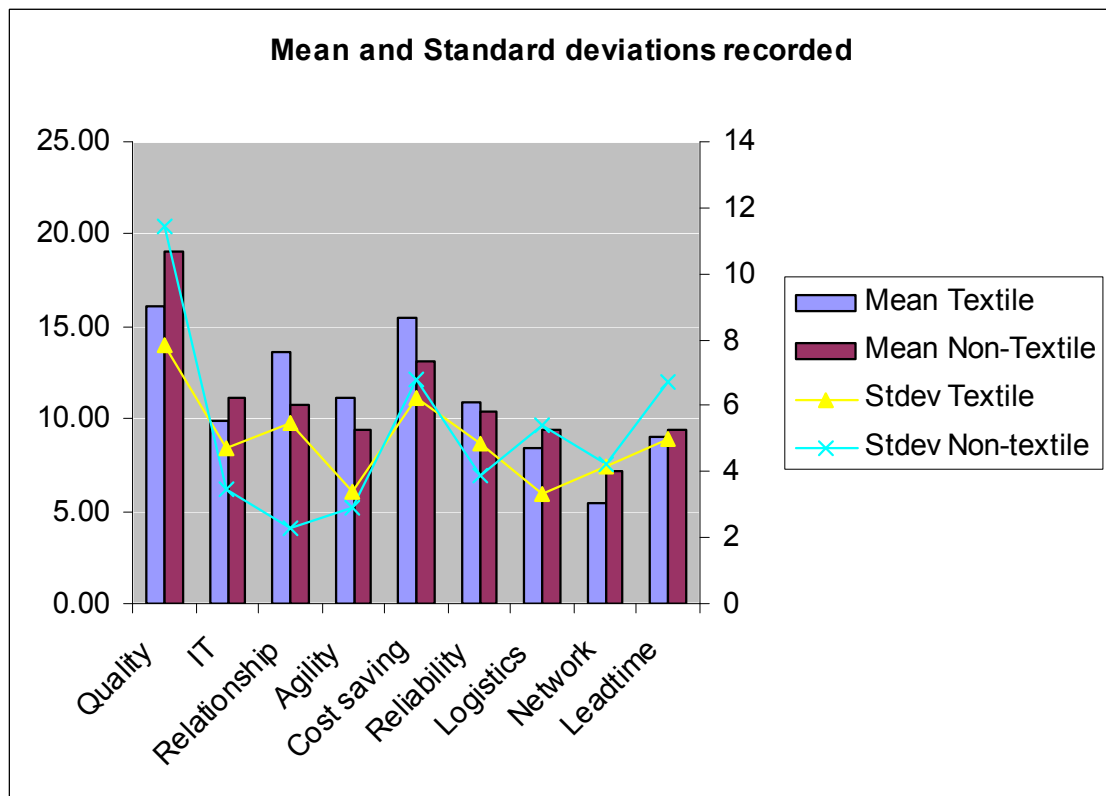
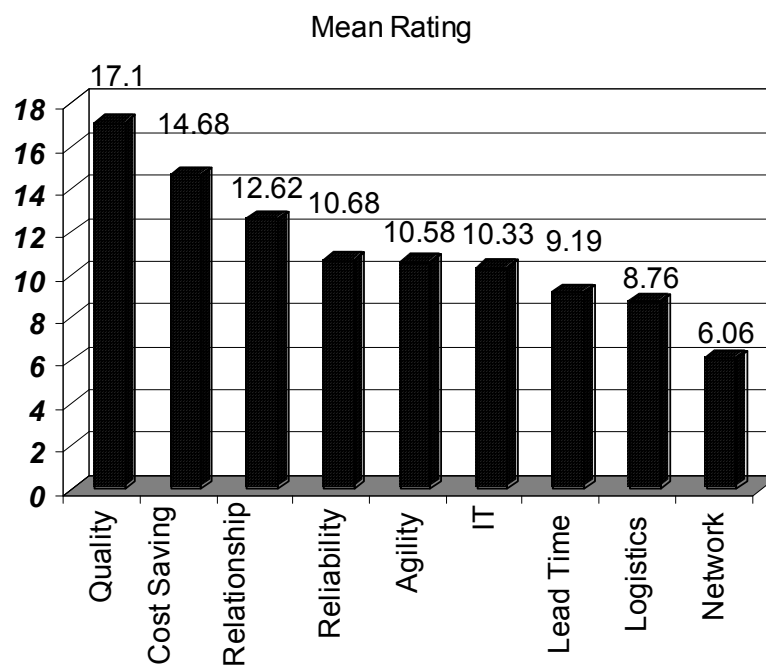


Figure 9 Mean Rating of Factors (Overall)



Source: Field Research

Table v Mean Rating of Factors (Textile)

	Factors	Mean Rating
1	Quality	16.06
2	Cost Saving	15.49
3	Relationship	13.61
4	Agility	11.18
5	Reliability	10.84
6	IT	9.92
7	Lead Time	9.06
8	Logistics	8.39
9	Network	5.45

Figure 10 Mean Rating of Factors (Textile)

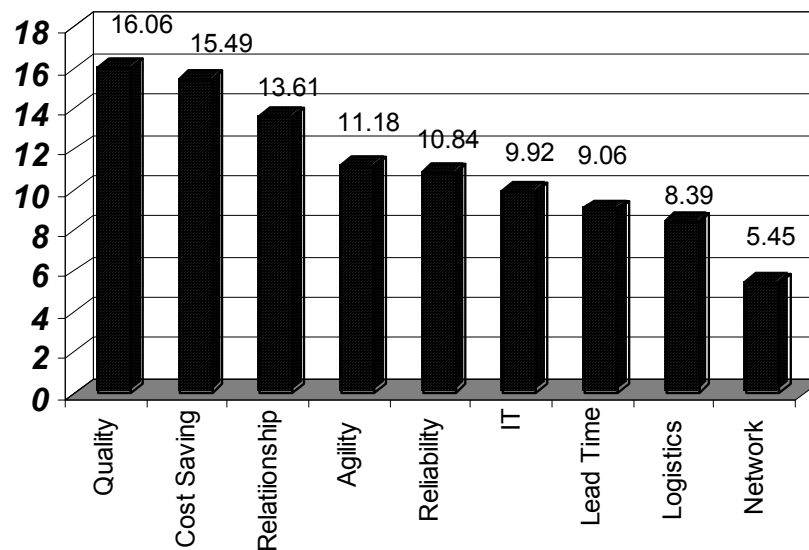
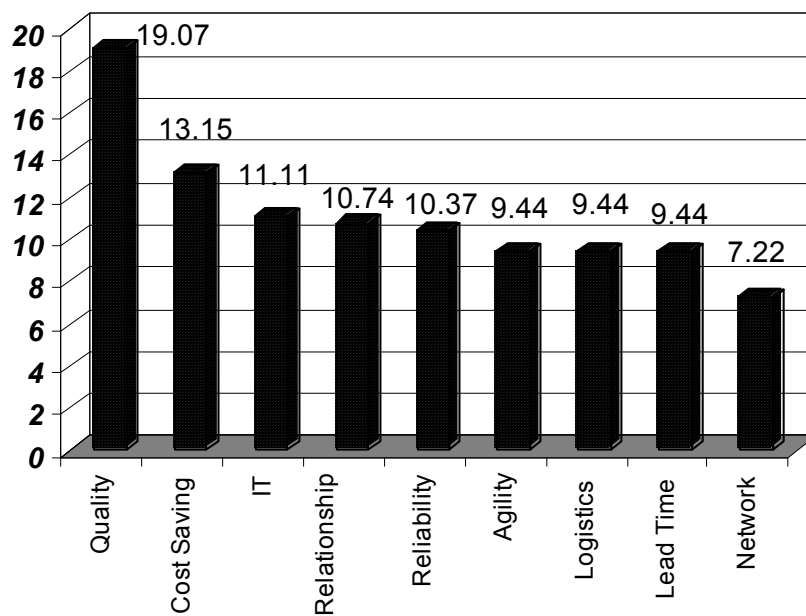


Table vi Mean Rating of Factors (Non-Textile)

	Factors	Mean Rating
1	Quality	19.07
2	Cost Saving	13.15
3	IT	11.11
4	Relationship	10.74
5	Reliability	10.37
6	Agility	9.44
7	Logistics	9.44
8	Lead Time	9.44
9	Network	7.22

Figure 11 Mean Rating of Factors (Non-Textile)



CHAPTER 5: INTERPRETATION OF RESULTS

In this chapter the obtained results are interpreted. The findings and insights are discussed and explained.

5.1 Part I of the questionnaire

As mentioned in the beginning of this research, owing to its geographical remoteness, the EPZ companies in general agree that airfreight is an essential mode of transport for their products. In a competitive environment that they are operating and struggling, they have to ensure that goods ordered arrive on time to the final destination.

It is observed that the textile segment agrees that the use of airfreight is to remedy to any delay in production while the non textile segment tends to disagree with this statement. It is interesting to note that the textile industries tend to market and sell their products on FOB (Free on Board) basis and by sea freight. Thus their commitment towards the buyer is to finish production at a precise time to make sure that the goods are on time for the ship's departure date while taking into consideration the number of sailing days and the frequency of operation of the shipping line. Thus any delay that results into a missed sailing date would have to be air freighted to ensure that goods arrive on time.

On the other side, due to the nature of the products, including perishables from the non-textile segment, products are often sold and marketed at the outset with air freight as mode of transport.

This is further confirmed by the fact that the textile segment prefers to send their cargo by sea freight due to its relatively low cost while the non-textile segment tends to disagree with this statement simply because they have either less or no choice to use but the air freight as mode of transport regardless of the price difference.

The non-textile segment agrees that they would choose air freight as mode of transport because of the nature of their products while the textile segment only agrees to use air freight as mode of transport in emergency cases.

