PARTNERS SELECTION AND PERFORMANCE MEASUREMENT IN SUPPLY CHAIN

A Survey of the Forestry, Manufacturing and Wholesale/Retail Industries in Sweden

Authors: Penekeh Pechu Tangiri and Vedat Zulfiu
Tutor: Dr. Fredrik Karlsson
Supervisor: Dr. Helena Forslund
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SUMMARY

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Authors: Penekeh Pechu Tangiri and Vedat Zulfii

Tutor: Dr. Fredrik Karlsson

Title: Partners Selection and Performance Measurement in Supply Chain

Background: Despite the existence of the concept of Supply Chain (SC) for decades, very little is known about how companies come together and which factors they take into consideration when selecting their business partners. Furthermore, when operating in the SC, companies focus more on efficiently utilizing company resources than effectively satisfying customers’ needs.

Purpose: The aim of this research is to test and scrutinize the factors that suppliers, manufacturers and distributors/retailers consider more important in the decision processes of choosing partners in a SC. It will investigate if Focal Companies (FC’s) in each of these categories (suppliers, manufacturers and retailers) take the same factors into consideration and identify metrics which companies focus on, in measuring the performance of a SC in terms of effectiveness and efficiency of SC processes.

Method: A webmail questionnaire was developed and administered to 525 companies within the forestry, manufacturing and retail industries in Sweden of which 101 were answered giving a response rate of 19.2%. The empirical findings have been analyzed in comparison with existing theories and conclusions reached.

Conclusions: In sum, the importance of any of these factors in any situation cannot be regarded as predetermined. This greatly depends on the position and the influence of the company in the SC. However, BME, IT, QS, E.CEO, CC and GL are the factors that different these three groups of actors, while EE and E.CEO are the two factors the distinguish FC’s from the other companies. Whereas in the chain, companies tend to focus
on managing their operating margins and working capital (efficiency) paying little attention to strategies for sustainable growth (effectiveness), which in most cases leads to ephemeral profitability.

**Keywords:** Supply Chain Management; Supply Chain; Value System Configurator; Partner Selection; Performance Measurement
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Penekeh Pechu Tangiri 
Vedat Zulfiu
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LIST OF ABBREVIATIONS

SCM-Supply Chain Management

SC-Supply Chain

IT-Information technology

VSC-Value System Configurator

FC-Focal Company

3PLPs-Third Party Logistics

SCOR- Supply Chain Operations Reference

SPSS-Statistical Package for the Social Science

DMG-Decision Making Group

MCDM-Multi-Criteria Decision Making

CEO- Chief Executive Officer

AHP-Analytical Hierarchy Process

V-SC-Virtual Supply Chain

BME – Business and Marketing Experience

BP – Business Performance

PC – Production Capacity

CC – Core Competence

Quality System

EE – Enterprise Environment
CS – Cultural Similarities

GL – Geographical Location

KPO – Knowledge of Partners’ Organization

E.CEO – Education and Experience of CEO

CCR – Corporate culture and Reputation

IT – IT capabilities
1. INTRODUCTION

The introduction chapter is intended to provide an overview of the subject and the main incentive of this thesis. It unwraps with a background of supply chain management, giving the reader insight to the study. The problem discussion, research questions, purpose and the significance of the study follow thereafter.

1.1. Background of Study

In recent years, business practitioners have been overwhelmed with new techniques/models and tools to increase competitiveness in a turbulent business environment and the integration of supply chain management (SCM) systems, amongst others, has been the subject of significant debate and discussion. Although the origin of supply chain (SC) can be traced as far back as the early 1980s (Cooper et al. 1997), it gained prominence in practical application during the last decade. This may be partly due to the fact that the creation of possibilities involves new technology and new information, which is now available.

As organizations seek to develop partnerships and more effective information links with trading partners, internal processes become interlinked and span the traditional boundaries of firms (Power, 2005). This thus, requires not only the integration of both the internal business processes but also the integration of processes and IT capabilities amongst partners.

Integration, which is a pre-requisite for SC and SCM, is a very complex concept that is difficult to oppose simply because its logical opposites are disintegration and sub-optimization, which nobody favors (Mouritsen et al. 2003), or at least is not encouraged for competitive purposes in the recent world of business. Studies (Cooper et al. 1997; Mouritsen et al. 2003) suggest that the SC is primarily an event that has been fabricated internally to compete for organizational power and prestige. Although the SC is not a discernible object in its own rights but a struggle over (Mouritsen et al. 2003), there is definitely a need for integration of business operations in the SC that goes beyond logistics (Cooper et al. 1997). Jonsson (2008) extended the concept of integration to incorporate partnership relation in
strategic sourcing while Fisher (1997) related the demand characteristics of the product to either functional or innovative.

In most industries today, it is not enough to optimize internal structure and infrastructure based on business strategy but to carefully link internal processes to external suppliers and customers in unique SC’s (Frohlich and Westbrook, 2001). This creates a network of interconnected companies sharing information for improved performance. Firms are, therefore, faced with the management of an extended enterprise, with shared destiny as a network of processes, relationships and technologies creating inter-dependence – SCM.

Many authors have put forward several definitions of SCM which will be discussed hereinafter, but we will, however, adopt the definition of Mentzer et al., (2001), who defined SCM as:

“The systematic, strategic coordination of the traditional business functions within a particular company and across businesses within the SC, for the purposes of improving the long-term performance of the individual companies and the SC as a whole”.

We choose this definition because it is comprehensive and gives a vivid picture of the SC and its processes. Diagrammatically, it can be illustrated as shown in figure 1.1.

Figure 1.1: The concept of SCM

Source: Croxton et al., (2001)
The question is who manages this network? In an attempt to response to this question, Andersson & Larsson (2006), use the term Value System Configurators (VSC) to describe the leading company in the network which has power and influence in the configuration of activities, due to its size, capacity and/or competence.

From the definition of SCM above, it is apparent that it involves an integrated process wherein a number of various business entities i.e. suppliers, manufacturers, distributors, retailers, etc. work together in an effort to acquire raw materials, process them into semi-finished or finished goods and make the final products available to final consumers. However, the scope of this research will be limited to a simple SC. That is a manufacturing company with its immediate supplier and retailer. It will examine the basis for the evaluation and selection of partners and factors that influence this process. Since it is generally considered that the focal company controls the SC (Lorenzoni and Baden-Fuller, 1995; Andersson and Larsson, 2006; Hanf and Pall, 2009; Belaya et al. 2009), this study will examine if these focal companies/Value system configurators (suppliers, manufacturers or distributors) consider the same factors as any other company.

Choosing the suitable partners and right SC strategy to implement SCM processes is generally believed to be able to improve SCM performance (Sun et al., 2009). The importance of each performance measure has varying importance in various industries and weighs have to be assigned to each performance measure according to its contribution to the performance of a given SC (Chan 2003). This piece of research will, therefore evaluate how performance of the chain is measured in terms of efficiency and effectiveness. It is designed such that both vertical and horizontal analysis can be made in the SC. Vertical analysis will involve grouping the companies into categories (suppliers, manufacturers and distributors) which is related to the first research question; and the horizontal analysis, which is related to the second question, will consider the performance of the chain as a whole.

For the sake of simplicity the existence of companies in more than one SC is being ignored and the survey is carried out from the perspective of the companies’ primary/most important SC as illustrated in figure 1.2.
1.2. **Problem Discussion**

1.2.1. **Supply Chain Partners Selection**

Nowadays, every industry is strongly recognizing that total management of the SC enhances the competitive edge of all actors operating therein (Zou et al. 2011). The core ideas of SCM are optimization and coordination of activities across a large number of independent profit centered entities through sharing information (Ashayeri, 2012). Many articles and books have been published for the methods and opinions about the application of SCM, although there is little consensus as to what a SC is (Zou et al. 2011). However, a simple SC should consist of at least a central company and its immediate supplier and retailer. Although, SCM
emphasizes cooperation and coordination of the activities that are required to deliver value to the customer, very little is known as to how the partners operating therein are selected (Ashayeri, 2012).

There is a wide range of research presenting both qualitative and quantitative methods of supplier selection (Zou et al. 2011); a handful of them on distributors’ selection (Wang and Kess, 2006) which has not been studied deeply and the theoretical methods developed by academics have not been fully applied in industry (Zou et al. 2011); and sparse for 3PLPs selection (Aguezzoul, 2010). Very few studies have examined partner selection in any detail, and where literature has examined the subject, this has generally been limited to a mere outline of the reasons for the establishment of a venture and/or how such a venture is then operated (Al-Khalifa and Peterson, 1999). There is no literature about combined use of SCOR modeling and the selection of partners in order to configure SC networks (Ashayeri, 2012).

Bochao, (2010) pointed out that the major problem in the construction of SC is faced in the selection of partners, which decides the success or failure of the entire SCM. Apparently, choosing the proper strategic partner is very critical for the entire SC efficiency (Ye and Huo, 2011) and it is a costly and time-consuming process to establish a successful partnership (Wang and Kess, 2006).

Since the SC is composed of all these members, an aggregation and reconciliation of these factors will be necessary to comprehend how these members/partners come together to build the chain/network wherein they operate.

1.2.2. Efficiency, Effectiveness and Performance Measurement in SCM

The pursuit of effective management of the SC has been of continuing interest to both practitioners and researchers in recent decades (Happek, 2005). Much of the effort to model the workings of SC’s has been motivated by the belief that its underlying concepts are so logical that benefits are bound to follow successful implementation (Martin and Petterson,
2009). Although there is no direct relationship of performance measure and no significance difference in companies with a mismatch of products and SC (Selldin and Olhager, 2007), there is an inescapable logic component that continues to prompt continuing and expanding research to measure performance progress in SCs in order to ensure that the benefits are realized (Martin and Petterson, 2009). Despite the huge investments made by companies to improve their SCs, Fisher, (1997) pointed out that the performance of most SCs has never been this worst with unprecedented costs rise.

Hervani et al. (2005) remarked that some of the existing literature does provide initial insights into broader SC performance measurement and particular attention has been paid to supplier performance evaluation and study of appropriate performance measures. Forslund (2007) argued that empirical studies proving the relationship between performance measurement and actual performance are scarce but there are indications that the way performance measurement is conducted has an impact on performance.

According to Lord Kelvin (1824-1907), “When you can measure what you are speaking about, and express it in numbers, you know something about it . . . [otherwise] your knowledge is of a meager and unsatisfactory kind…” (Mann et al., 2009); “if you cannot measure, then it does not exist” (Lebas, 1995). But it is however, interesting to note that 62% of the executives attending a SC seminar “thought that their performance measurement system measured the wrong things” (Morgan, 2003, p. 44 as stated in Mann et. al., 2009).

At first it seems logical to measure only the aggregate output of the individual companies in the SC. However, the ownership of chain members is distributed over several companies that must ensure their survival by profiting from membership (Martin and Petterson, 2009). The authors argue that research that focuses attention on the entire value chain’s profitability demonstrates that each member of the chain is inescapably linked to the chain’s other members and impacted by their performance. Thus, for performance to be effectively and efficiently measured, the same measurement instrument(s) should be used by all members of the SC to ensure a common standard. Nonetheless, the performance management process can be managed in many different ways and is often managed differently by customers and
suppliers, which may result in non-synchronized and inconsistent actions (Forslund and Jonsson, 2010).

The need for an effective and efficient SC has compelled companies to review, evaluate, and consider the adoption of SC measurement techniques. In SCM, performance measurement provides feedback about whether the strategic objectives have been met, and informs management about which areas need improvement (Martin and Petterson, 2009).

As, with all processes, performance measurement incurs cost and it is thus, imperative that the performance measurement system adds value, since managers at various levels spend substantial time in measuring performance, planning and implementing course corrections (Mann et. al., 2009). Consequently, SC members should not only be efficient but also effective.

Although most companies prioritize financial metrics, they suffer from certain weaknesses, such as: lack of customers focus; inwards looking; are lagging indicators; fail to include intangibles; and they do not help managers to be proactive (Gunasekaran and Kobu, 2007; Mann et. al., 2009; Martin and Petterson, 2009). According to Gunasekaran and Kobu (2007), performance measures and metrics are not just measuring the performance but are also embedded with politics, emotions and several other behavioral issues. This becomes more complex when performance measurement of SC functions in an organization is viewed to be the same as the performance measurement of the entire SC (Mann et. al., 2009).

After reviewing the research and on considering different perspectives taken by the researchers, it is evident that there is no universal performance measurement system that suits all organizations; or probable that a single measure cannot accurately capture the overall system performance in the SC (Mann et. al., 2009; Martin and Petterson, 2009).