Nominations of logistics service providers are mostly observed in the textile industry as opposed to the non textile one. This could be explained by the degree of outsourcing that the textile buyers have engaged with their logistics service providers and therefore would instruct the manufacturers to use the freight forwarder, at point of origin, within the network of their nominated logistics service provider.

They further confirm this point by stating that that they do not always work with their present freight forwarder and depending on conditions and or instructions; they would use other freight forwarder.

No matter whether the same freight forwarder is used or not, the whole industry is looking for quality of service and they would prefer to give their business to those freight forwarders which can assure the quality dimension.

Although many previous researches have demonstrated that IT 'Tracking and Tracing' of whereabouts of the goods are important, the non-textile sector has no opinion on this issue .This could be explained by the fact that textile manufactures as well as buyers are very sensitive of arrival date as well as availability of goods for sale. On the manufacturers' side, they want to make sure that they will not have to bear any penalties while on the importers' side they do not want to run out of stock for any of their outlets.

5.2 Part II of the questionnaire

When given to allocate marks to rate order of importance they attach to various factors that are considered important in the process of delivering logistics services, the calculated mean of all responses received showed the order of importance to be the following;

Table vii Order of importance of factors (All respondents)

1. Quality
2. Cost Saving
3. Relationship
4. Reliability
5. Agility
6. IT
7. Lead Time
8. Logistics
9. Network

However, the variation in the responses shows no significant difference for the two distinct segments of the respondents, the order was nevertheless worked out separately for each segment. The orders of importance they attach to the nine factors were found to be different in each group as shown below.

Table viii Order of importance of factors (Textile & Non-Textile)

<u>TEXTILE</u>	<u>NON- TEXTILE</u>
1. Quality	Quality
2. Cost Saving	Cost Saving
3. Relationship	IT
4. Reliability	Relationship
5. Agility	Reliability
6. IT	Agility
7. Lead Time	Logistics
8. Logistics	Lead Time
9. Network	Network

The two distinct segments of the market value the factors differently to a certain level. Although the factors 'quality' and 'cost-saving' appear to be the major factors that both segments value in the same order of importance, other factors are valued in different order by the two groups.

However, both groups attach a lesser importance to the factor 'network' which appears to have been attributed a lesser mark by respondents from both segments.

Analysis of variance was also carried out using the Kruskal-Wallis Multiple-Comparison Z-Value Test (Appendices 'F', 'H' & 'I')

Extracts of the tables for the z-value comparison are reproduced below.

Table ix Kruskal-Wallis Multiple-Comparison Z-Value Test for all respondents

Variable	Agility	Cost_saving	IT	Leadtime	Logistics
Agility	0.0000	3.9805	0.0247	2.1190	2.7374
Cost_saving	3.9805	0.0000	3.9558	6.0995	6.7179
IT	0.0247	3.9558	0.0000	2.1437	2.7621
Leadtime	2.1190	6.0995	2.1437	0.0000	0.6184
Logistics	2.7374	6.7179	2.7621	0.6184	0.0000
Network	5.8100	9.7905	5.8347	3.6910	3.0726
Quality	4.8253	0.8448	4.8006	6.9443	7.5627
Relationship	2.1950	1.7855	2.1703	4.3140	4.9324
Reliability	0.1675	4.1480	0.1922	1.9515	2.5699

Kruskal-Wallis Multiple-Comparison Z-Value Test for all respondents				
Variable	Network	Quality	Relationship	Reliability
Agility	5.8100	4.8253	2.1950	0.1675
Cost_saving	9.7905	0.8448	1.7855	4.1480
IT	5.8347	4.8006	2.1703	0.1922
Leadtime	3.6910	6.9443	4.3140	1.9515
Logistics	3.0726	7.5627	4.9324	2.5699
Network	0.0000	10.6353	8.0050	5.6425
Quality	10.6353	0.0000	2.6303	4.9928
Relationship	8.0050	2.6303	0.0000	2.3625
Reliability	5.6425	4.9928	2.3625	0.0000
Regular Test: Medians significantly different if z-value > 1.9600				
Bonferroni Test: Medians significantly different if z-value > 3.1970				

Table x Kruskal-Wallis Multiple-Comparison -Value Test for Textile companies

Variable	Agility	Cost_saving	IT	Leadtime	Logistics
Agility	0.0000	3.4504	0.9326	2.0964	2.9825
Cost_saving	3.4504	0.0000	4.3830	5.5468	6.4329
IT	0.9326	4.3830	0.0000	1.1638	2.0499
Leadtime	2.0964	5.5468	1.1638	0.0000	0.8861
Logistics	2.9825	6.4329	2.0499	0.8861	0.0000
Network	5.5377	8.9881	4.6051	3.4413	2.5552
Quality	3.0562	0.3942	3.9888	5.1526	6.0387
Relationship	1.8168	1.6336	2.7494	3.9132	4.7993
Reliability	0.7050	4.1554	0.2276	1.3914	2.2776
Regular Test: Medians significantly different if z-value > 1.9600					
Bonferroni Test: Medians significantly different if z-value > 3.1970					
Kruskal-Wallis Multiple-Comparison Z-Value Test for textile companies					
Variable	Network	Quality	Relationship	Reliability	
Agility	5.5377	3.0562	1.8168	0.7050	
Cost_saving	8.9881	0.3942	1.6336	4.1554	
IT	4.6051	3.9888	2.7494	0.2276	
Leadtime	3.4413	5.1526	3.9132	1.3914	
Logistics	2.5552	6.0387	4.7993	2.2776	
Network	0.0000	8.5939	7.3545	4.8328	
Quality	8.5939	0.0000	1.2394	3.7611	
Relationship	7.3545	1.2394	0.0000	2.5217	
Reliability	4.8328	3.7611	2.5217	0.0000	
Regular Test: Medians significantly different if z-value > 1.9600					
Bonferroni Test: Medians significantly different if z-value > 3.1970					

Table xi Kruskal-Wallis Multiple-Comparison Z-Value Test for Non-Textile companies

Variable	Agility	Cost_saving	IT	Leadtime	Logistics
Agility	0.0000	2.1888	1.5866	0.7133	0.4800
Cost_saving	2.1888	0.0000	0.6022	2.9022	2.6688
IT	1.5866	0.6022	0.0000	2.2999	2.0666
Leadtime	0.7133	2.9022	2.2999	0.0000	0.2333
Logistics	0.4800	2.6688	2.0666	0.2333	0.0000
Network	2.0800	4.2688	3.6666	1.3666	1.6000
Quality	4.1321	1.9433	2.5455	4.8454	4.6121
Relationship	1.4311	0.7578	0.1556	2.1444	1.9111
Reliability	0.7644	1.4244	0.8222	1.4777	1.2444
Regular Test: Medians significantly different if z-value > 1.9600					
Bonferroni Test: Medians significantly different if z-value > 3.1970					
 Kruskal-Wallis Multiple-Comparison Z-Value Test for Non- Textile companies					
Variable	Network	Quality	Relationship	Reliability	
Agility	2.0800	4.1321	1.4311	0.7644	
Cost_saving	4.2688	1.9433	0.7578	1.4244	
IT	3.6666	2.5455	0.1556	0.8222	
Leadtime	1.3666	4.8454	2.1444	1.4777	
Logistics	1.6000	4.6121	1.9111	1.2444	
Network	0.0000	6.2121	3.5110	2.8444	
Quality	6.2121	0.0000	2.7010	3.3677	
Relationship	3.5110	2.7010	0.0000	0.6667	
Reliability	2.8444	3.3677	0.6667	0.0000	
Regular Test: Medians significantly different if z-value > 1.9600					
Bonferroni Test: Medians significantly different if z-value > 3.1970					

5.3 Propositions evaluated

Proposition 1 was stated as follows;

From a business' and customers' perspective, Critical Success Factors are;

- Logistics facilities
- A global network of partners
- Information Technology
- Quality of service

This is based on the conceptual model proposed by Gunasekaram & Ngai (2004), the dimensions of which encompass the model that was suggested by Aldin & Stahre (2003).

Although Gunasekaram & Ngai (2004) have put forward the four listed factors, respondents in this survey also value other factors which they consider as important. The four prescribed factors are important but need to be complemented with the other factors. It would be too dangerous for marketers to restrain themselves to only those four factors that are proposed in the conceptual model.

Although the factor 'network' is considered critical in the conceptual model, this factor is found to be of lesser importance compared the other factors in this research. The 'cost-saving' factor which was found to be a key factor in this research is not among the four prescribed ones.

Proposition 2 was stated as follows;

Visibility on the supply chain through 'IT' integration has raised itself from a qualifying criterion to become a winning one. This factor is significantly different from other factors.

Analysis of variance was carried out using the Kruskal-Wallis Multiple-Comparison Z-Value Test. The analysis was done for inputs from all the respondents as well as inputs from textile and non-textile respondents separately. The factor is significantly different from other factors if the z value is greater than 1.9600.

In all the three cases it was found 'IT' is only significantly different to some factors but not to all. The factor 'IT' is not significantly different to Reliability and Agility when inputs from all the respondents are analysed. When inputs from the textile respondents are analysed, it is found that IT is not significantly different to the following factors namely; Reliability, Agility and Lead-time. Lastly, when responses from the non-textile segment are analysed, the factor 'IT' was found not be significantly different from the following factors namely; Agility, Cost-saving, Relationship and Reliability.

Proposition 3 was stated as follows;

Different segments will value the importance of the factors differently.

Responses received in the second part of the questionnaire revealed that indeed the importance of the factors is not valued similarly by the two different segments of the EPZ companies.

In table viii reproduced above, it can be observed that although the first two factors and the last one are valued at the same order of importance, the other factors are indeed valued differently. Overall, it is can be said that different segments value the importance of the factors differently.

CHAPTER 6: CONCLUSION AND/OR RECOMMENDATIONS

This chapter describes the conclusion of this research. Further recommendations are also made and suggestions for further research are put forward.

6.1 Summary

The main problem of this present research was to identify the critical success factors in the process of delivering logistics services and to analyse their importance in the Mauritian context from a customer's and business' perspective.