Furthermore, although SCM has been widely practiced by numerous companies in recent years, reviewing the literature suggests that there are a limited number of articles that deal with performance measures and metrics in a SC environment (Gunasekaran and Kobu, 2007). As a result, there is a need for more comprehensive performance measures and metrics common to all companies in the SC with which performance at each stage of the
chain could be measured. Our study, therefore, will try to identify readily available measurements and metrics useful for the purpose of measuring performance in the SC efficiently and effectively.

1.3. Research Questions:

1. Which factors do suppliers, manufacturers and retailers consider more important in the decision process of choosing SC partners and why?

1.1. Do suppliers, manufacturers and distributors consider the same factors when choosing their SC partners?

1.2. Do value system configurators/focal companies (suppliers, manufacturer or retailers) consider the same factors as any other company in choosing SC partners?

2. Which are the metrics that companies in a direct SC focus on to measure performance in terms of efficiency and effectiveness?

1.4. Purpose

As mentioned earlier, very few studies have examined partner selection in any detail. Where literature has examined the subject, this has generally been limited to a mere outline of the factors that could influence partners’ selection and models used in the selection process. More so, literature has also examined the selection factors and process of these actors separately, rather than in the system, consisting of at least a central company (FC) and its immediate supplier and retailer. The first purpose of this research will be to:

- Test and scrutinize the factors that suppliers, manufacturers and distributors/retailers consider most important in the decision processes of choosing SC partners. It will
investigate if focal companies in each of these categories (suppliers, manufacturers and retailers) take the same factors into consideration.

Since the SC is viewed as a set of fragmented parts, each performing its own function and contributing directly and indirectly to the performance of all the other SC members as well as ultimate overall SC performance and the importance of each performance measure has varying importance and weighs have to be assigned to each performance measure according to its contribution to the performance of a given SC, the second purpose will be to:

- Identify metrics which companies focus on in measuring the performance of a direct SC in terms of effectiveness and efficiency of SC processes.

1.5. **Significance of Study**

The significance of this study will be:

- To test the proposed theories and provide an in-depth understanding of the factors that suppliers, manufacturers, retailers and focal companies use in the processes involved in choosing the suitable SC partners and;
- To improve literature on SC performance measurement based on both efficiency and effectiveness.
2. METHODOLOGY

This chapter presents the methodology used in this thesis. In this research engaged in testing existing theories, it employs the positivism stand with an inductive method with a quantitative approach. The chapter starts with scientific perspective of the thesis, continued with scientific method, research method, data collection, questionnaire used in the thesis, validity and reliability and wraps up with method of analysis used by the authors.

2.1. Scientific Perspective

2.1.1. Positivism

Positivism is the oldest and the most widely used approach (Neuman, 2003). It is an epistemological position that advocates the application of the methods of natural sciences to the study of social reality and beyond (Bryman and Bell, 2007).

According to positivists, in order to create value, theory has to be testable, otherwise it will lose its value – theory which cannot be investigated or measured has no value. Positivist researchers prefer precise quantitative data and often use experiments, survey and statistics to seek rigorous, exact measures and objective research, and they test hypothesis by carefully analyzing numbers from the measures (Neuman, 2003). Positivism is portrayed as the view that all true knowledge is scientific and consequently, things are measurable.

Positivism sees social science as an organized method for combining deductive logic with precise empirical observations of individual behaviors, in order to discover and confirm a set of probabilistic causal laws that can be used to predict general patterns of human activity (Neuman, 2003). It relates to the philosophical position of the natural scientist, which thus, entails working with an observable social reality and the end product can be law-like generalizations similar to those in the physical and natural sciences (Saunders et al. 2009).

According to Bryman and Bell, (2007) positivism is also taken to entail the following principles:
• Phenomenalism Only phenomena and hence knowledge confirmed by the senses can genuinely be warranted as knowledge (principle of);

• The purpose of theory is to generate hypotheses that can be tested and that will thereby allow explanations of laws to be assessed (the principle of deductivism);

• Knowledge is arrived at through the gathering of facts that provide the basis for laws (the principle of inductivism);

• Science must be conducted in a way that is value free (that is, objective);

• There is clear distinction between scientific statements and normative statements and a belief that the former are the true domain scientist.

2.1.2. Hermeneutics

The philosophy of hermeneutics is fundamentally concerned with matters of text and interpretation (Prasad, 2005). Texts as regarded in this tradition could be advertising campaigns (as in the Sand Castles Advertisement, the Safety Advertisement and the Natural-Source-of-Energy Advertisement, Philips and Brown, 1993); letters (as in letters of CEOs to shareholders in the oil industry, Prasad and Mir, 2002), electronic mails, agendas of meetings, instructions, etc.

The initial motive of this tradition was to interpret the so-called difficult texts – texts that could not be easily understood by everyone. Consequently, it developed through philology, theology and jurisprudence, (Prasad, 2005).

Although some texts may look obvious, like an agenda of a meeting or a simple advert, Friedrich Schleiermacher argued that no text is simple or obvious; any piece of text does not lie isolated but has some social, cultural and historical background related to the author(s) of the texts.

Consequently, in order to understand such a piece of text, this socio-historical background has to be explored. This is what Prasad refers to as the hermeneutics circle. – “the part can only be understood from the whole and ‘the whole’ from the collection of the ‘individual parts” (Prasad, 2005). She notes that the crucial notion within hermeneutics is that of the
subtexts, or the text underneath the surface-text, which constitutes the ‘real’ or more important text.

2.1.3. **Scientific Perspective of Thesis**

Considering the fact that the research design is based on existing theories, the authors employ positivism. It starts with the theory and literature review on the topics of SC, SC Management, Value System configuration, Business Performance etc. Thereafter, the authors answer the research questions based on both literature and collected data from questionnaire.

2.2. **Scientific Method**

According to Ghauri and Gronhaug (2010), there are basically two ways of establishing what is true or false and to draw conclusions – induction or deduction.

2.2.1. **Inductive Method**

Generally, through induction, conclusions from research empirical observations are drawn. In this method the process goes from observations → findings → theory building (Bryman and Bell, 2007). These authors pointed out that the findings are incorporated back into existing knowledge to improve theories. Consequently, theory is the outcome of research and inductive reasoning works from specific observations to broader generalizations and concepts. This type of research is often associated with the qualitative type of research which goes from assumptions to conclusions (Ghauri and Gronhaug, 2010); and the result of the analysis and conclusion would be the formulation of the theory, (Neuman, 2003; Ghauri and Gronhaug, 2010).

2.2.2. **Deductive Method**

In general, deductive method starts with a general theory and drives to a more specific conclusion. Deductive theory represents the commonest view of the nature of the relationship between theory and research (Bell and Bryman, 2007). Ghauri and Gronhaug,
(2010) note that this type of research is often associated with the quantitative type of research.

According to Saunders et al. (2009), the main differences between deductive and inductive approaches are summarized as shown in table 2.1 below.

Table 2.1: Differences between Inductive and Deductive Methods

<table>
<thead>
<tr>
<th>Deduction emphasis</th>
<th>Induction emphasis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scientific principles</strong></td>
<td>Gaining an understating of the meanings humans attach to events</td>
</tr>
<tr>
<td><strong>Moving from theory to data</strong></td>
<td>A close understanding of the research context</td>
</tr>
<tr>
<td><strong>The need to explain causal relationships between variables</strong></td>
<td>The collection of qualitative data</td>
</tr>
<tr>
<td><strong>The collection of quantitative data</strong></td>
<td>A more flexible structure to permit changes of research emphasis as the research progresses</td>
</tr>
<tr>
<td><strong>The application of controls to ensure validity of data</strong></td>
<td>A realization that the researcher is part of the research process</td>
</tr>
<tr>
<td><strong>The operationalization of concepts to ensure clarity of definition</strong></td>
<td>Less concern with the need to generalize</td>
</tr>
<tr>
<td><strong>A highly structured approach</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Researcher independence of what is being researched</strong></td>
<td></td>
</tr>
<tr>
<td><strong>The necessity to select samples of sufficient size in order to generalize conclusions</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Saunders et al, (2009)
2.2.3. **Scientific Method of the Thesis**

The authors used a deductive approach as it starts with a review of the relevant theory related to the research questions, collection of data from using questionnaire, and subsequently testing the theory with empirical findings to drive to specific conclusions.

2.3. **Research Method**

2.3.1. **Qualitative Method**

Qualitative research method is a research style based at exploring issues, understanding phenomena mostly about people and their cultures. The qualitative researcher begins data gathering with a general topic and notions of what will be relevant to the topic in question (Neuman, 2003). The process of qualitative research involves emerging questions and procedures, data typically collected in the participant’s setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data (Creswell 2009).

According to Bryman and Bell (2007), qualitative research tends to be concerned with words than numbers, but three further features are particularly noteworthy:

- An inductive view of the relationship between theory and research, whereby the former is generated out of the latter;
- An epistemological position described as interpretivist, meaning that, in contrast to the adoption of a natural scientific model in quantitative research, the stress is on the understanding of the social world through an examination of the interpretation of that world by its participant and
- An ontological position described as constructionist, which implies that social properties are outcomes of the interactions between individual, rather than phenomena “out there” and separate from those involved in its construction.
In qualitative research data collection and analysis are often conducted simultaneously in an interactive way where collected data are analyzed, initiating new questions, and initiating further data collection, (Ghauri and Gronhaug, 2010). Thus, as more data are collected and analyzed the problem becomes gradually clarified and theory emerges.

**2.3.2. Quantitative Method**

Quantitative method relies less on interviews and case studies, but focuses on the collection and analysis of numerical data. Quantitative research can be construed as a research strategy that emphasizes quantification in the collection and analysis of data (Bryman and Bell, 2007). According to these authors, it:

- Entails a deductive approach to the relationship between theory and research, in which the accent is placed on the testing of theories;
- Has incorporated the practices and norms of the natural scientific model and of positivism in particular and;
- Embodies a view of social reality as an external, objective reality.

**2.3.3. Mixed Method**

Mixed method research resides in the middle of this continuum (qualitative and quantitative method) because it incorporates elements of both qualitative and quantitative approaches, (John Creswell 2009). As a result, it involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing of both approaches in a study. Some characteristics of these three methods are shown in table 2.2.
### Table 2.2: Quantitative, Mixed and Qualitative Methods

<table>
<thead>
<tr>
<th>Quantitative Method</th>
<th>Mixed Method</th>
<th>Qualitative Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pre-determined</td>
<td>• Both pre-determined and emerging methods</td>
<td>• Emerging methods</td>
</tr>
<tr>
<td>• Instrument based questions</td>
<td>• Both open-and closed-ended questions</td>
<td>• Open-ended questions</td>
</tr>
<tr>
<td>• Performance data, attitude data, observational data</td>
<td>• Multiple forms of data drawing on all possibilities</td>
<td>• Interview data, observation data, document data, and audio-visual data</td>
</tr>
<tr>
<td>• Statistical analysis</td>
<td>• Statistical and text analysis</td>
<td>• Text and image analysis</td>
</tr>
<tr>
<td>• Statistical interpretations</td>
<td>• Across databases interpretation</td>
<td>• Themes, patterns interpretation</td>
</tr>
</tbody>
</table>

Source: Creswell, 2009

#### 2.3.4. Research Method of Thesis

This thesis relies less on interviews and case studies, but focuses on the collection and analysis of numerical data. Thus, the authors adopted quantitative method of research wherein numeric statistical data employing closed ended questionnaires was used.

#### 2.4. Data Collection

Empirical research can collect data from either of two types of sources, primary or secondary, and sometimes both. However, primary data is considered more important because it is collected for the purpose of the research and will be best suited.

##### 2.4.1. Primary Data

The importance of primary data in a piece of research cannot be overemphasized. Primary data are original data collected by researchers for the research problem at hand (Ghauri and Gronhaug, 2010). According to these authors, there are several options for collecting...
primary data, which can be classified into four groups: observations, experiments, surveys (questionnaires) and interviews.

The observations option does not only find out what people say or think they do, but what they actually do. Observation as a data collection tool entails listening and watching other people’s behavior in a way that allows some type of learning and analytical interpretation (Ghauri and Gronhaug, 2010).

Experiments study causal links; whether a change in one independent variable produces a change in another dependent variable (Hakim, 2000). According to Sanders et al, (2009) experiments, often including those in disciplines closely associated with business and management such as organizational psychology, are conducted in laboratories rather than in the field.