From this present study, it was found that although the conceptual model that was suggested by Gunasekaram & Ngai (2004), contains factors that exporters in Mauritius value, these factors have to be complemented by some other factors that are also considered to be of importance.

Although various literatures suggested that Information Technology 'IT' has brought significant benefits in different places in the way it impacts on the supply chain, the present study revealed that this element is not significantly different to some other factors whether the analysed results are taken from all respondents or from the two segments separately.

The present research also revealed that the important factors in the process of delivering logistics services are valued differently by different segments of the EPZ industry. This is a very important insight for marketers from the logistics service providers as it will help in formulating and deploying their strategies to tap in different segments of the industry.

This research also confirmed that owing to the geographical remoteness from the main consuming markets, exporters consider airfreight as an essential mode of transportation. The market can be considered as price sensitive as exporters value the cost-saving factor as important. However they also value the factor quality and would expect a level of service that needs to follow in order to help them in their endeavours.

Unlike the non-textile companies, textile manufacturers will only chose airfreight as a mode of transport only if they have delayed production and would rather favour sea freight as a preferred mode of transport owing to its relatively low cost.

The choice of using a specific logistics service provider is either the result of a nomination imposed by buyer or the result of a local selection among service providers. However, the respondents disagree with the fact that they have always worked with their present freight forwarder. There is a loyalty question that needs to be worked upon and marketers from the logistics service providers need to formulate their strategy so as to raise the exit barriers.

6.2 Limitations

The main limitation of this study has been the impossibility to further sub categorise the segments in sub segments. The non-textile sector has manufacturers so diverse in their relative production area that it would have been practically impossible to sub categorise in perishables, watch manufacturers or other sectors.

This is equally true for the textile manufactures as sub segmenting would have lead to industries in the shirt making, trousers and other products.

Time constraint was also another limitation of the research. Had the research period been longer at the outset, the rate of response could have been higher more time could have been dedicated in chasing potential respondents.

6.3 Recommendations

Customer acquisition and customer retention is of vital importance for firms to stay in business. It is therefore important to meet the requirements of the customers in order to attract, satisfy and delight them. A logical step is thus to understand their needs and to deploy a marketing strategy that will help the firm to achieve this objective.

Given that different segments of the market value the factors and the products differently, it is vital for logistics service providers to understand the critical success factors in order to focus their attention thereupon so as to propose the required and desired service to the customers at large as well as to specific segments of the market.

6.4 Suggestions for further research

Further research in the area of critical success factors could be done in a drill down approach from this present study. For example, the quality dimension could be analysed in a research on its own to see the relative impact it has to further help the marketers in formulating and fine tuning their marketing strategy.

Given that this research has highlighted the order of importance the various factors represent from a customers' perspective, a further research could be carried out to assess how customers would react to when different bundled packages are proposed. That research would then focus on the customer buying behaviour.

The fact that other researches carried out elsewhere demonstrated that 'IT' is an important dimension in logistics services; it would be beneficial to the local industry to carry out a survey on awareness of the benefits of the effects of information technology over the supply chain for Mauritian exporters.

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APPENDICES

Appendix A Covering Letter

15 Morcellement Gunness
COROMANDEL

14th March 2005

Dear

Academic Research on critical success factors for the marketing of logistics service providers in Mauritius.

I am presently working on a research on the above-mentioned topic to fulfil a MBA course requirement.

I would be grateful if you could spare a few minutes and fill in the attached questionnaire and return it to me in the enclosed envelope by **15 July 2005**. Or maybe you could pass on the questionnaire to the person responsible for shipping in your organisation. Your contribution is extremely valuable and vital in helping me complete my course.

Should you require any explanation or clarification on the questionnaire, please do not hesitate to phone me on 211 2819 (office hours) or 258 6554 (after office hours).

You can rest assured that the data obtained will remain strictly confidential and will not be used for any other purpose.

Should you be interested in a copy of the abstract of my findings, please fill in Part III (request for abstract) of the questionnaire.

Thank you in advance for your valuable time and co-operation.

Yours sincerely

Mohammad Riaz Esmael
encs.

Appendix B Questionnaire

PART 1 – BACKGROUND INFORMATION

My job title is:

Our company exports Textile Products ☐ . Non-Textile Products ☐

(Please tick the appropriate box to describe the products your company exports)

Our company exports since:

In 2004, exports amounted to kilos, of which kilos were by air and kilos by sea.

INSTRUCTIONS:

Please answer the following statements based on your experience. You may only choose ONE ANSWER per statement. There is no right or wrong answer. Please CROSS (X) YOUR ANSWER in the space provided. You have the following options:

(1) strongly disagree (2) disagree (3) no opinion/undecided (4) agree (5) strongly agree

GENERAL INFORMATION	Strongly disagree				Strongly agree
1 Air freight is an essential transportation mode for our products	1	2	3	4	5
2 We export our products by air freight due to delay in production	1	2	3	4	5
3 We prefer to send our cargo by sea because it is cheaper	1	2	3	4	5
4 We export our products by air freight because of the nature of our products.	1	2	3	4	5
5 We export our products by air freight only in case of emergency	1	2	3	4	5
6 We are instructed to work with the freight forwarder nominated by the buyer	1	2	3	4	5
7 We always work with our own appointed freight forwarder	1	2	3	4	5
8 We have always worked with our present freight forwarder no matter what.	1	2	3	4	5
9 Our freight forwarder provides us with all the logistics service we need.	1	2	3	4	5
10 The better the service level is from a service provider the higher the propensity will be to that service provider to get more business.	1	2	3	4	5
11 Internet based Tacking and tracing of the movement of our goods is of paramount importance. We will give more business to the service provider who offers this feature.	1	2	3	4	5

PART II – SURVEY QUESTIONNAIRE

INSTRUCTIONS:

In this section you are provided with nine factors. A short description is given of each factor. You are provided with a total of 100 marks. From the 100 marks, you are required to allocate a specific mark to each of these 9 factors. The greater the score, the more important the factor is. Your total mark allocated to the nine factors must be equal to 100.

If a factor does not represent any importance, please allocate zero mark to that factor.

SHORT DESCRIPTION OF FACTORS

Quality of Service

The logistics service provider gives extra attention and cares for the customers' requirements. The staffs are courteous, always willing to help, respond to requests promptly and execute documentation without errors. The logistics service provider measures performance on agreed set objectives.

Information Technology

'IT' integration in the supply chain provides visibility (Track & Trace) and orders can be followed via the internet with real time information. This allows faster and error free communication and provides knowledge to the customer on the whereabouts of the cargo.

Relationship

The freight forwarder must be able to build long-term relationship with the customers. They need to have the ability to convey trust and confidence. There is a need to establish mutual trust between the freight forwarder and the customer.

Agility

The Freight forwarder adopts a positive attitude and demonstrates flexibility and is proactive. They adapt their procedure to suit customers' needs. They have to adjust to changing needs and propose convenient solutions quickly.

Cost Saving

The freight forwarder needs to have economies of scale and thus can allow customers to save of freight expenditure. Customers will switch forwarder if they get a slight lower price from another freight forwarder. The freight forwarder must strive to propose cost effective solutions.

Reliability

The freight forwarder must have the ability to perform the promised service dependably and accurately. Customers must feel it can depend on the freight forwarder. The job will get done when contracted to the freight forwarder. The freight forwarder must assist customers in meeting their requirements. The freight forwarder must have a good track record and a solid reputation.

Logistics Facilities

The Freight forwarder needs to have facilities such that it are equipped to carry out tasks like warehousing, stuffing of container, inventory management and purchase order management. The freight forwarder must be able to provide value added services like picking and sorting, packing, bagging and bar-coded labelling.

Global Network Partners

The Freight forwarder needs to have a good global coverage with reliable and agile overseas agents who can provide logistics solutions and rapid rate quotes. The overseas agent of the freight forwarder must have expertise in certain field to be able to provide specific services e.g. unpacking, distribution. The Overseas agents of the freight forwarder are instrumental to a seamless flow of our cargo.

Lead Time

Delay in deliveries may jeopardise suppliers' contract with their customers and can lead to severe penalties. Buyers are very strict on target dates for their orders. The freight forwarder must make all the efforts to ensure on-time delivery of the cargo.

FACTORS	MARKS
QUALITY OF SERVICE	
INFORMATION TECHNOLOGY	
RELATIONSHIP	
AGILITY	
COST SAVING	
RELIABILITY	
LOGISTICS FACILITIES	
GLOBAL NETWORK PARTNERS	
LEAD TIME	
TOTAL	100

PART III - REQUEST FOR ABSTRACT

I would like to obtain a copy of the abstract of this dissertation. Please send to:

Name: Title:

Address:

Appendix C Data Rescaling

Eigenvalue Section				
Factor No.	Eigenvalue	Individual Percent	Cumulative Percent	Bar Chart
1	0.143945	55.7	55.7	
2	0.085139	32.94	88.64	
3	0.025056	9.69	98.33	
4	0.004307	1.67	100	
Total	0.258447			

Plot Detail Section for Columns

Name	Quality	Mass	Inertia	Factor	Axis1 COR	CTR	Factor	Axis2 COR	CTR
1 C1	0.864	0.048	0.107	0.677	0.795	0.152	-0.199	0.069	0.022
2 C2	0.969	0.224	0.281	0.558	0.959	0.485	-0.054	0.009	0.008
3 C3	0.361	0.164	0.109	0.075	0.033	0.006	0.237	0.328	0.108
4 C4	0.911	0.382	0.207	-0.283	0.574	0.213	0.217	0.337	0.212
5 C5	0.993	0.182	0.296	-0.337	0.27	0.144	-0.552	0.723	0.65

	X	Y	$\Delta X/\sqrt{\epsilon_1}$	$\Delta Y/\sqrt{\epsilon_2}$	D		
1 Strongly Disagree	0.677	-0.199				1	
2 Disagree	0.558	-0.054	0.314	-0.497	0.588	1.406	
3 Neutral	0.075	0.237	1.273	-0.997	1.617	2.523	
4 Agree	-0.283	0.217	0.944	0.069	0.946	3.177	
5 Strongly Agree	-0.337	-0.552	0.142	2.635	2.639	5.000	
					5.790		

Appendix D Raw Data

Respondent	Textile (1)/ Non- textile(2)	Qu.1	Qu.2	Qu.3	Qu.4	Qu.5	Qu.6	Qu.7	Qu.8	Qu.9	Qu.10	Qu.11	Quality	IT	Relationship	Agility	Cost saving	Reliability	Logistics	Network	Leadtime	Checksum
1	1	2	5	5	2	4	5	5	5	4	4	4	12	10	10	11	10	11	12	12	12	100
2	1	2	5	5	1	5	5	1	1	5	5	5	20	15	10	10	10	10	10	5	10	100
3	1	4	4	5	2	5	5	2	1	4	4	4	14	8	12	10	11	12	8	10	15	100
4	1	4	4	5	2	5	3	2	4	3	4	5	30	2	14	9	15	10	7	3	10	100
5	1	5	2	5	5	1	5	2	5	5	4	2	20	11	13	20	10	10	10	5	1	100
6	1	2	5	5	1	5	5	1	3	4	4	2	11	2	30	15	15	10	5	2	10	100
7	1	5	4	5	2	4	2	4	4	4	4	4	30	15	10	10	10	10	5	2	8	100
8	1	5	1	2	5	1	5	1	5	5	2	3	40	1	20	15	2	15	3	1	3	100
9	1	5	5	5	3	3	3	2	3	3	4	4	10	10	20	10	2	25	10	10	3	100
10	1	5	3	5	2	4	3	3	2	3	4	3	8	3	25	10	13	30	5	3	3	100
11	1	5	5	5	1	3	3	3	2	3	4	3	15	3	15	15	15	15	10	5	7	100
12	1	5	4	5	2	4	4	2	2	2	4	2	19	3	30	15	13	10	5	3	2	100
13	1	5	4	3	2	3	2	2	3	2	4	3	30	15	10	5	19	15	3	1	2	100
14	1	2	5	5	3	5	1	5	2	4	4	5	40	3	5	5	20	5	10	1	11	100
15	1	4	5	5	2	4	4	1	2	4	4	4	20	15	20	15	20	5	5	0	0	100
16	1	4	2	4	2	2	2	4	4	4	5	5	10	15	10	10	20	10	10	5	10	100
17	1	4	2	5	2	2	4	3	3	4	5	5	10	15	10	10	20	10	10	5	10	100
18	1	4	4	5	4	4	4	2	2	4	5	5	10	15	10	10	20	10	10	5	10	100
19	1	4	4	5	3	4	3	2	1	1	5	4	10	10	10	10	25	10	15	5	5	100
20	1	4	4	4	3	4	4	2	2	2	5	4	10	15	10	10	10	15	15	0	15	100
21	1	5	4	5	2	5	4	2	2	2	4	5	10	15	10	10	10	15	15	0	15	100
22	1	5	5	5	3	5	3	3	3	3	4	3	10	10	10	10	20	10	10	10	10	100
23	1	4	4	5	2	5	4	2	2	4	4	5	10	10	10	10	25	10	10	5	10	100
24	1	2	2	5	1	4	4	5	1	4	4	2	30	0	15	15	10	25	0	0	5	100
25	1	4	4	5	2	5	4	2	2	4	4	4	15	15	10	10	15	10	10	5	10	100
26	1	4	4	5	3	4	4	2	3	4	5	5	10	10	10	10	15	10	10	10	15	100
27	1	5	2	3	5	2	2	4	2	4	4	3	20	0	20	15	20	10	5	0	10	100
28	1	5	3	5	3	3	2	4	4	4	4	4	10	10	20	10	10	10	10	10	10	100
29	1	4	2	4	2	3	2	4	4	4	5	4	25	15	10	15	15	10	5	0	5	100
30	1	4	4	5	2	5	4	2	2	4	4	4	20	10	15	15	15	15	10	0	0	100
31	1	4	4	4	2	2	2	4	3	4	4	4	15	15	10	10	20	5	15	5	5	100
32	1	4	5	5	3	5	4	2	2	3	4	4	15	15	10	15	15	10	10	0	10	100
33	1	5	4	5	2	2	4	4	4	4	4	4	10	10	20	10	20	5	5	0	20	100
34	1	2	4	2	2	4	2	2	2	2	2	2	10	10	20	10	30	5	5	5	5	100
35	1	2	2	3	2	3	2	3	3	2	3	3	10	10	10	20	30	5	5	5	5	100
36	1	5	3	3	5	3	4	4	4	4	3	3	10	15	10	10	15	10	10	10	10	100
37	1	5	4	5	2	4	4	4	2	4	4	4	20	10	10	10	10	10	10	10	10	100
38	1	5	4	5	2	4	4	4	2	4	4	4	15	10	20	10	15	5	5	5	15	100
39	1	4	4	2	4	3	2	4	3	4	4	4	20	10	15	10	10	10	5	15	5	100
40	1	4	5	5	1	5	5	1	3	3	3	3	10	5	10	10	20	10	5	15	15	100
41	1	4	4	3	4	4	2	2	2	3	4	4	20	10	10	10	20	10	5	5	10	100
42	1	5	5	5	2	4	4	1	1	3	4	3	20	5	10	10	10	10	10	5	20	100
43	1	4	4	4	3	4	4	3	2	4	5	5	10	10	10	20	10	10	10	10	10	100
44	1	2	2	2	4	4	2	2	3	2	3	3	10	10	10	10	10	10	10	10	20	100
45	1	4	4	4	2	4	4	3	3	4	5	5	10	20	10	10	10	10	10	10	10	100
46	1	4	4	5	1	5	2	4	2	4	4	4	10	10	15	5	20	5	10	10	15	100
47	1	4	3	2	4	4	2	3	3	3	4	4	15	10	20	10	10	10	10	10	5	100
48	1	3	4	5	4	4	3	2	3	3	4	4	15	10	15	10	15	10	10	5	10	100
49	1	4	4	4	3	4	4	3	3	4	4	4	15	10	15	5	15	10	10	10	10	100
50	1	2	4	2	2	4	4	4	4	4	4	4	20	10	10	10	20	10	10	5	5	100

Respondent	Textile (1)/ Non- textile(2)	Qu.1	Qu.2	Qu.3	Qu.4	Qu.5	Qu.6	Qu.7	Qu.8	Qu.9	Qu.10	Qu.11	Quality	IT	Relationship	Agility	Cost saving	Reliability	Logistics	Network	Leadtime	Checksum
50	1	2	4	2	2	4	4	4	4	4	4	4	20	10	10	10	20	10	10	5	5	100
51	1	2	4	2	4	4	4	4	4	3	4	4	10	10	10	10	30	10	5	5	10	100
52	2	5	2	2	5	2	4	3	3	4	4	4	10	10	10	10	15	15	10	10	10	100
53	2	3	4	2	4	2	3	2	2	3	3	3	10	10	10	5	10	15	10	20	10	100
54	2	3	4	2	2	4	2	3	3	3	4	4	10	10	10	20	30	5	5	5	5	100
55	2	4	1	4	2	2	2	2	2	4	4	3	50	5	10	5	10	5	5	5	5	100
56	2	4	1	1	5	3	2	4	4	4	4	4	20	10	10	10	10	10	10	10	10	100
57	2	3	3	4	3	4	4	4	4	4	4	4	20	10	10	10	10	10	20	5	5	100
58	2	5	2	1	5	1	1	4	2	4	5	5	30	20	10	10	10	10	0	0	10	100
59	2	3	4	4	4	4	4	4	4	4	4	4	20	10	10	5	30	10	5	5	5	100
60	2	5	4	2	4	4	3	3	2	3	4	3	10	15	10	10	10	5	25	10	5	100
61	2	4	3	4	3	4	2	4	2	4	4	4	10	10	10	10	20	20	10	0	10	100
62	2	4	5	5	2	5	2	4	1	3	4	4	10	10	10	10	20	10	10	10	10	100
63	2	2	4	2	4	2	4	2	3	2	3	3	20	10	10	5	10	10	5	10	20	100
64	2	3	5	5	1	5	1	4	2	4	5	3	15	10	10	10	15	10	10	10	10	100
65	2	5	2	3	5	4	2	4	3	3	3	3	10	5	20	10	10	10	5	5	25	100
66	2	2	4	2	2	4	2	2	2	2	3	3	10	10	10	10	10	10	5	5	30	100
67	2	4	1	4	2	2	2	2	2	4	4	3	40	10	10	10	10	5	5	5	5	100
68	2	3	3	4	3	4	4	4	4	4	4	4	20	10	10	10	10	10	20	5	5	100
69	2	5	2	1	5	1	4	2	4	5	3	5	20	20	10	10	10	10	5	5	10	100
70	2	5	2	1	5	3	1	4	2	4	5	5	10	10	10	10	10	20	10	10	10	100
71	2	5	1	1	5	2	1	4	3	3	4	5	10	15	10	10	10	15	10	10	10	100
72	2	4	3	2	5	2	2	4	1	3	4	4	30	10	10	10	10	10	10	5	5	100
73	2	4	4	5	1	5	2	4	2	3	4	4	10	10	10	10	30	10	10	0	10	100
74	2	4	4	2	4	4	2	4	4	4	4	4	40	10	10	10	10	5	5	5	5	100
75	2	5	3	3	5	2	2	5	2	5	5	3	30	10	10	10	10	10	10	10	0	100
76	2	5	3	3	5	2	2	5	2	5	5	3	30	10	10	10	10	10	10	10	0	100
77	2	5	2	4	4	4	2	2	2	2	4	3	10	15	15	10	5	10	10	10	15	100
78	2	4	2	4	4	4	2	2	2	2	4	3	10	15	15	5	10	10	15	10	10	100