Interviews option requires the researcher to know the respondent, his background, values, and expectations, in order to be able to proceed efficiently and without any disturbances (Ghauri and Gronhaug, 2010).

A survey can either be exploratory or descriptive. Descriptive research is suitable when the research has a clear and structured. This type of research design requires that the researcher has a great deal of knowledge about the topic under investigation (Churchill and Iacobucci 2006). On the other hand, exploratory designs are intended to help gain basic knowledge within a problem area used when the purpose is hard to distinguish and/or the choice and use of models or existing theories are unclear.

Surveys method necessitates that data should be collected by communicating (e.g. personal interviews, telephone interviews and self-completion questionnaire, (Fowler, 2002; Saunders et al. 2009) with respondent. According to Babbie, (2004) this method is probably superior in social sciences for gathering primary data from population too large to be observed directly.
2.4.2. Secondary Data

Secondary data are information collected by others for purposes that can be different from ours, (Ghauri and Gronhaug, 2010). According to these authors: secondary data can help researchers in the following manner:

- Answering research questions or solving some or all of the research problems;
- Helping in problem formulation and/or devising more concrete and focused research questions;
- Deciding on the appropriateness of a certain research method or suggesting better research methods for a particular problem;
- Providing benchmarking measures and other findings that can be compared later on with the results of the study at hand.

2.4.3. Data Collection of Thesis

A descriptive survey research was used as research design due to the fact that the purpose was clear and structured. A survey questionnaire (appendix 1) with 15 questions was developed based on the literature review. Primary data was used in the thesis. Primary data was obtained through self-administered questionnaires collected during April and May within three weeks. The questionnaire covers supplier, manufacturers and distributors in the SC.

2.5. Questionnaire Design

Questionnaire construction is more an art than a science (Churchill and Iacobucci, 2006). According to Bourque and Clark, (1994), as stated Saunders et al, (2009), when designing individual questions researchers do one of three things:

- Adopt questions used in other questionnaire;
- Adapt questions used in other questionnaire;
Develop their own questions.

Generally, most types of questionnaire include a combination of open questions (the case when respondents are allowed to give answers in their own way) and closed question (when respondent has some alternatives and should choose one or more of them), (Saunders et al 2009; Bryman and Bell, 2007).

Thus, there are six types of closed questions (Saunders et al 2009):

- List: where the respondent is offered a list of items, any of which may be selected;
- Category: where only response can be selected from a given set of categories;
- Ranking: where the respondent is asked to place something in order;
- Rating: used to collect opinion data;
- Quantity: to which the response is a number giving the amount;
- Matrix, where responses to two or more questions can be recorded using the same grid.

### 2.5.1. Self-completion Questionnaire

Generally there are two main types of questionnaires: self-administrated questionnaires and interviewer-administered (Saunders et al 2009). As shown in the figure 2.1, these types of questionnaires can be completed in different ways. Authors have chosen the first type of questionnaire- self-administrated questionnaire because of the following advantages: fitting with the purpose of this thesis, quicker to administer, convenience for respondent etc.
According to Bell and Brymann, (2007), with a self-completion questionnaire, respondents answer questions by completing the questionnaire themselves. Such questionnaires are administrated electronically using the internet, posted to respondents who return them by post after completion, or delivered by hand to each respondent and collected later. The authors note that the most economical method of collecting data is by electronic mails, although there are some weaknesses as compiled in table 2.3.

Table 2.3: Advantages and Disadvantages of self-completion method

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheaper to administer</td>
<td>Cannot prompt</td>
</tr>
<tr>
<td>Quicker to administer</td>
<td>Difficulty of asking other kinds of question</td>
</tr>
<tr>
<td>Absence of interviewer effects</td>
<td>Difficult to ask a lot of questions</td>
</tr>
<tr>
<td>No interviewer variability</td>
<td>Greater risk of missing data</td>
</tr>
<tr>
<td>Convenience for respondent</td>
<td>Lower response rates</td>
</tr>
</tbody>
</table>

Source: Compiled from Bryman and Bell, (2007)
2.5.2. Questionnaire Design for the Thesis

In order to increase the respond rate, the authors used list, category, rating and matrix form of closed questions, making the questions as precise as possible. To ensure that the survey questionnaire operates and functions well as recommended by Bryman and Bell (2007), the authors reviewed the questionnaire several times with both the tutor and the supervisor and perform a pre-test with their course-mates and lecturers of the logistics department which led to the adjustment of wordings and structure. Most questions used a six-point Likert scale for SC practices adapted from Keller et al. (2002). A six-point (rather than a five or seven-point) Likert scale was used to ensure that the respondent made an active choice.

All companies were contacted by phone for four weeks and the top management (General Manager, SC, Logistics, Purchasing, Sales/Marketing managers) were considered appropriate respondents because at least one of these positions exists in almost every company. E-mail addresses were obtained from the company website or from the responsible individual by calling through the switchboard number obtained through (www.scb.se) or company website. Each respondent received a personal e-mail with the web-based questionnaire link making it convenient for the respondent.

Beside questions which constitute the main part of the questionnaire, the authors provided the respondent with the covering letter which provided information about them and explained the purpose of the survey as recommended by Dillman (2007), quoted from Saunders et al, (2009) so as create reliance and to achieve as high as a response rate as possible.

2.6. Population and Sample

According to Bryman and Bell (2007), the population refers to the total units under consideration from which a representative part called the sample is to be selected for investigation. Sampling techniques provide a range of methods that enable the researcher to reduce the amount of data you need to collect by considering only data from a sub-group rather than all possible cases or elements (Sanders et. al., 2009). They divide sampling
techniques into two groups: probability or representative sampling (simple random sample, systematic sample, stratified random sampling, multi-stage cluster sampling) and non-probability or judgemental sampling (quota, purposive, snowball, self-selection and convenience) (Bryman and Bell 2007).

2.6.1. Population and Sample of the Thesis

The authors selected the population from the list of forestry, manufacturing companies and wholesalers/retailers, with more than 50 employees, from Statistics Sweden (www.scb.se) using the Swedish standard industrial classification (SNI) codes. This ended up with a total number of 2021 companies. To make the sample representative, the authors used stratified random sampling, selected the appropriate proportion from each of the stratum (manufacturing, forestry and wholesaler/retailers). It should be noted that these three industries do not stand as suppliers, manufacturers and retailers. The respondents were asked to identify their companies as suppliers, manufacturers or retailers which were used in the analysis.

After the companies were contacted by phone (or when the questionnaire link was mailed to them) it was evident that a number of them were not suitable for the study. This is because some of them were online shops, or subsidiaries who needed authorization from the Mother Company, or classification was wrong (service companies or number of employees’ selection criteria did not match). These companies were categorized as not relevant for the study. The sample was then adjusted by removing the total number of not relevant companies. The selected industries, population, sample, together with information on adjusted sample can be seen in table 2.4. Although the forestry, manufacturing and retail industries in table 2.4 were not categorized as suppliers, manufacturers and retailers, there was a greater probability of these actors emerging from these industries. As such, the response rate is representative
Out of the 525 companies which were sampled, 101 responded giving a response rate of 19.2%.

Since 1986 when the first e-mail surveys were performed, the number of studies that use e-mail to collect data has been increasing over the past fifteen years but the average response rate to the surveys appears to be decreasing (Sheehan 2001). He examined influences on response rates to e-mail surveys over the past fifteen years and found out that on average out of the 31 studies reported a mean response rate of 36.83%, with a mean response rate of 27.5% in 1999 and 24.0% in 2000. He thus, concluded that as time progresses, it seems likely that response rates to e-mail surveys will continue to decrease. Kaplowitz et al. (2004), in addition, compared response rates of a web survey to a mail hard copy questionnaire and found out the response rate as follows: mail 31.5%, postcard and e-mail 29.7%, email and postcard (25.4%) and e-mail (20.7%). Consequently, a response rate 19.2%, though low, is acceptable for a web survey. The response rate of the 101 respondents is represented in table 2.5. The response with respect to the position of the respondents in the SC is depicted in table 2.6. The sub-manufacturers were not, however separated due to low rate of responses.

Table 2.4: Population and Sample Distribution

<table>
<thead>
<tr>
<th>Industries</th>
<th>Population</th>
<th>Sample</th>
<th>Not Relevant</th>
<th>Adjusted Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry and logging</td>
<td>14</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1047</td>
<td>314</td>
<td>36</td>
<td>278</td>
</tr>
<tr>
<td>Wholesale/Retailer</td>
<td>960</td>
<td>288</td>
<td>47</td>
<td>241</td>
</tr>
<tr>
<td>Total</td>
<td>2021</td>
<td>608</td>
<td>83</td>
<td>525</td>
</tr>
</tbody>
</table>

Source: Compile from Statistics Sweden (www.scb.se)
### Table 2.5: Population and Sample Distribution

<table>
<thead>
<tr>
<th>Position</th>
<th>Number of Responses</th>
<th>% Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppliers</td>
<td>18</td>
<td>17.8</td>
</tr>
<tr>
<td>Manufacturers</td>
<td>50</td>
<td>49.5</td>
</tr>
<tr>
<td>Wholesale/Retailer</td>
<td>33</td>
<td>32.7</td>
</tr>
<tr>
<td>Total</td>
<td>101</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Authors

### Table 2.6: Response Rate by position in SC

<table>
<thead>
<tr>
<th>Position</th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppliers</td>
<td>18</td>
<td>17.82</td>
</tr>
<tr>
<td>Manufacturers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>food products, beverages, tobacco products</td>
<td>9</td>
<td>8.91</td>
</tr>
<tr>
<td>wood products, furniture, paper and paper products</td>
<td>13</td>
<td>12.87</td>
</tr>
<tr>
<td>rubber and plastic products, coke, chemicals and refined petroleum products</td>
<td>5</td>
<td>4.95</td>
</tr>
<tr>
<td>machinery and equipment, motor vehicles, trailers and semi-trailers and other transport equipments</td>
<td>8</td>
<td>7.92</td>
</tr>
<tr>
<td>basic metals and metal products</td>
<td>9</td>
<td>8.91</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>5.94</td>
</tr>
<tr>
<td>Retailers</td>
<td>33</td>
<td>32.68</td>
</tr>
<tr>
<td>Total</td>
<td>101</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Compiled from questionnaire response
2.7. **Scientific Credibility**

2.7.1. **Validity**

Validity is concerned with whether the findings are really about what they appear to be about (Sanders et al., 2009). Validity means that research is capturing whatever it is supposed to capture (Cohen et al., 2007). Generally, two common kinds of validity can be identified with both qualitative and quantitative methods as well: internal and external validity. Internal validity refers to the extent to which the authors can infer that a casual relationship exists between two variables while external validity refers to what extent the findings can be generalized to particular persons, settings and times, as well as across types of persons, settings and times (Ghauri and Gronhaug, 2010). Often, when discussing the validity of a questionnaire, researchers refer to content validity (the extent to which the measurement device provides adequate coverage of the investigative subject), criterion-related validity (the ability of the measures/questions to make accurate predictions) and construct validity (the extent to which your measurement questions actually measure the presence of those constructs you intended them to measure) (Saunders et al. 2009; Ghauri and Gronhaug, 2010).

2.7.2. **Reliability**

Reliability refers to the extent to which data collection techniques or analysis procedures will yield consistent findings (Sanders et. al., 2009). According to Bryman and Bell (2007), there are three prominent factors involved when considering whether a measure is reliable:

- **Stability:** This consideration entails asking whether or not a measure is stable over time, so that the researchers can be confident that the results relating to that measure for a sample of respondents do not fluctuate.

- **Internal reliability:** This measures whether or not the indicators that make up the scale or index are consistent.
Inter observer consistency: When a great deal of subjective judgment is involved in such activities as the recording of observations or the translation of data into categories and where than one ‘observer’ is involved in such activities, there is the possibility that there is a lack of consistency in their decisions.

2.7.3. Validity and Reliability of the Thesis

Construct validity is believed to be the most complex and abstract type of validity especially in this type of study. In order to build the construct validity for the thesis the questionnaire items were drawn directly or indirectly from the literature reviewed. This was to ensure that it confirms to predicted correlations with other theoretical propositions. Factor analysis in SPSS was further used to confirm this validity. Kaiser (1974) as stated in Parsian and Dunning (2009) recommends accepting values of KMO ≥ 0.5. The KMO and Bartlett’s test yielded values of 0.459 for suppliers, 0.661 for manufacturers and 0.582 for distributors, which averagely is > 0.5. All these values are significant at 1% level of significance (Appendix 2). Considering the fact that there is a lack of research and empirical work in this area, these values are considered satisfactory and will act as a springboard for further studies. Content validity was ensure by reviewing the questionnaire with lecturers in the department, including the supervisor and tutor who are experts in the field. Question items which were not valid were either removed or rephrased as required. The questionnaire was also pre-tested with classmates in both the Supply Chain and Marketing programmes.

The respondents of the questionnaire were chosen from those who are closely related with the research area – SCM managers, logistics managers, purchase managers etc. Internal validity was guaranteed by the objectivity and neutrality of the authors in their approach. Regarding external validity, since the sample is not small the findings of this thesis can be generalized and use for further research purposes.

The reliability of this thesis is based on the fact that most indicators selected have been reviewed and tested in previous studies and the scale was adapted from the likert scale.
More so, to ensure inter-observer consistency the result of the survey was exported directly in an excel spreadsheet and open in SPSS where the analysis was carried out.

2.7.4 Assessing Non-Response Bias

Despite the low response rate obtained in this study, low response rates alone do not necessarily suggest response bias. A test of non-response bias is another way of increasing the reliability of a study. According to Krosnick (1999) and Dillman (1991) stated in Sax et al. (2003), when respondent characteristics are representative of non-respondents, low rates of return are not biasing. Non-response bias refers to a situation in which respondent who fail to return a questionnaire have opinions systematically different from those who return their surveys (Sax et al. 2003). Fraenkel and Wallen, 1993 distinguished two types of non-response bias: Total non-response which refers to individuals failing to return the survey at all and unit or item non-response bias which indicates that the survey was returned incomplete (Sax et al. 2003). Unit or item non-response bias could not be a problem in this research since the questionnaire could not be submitted without completing all items. As regard total non-response bias, it is customary to test for non-response bias by comparing the responses of those who responded to the first mailing of a questionnaire with those who responded to the second mailing. Those who return the second questionnaire are, in effect, a sample of non-respondents to the first and as such they are representative of that group. In this survey, respondents were called and the questionnaire link was sent immediately. Nevertheless, a reminder was sent twice and in both cases, a total of 28 responses were received. This group will be considered as non respondent since the questionnaire was anonymous.
In total, 8 variables out of 37 with statistically significant means between these two groups were identified as shown in table 2.7. However, in all these questions (appendix 1) respondents were asked to rate each of the issue on the scale of not at all important (1) to very important (6). Thus, a positive value indicates that more respondent saw the issue as important rather than an issue of non-response bias. Consequently, non-response bias in not a problem in this study and thus, providing a pre-requisite for validity.

### 2.8. Data Analysis

Parametric statistical tests can either be descriptive or inferential (Williman, 2011). He mentioned that while descriptive tests reveal how the values of a variable are distributed, inferential tests suggest or infer results from a sample in relation to a population. The number of variables in the analysis can also be used to distinguish three types of analyses: univariate analysis (one variable and uses descriptive tests), bivariate analysis (two variables in relation to each other) and multivariate analysis (more than two variables) (Bryman and Bell 2007; Williman, 2011).
2.8.1. Analysis Method of the Thesis

Considering the fact that the objective of this study is to investigate differences between groups (suppliers, manufacturer and retailers) on the basis of the attributes of the cases, indicating which factors each group prioritize in the selection of their partners, the most suitable statistical techniques that the authors used was multivariate data analysis employing Discriminant Analysis (DA) using SPSS. Descriptive statistics was also used for describing variables and performance in the SC.

Summary of Methodology Table

Table: 2.8: Summary of Methodology

<table>
<thead>
<tr>
<th>Methodology of the thesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific perspective</td>
</tr>
<tr>
<td>Scientific Method</td>
</tr>
<tr>
<td>Research Method</td>
</tr>
<tr>
<td>Survey</td>
</tr>
<tr>
<td>Data collection</td>
</tr>
<tr>
<td>Scientific credibility</td>
</tr>
<tr>
<td>Analysis method</td>
</tr>
</tbody>
</table>

Source: Authors
3. THEORETICAL FRAMEWORK

In order to answer the two research questions stated above, relevant literature is reviewed. Prior to that, literature on the definition and scope of SC and SCM; and the Focal Company or Value System Configurator is reviewed. Subsequently, each section is directly related to each research question. In this section, an attempt is made to provide theoretical answers to the research question.

3.1. Definition of Supply Chain (SC)

Various definitions of a SC have been offered in the past several years as the concept has gained popularity (Lummus et. al., 2001). Beamon, (1998) defines SC as “an integrated manufacturing process wherein raw materials are converted into final products, then delivered to customers”.

The Association of Operational Managers (APICS) describes the SC as:

1) the processes from the initial raw materials to the ultimate consumption of the finished products linking across supplier-user companies; and 2) the functions within the outside of the company that enable the value chain to make products and provide services to the customer, (Lummus et. al., 2001).

The Supply-Chain Council (1997) uses the definition of SC as:

“… a term that encompasses every effort involved in producing and delivering a final product, from the supplier’s supplier to the customer’s customer” (Lummus et. al., 2001).

Lummus and Vokurka, (1999) reviewed a number of definitions of SC and summarized the definition as follows:

“… all the activities involved in delivering a product from raw material through to the customer, including sourcing raw materials and parts, manufacturing and assembly,
warehousing and inventory tracking, order entry and order management, distribution across all channels, delivery to the customer, and the information systems necessary to monitor all of these activities”.

The SC can therefore, be seen as the link and inter-relationship of all the partners in the chain/network including departments within an organization and the external partners - suppliers, carriers, third-party companies, and information systems providers involved in making the final products available to the final consumer.

### 3.2. Supply Chain Management (SCM)

#### 3.2.1. Definition

Much confusion has occurred amongst SC researchers during the past two decades by the many SCM definitions that have been proposed in the literature (Stock and Boyer, 2009). However, although there is a variation in the definition of SCM, there seems to be a more common agreement across authors than it is with the definition of SC (Cooper and Ellram 1993; Mentzer et al., 2001). This multitude of definitions presents a source of confusion for both researchers and practitioners.

According to Cooper et al. (1997), new product development is perhaps the clearest example that distinguishes SCM from logistics since all aspects of business ideally should be involved (including marketing for the concept, research and development for the actual formulation, manufacturing and logistics for their respective capabilities, and finance for funding) otherwise SCM would have been considered as the extension of logistics across organizational boundaries.

Stock and Boyer, (2009) pointed out that without an inclusive or encompassing definition, it will be difficult for researchers to develop SC theory, define and test relationships between components of SCM, and develop a consistent stream of research that “builds” on what has gone before (at least in a comprehensive way). They built on other researches (e.g. Mentzer et al., 2001), by reviewing 173 definitions of SCM across a multiplicity of journals and
books principally focusing on common key concepts within each definition. A number of these definitions are compiled in appendix 3. For the purpose of this study, we adopt the definition of Mentzer et al. (2001) which takes into consideration all these aspects. They define SCM as:

“The systematic, strategic coordination of the traditional business functions within a particular company and across businesses within the SC, for the purposes of improving the long-term performance of the individual companies and the SC as a whole”.

Mentzer et al., (2001) classified SCM into three categories: a management philosophy, implementation of a management philosophy, and a set of management processes. As a philosophy, SCM takes a systems approach to viewing the SC as a single entity, rather than as a set of fragmented parts, each performing its own function and contributing directly and indirectly to the performance of all the other SC members as well as ultimate overall SC performance (Cooper and Ellram, 1993; Cooper et al. 1997; Mentzer et al. 2001).

Mentzer et al. (2001) argued that SCM as a set of activities to implement a management philosophy requires that firms must establish management practices (preferably activities) that permit them to act or behave consistently with the philosophy. In the same article, these authors regard SCM as a set of management processes. That is, management of the structured and measured set of activities designed to produce specific output for a particular customer or market. Therefore, to successfully implement SCM, firms within a SC must overcome their own functional silos and adopt a process approach and recognizing all the functions within a SC as key processes (Cooper et al. 1997).

3.2.2. Scope

The scope of SCM is functional and organizational (Cooper et al. 1997; Mentzer et al. 2001). Cooper et al. (1997) defined the scope of SCM in terms of the number of firms involved in the SC and the activities and functions involved. In the organizational scope, Mentzer et al. (2001) argued that SCM is not only concerned with the number of firms involved, but also with what kinds of inter-firm relationships are relevant to the participating
firms in the implementation and the process of SCM. They suggested that since process refers to the combination of a particular set of functions to get a specific output, all the traditional business functions should be included in the process of SCM.

Generally, the scope of SCM is influenced by: the number and types of businesses to integrate the SC network over which they are integrated and the aspects of general management to focus the integration upon (Cooper et al. 1997). According to these authors, structure is characterized by the number of suppliers or customers in each tier (vertical) and the number of tiers across which the process in integrated (horizontal).

![Figure 3.1: Direct SC](image)

![Figure 3.2: Extended Supply Chain](image)

![Figure 3.3: Ultimate Supply Chain](image)

Source: Mentzer et al. (2001)

Encompassed within the adopted definition of SCM, Mentzer et al. (2001) identified three degrees of SC complexity: direct SC (a company, a supplier, and a customer); extended SC (suppliers of the immediate supplier and customers of the immediate customer); and an ultimate SC (involving 3PLs, Market research firms and Financial providers) as shown in figures 3.1, 3.2 and 3.3 respectively. Given the potential for countless alternative SC
configurations, it is important to note that any one organization can be part of numerous SCs (Mentzer et al. 2001) and it becomes important for firm to identify the most critical chains and levels in each chain that will be managed and pursue the inter-organizational relationships needed to do so (Mejza and Wisner, 2001).

3.3. Value System Configurator (VSC) or Focal Company (FC)

In spite of the collaborative scenery which is presumed to exist in a SC or network, it seems apparent that such networks represent strictly coordinated systems. Configuring a SC or value system does not happen by itself but is a result of the influence of a VSC or FC (Andersson and Larsson, 2006). In SC network a central decision making authority, the FC has a business idea and is expected to design, manage and coordinates the other members in order to realize its strategic objectives (Hanf and Pall, 2009). In fact, the natural state for SC relationships does not appear to be one of symmetry and equilibrium but one within which exists the issue of power context (Belaya et al. 2009). Thus, SC network is a strategic network that is pyramidal hierarchically organized (Belaya et al. 2009), possessing a powerful FC (chain captain) situated at the downstream stage of the chain, coordinating the suppliers’ network and disposing over a centralized authority (Lorenzoni and Baden-Fuller, 1995) due to its size, capacity, competence and/or new concepts to fulfill the leading function in the chain (Andersson and Larsson, 2006; Belaya et al. 2009). The FC is thereby, in general, that firm that is identified by the consumers as being ‘responsible’ for the specific product or a producer brand (Hanf and Pall, 2009) while the other network actors are dependent on it (Andersson and Larsson, 2006; Hanf and Pall, 2009).

Helper, (1991), as stated in Belaya et al. (2009) pointed out that such factors as size differences in favor of the VSC as well as size differences between suppliers themselves, buyers’ and suppliers’ different areas of expertise and different switching costs contribute to the power inequalities within a SC network. Applied to economic context, power is defined as “the ability of one firm to influence the intentions and actions of another firm” (Emerson, 1962, pp. 31–41, stated in Belaya et al. 2009). In the SC network context, it reflects the fear of a network member of being punished if it fails to comply with the requirements of the FC.
(Belaya et al. (2009). Therefore, to have power and be a FC, the company in question must possess and control resources that are considered strategic for the chain. Belaya et al. (2009) outlined a series of powers that a company can have in order to have influence in the chain. They include: reward power depends on the ability of the power holder to offer rewards to others; expert power is derived from having skills or special knowledge in a specific subject; legitimate power stems from a legitimate right to influence and an obligation to accept this influence; referent power depends on an ability to be attractive to others and depends on the charisma and interpersonal skills of the power holder. It is therefore, imperative to have a comprehensive knowledge of power distribution among SC actors so as to properly apportion responsibility. However, Lorenzoni and Baden-Fuller (1995) pointed out that in partner selection not only the power, resource and technological fit is important, rather the similarity in management culture and decision making process.

Andersson and Larsson, (2006) argued that to turn into a VSC requires contacts with the final customer, an idea of current and future customer preferences, having an overview of the entire network and knowledge of the critical activities in the system. Consequently, the analytical task of managers will become more complex as they will not just examine the major competitor, but must examine the network of firms that relate to that competitor.