Appendix E Rescaled Data and calculations

Respondent	Textile (1)/ Non- textile(2)	Qu.1	Qu.2	Qu.3	Qu.4	Qu.5	Qu.6	Qu.7	Qu.8	Qu.9	Qu.10	Qu.11	Quality	IT	Relationship	Agility	Cost saving	Reliability	Logistics	Network	Leadtime	Checksum
1	1	1.41	5.00	5.00	1.41	3.18	5.00	5.00	5.00	3.18	3.18	3.18	12	10	10	11	10	11	12	12	12	100
2	1	1.41	5.00	5.00	1.00	5.00	5.00	1.00	1.00	5.00	5.00	5.00	20	15	10	10	10	10	10	5	10	100
3	1	3.18	3.18	5.00	1.41	5.00	5.00	1.41	1.00	3.18	3.18	3.18	14	8	12	10	11	12	8	10	15	100
4	1	3.18	3.18	5.00	1.41	5.00	2.52	1.41	3.18	2.52	3.18	5.00	30	2	14	9	15	10	7	3	10	100
5	1	5.00	1.41	5.00	5.00	1.00	5.00	1.41	5.00	5.00	3.18	1.41	20	11	13	20	10	10	10	5	1	100
6	1	1.41	5.00	5.00	1.00	5.00	5.00	1.00	2.52	3.18	3.18	1.41	11	2	30	15	15	10	5	2	10	100
7	1	5.00	3.18	5.00	1.41	3.18	1.41	3.18	3.18	3.18	3.18	3.18	30	15	10	10	10	10	5	2	8	100
8	1	5.00	1.00	1.41	5.00	1.00	5.00	1.00	5.00	5.00	1.41	2.52	40	1	20	15	2	15	3	1	3	100
9	1	5.00	5.00	5.00	2.52	2.52	2.52	1.41	2.52	2.52	3.18	3.18	10	10	20	10	2	25	10	10	3	100
10	1	5.00	2.52	5.00	1.41	3.18	2.52	2.52	1.41	2.52	3.18	2.52	8	3	25	10	13	30	5	3	3	100
11	1	5.00	5.00	5.00	1.00	2.52	2.52	2.52	1.41	2.52	3.18	2.52	15	3	15	15	15	15	10	5	7	100
12	1	5.00	3.18	5.00	1.41	3.18	3.18	1.41	1.41	1.41	3.18	1.41	19	3	30	15	13	10	5	3	2	100
13	1	5.00	3.18	2.52	1.41	2.52	1.41	1.41	2.52	1.41	3.18	2.52	30	15	10	5	19	15	3	1	2	100
14	1	1.41	5.00	5.00	2.52	5.00	1.00	5.00	1.41	3.18	3.18	5.00	40	3	5	5	20	5	10	1	11	100
15	1	3.18	5.00	5.00	1.41	3.18	3.18	1.00	1.41	3.18	3.18	3.18	20	15	20	15	20	5	5	0	0	100
16	1	3.18	1.41	3.18	1.41	1.41	1.41	3.18	3.18	3.18	5.00	5.00	10	15	10	10	20	10	10	5	10	100
17	1	3.18	1.41	5.00	1.41	1.41	3.18	2.52	2.52	3.18	5.00	5.00	10	15	10	10	20	10	10	5	10	100
18	1	3.18	3.18	5.00	3.18	3.18	3.18	1.41	1.41	3.18	5.00	5.00	10	15	10	10	20	10	10	5	10	100
19	1	3.18	3.18	5.00	2.52	3.18	2.52	1.41	1.00	1.00	5.00	3.18	10	10	10	10	25	10	15	5	5	100
20	1	3.18	3.18	3.18	2.52	3.18	3.18	1.41	1.41	1.41	5.00	3.18	10	15	10	10	10	15	15	0	15	100
21	1	5.00	3.18	5.00	1.41	5.00	3.18	1.41	1.41	1.41	3.18	5.00	10	15	10	10	10	15	15	0	15	100
22	1	5.00	5.00	5.00	2.52	5.00	2.52	2.52	2.52	2.52	3.18	2.52	10	10	10	10	20	10	10	10	10	100
23	1	3.18	3.18	5.00	1.41	5.00	3.18	1.41	1.41	3.18	3.18	5.00	10	10	10	10	25	10	10	5	10	100
24	1	1.41	1.41	5.00	1.00	3.18	3.18	5.00	1.00	3.18	3.18	1.41	30	0	15	15	10	25	0	0	5	100
25	1	3.18	3.18	5.00	1.41	5.00	3.18	1.41	1.41	3.18	3.18	3.18	15	15	10	10	15	10	10	5	10	100
26	1	3.18	3.18	5.00	2.52	3.18	3.18	1.41	2.52	3.18	5.00	5.00	10	10	10	10	15	10	10	10	15	100
27	1	5.00	1.41	2.52	5.00	1.41	1.41	3.18	1.41	3.18	3.18	2.52	20	0	20	15	20	10	5	0	10	100
28	1	5.00	2.52	5.00	2.52	2.52	1.41	3.18	3.18	3.18	3.18	3.18	10	10	20	10	10	10	10	10	10	100
29	1	3.18	1.41	3.18	1.41	2.52	1.41	3.18	3.18	3.18	5.00	3.18	25	15	10	15	15	10	5	0	5	100
30	1	3.18	3.18	5.00	1.41	5.00	3.18	1.41	1.41	3.18	3.18	3.18	20	10	15	15	15	10	0	0	0	100
31	1	3.18	3.18	3.18	1.41	1.41	1.41	3.18	2.52	3.18	3.18	3.18	15	15	10	10	20	5	15	5	5	100
32	1	3.18	5.00	5.00	2.52	5.00	3.18	1.41	1.41	2.52	3.18	3.18	15	15	10	15	15	10	0	0	10	100
33	1	5.00	3.18	5.00	1.41	1.41	3.18	3.18	3.18	3.18	3.18	3.18	10	10	20	10	20	5	5	0	20	100
34	1	1.41	3.18	1.41	1.41	3.18	1.41	1.41	1.41	1.41	1.41	1.41	10	10	20	10	30	5	5	5	5	100
35	1	1.41	1.41	2.52	1.41	2.52	1.41	2.52	2.52	1.41	2.52	2.52	10	10	10	20	30	5	5	5	5	100
36	1	5.00	2.52	2.52	5.00	2.52	3.18	3.18	3.18	3.18	2.52	2.52	10	15	10	10	15	10	10	10	10	100
37	1	5.00	3.18	5.00	1.41	3.18	3.18	3.18	1.41	3.18	3.18	3.18	20	10	10	10	10	10	10	10	10	100
38	1	5.00	3.18	5.00	1.41	3.18	3.18	3.18	1.41	3.18	3.18	3.18	15	10	20	10	15	5	5	5	15	100
39	1	3.18	3.18	1.41	3.18	2.52	1.41	3.18	2.52	3.18	3.18	3.18	20	10	15	10	10	10	5	15	5	100
40	1	3.18	5.00	5.00	1.00	5.00	5.00	1.00	2.52	2.52	2.52	2.52	10	5	10	10	20	10	5	15	15	100
41	1	3.18	3.18	2.52	3.18	3.18	1.41	1.41	1.41	2.52	3.18	3.18	20	10	10	10	20	10	5	5	10	100
42	1	5.00	5.00	5.00	1.41	3.18	3.18	1.00	1.00	2.52	3.18	2.52	20	5	10	10	10	10	10	5	20	100
43	1	3.18	3.18	3.18	2.52	3.18	3.18	2.52	1.41	3.18	5.00	5.00	10	10	10	20	10	10	10	10	10	100
44	1	1.41	1.41	1.41	3.18	3.18	1.41	1.41	2.52	1.41	2.52	2.52	10	10	10	10	10	10	10	10	20	100
45	1	3.18	3.18	3.18	1.41	3.18	3.18	2.52	2.52	3.18	5.00	5.00	10	20	10	10	10	10	10	10	10	100
46	1	3.18	3.18	5.00	1.00	5.00	1.41	3.18	1.41	3.18	3.18	3.18	10	10	15	5	20	5	10	10	15	100
47	1	3.18	2.52	1.41	3.18	3.18	1.41	2.52	2.52	2.52	3.18	3.18	15	10	20	10	10	10	10	10	5	100
48	1	2.52	3.18	5.00	3.18	3.18	2.52	1.41	2.52	2.52	3.18	3.18	15	10	15	10	15	10	10	5	10	100
49	1	3.18	3.18	3.18	2.52	3.18	3.18	2.52	2.52	3.18	3.18	3.18	15	10	15	5	15	10	10	10	10	100
50	1	1.41	3.18	1.41	1.41	3.18	3.18	3.18	3.18	3.18	3.18	3.18	20	10	10	10	20	10	10	5	5	100