Working with suppliers often requires FC’s to make significant idiosyncratic investments to improve coordination between organizations and enhance the suppliers’ presence in the end market (Belaya et al. 2009). Owing to the fact that they will compete as a chain rather than individual companies, Hanf and Pall (2009) noted that, in this context it is a vital role of the FC to improve skills competencies of its suppliers and/or distributors and to make a system with synergy effects from the independent companies.

Lorenzoni and Baden Fuller (1995) posit that FC’s transfer knowledge to some of their suppliers and/or distributors or help them to acquire new competencies from other sources or involve their suppliers in the product design, contrast to the traditional supplier buyer relationship. These knowledge resources are transferred by using different organizational tools, such as training systems, exchange of human resources between FC and suppliers, and diffusion of information systems that force the suppliers to use new managerial tools for
design and communication (Hanf and Pall, 2009). Belaya et al. (2009), nonetheless, remarked that when FC’s make such investments, they are concerned about the possibility of a supplier/distributor terminating the relationship, which would result in an irrevocable loss; and the supplier’s/distributor’s use of specific assets as a hostage, which makes it difficult for them to regain the value of their investments, making an FC not only a power holder but also a power target. Thus, for this to work effectively there should be complete trust amongst members in the chain.

3.4. Supply Chain Partners Selection and Evaluation

Despite the fact that the concept of SC exists for over twenty years, partners and configuration selection process still is rather unstructured (Ashayeri et al. 2012). Partners’ evaluation and selection is the basis of SC strategic cooperative relations (Bochao, 2010). In order to increase value in any SC, a more comprehensive and integrative approach is required to select the right partners and establish the right configuration along the chain (Ashayeri, 2012). He used an intuitionistic fuzzy Choquet integral operator based approach to partners and configuration selection as shown in figure 3.4. In this approach, a decision making group (DMG) is set up to decide on the selection criteria. A market research is then conducted to evaluate companies that meet these criteria. It is important to establish the basis for the evaluation and selection of SC partners. Factors which can be used to determine the partner evaluation index and to establish SC partnerships are business performance, business structure and production capacity, quality systems and enterprise environments (Bochao, 2010). Agarwal et al. (2011) reviewed sixty articles from various journals and conference papers to find out the most prominent multi-criteria decision making (MCDM) methodologies proposed by many researchers for supplier evaluation and selection from 2000 to 2011. These approaches focused on qualitative and quantitative factors pertaining to the needs and specifications of the buyers. Jonsson (2008) described partnership relations as a win/win game wherein partners try together to increase the total competitiveness of the SC. He however, discussed different levels of relationships and used the Kraljic matrix as a means of suppliers’ segmentation.
Fisher (1997) suggests that an effective SC has to be designed with respect to the product that is going to be supplied through the chain. He added that products can be either functional or innovative, depending primarily on its demand characteristics in terms of life cycle length, demand predictability, product variety, or market standards for lead times and service. Consequently, the individual companies need tools to match the SC partners to their product lines.

Zou et al. (2011) analyzed distributors’ selection based on the rough set theory approach in both equal and unequal weight features and found out that relationship intensity, marketing experience, and the management ability in selecting the distributors were important factors.
Moreover, the derived rules also provided critical implication that the entire constituencies in the SC should maintain an intensity relationship with one other throughout the chain.

Wang and Kess, (2006) found out that the Finnish manufacturer selected international distributors from China for three reasons: interest in the products, distributor companies were owned and run by young people to minimize the cultural differences and the geographic location of the distributor was a relevant factor. They added that besides the factors, such as honesty, reliability, good communication and marketing competency, a competent distributor may be described as one who is ambitious about the future, has the ability to study, take initiative and give commitment.

Al-Khalifa and Peterson (1999) found out that the critical factors in international joint venture partner selection criteria are related to the reputation, experience and personal knowledge of the partner organizations as well as to some of the personal characteristics of their Chief Executive Officer (CEO). They noted that a distinction between “task related” factors and “partner related” factors were important and seem to be related to the ends-means dichotomy. They concluded that, the decision factors in partner selection cannot be regarded as fixed in relative importance or magnitude. Their importance in any given situation is itself a function of the size, culture and experience of the company, and of the education and experience of the CEO.

Ye and Huo (2011), building on the perspective of the balanced scorecard pointed out that it is necessary to take into account economic factors, at the same time balance social benefits factors in choosing indicators system of strategic partner of the SC. They argued that the four dimensions of the balanced scorecard reflect the indicator selection requests for strategic cooperation and the SC partners must make a long term strategic development planning, persist in innovation based on the concept of cooperation win-win, and takes the sustainable development path. They extended the four dimensions to include the strategy dimension and social value dimension as shown in figure 3.5.
Bochao (2010) recommended that a comprehensive evaluation index system of partners should form the basis and criteria of the business to comprehensively evaluate its partners. The index should reflect the different properties of the complex system, consisting of the enterprise itself and the environment, as well as an integration orderly composed in accordance with affiliation and hierarchy. He outlined corporate reputation, time to market, product quality, cost control, and service level as important factors which may affect the SC relationships. After the evaluation system has been established, partners can be selected according to the evaluation results, and establish partnerships as shown in figure 3.6. He asserted that SC partner selection is a multi-objective evaluation technique which contains qualitative and quantitative factors. He used the Analytical hierarchy process (AHP) for partners’ selection as shown in figure 3.7. In this model, core competence, cofactors, operating environment and performance factors are the main criteria for choosing partners.
Ashayeri, (2012) outlined accelerating pace of business, short product life cycles, quick response to market opportunities, low cost of market entry, increasing mass customization demands and the pressure for globalization to remain competitive, as the reasons for considering a virtual SC (V-SC). In a V-SC the entire partner companies are specialized in their core competencies and have improved the efficiency and effectiveness, greater adaptability, flexibility, agility, and speed requirements (Ashayeri, 2012). Lifecycle of a V-SC consists of the identification, formation, operation and termination phases as shown in figure 3.8.
Figure 3.8: The phases of the organization-SC’s life cycle

<table>
<thead>
<tr>
<th>Identification</th>
<th>Formulation</th>
<th>Operation</th>
<th>Termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation identification (discover strong opportunities in market)</td>
<td>Partner (determine possible partners)</td>
<td>Design</td>
<td>Operation termination</td>
</tr>
<tr>
<td>Operation selection (evaluate them and select right ones)</td>
<td>Partner selection (evaluate alternatives and choose right ones)</td>
<td>Marketing</td>
<td>Asset dispersal (accounting and legal issues)</td>
</tr>
<tr>
<td></td>
<td>Partner formation</td>
<td>Financial Mgt.</td>
<td></td>
</tr>
</tbody>
</table>

Source: Adapted from Ashayeri (2012)
Theoretical model and hypothesis for first research question

From the reviewed literature, there is the perception that different factors are considered for the selection of supplier partners than distributors/retailers. More so, companies with greater skills, capacity and/or power seem to control the SC and by inference, will not consider the same factors as other companies. Thus, the following hypotheses are formulated:

\( \textbf{H}_{1A}: \text{Suppliers, Manufacturers and Distributors take the same factors into consideration when choosing SC partners.} \)

\( \textbf{H}_{1B}: \text{FC/VSC (Suppliers, Manufacturers and Distributors) do not take the same factors into consideration as any other company when choosing SC partners.} \)

In general, figure 3.9 shows a summary of factors identified from literature as critical for partners selection: business performance, business structure, production capacity, quality system, life cycle of the product, geographical location, cultural difference, company reputation, personal knowledge of company, education and experience of CEO, corporate reputation, social responsibility, profitability rate, employee satisfaction, service level, flexible management processes. Hence, figure 3.9.
Figure 3.9: Factors Affecting SC Partners’ Selection

Partner selection =

- Functional and innovative products
  - Business performance
  - Business Structure
  - production capacity
  - quality system
  - life cycle of the product
  - geographical location
  - culture difference
  - company reputation
  - personal knowledge of company
  - education and experience of CEO
  - social responsibility
  - profitability rate
  - employee satisfaction
  - service level
  - flexible management
  - IT capabilities
3.5. Efficiency, Effectiveness and Performance Measurement in Supply Chain

3.5.1. Efficiency and Effectiveness in Performance

Efficiency and effectiveness are central terms used in assessing and measuring the performance of organizations and both terms also apply to business arrangements such as strategic alliances, joint ventures, sourcing and outsourcing agreements (Mouzas, 2006). Drucker (1977) distinguished efficiency from effectiveness by associating efficiency to “doing things right” and effectiveness to “doing the right things” (Kumar and Gulati, 2010). Thus, by doing the right things wrongly, a company is effective but not efficient. Kumar and Gulati (2010) asserted that a measure of efficiency is not a measure of a success in the marketplace but a measure of operational excellence in the resource utilization process. Effectiveness, on the other hand, relates to company's own strategy to generate a sustainable business growth in its surrounding networks and the extent to which the policy objectives are achieved (Mouzas, 2006; Kumar and Gulati, 2010). These concepts can be extended to the SC based on the fact that SCM has a system approach to viewing the SC as a whole.

Figure 3.10: Influence of Efficiency and Effectiveness on Performance

As a result, efficiency will be seen as a cost-related advantage while effectiveness is an advantage of customer responsiveness within SC. Therefore, while trying to meet customers’ demand, companies in the SC have to optimize the use of their resource in order to maximize performance.
It is significant to note that though efficiency and effectiveness are two mutually exclusive components of overall performance measure yet they may influence each other (Kumar and Gulati, 2010) as shown in figure 3.10. Nevertheless, it is possible that a SC is efficient in utilizing the inputs, but not effective or vice versa. However, performance will be maximized by maximizing both efficiency and effectiveness of not only the individual companies, but all the companies in the SC. Thus, overall performance measure can be seen as a means of quantifying the efficiency and effectiveness of actions (Neely et al., 1995). Hence, performance measure for an organization is a product of efficiency and effectiveness measures (i.e. performance = efficiency \times effectiveness) (Kumar and Gulati, 2010).

Mouzas (2006) illustrated the effect of different levels of efficiency and effectiveness on the performance level of an individual organization (Figure 3.11).

![Figure 3.11: The effect of different levels of efficiency and effectiveness.](image)

Source: Mouzas (2006)

From the figure, Mouzas, (2006) noted that mainly focusing on efficiency and neglecting effectiveness results in an ephemeral profitability. On the contrary, neglecting efficiency and focusing on effectiveness may result in an unprofitable growth. Thus, to ensure sustainable profitability companies need an equal emphasis on both high efficiency and effectiveness.
Given that efficiency and effectiveness are the central terms used in assessing and measuring the performance of organizations, irrespective of the organization or group of organizations, performance can be defined as an appropriate combination of efficiency and effectiveness (Kumar and Gulati, 2010). These authors noted that although most managers might use the terms as synonymous, each of them has its own distinct meaning.

### 3.5.2. Performance Management and Performance Measurement

Even though the concept of performance management is new, its meaning has been discussed under other labels, such as performance measurement systems, for a longer time (Forslund 2007). Performance management creates a framework for, and measures for performance. Are there any significant differences between performance measurement and management? After thoroughly reviewing literature, Lebas (1995) concluded that measurement and management are inextricably linked and they work interactively as shown in figure 3.12. He concurred that performance management precedes and follows performance measurement in a virtuous spiral and measures are used mainly to identify deviations from the expected results of the casual model. Hervani et al. (2005) had also argued that performance measurement must evolve to performance management, where the organization develops the appropriate organizational structure and the ability to use

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**Figure 3.12: Performance Management and Performance Measurement are Inseparable**

![Diagram](source: Lebas, (1995))
performance measurement results to actually bring about change in the organization. Performance management is one approach for measuring and improving performance in the SC, and can be seen as a process consisting of the following activities: selecting performance variables, defining metrics, target setting, measurement and analysis (Forslund, 2007; Forslund and Jonsson 2007) and performance measurement is just a part of this process. According to Chan (2003), performance measurement describes the feedback or information on activities with respect to meeting customer expectations and strategic objectives. Therefore, performance measurement has many uses including the determination of the efficiency and effectiveness of an existing system or to compare competing alternative systems and is typically used to plan, design, implement and monitor proposed systems (Hervani et al. 2005).

3.5.3. Supply Chain Performance Measurement Metrics

There are several ways of describing and measuring the performance in a SC. Measuring means transforming complex reality into a sequence of limited symbols that can be communicated and that can be more or less reproduced under similar circumstances (Lebas, 1995). Hervani et al. (2005) averred that the variety and level of performance measures depends greatly on the goal of the organization or the individual strategic business unit’s characteristics. In this light, Lebas (1995) argued that since the purpose of management is about creating and shaping the future of the organization and performance is not much about past achievements, as generally accepted, but about the future capabilities of the unit being evaluated. He asserted that performance is conceptual both in terms of users and in terms of purpose.

Beamon (1998) provided a basis for performance measurement within a company while advocating for the research need for more holistic measurements of SC performance. This issue of how to measure SC performance was illustrated by many authors (Chan, 2003; Gunasekaran et al. 2001; Gunasekaran et al. 2004; Folan and Browne 2005; Forslund and Jonsson 2007).
Chan (2003) identified seven categories of performance measurement based on both quantitative and qualitative methods. Cost (inventory cost, incentives and subsidies cost, labor and machinery cost) and resource utilization (Labor, machine, capacity and energy) were the main focus under the quantitative category. Qualitatively, he identified quality (delivery time, customer response time, fill rate, etc); flexibility (material and process handling, delivery modifications, new product, expansion, etc.); visibility (time and accuracy); trust (consistency) and innovativeness (new product launch and new use of technology) as being vital to performance measurement. He pointed out that qualitative measurements are conceptual ideas and have no bases or standardized means of measurement leading to inconsistency, confusion and biased judgment. Overall, these difficulties in developing standards for performance measurement are traced to the various measurement taxonomies: management level to measure – strategic, tactical, or operational; tangible versus intangible measures; variations in collection and reporting; an organization’s location along the SC or functional differentiation within organizations (Hervani et al. 2005).

Figure 3.13: Development of an Extended Enterprise Performance Measurement System

Source: Folan and Browne (2005)
Drawing from the perspective of the balance scorecard, Folan and Browne (2005) presented an extended enterprise performance measurement system that incorporates internal, supplier, customer, and extended enterprise perspectives. They tested this in a case study in a first-tier supplier of chassis component products to leading automotive companies in the European automotive industry. In order to go beyond measurement based upon traditional logistics measures only, and examine both intra- and inter-organizational performance at each node, they pointed out that each of the four perspectives of the scorecard is expected to be applied at each node and this interaction with its suppliers and customers relative to company X is as illustrated in figure 3.13.

Figure 3.14: Development of an Extended Enterprise Performance Measurement Success Factors

<table>
<thead>
<tr>
<th>Performance Measurement Axis</th>
<th>Internal</th>
<th>Supplier</th>
<th>Customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Location beside OEM</td>
<td>Supplier</td>
<td>Customer</td>
</tr>
<tr>
<td>Innovation</td>
<td>Location beside OEM</td>
<td>Supplier</td>
<td>Customer</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Location beside OEM</td>
<td>Supplier</td>
<td>Customer</td>
</tr>
<tr>
<td>Precision</td>
<td>Supplier</td>
<td>Customer</td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td>Supplier</td>
<td>Customer</td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>Supplier</td>
<td>Customer</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Supplier</td>
<td>Customer</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>Supplier</td>
<td>Customer</td>
<td></td>
</tr>
</tbody>
</table>

Source: Folan and Browne (2005)
They combined seven macro measures of performance on the vertical axis, with perspectives (internal, supplier, and customer) of the extended enterprise balanced scorecard on the horizontal axis, to create 21 different types of success factor as shown in figure 3.14.

Martin and Petterson, (2009) conducted a survey that assessed the extent to which firms involved in specific agreements associated with SCM practice (organizational structure, partnering, supplier, and process improvement agreements) perceived their performance in terms of inventory, cycle times, and financial performance. They found out that there were significant differences between firms that practiced SCM and those that did not although there was no significant difference in the financial performance. They concluded that while financial performance is ultimately important to each member of the SC, the statistical results indicate that financial measurements are appropriate for strategic decisions, but daily operational measurements might be supported better with non-financial measures.

Forslund and Jonsson (2010) pointed out that in order to be successful in performance measurement companies have to understand the importance of using validated, measurable and sufficiently detailed definitions of metrics, with clearly formulated targets or use standardized metrics that can be found in the SC operation reference (SCOR) model based on five standard SC processes: plan, source, make, deliver and return. In this light, Gunasekaran et al. (2001) had discussed a range of performance metrics and classified them into strategic, tactical and operational levels of management; financial and non-financial as shown in table 3.2. Aligning them to the four basic links of the SCOR model, they constituted figure 3.15 with high performance metrics that targeted broader functional areas of SC as well as its total attributes. Considering the SCOR model, Gunasekaran et al. (2004) designed a framework for performance metrics in the SC.
### Figure 3.15: List of Key Performance metrics

<table>
<thead>
<tr>
<th>Level</th>
<th>Performance metric</th>
<th>Financial</th>
<th>Non-financial</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic</strong></td>
<td>Total cash flow time</td>
<td>x</td>
<td></td>
<td>Stewart (1995)</td>
</tr>
<tr>
<td></td>
<td>Rate of return on investment</td>
<td>x</td>
<td></td>
<td>Christopher (1992); Dobler and Burt (1990)</td>
</tr>
<tr>
<td></td>
<td>Flexibility to meet particular customer needs</td>
<td>x</td>
<td>x</td>
<td>Bower and Hout (1988); Christopher (1992)</td>
</tr>
<tr>
<td></td>
<td>Delivery lead time</td>
<td>x</td>
<td>x</td>
<td>Rushton and Oxley (1989)</td>
</tr>
<tr>
<td></td>
<td>Total cycle time</td>
<td></td>
<td>x</td>
<td>Christopher (1992); Stewart (1995)</td>
</tr>
<tr>
<td></td>
<td>Level of degree of buyer-supplier partnership</td>
<td></td>
<td></td>
<td>Toni et al (1994); Mason-Jones and Towill (1997)</td>
</tr>
<tr>
<td></td>
<td>Customer query time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tactical</strong></td>
<td>Extent of co-operation to improve quality</td>
<td></td>
<td>x</td>
<td>Graham et al (1994)</td>
</tr>
<tr>
<td></td>
<td>Total transportation cost</td>
<td>x</td>
<td>x</td>
<td>Rushton and Oxley (1991)</td>
</tr>
<tr>
<td></td>
<td>Truthfulness of demand predictability/forecasting methods</td>
<td></td>
<td></td>
<td>Fisher (1997); Harrington (1996)</td>
</tr>
<tr>
<td></td>
<td>Product development cycle time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operational</strong></td>
<td>Manufacturing cost</td>
<td>x</td>
<td>x</td>
<td>Wild (1995)</td>
</tr>
<tr>
<td></td>
<td>Capacity utilization</td>
<td></td>
<td></td>
<td>Stewart (1995)</td>
</tr>
<tr>
<td></td>
<td>Information carrying cost</td>
<td>x</td>
<td>x</td>
<td>Levy (1997); Lee and Billington (1992); Stewart (1995); Dobler and Burt (1990); Slack et al (1998); Pyke and Cohen (1994)</td>
</tr>
<tr>
<td></td>
<td>Inventory carrying cost</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Gunasekaran et al. (2001)
Theoretical model and hypothesis for second research question

In the SC, efficiency is cost related while effectiveness is customer responsiveness. SC costs are costs that affect the members of the chain namely purchase cost, production cost; transportation cost etc. effectiveness is SC solutions, logistics system's ability to provide rapid response to customer requests, logistics system's ability to accommodate special or non-routine requests, logistics system's ability to handle unexpected events etc. Thus, to
optimize performance in the SC, the members of the chain have to optimize both efficiency and effectiveness. Hence, figure 3.17.

The overall performance measure is seen as a means of quantifying the efficiency and effectiveness of actions i.e. performance = efficiency × effectiveness) (Neely et al., 1995; Kumar and Gulati, 2010) and performance is maximized by maximizing both quantities. Hence, the second hypothesis is as follows:

**H2:** In measuring SC performance, companies focus more on efficiency metrics than effectiveness metrics.
4. EMPIRICAL FINDINGS

This chapter presents the results of the empirical evidence collected with the questionnaire. It is presented in the same structure as the questionnaire and consequently the research questions and purpose. It has four sections. The first descriptive part presents the means, standard deviations, skewness and kurtosis of the responses of first research question while the second part describes the data by cross-tabulation for easy visualization and understanding. The third section (4.3) presents a Discriminant Analysis (DA) that assesses the extent to which these factors contribute in separating the groups of SC actors and how correctly they were classified into the various categories. The last part, which is mainly descriptive, describes the data related to the second research question.

4.1. Descriptive Statistics

The following describes the findings generated from the empirical investigation obtained from the administered questionnaire. It is intended to present a basic understanding of the data at hand, clarify and show the characteristics of the data reported. This is displayed in the order as in the questionnaire and consequently, the research questions, purpose and theory in chapter three.

4.1.1. Descriptive Statistics of Partners’ Selection Factors

Business indicators generally fall in one of the following categories: financial, social, customer, growth or strategy. Prior to the rating of the factors (indicators) that were outlined from literature as important in the partners’ selection process, respondents were asked to rank, in order of importance, the following 5 business indicators concerning their partner’s business when developing evaluation criteria for the selection of business partners. The scores are on 5. The averages and percentages of the rankings were calculated. Growth, strategy and social indicators were the top three respectively with averages greater than even, while customer and financial indicators were the least important.

- Financial (profitability rate, assets and liability rate, etc.) = 1.88 (37.60%)
✓ Social (corporate reputation, credit evaluation, social responsibility) = 3.31 (66.20%)
✓ Customer (Quality level, service level, etc) = 2.37 (47.40%)
✓ Growth (Learning and innovation, improvement ability etc) = 3.80 (76.00%)
✓ Strategy (Cooperation idea, Corporate culture, Leader quality, Environmental protection level) = 3.64 (72.80%)

Table 4.1 showed the distribution of responses (both in number and percentages) as well as the scale properties in terms of mean, standard deviation (S.D), skewness and kurtosis of the 101 respondents regarding the 12 factors: Business and Marketing Experience (BME), Business Performance (BP), Production Capacity (PC), Core Competence (CC), Quality System (QS), Enterprise Environment (EE), Cultural Similarities (CS), Geographical Location (GL), Knowledge of Partners’ Organization (KPO), Education of CEO (E.CEO), Corporate Culture and Reputation (CCR), and IT capabilities (IT). The respondents were asked to indicate the extent to which these factors were important to them regarding their business partners when choosing them; where a low-number Likert response would indicate that the factor was not at all important (1), and a high number (6) would indicate a very important.

As shown in the Table, the means indicate that the factors were neither very similar nor were they very different from each other, as the scores appear to be clustered around the mean, indicating agreement to a greater extent with theoretical predictions. However, it should be noted that there were some variations in the responses as indicated by the S.D, with the relatively largest dispersion from the mean associated with BME (1.028) and GL (1.139). This may indicate a greater degree of uncertainty, particularly with GL which has a smaller mean (2.96). The distribution of responses and the relatively low values for skewness and kurtosis indicate that the data is approximately normally distributed. In addition, no factor had a distribution with a sharp peak than the standard normal distribution. However, the factors with the sharpest peaks are QS (1.018) and BME (1.024).
Table 4.1: Descriptive Statistics for Partners’ Selection Factors

<table>
<thead>
<tr>
<th>Factors</th>
<th>Distribution of response</th>
<th>Scale Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>BME</td>
<td>2 (1.98%)</td>
<td>4 (3.96%)</td>
</tr>
<tr>
<td>BP</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>PC</td>
<td>0 (0.00%)</td>
<td>1 (0.99%)</td>
</tr>
<tr>
<td>CC</td>
<td>0 (0.00%)</td>
<td>1 (0.99%)</td>
</tr>
<tr>
<td>QS</td>
<td>0 (0.00%)</td>
<td>3 (2.97%)</td>
</tr>
<tr>
<td>EE</td>
<td>0 (0.00%)</td>
<td>12 (11.88%)</td>
</tr>
<tr>
<td>CS</td>
<td>5 (4.95%)</td>
<td>55 (54.46%)</td>
</tr>
<tr>
<td>GL</td>
<td>5 (4.95%)</td>
<td>37 (36.63%)</td>
</tr>
<tr>
<td>KPO</td>
<td>0 (0.00%)</td>
<td>21 (20.79%)</td>
</tr>
<tr>
<td>E.CEO</td>
<td>9 (8.91%)</td>
<td>59 (58.42%)</td>
</tr>
<tr>
<td>CCR</td>
<td>0 (0.00%)</td>
<td>20 (19.80%)</td>
</tr>
<tr>
<td>IT</td>
<td>0 (0.00%)</td>
<td>6 (5.94%)</td>
</tr>
</tbody>
</table>

Source: Compiled from questionnaire responses and SPSS output
CCR (skewness of 0.017) and BP (skewness of 0.083) are the two factors for which the responses were approximately normally distributed. Worth noting is the fact that E.CEO had 85.15% of respondents choosing the negative side of the scale (high positive skewness of 0.962) and CS had 86.14% of respondents choosing the negative side of the scale (skewness of 0.908). On the other hand, QS was highly negatively skewed (-0.907), with 90.10% choosing the positive part of the scale.