Respondent	Textile (1)/ Non- textile(2)	Qu.1	Qu.2	Qu.3	Qu.4	Qu.5	Qu.6	Qu.7	Qu.8	Qu.9	Qu.10	Qu.11	Quality	IT	Relationship	Agility	Cost saving	Reliability	Logistics	Network	Leadtime	Checksum
51	1	1.41	3.18	1.41	3.18	3.18	3.18	3.18	3.18	2.52	3.18	3.18	10	10	10	10	30	10	5	5	10	100
52	2	5.00	1.41	1.41	5.00	1.41	3.18	2.52	2.52	3.18	3.18	3.18	10	10	10	10	15	15	10	10	10	100
53	2	2.52	3.18	1.41	3.18	1.41	2.52	1.41	1.41	2.52	2.52	2.52	10	10	10	5	10	15	10	20	10	100
54	2	2.52	3.18	1.41	1.41	3.18	1.41	2.52	2.52	2.52	3.18	3.18	10	10	10	20	30	5	5	5	5	100
55	2	3.18	1.00	3.18	1.41	1.41	1.41	1.41	1.41	3.18	3.18	2.52	50	5	10	5	10	5	5	5	5	100
56	2	3.18	1.00	1.00	5.00	2.52	1.41	3.18	3.18	3.18	3.18	3.18	20	10	10	10	10	10	10	10	10	100
57	2	2.52	2.52	3.18	2.52	3.18	3.18	3.18	3.18	3.18	3.18	3.18	20	10	10	10	10	10	20	5	5	100
58	2	5.00	1.41	1.00	5.00	1.00	1.00	3.18	1.41	3.18	5.00	5.00	30	20	10	10	10	10	0	0	10	100
59	2	2.52	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	20	10	10	5	30	10	5	5	5	100
60	2	5.00	3.18	1.41	3.18	3.18	2.52	2.52	1.41	2.52	3.18	2.52	10	15	10	10	10	5	25	10	5	100
61	2	3.18	2.52	3.18	2.52	3.18	1.41	3.18	1.41	3.18	3.18	3.18	10	10	10	10	20	20	10	0	10	100
62	2	3.18	5.00	5.00	1.41	5.00	1.41	3.18	1.00	2.52	3.18	3.18	10	10	10	10	20	10	10	10	10	100
63	2	1.41	3.18	1.41	3.18	1.41	3.18	1.41	2.52	1.41	2.52	2.52	20	10	10	5	10	10	5	10	20	100
64	2	2.52	5.00	5.00	1.00	5.00	1.00	3.18	1.41	3.18	5.00	2.52	15	10	10	10	15	10	10	10	10	100
65	2	5.00	1.41	2.52	5.00	3.18	1.41	3.18	2.52	2.52	2.52	2.52	10	5	20	10	10	10	5	5	25	100
66	2	1.41	3.18	1.41	1.41	3.18	1.41	1.41	1.41	1.41	2.52	2.52	10	10	10	10	10	10	5	5	30	100
67	2	3.18	1.00	3.18	1.41	1.41	1.41	1.41	1.41	3.18	3.18	2.52	40	10	10	10	10	5	5	5	5	100
68	2	2.52	2.52	3.18	2.52	3.18	3.18	3.18	3.18	3.18	3.18	3.18	20	10	10	10	10	10	20	5	5	100
69	2	5.00	1.41	1.00	5.00	1.00	3.18	1.41	3.18	5.00	2.52	5.00	20	20	10	10	10	10	5	5	10	100
70	2	5.00	1.41	1.00	5.00	2.52	1.00	3.18	1.41	3.18	5.00	5.00	10	10	10	10	10	20	10	10	10	100
71	2	5.00	1.00	1.00	5.00	1.41	1.00	3.18	2.52	2.52	3.18	5.00	10	15	10	10	10	15	10	10	10	100
72	2	3.18	2.52	1.41	5.00	1.41	1.41	3.18	1.00	2.52	3.18	3.18	30	10	10	10	10	10	10	5	5	100
73	2	3.18	3.18	5.00	1.00	5.00	1.41	3.18	1.41	2.52	3.18	3.18	10	10	10	10	30	10	10	0	10	100
74	2	3.18	3.18	1.41	3.18	3.18	1.41	3.18	3.18	3.18	3.18	3.18	40	10	10	10	10	5	5	5	5	100
75	2	5.00	2.52	2.52	5.00	1.41	1.41	5.00	1.41	5.00	5.00	2.52	30	10	10	10	10	10	10	10	0	100
76	2	5.00	2.52	2.52	5.00	1.41	1.41	5.00	1.41	5.00	5.00	2.52	30	10	10	10	10	10	10	10	0	100
77	2	5.00	1.41	3.18	3.18	3.18	1.41	1.41	1.41	1.41	3.18	2.52	10	15	15	10	5	10	10	10	15	100
78	2	3.18	1.41	3.18	3.18	3.18	1.41	1.41	1.41	1.41	3.18	2.52	10	15	15	5	10	10	15	10	10	100
Mean		3.48	2.92	3.45	2.51	3.04	2.47	2.41	2.13	2.87	3.41	3.22	17.10	10.33	12.62	10.58	14.68	10.68	8.76	6.06	9.19	
Textile	51																					
Non-te	27																					
Mean	Textile	3.42	3.20	4.01	2.10	3.28	2.81	2.25	2.22	2.84	3.41	3.26	16.06	9.92	13.61	11.18	15.49	10.84	8.39	5.45	9.06	
Mean	Non-text	3.58	2.38	2.38	3.29	2.58	1.82	2.71	1.98	2.92	3.39	3.16	19.07	11.11	10.74	9.44	13.15	10.37	9.44	7.22	9.44	
Stdev	Textile	1.3051	1.167	1.377	1.117	1.194	1.166	1.08	1.03	0.85	0.88	1.06	7.822	4.711	5.459	3.41	6.23	4.835	3.34	4.16	4.96	
Stdev	Non-text	1.21	1.13	1.28	1.51	1.22	0.82	1.02	0.80	0.96	0.82	0.84	11.44	3.49	2.28	2.89	6.81	3.90	5.43	4.24	6.70	
Sp		1.2719	1.154	1.346	1.265	1.204	1.059	1.06	0.96	0.89	0.86	0.99	9.22	4.332	4.625	3.241	6.436	4.538	4.18	4.19	5.61	
t-statistic		-2.10	12.44	21.45	-16.57	10.27	16.44	-7.68	4.48	-1.56	0.42	1.76	-5.77	-4.85	10.95	9.44	6.42	1.84	-4.45	-7.47	-1.21	
p-value		0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.68	0.08	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.23	

Appendix F Analysis of Variance Report for all respondents

Analysis of Variance Report for all respondents

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Database

Response

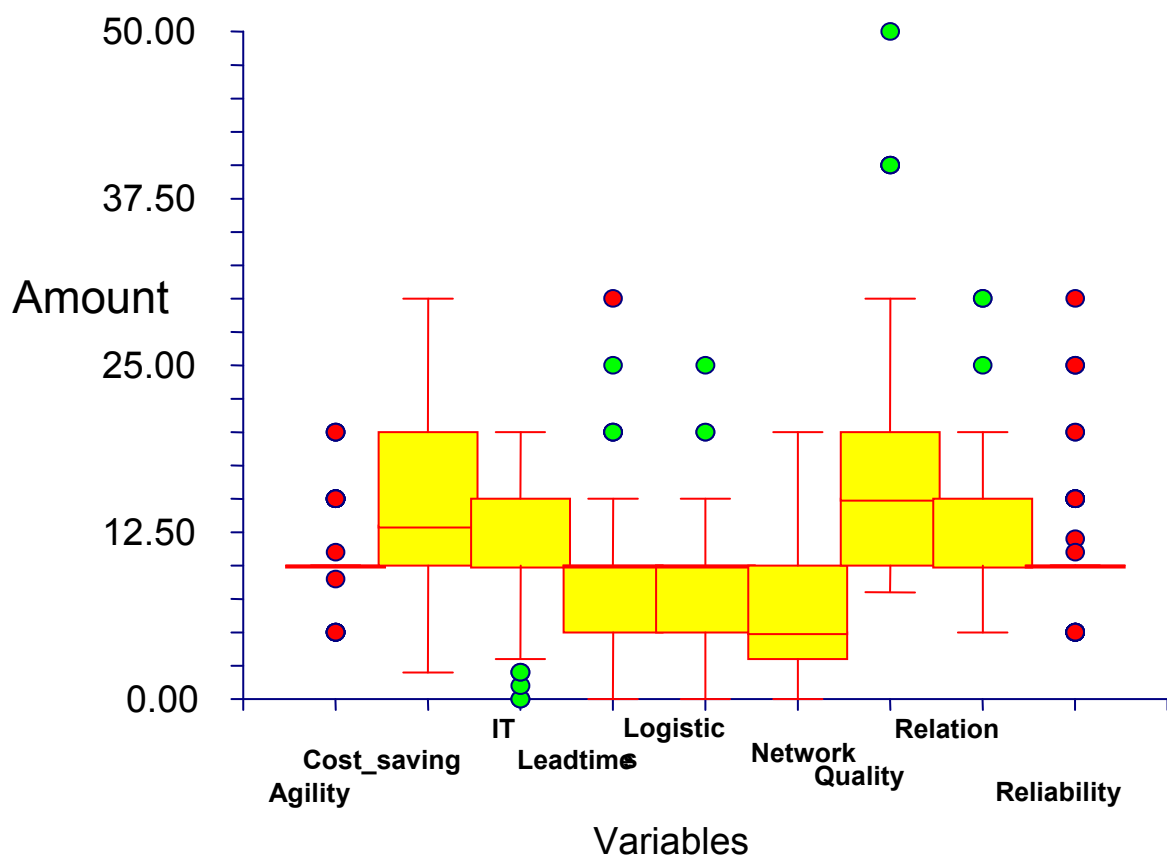
Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Reliability

Tests of Assumptions Section

Assumption	Test Value	Prob Level	Decision (0.05)
Skewness Normality of Residuals	11.7055	0.000000	Reject
Kurtosis Normality of Residuals	8.3926	0.000000	Reject
Omnibus Normality of Residuals	207.4543	0.000000	Reject
Modified-Levene Equal-Variance Test	11.2758	0.000000	Reject

Box Plot Section

Box Plot



Analysis of Variance Table

Source Term	DF	Sum of Squares (Alpha=0.05)	Mean Square	F-Ratio	Prob Level	Power
A (...)	8	6760.18	845.0225	28.37	0.000000*	1.000000
S(A)	693	20639.15	29.78233			
Total (Adjusted)	701	27399.33				
Total	702					

* Term significant at alpha = 0.05

Analysis of Variance Report for all respondents

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 Database
 Response
 Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Reliability

Kruskal-Wallis One-Way ANOVA on Ranks

Hypotheses

Ho: All medians are equal.

Ha: At least two medians are different.