The results also showed that these respondents considered QS (4.70), PC (4.35), BP (4.33), BME (4.23), CC (4.18) and IT (4.11) to be of high value in choosing SC partners. EE (3.47), CCR (3.50) and KPO (3.25) are somewhat neutral, while GL (2.96), CS (2.52) and E.CEO (2.42) were the three least important.

### 4.1.2. Descriptive Statistics of Partners’ Selection Factors from Supplies’ Perspective

Table 4.2 shows the response distribution and scale statistics for partners’ selection factors from suppliers’ perspective. From this table, it can be observed that to suppliers, QS (4.72), BP (4.67), PC (4.56), BME (4.17), IT (4.17) and CC (4.00) are of high value in choosing SC partners. CCR (3.50), KPO (3.50) and EE (3.33) are, to some extent neutral, while E.CEO (2.61), GL (2.56) and CS (2.50) were the three least important. The same factors maintain the same level of importance as in table 4.1, but in general, the means are higher in table 4.2. This means that suppliers contribute to a greater extent to the importance of these factors. The factors with the greatest spread around the means are BME (1.098) and QS (1.018).

CC and CS approximates a standard normal distribution with skewness of approximately 0. This implies that the responses are evenly spread about their means. High negative skewness can be identified with IT (-1.373) and QS (-1.257) with respective responses of 94.45% and 88.90% to the positive side of the scale. GL has a longer tail of its distribution to the right (1.075) with 77.78% of respondents choosing the negative direction. Particularly, important is the sharp peak of IT (4.588). IT is therefore, leptokurtotic and associated with exceptionally large values than normal.
<table>
<thead>
<tr>
<th>Factors</th>
<th>Distribution of response</th>
<th>Scale Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>BME</td>
<td>0 (0.00%)</td>
<td>2 (11.11%)</td>
</tr>
<tr>
<td>BP</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>PC</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>CC</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>QS</td>
<td>0 (0.00%)</td>
<td>1 (5.56%)</td>
</tr>
<tr>
<td>EE</td>
<td>0 (0.00%)</td>
<td>1 (5.56%)</td>
</tr>
<tr>
<td>CS</td>
<td>1 (5.56%)</td>
<td>8 (44.44%)</td>
</tr>
<tr>
<td>GL</td>
<td>0 (0.00%)</td>
<td>12 (66.67%)</td>
</tr>
<tr>
<td>KPO</td>
<td>0 (0.00%)</td>
<td>2 (11.11%)</td>
</tr>
<tr>
<td>E.CEO</td>
<td>1 (5.56%)</td>
<td>9 (50%)</td>
</tr>
<tr>
<td>CCR</td>
<td>0 (0.00%)</td>
<td>3 (16.67%)</td>
</tr>
<tr>
<td>IT</td>
<td>0 (0.00%)</td>
<td>1 (5.56%)</td>
</tr>
</tbody>
</table>

Source: Compiled from questionnaire responses and SPSS output
4.1.3. Descriptive Statistics of Partners’ Selection Factors from Manufacturers’ Perspective

Table 4.3 shows the response distribution and scale statistics for partners’ selection factors from manufacturers’ perspective. It can be observed that to manufacturers, QS (4.5), CC (4.42), BP (4.26), PC (4.22) and BME (4.00) are of high value in choosing SC partners. IT (3.88), CCR (3.60), EE (3.44), KPO (3.28) and GL (3.04) are rated averagely, while CS (2.64) and E.CEO (2.56) were the least important.

Most of the factors had comparatively higher dispersion around the mean, with only four factors BP (0.899), PC (0.975), QS (0.953), EE (0.829) and IT (0.895) having S.D less than 1. No factor had exceptionally high values as seen in the kurtosis and the responses were approximately normally distributed with generally low positive and negative values for skewness.

Table 4.3: Descriptive Statistics for Partners’ Selection Factors from Manufacturers’ Perspective

<table>
<thead>
<tr>
<th>Factors</th>
<th>Distribution of response</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Mean</th>
<th>S.D</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME</td>
<td>2(4%) 2(4%) 9(18%) 23(46%) 9(18%) 5(10%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.00</td>
<td>1.143</td>
<td>-.427</td>
<td>.756</td>
</tr>
<tr>
<td>BP</td>
<td>0(0.0%) 0(0.0%) 11(22%) 19(38%) 16(32%) 4(8%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.26</td>
<td>.899</td>
<td>.153</td>
<td>-.749</td>
</tr>
<tr>
<td>PC</td>
<td>0(0.0%) 1(2%) 12(24%) 16(32%) 17(34%) 4(8%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.22</td>
<td>.975</td>
<td>-.052</td>
<td>-.708</td>
</tr>
<tr>
<td>CC</td>
<td>0(0.0%) 0(0.0%) 14(28%) 9(18%) 19(38%) 8(16%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.42</td>
<td>1.071</td>
<td>-.095</td>
<td>-1.276</td>
</tr>
<tr>
<td>QS</td>
<td>0(0.0%) 1(2%) 6(12%) 17(34%) 19(38%) 7(14%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.50</td>
<td>.953</td>
<td>-.295</td>
<td>-.197</td>
</tr>
<tr>
<td>EE</td>
<td>0(0.0%) 9(18%) 16(32%) 19(38%) 6(12%) 0(0.0%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.44</td>
<td>.929</td>
<td>-.056</td>
<td>-.821</td>
</tr>
<tr>
<td>CS</td>
<td>4(8%) 25(50%) 9(18%) 9(18%) 3(6%) 0(0.0%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.64</td>
<td>1.064</td>
<td>.675</td>
<td>-.369</td>
</tr>
<tr>
<td>GL</td>
<td>5(10%) 17(34%) 11(22%) 6(12%) 10(20%) 1(2%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.04</td>
<td>1.370</td>
<td>.372</td>
<td>-.991</td>
</tr>
<tr>
<td>KPO</td>
<td>0(0.0%) 12(24%) 20(40%) 11(22%) 6(12%) 1(2%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.28</td>
<td>1.031</td>
<td>.566</td>
<td>-.282</td>
</tr>
<tr>
<td>E.CEO</td>
<td>4(8%) 27(54%) 9(18%) 7(14%) 3(6%) 0(0.0%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.56</td>
<td>1.033</td>
<td>.873</td>
<td>.108</td>
</tr>
<tr>
<td>CCR</td>
<td>0(0.0%) 8(16%) 14(28%) 20(40%) 6(12%) 2(4%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.60</td>
<td>1.030</td>
<td>.187</td>
<td>-.240</td>
</tr>
<tr>
<td>IT</td>
<td>0(0.0%) 3(6%) 14(28%) 19(38%) 14(28%) 0(0.0%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.88</td>
<td>.895</td>
<td>-.289</td>
<td>-.755</td>
</tr>
</tbody>
</table>

Source: Compiled from questionnaire responses and SPSS output
4.1.4. Descriptive Statistics of Partners' Selection Factors from Wholesalers/Retailers' Perspective

Table 4.4 shows the response distribution and scale statistics for partners' selection factors from retailers' perspective. In the viewpoint of retailers, it is indicated that QS (5.00), BME (4.61), PC (4.42), IT (4.42) and BP (4.24) are of high significance to retailers' in choosing SC partners. CCR (3.36) KPO (3.06) and GL (3.06) were closely rated neutral while CS (2.36) and E.CEO (2.09) were rated low.

The distribution of the responses was generally not too spread out as can be seen in the S.D. This indicates a higher level of certainty in the responses. The majority of the respondents perceived QS (skewness of -2.258) as very important as only 1 respondent (3.03%) chose the negative part of the scale. The perception is similar for IT (skewness of -1.589) with 29 respondents (87.88%) choosing the positive part of the scale. On the other hand, a greater part of them identified CS (skewness of 1.188) and KPO (skewness of 1.295) as not very important with respectively 32 (96.97%) and 26 (78.79%) respondents responding on the negative part of the scale.

The majority of the respondents regarded QS (kurtosis of 9.968) as exceptionally important. High response values are also associated with KPO (3.809) while E.CEO (2.027) and IT (2.018) approximate normal values.
Table 4.4: Descriptive Statistics for Partners’ Selection Factors from Retailers’ Perspective

<table>
<thead>
<tr>
<th>Factors</th>
<th>Distribution of response</th>
<th>Scale Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>BME</td>
<td>0(0.00%)</td>
<td>0(0.00%)</td>
</tr>
<tr>
<td>BP</td>
<td>0(0.00%)</td>
<td>0(0.00%)</td>
</tr>
<tr>
<td>PC</td>
<td>0(0.00%)</td>
<td>0(0.00%)</td>
</tr>
<tr>
<td>CC</td>
<td>0(0.00%)</td>
<td>1(3.03%)</td>
</tr>
<tr>
<td>QS</td>
<td>0(0.00%)</td>
<td>1(3.03%)</td>
</tr>
<tr>
<td>EE</td>
<td>0(0.00%)</td>
<td>2(6.06%)</td>
</tr>
<tr>
<td>CS</td>
<td>0(0.00%)</td>
<td>22(66.67%)</td>
</tr>
<tr>
<td>GL</td>
<td>0(0.00%)</td>
<td>8(24.24%)</td>
</tr>
<tr>
<td>KPO</td>
<td>0(0.00%)</td>
<td>7(21.21%)</td>
</tr>
<tr>
<td>E.CEO</td>
<td>4(12.12%)</td>
<td>23(69.70%)</td>
</tr>
<tr>
<td>CCR</td>
<td>0(0.00%)</td>
<td>9(27.27%)</td>
</tr>
<tr>
<td>IT</td>
<td>0(0.00%)</td>
<td>2(6.06%)</td>
</tr>
</tbody>
</table>

Source: Compiled from questionnaire responses and SPSS output
4.1.5. Descriptive Statistics of Partners’ Selection Factors from FC's Perspective

QS (5.00), CC (4.40), BP (4.33), PC (4.27), IT (4.20) and BME (4.13) were rated high by FC’s; EE (3.87), CCR (3.87) and KPO (3.40) were somewhat neutral while GL (2.73), E.CEO (2.73) and CS (2.27) are rated low (table 4.5). With respect to the S.D, BME (1.125), EE (1.060), GL (1.223), E.CEO (1.100) and IT (1.014) can be identified with values greater than 1, and therefore a greater degree of uncertainty in the responses. However, the responses were approximately normally distributed with values of skewness generally close to 0; the best being the distribution of QS, which is the most important factor to FC’s in choosing their SC partners. BME with a skewness value of (-1.684), registered 13 out of the 15 FC’s (86.7%) to the positive side of the scale. It also recorded more exceptional values (kurtosis of 3.329) compared to any other factor.