Test Results

Method	DF	Chi-Square (H)	Prob Level	Decision(0.05)
Not Corrected for Ties	8	154.3082	0.000000	Reject Ho
Corrected for Ties	8	179.421	0.000000	Reject Ho
Number Sets of Ties	18			
Multiplicity Factor	4.842082E+07			

Group Detail

Group	Count	Sum of Ranks	Mean Rank	Z-Value	Median
Agility	78	27367.00	350.86	-0.0296	10
Cost_saving	78	36717.00	470.73	5.5075	13
IT	78	27425.00	351.60	0.0047	10
Leadtime	78	22389.50	287.04	-2.9773	10
Logistics	78	20937.00	268.42	-3.8375	10
Network	78	13719.50	175.89	-8.1118	5
Quality	78	38701.50	496.17	6.6828	15
Relationship	78	32523.00	416.96	3.0238	10
Reliability	78	26973.50	345.81	-0.2626	10

Analysis of Variance Report for all respondents

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 Response
 Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Reliability

Kruskal-Wallis Multiple-Comparison Z-Value Test

Variable	Agility	Cost_saving	IT	Leadtime	Logistics
Agility	0.0000	3.9805	0.0247	2.1190	2.7374
Cost_saving	3.9805	0.0000	3.9558	6.0995	6.7179
IT	0.0247	3.9558	0.0000	2.1437	2.7621
Leadtime	2.1190	6.0995	2.1437	0.0000	0.6184
Logistics	2.7374	6.7179	2.7621	0.6184	0.0000
Network	5.8100	9.7905	5.8347	3.6910	3.0726
Quality	4.8253	0.8448	4.8006	6.9443	7.5627
Relationship	2.1950	1.7855	2.1703	4.3140	4.9324
Reliability	0.1675	4.1480	0.1922	1.9515	2.5699

Regular Test: Medians significantly different if z-value > 1.9600

Bonferroni Test: Medians significantly different if z-value > 3.1970

Analysis of Variance Report for all respondents

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Database

Respons

Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Reliability

Kruskal-Wallis Multiple-Comparison Z-Value Test

Variable	Network	Quality	Relationship	Reliability
Agility	5.8100	4.8253	2.1950	0.1675
Cost_saving	9.7905	0.8448	1.7855	4.1480
IT	5.8347	4.8006	2.1703	0.1922
Leadtime	3.6910	6.9443	4.3140	1.9515
Logistics	3.0726	7.5627	4.9324	2.5699
Network	0.0000	10.6353	8.0050	5.6425
Quality	10.6353	0.0000	2.6303	4.9928
Relationship	8.0050	2.6303	0.0000	2.3625
Reliability	5.6425	4.9928	2.3625	0.0000

Regular Test: Medians significantly different if z-value > 1.9600

Bonferroni Test: Medians significantly different if z-value > 3.1970

Appendix G Correspondence Analysis Report

Correspondence Analysis Report

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Database

Variables C1 to C5

Raw Data Section

	C1	C2	C3	C4	C5	Total
Row 1	0	12	7	32	27	78
Row 2	5	15	10	35	13	78
Row 3	5	15	8	15	35	78
Row 4	8	29	13	14	14	78
Row 5	4	14	10	34	16	78
Row 6	5	29	9	28	7	78
Row 7	6	27	12	28	5	78
Row 8	7	33	20	15	3	78
Row 9	1	11	20	40	6	78
Row 10	0	2	9	52	15	78
Row 11	0	5	23	35	15	78
Total	41	192	141	328	156	858

Eigenvalue Section

Factor No.	Eigenvalue	Individual Percent	Cumulative Percent	Bar Chart
1	0.143945	55.70	55.70	
2	0.085139	32.94	88.64	
3	0.025056	9.69	98.33	
4	0.004307	1.67	100.00	
Total	0.258447			

Plot Detail Section for Columns

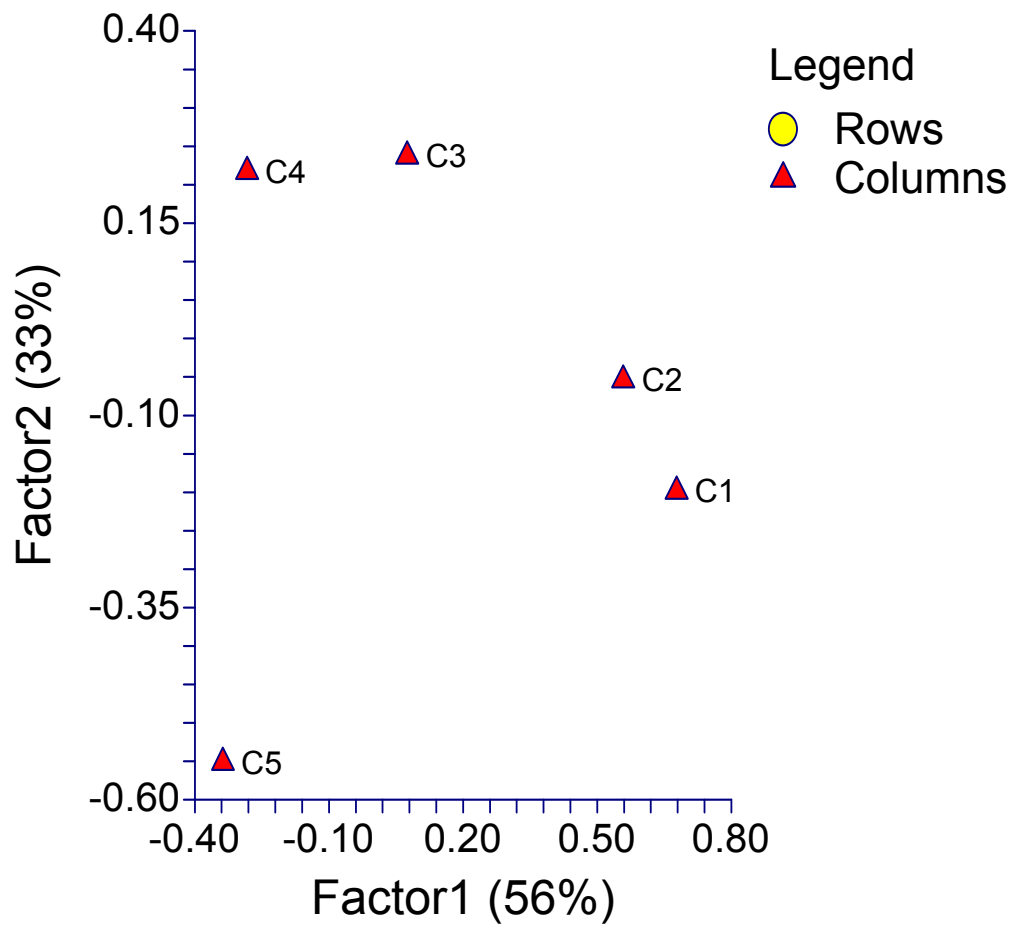
Name	Quality	Mass	Inertia	Factor	Axis1 COR	CTR	Factor	Axis2 COR	CTR
1 C1	0.864	0.048	0.107	0.677	0.795	0.152	-0.199	0.069	0.022
2 C2	0.969	0.224	0.281	0.558	0.959	0.485	-0.054	0.009	0.008
3 C3	0.361	0.164	0.109	0.075	0.033	0.006	0.237	0.328	0.108
4 C4	0.911	0.382	0.207	-0.283	0.574	0.213	0.217	0.337	0.212
5 C5	0.993	0.182	0.296	-0.337	0.270	0.144	-0.552	0.723	0.650

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Variables

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C1 to C5

Plots

Correspondence Plot



Appendix H Analysis of Variance report for textile companies

Analysis of Variance Report for Textile companies

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Database

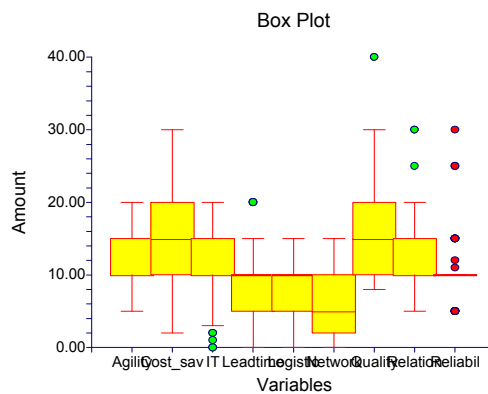
Response

Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Reliability

Tests of Assumptions Section

Assumption	Test Value	Prob Level	Decision (0.05)
Skewness Normality of Residuals	7.6743	0.000000	Reject
Kurtosis Normality of Residuals	5.5713	0.000000	Reject
Omnibus Normality of Residuals	89.9343	0.000000	Reject
Modified-Levene Equal-Variance Test	4.7686	0.000012	Reject

Box Plot Section



Analysis of Variance Table

Source Term	DF	Sum of Squares (Alpha=0.05)	Mean Square	F-Ratio	Prob Level	Power
A (...)	8	4846.157	605.7696	22.71	0.000000*	1.000000
S(A)	450	12003.18	26.67373			
Total (Adjusted)	458	16849.33				
Total	459					

* Term significant at alpha = 0.05

Analysis of Variance Report for textile companies

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Database

Response

Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Reliability

Kruskal-Wallis One-Way ANOVA on Ranks**Hypotheses**

Ho: All medians are equal.

Ha: At least two medians are different.

Test Results

Method	DF	Chi-Square (H)	Prob Level	Decision(0.05)
Not Corrected for Ties	8	122.4143	0.000000	Reject Ho
Corrected for Ties	8	136.3052	0.000000	Reject Ho
Number Sets of Ties	18			
Multiplicity Factor	9854934			

Group Detail

Group	Count	Sum of Ranks	Mean Rank	Z-Value	Median
Agility	51	12284.50	240.87	0.6209	10
Cost_saving	51	16665.00	326.76	5.5257	15
IT	51	11100.50	217.66	-0.7048	10
Leadtime	51	9623.00	188.69	-2.3592	10
Logistics	51	8498.00	166.63	-3.6188	10
Network	51	5254.00	103.02	-7.2511	5
Quality	51	16164.50	316.95	4.9653	15
Relationship	51	14591.00	286.10	3.2034	10
Reliability	51	11389.50	223.32	-0.3813	10

Means and Effects Section

Term	Count	Mean	Standard Error	Effect
All	459	11.11111		11.11111
A:				
Agility	51	11.17647	0.7231972	6.535948E-
02				
Cost_saving	51	15.4902	0.7231972	4.379085
IT	51	9.921569	0.7231972	-1.189543
Leadtime	51	9.058824	0.7231972	-2.052288
Logistics	51	8.392157	0.7231972	-2.718954
Network	51	5.45098	0.7231972	-5.660131
Quality	51	16.05882	0.7231972	4.947712
Relationship	51	13.60784	0.7231972	2.496732
Reliability	51	10.84314	0.7231972	-0.2679739

Analysis of Variance Report for textile companies

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Database

Response

Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Relia

bility

Scheffe's Multiple-Comparison Test

Response: Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Reliability
Term A:

Alpha=0.050 Error Term=S(A) DF=450 MSE=26.67373 Critical Value=3.9588

Group	Count	Mean	Different From Groups
Network	51	5.45098	IT, Reliability, Agility, Relationship Cost_saving, Quality
Logistics	51	8.392157	Relationship, Cost_saving, Quality
Leadtime	51	9.058824	Relationship, Cost_saving, Quality
IT	51	9.921569	Network, Cost_saving, Quality
Reliability	51	10.84314	Network, Cost_saving, Quality
Agility	51	11.17647	Network, Cost_saving, Quality
Relationship	51	13.60784	Network, Logistics, Leadtime
Cost_saving	51	15.4902	Network, Logistics, Leadtime, IT Reliability, Agility
Quality	51	16.05882	Network, Logistics, Leadtime, IT Reliability, Agility

Notes:

This report provides multiple comparison tests for all possible contrasts among the means. These contrasts may involve more groups than just each pair, so the method is much stricter than need be. The Tukey-Kramer method provides more accurate results when only pairwise comparisons are needed.

Kruskal-Wallis Multiple-Comparison Z-Value Test

Variable	Agility	Cost_saving	IT	Leadtime	Logistics
Agility	0.0000	3.4504	0.9326	2.0964	2.9825
Cost_saving	3.4504	0.0000	4.3830	5.5468	6.4329
IT	0.9326	4.3830	0.0000	1.1638	2.0499
Leadtime	2.0964	5.5468	1.1638	0.0000	0.8861
Logistics	2.9825	6.4329	2.0499	0.8861	0.0000
Network	5.5377	8.9881	4.6051	3.4413	2.5552
Quality	3.0562	0.3942	3.9888	5.1526	6.0387
Relationship	1.8168	1.6336	2.7494	3.9132	4.7993
Reliability	0.7050	4.1554	0.2276	1.3914	2.2776

Regular Test: Medians significantly different if z-value > 1.9600

Bonferroni Test: Medians significantly different if z-value > 3.1970

Analysis of Variance Report for textile companies

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Database

Response Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Reliability

Kruskal-Wallis Multiple-Comparison Z-Value Test

Variable	Network	Quality	Relationship	Reliability
Agility	5.5377	3.0562	1.8168	0.7050
Cost_saving	8.9881	0.3942	1.6336	4.1554
IT	4.6051	3.9888	2.7494	0.2276
Leadtime	3.4413	5.1526	3.9132	1.3914
Logistics	2.5552	6.0387	4.7993	2.2776
Network	0.0000	8.5939	7.3545	4.8328
Quality	8.5939	0.0000	1.2394	3.7611
Relationship	7.3545	1.2394	0.0000	2.5217
Reliability	4.8328	3.7611	2.5217	0.0000

Regular Test: Medians significantly different if z-value > 1.9600

Bonferroni Test: Medians significantly different if z-value > 3.1970

Appendix I Analysis of Variance for Non-Textile companies

Analysis of Variance Report for Non-Textile companies

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Database

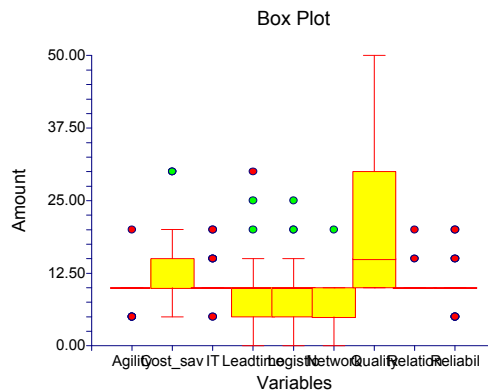
Response

Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Reliability

Tests of Assumptions Section

Assumption	Test Value	Prob Level	Decision (0.05)
Skewness Normality of Residuals	8.0055	0.000000	Reject
Kurtosis Normality of Residuals	5.8977	0.000000	Reject
Omnibus Normality of Residuals	98.8715	0.000000	Reject
Modified-Levene Equal-Variance Test	7.1039	0.000000	Reject

Box Plot Section



Analysis of Variance Table

Source Term	DF	Sum of Squares (Alpha=0.05)	Mean Square	F-Ratio	Prob Level	Power
A (...)	8	2475.926	309.4908	8.97	0.000000*	1.000000
S(A)	234	8074.074	34.50459			
Total (Adjusted)	242	10550				
Total	243					

* Term significant at alpha = 0.05

Analysis of Variance Report for Non-Textile companies

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Database

Response

Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Relia

bility

Kruskal-Wallis One-Way ANOVA on Ranks

Hypotheses

Ho: All medians are equal.

Ha: At least two medians are different.

Test Results

Method	DF	Chi-Square (H)	Prob Level	Decision(0.05)
Not Corrected for Ties	8	40.83014	0.000002	Reject Ho
Corrected for Ties	8	53.79533	0.000000	Reject Ho
Number Sets of Ties	8			
Multiplicity Factor	3458166			

Group Detail

Group	Count	Sum of Ranks	Mean Rank	Z-Value	Median
Agility	27	2952.50	109.35	-0.9917	10
Cost_saving	27	3937.50	145.83	1.8687	10
IT	27	3666.50	135.80	1.0817	10
Leadtime	27	2631.50	97.46	-1.9239	10
Logistics	27	2736.50	101.35	-1.6189	10
Network	27	2016.50	74.69	-3.7098	5
Quality	27	4812.00	178.22	4.4082	15
Relationship	27	3596.50	133.20	0.8784	10
Reliability	27	3296.50	122.09	0.0073	10

Means and Effects Section

Term	Count	Mean	Standard Error	Effect
All	243	11.11111		11.11111
A:				
Agility	27	9.444445	1.130463	-1.666667
Cost_saving	27	13.14815	1.130463	2.037037
IT	27	11.11111	1.130463	0
Leadtime	27	9.444445	1.130463	-1.666667
Logistics	27	9.444445	1.130463	-1.666667
Network	27	7.222222	1.130463	-3.888889
Quality	27	19.07407	1.130463	7.962963
Relationship	27	10.74074	1.130463	-0.3703704
Reliability	27	10.37037	1.130463	-0.7407407

Analysis of Variance Report for Non-Textile companies

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Database

Response

Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Relia

bility

Scheffe's Multiple-Comparison Test

Response: Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Reliability
Term A:

Alpha=0.050 Error Term=S(A) DF=234 MSE=34.50459 Critical Value=3.9781

Group	Count	Mean	Different From Groups
Network	27	7.222222	Quality
Agility	27	9.444445	Quality
Logistics	27	9.444445	Quality
Leadtime	27	9.444445	Quality
Reliability	27	10.37037	Quality
Relationship	27	10.74074	Quality
IT	27	11.11111	Quality
Cost_saving	27	13.14815	
Quality	27	19.07407	Network, Agility, Logistics, Leadtime Reliability, Relationship, IT

Notes:

This report provides multiple comparison tests for all possible contrasts among the means. These contrasts may involve more groups than just each pair, so the method is much stricter than need be. The Tukey-Kramer method provides more accurate results when only pairwise comparisons are needed.

Kruskal-Wallis Multiple-Comparison Z-Value Test

Variable	Agility	Cost_saving	IT	Leadtime	Logistics
Agility	0.0000	2.1888	1.5866	0.7133	0.4800
Cost_saving	2.1888	0.0000	0.6022	2.9022	2.6688
IT	1.5866	0.6022	0.0000	2.2999	2.0666
Leadtime	0.7133	2.9022	2.2999	0.0000	0.2333
Logistics	0.4800	2.6688	2.0666	0.2333	0.0000
Network	2.0800	4.2688	3.6666	1.3666	1.6000
Quality	4.1321	1.9433	2.5455	4.8454	4.6121
Relationship	1.4311	0.7578	0.1556	2.1444	1.9111
Reliability	0.7644	1.4244	0.8222	1.4777	1.2444

Regular Test: Medians significantly different if z-value > 1.9600

Bonferroni Test: Medians significantly different if z-value > 3.1970

Analysis of Variance Report for Non-Textile companies

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Database

Response

Agility, Cost_saving, IT, Leadtime, Logistics, Network, Quality, Relationship, Reliability

bility

Kruskal-Wallis Multiple-Comparison Z-Value Test

Variable	Network	Quality	Relationship	Reliability
Agility	2.0800	4.1321	1.4311	0.7644
Cost_saving	4.2688	1.9433	0.7578	1.4244
IT	3.6666	2.5455	0.1556	0.8222
Leadtime	1.3666	4.8454	2.1444	1.4777
Logistics	1.6000	4.6121	1.9111	1.2444
Network	0.0000	6.2121	3.5110	2.8444
Quality	6.2121	0.0000	2.7010	3.3677
Relationship	3.5110	2.7010	0.0000	0.6667
Reliability	2.8444	3.3677	0.6667	0.0000

Regular Test: Medians significantly different if z-value > 1.9600

Bonferroni Test: Medians significantly different if z-value > 3.1970