The descriptive statistics for all three actors (suppliers, manufacturers and retailers) and FC’s are summarized in table 4.6 below.
Table 4.5: Descriptive Statistics for Partners’ Selection Factors from FC’s’ Perspective

<table>
<thead>
<tr>
<th>Factors</th>
<th>Distribution of response</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Mean</th>
<th>S.D</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME</td>
<td>1(6.7%)</td>
<td>0(0.0%)</td>
<td>2(13.3%)</td>
<td>5(33.3%)</td>
<td>7(46.7%)</td>
<td>0(0.0%)</td>
<td>4.13</td>
<td>1.125</td>
<td>-1.684</td>
</tr>
<tr>
<td>BP</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>4(26.7%)</td>
<td>3(20.0%)</td>
<td>7(46.7%)</td>
<td>1(6.7%)</td>
<td>4.33</td>
<td>.976</td>
<td>-.256</td>
</tr>
<tr>
<td>PC</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>3(20.0%)</td>
<td>7(46.7%)</td>
<td>3(20.0%)</td>
<td>2(13.3%)</td>
<td>4.27</td>
<td>.961</td>
<td>.498</td>
</tr>
<tr>
<td>CC</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>3(20.0%)</td>
<td>5(33.3%)</td>
<td>5(33.3%)</td>
<td>2(13.3%)</td>
<td>4.40</td>
<td>.986</td>
<td>.062</td>
</tr>
<tr>
<td>QS</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>3(20.0%)</td>
<td>9(60.0%)</td>
<td>3(200%)</td>
<td>5.00</td>
<td>.655</td>
<td>.000</td>
</tr>
<tr>
<td>EE</td>
<td>0(0.0%)</td>
<td>2(13.3%)</td>
<td>3(20.0%)</td>
<td>5(33.3%)</td>
<td>5(33.3%)</td>
<td>0(0.0%)</td>
<td>3.87</td>
<td>1.060</td>
<td>-.531</td>
</tr>
<tr>
<td>CS</td>
<td>2(13.3%)</td>
<td>9(60.0%)</td>
<td>2(13.3%)</td>
<td>2(13.3%)</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>2.27</td>
<td>.884</td>
<td>.832</td>
</tr>
<tr>
<td>GL</td>
<td>1(6.7%)</td>
<td>8(53.3%)</td>
<td>2(13.3%)</td>
<td>2(13.3%)</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>2.73</td>
<td>1.223</td>
<td>.858</td>
</tr>
<tr>
<td>KPO</td>
<td>0(0.0%)</td>
<td>3(20.0%)</td>
<td>5(33.3%)</td>
<td>5(33.3%)</td>
<td>2(13.3%)</td>
<td>0(0.0%)</td>
<td>3.40</td>
<td>.986</td>
<td>.062</td>
</tr>
<tr>
<td>E.CEO</td>
<td>2(13.3%)</td>
<td>5(33.3%)</td>
<td>3(20.0%)</td>
<td>5(33.3%)</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>2.73</td>
<td>1.100</td>
<td>-.134</td>
</tr>
<tr>
<td>CCR</td>
<td>0(0.0%)</td>
<td>1(6.7%)</td>
<td>3(20.0%)</td>
<td>8(53.3%)</td>
<td>3(20.0%)</td>
<td>0(0.0%)</td>
<td>3.87</td>
<td>.834</td>
<td>-.579</td>
</tr>
<tr>
<td>IT</td>
<td>0(0.0%)</td>
<td>1(6.7%)</td>
<td>3(20.0%)</td>
<td>20.0%</td>
<td>8(53.3%)</td>
<td>0(0.0%)</td>
<td>4.20</td>
<td>1.014</td>
<td>-.929</td>
</tr>
</tbody>
</table>

Source: Compiled from questionnaire responses and SPSS output
### Summary Tables for the Descriptive Statistics from Suppliers’, Manufacturers’, Retailers’ and FC’s’ Perspective

Table 4.6: Summary of Descriptive Statistics for Partners’ Selection Factors

| Factors | Means | Scale Properties | | | | | | |
|---------|-------|------------------|----------------|----------------|----------------|----------------|----------------|
| BME     | 4.17  | 4.00 | 4.61 | 4.13| 1.098 | 1.143 | .659 | 1.125| -.666 | -.427 | -.068 | -1.684 | -.012 | .756  | -.023 | 3.329 |
| BP      | 4.67  | 4.26 | 4.24 | 4.33| .840 | .899 | .663 | .976 | -.595 | .153  | .377  | -.256 | .201  | -.749 | .548  | -.334 |
| PC      | 4.56  | 4.22 | 4.42 | 4.27| .784 | .975 | .663 | .961 | -.618 | -.052 | -.047 | .498  | .147  | -.708 | -.091 | -.334 |
| CC      | 4.00  | 4.42 | 3.91 | 4.40| .686 | 1.071 | .723 | .986 | .000  | -.095 | -.388 | .062  | -.584 | -1.276 | .362  | -.810 |
| QS      | 4.72  | 4.50 | 5.00 | 5.00| 1.018 | .953 | .707 | .655 | -1.251 | -.295 | -2.258 | .000  | 2.057 | -.197 | 9.968 | .655 |
| EE      | 3.33  | 3.44 | 3.58 | 3.87| .686 | .929 | .663 | 1.060| .683  | -.056 | -.638 | -.531 | .930  | -.821 | .264  | -.791 |
| CS      | 2.50  | 2.64 | 2.36 | 2.27| .707 | 1.064 | .549 | .884 | .000  | .675  | 1.188 | .832  | .118  | -.369 | .519  | .524 |
| GL      | 2.56  | 3.04 | 3.06 | 2.73| .856 | 1.370 | .827 | 1.223| 1.075 | .372  | .589  | .858  | -.698 | -.991 | .172  | -.363 |
| KPO     | 3.50  | 3.28 | 3.06 | 3.40| .924 | 1.031 | .827 | .986 | .252  | .566  | 1.295 | .062  | -.602 | -.282 | 3.809 | -.810 |
| E.CEO   | 2.61  | 2.56 | 2.09 | 2.73| .916 | 1.033 | .631 | 1.100| .405  | .873  | .730  | -.134 | -.883 | .108  | 2.027 | -1.337 |
| CCR     | 3.50  | 3.60 | 3.36 | 3.87| .924 | 1.030 | .994 | .834 | -.252 | .187  | -.206 | -.579 | -.602 | -.240 | -1.174 | .502 |
| IT      | 4.17  | 3.88 | 4.42 | 4.20| .707 | .895  | .867 | 1.014| -1.373 | -.289 | -1.589 | -.929 | 4.588 | -.755 | 2.018 | -.349 |

Source: Compiled from questionnaire responses and SPSS output
4.2. **Cross Tabulation**

Considering the fact that one major disadvantage of mean and S.D is that they are affected by extreme values, the single utilization of these measures will be inappropriate. A visual on how the responses were actually distributed and DA to generate discriminating functions will clarify the situation.

**4.2.1. Cross Tabulation of Suppliers, Manufacturers and Retailers with the Twelve Factors**

By cross-tabulating the 3 categories with the 12 factors, it can be realized that 4 factors (Core competence, Quality system, Geographical location and IT capabilities) are significant at a 5% level as shown in table 4.7.

Table 4.7: Chi Squares for the three Groups (suppliers, manufactures and retailers) and 12 Factors

<table>
<thead>
<tr>
<th>Actors*Factors</th>
<th>Factors</th>
<th>Value of Pearson Chi-Square</th>
<th>Asymp.-Sig (2-sided) of Pearson Chi-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2*BME</td>
<td>BME</td>
<td>17.636</td>
<td>.061</td>
</tr>
<tr>
<td>Q2*BP</td>
<td>BP</td>
<td>11.068</td>
<td>.086</td>
</tr>
<tr>
<td>Q2*PC</td>
<td>PC</td>
<td>9.699</td>
<td>.287</td>
</tr>
<tr>
<td>Q2*CC</td>
<td>CC</td>
<td>23.836</td>
<td><strong>.002</strong></td>
</tr>
<tr>
<td>Q2*QS</td>
<td>QS</td>
<td>17.526</td>
<td><strong>.025</strong></td>
</tr>
<tr>
<td>Q2*EE</td>
<td>EE</td>
<td>11.433</td>
<td>.076</td>
</tr>
<tr>
<td>Q2*CS</td>
<td>CS</td>
<td>15.422</td>
<td>.051</td>
</tr>
<tr>
<td>Q2*GL</td>
<td>GL</td>
<td>27.305</td>
<td><strong>.002</strong></td>
</tr>
<tr>
<td>Q2*KPO</td>
<td>KPO</td>
<td>8.128</td>
<td>.421</td>
</tr>
<tr>
<td>Q2*E.CEO</td>
<td>E.CEO</td>
<td>9.133</td>
<td>.331</td>
</tr>
<tr>
<td>Q2*CCR</td>
<td>CCR</td>
<td>4.592</td>
<td>.800</td>
</tr>
<tr>
<td>Q2*IT</td>
<td>IT</td>
<td>20.283</td>
<td><strong>.002</strong></td>
</tr>
</tbody>
</table>

Source: Compiled from SPSS output
These four factors are not of equal importance to all three groups. To clearly visualize the importance of these four factors, bar charts were included in the output. It can be observed from the bar charts in figures 4.1, 4.2, 4.3 and 4.4 that CC is a very important factor to manufacturers; QS to retailers and GL is very important to manufacturers, and to an extent to retailers but not to suppliers.

Figure 4.1: Bar chart for Core Competence

Source: SPSS outputs

Figure 4.2: Bar chart for Quality System

Source: SPSS outputs

Figure 4.3: Bar chart for Geographical location

Source: SPSS outputs

Figure 4.4: Bar chart for IT Capabilities

Source: SPSS outputs
Besides these four factors, cultural similarities and corporate cultures and reputation (figures 4.5 and 4.6) are important factors to manufacturers.

Figure 4.5: Bar chart for Culture Similarities
Figure 4.6: Bar chart for Corporate Culture and Reputation

Source: SPSS outputs

Table 4.8: Chi Squares for manufacturers from supplier or retailer perspective and 12 Factors

<table>
<thead>
<tr>
<th>Actors*Factors</th>
<th>Factors</th>
<th>Value of Pearson Chi-Square</th>
<th>Asymp.-Sig (2-sided) of Pearson Chi-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2*BME</td>
<td>BME</td>
<td>23.077</td>
<td>.000</td>
</tr>
<tr>
<td>Q2*BP</td>
<td>BP</td>
<td>.886</td>
<td>.829</td>
</tr>
<tr>
<td>Q2*PC</td>
<td>PC</td>
<td>14.558</td>
<td>.006</td>
</tr>
<tr>
<td>Q2*CC</td>
<td>CC</td>
<td>14.646</td>
<td>.002</td>
</tr>
<tr>
<td>Q2*QS</td>
<td>QS</td>
<td>9.761</td>
<td>.045</td>
</tr>
<tr>
<td>Q2*EE</td>
<td>EE</td>
<td>4.070</td>
<td>.254</td>
</tr>
<tr>
<td>Q2*CS</td>
<td>CS</td>
<td>9.205</td>
<td>.056</td>
</tr>
<tr>
<td>Q2*GL</td>
<td>GL</td>
<td>11.012</td>
<td>.051</td>
</tr>
<tr>
<td>Q2*KPO</td>
<td>KPO</td>
<td>5.964</td>
<td>.202</td>
</tr>
<tr>
<td>Q2*E.CEO</td>
<td>E.CEO</td>
<td>9.992</td>
<td>.041</td>
</tr>
<tr>
<td>Q2*CCR</td>
<td>CCR</td>
<td>5.880</td>
<td>.208</td>
</tr>
<tr>
<td>Q2*IT</td>
<td>IT</td>
<td>.549</td>
<td>.908</td>
</tr>
</tbody>
</table>

Source: Compiled from SPSS output
Manufacturers who answered from the perspective of a specific supplier were compared with those who answered from the perspective of a specific retailer. Out the 50 manufacturers who responded, 30 responded with respect to suppliers and 20 with respect to retailers. It was also observed that they do not take the same factors into consideration as shown in figures 4.7 to 4.12. Category 1 represents suppliers and 2 stands for retailers. BME of the company, PC, CC, QS and E.CEO were observed to be significant at a 5% level of significance (table 4.8).

Figure 4.7: Bar chart for Business and Marketing of company-Man. Supplier and Ret. Perspective

Figure 4.8: Bar chart for Production Capacity-Man. Supplier and Retailer Perspective

Figure 4.9: Bar chart for Core Competence-Man. Supplier and Retailer Perspective

Figure 4.10: Bar chart for Quality System-Man. Supplier and Retailer Perspective

Source: SPSS outputs
Although geographical location was not identified as significant at a 5% level, it should be noted that it is considered very important when manufacturers choose suppliers than when they choose retailers figure 5.12.

4.2.2. Cross Tabulation of FC and Twelve Factors

Q5, Q6 and Q7 under background questions were used to identify FC. Considering the fact that collaboration is presumed to exist in the SC, companies who invested in partners’ facilities to improve their competences, who usually (and every time) influence partners’ intentions and actions and whose partners usually (and every time) accepted their business ideas were considered as FC. Out of the 19 companies who invested in their partners’ facilities to improve their competences, 4 of these companies existed whose ideas were never or occasionally considered by their partners and who never or occasionally influence the intentions and actions of their partners. These were removed from the list of FC’s. Table 4.9 shows these 15 FC’s which were identified classified into the three groups. 4 are suppliers, 7 manufacturers and 4 retailers.
To run the analysis, all the other 86 companies were grouped as category 1 and the 15 FC’s as category 2. Only EE and E.CEO were significant at a 5% level and could be identified as being associated with the separation of these two categories. The bar chart is shown in figure 4.13 and 4.18 respectively.

Table 4.10: Chi Squares for FC and the Other Companies

<table>
<thead>
<tr>
<th>Actors*Factors</th>
<th>Factors</th>
<th>Value of Pearson Chi-Square</th>
<th>Asymp.-Sig (2-sided) of Pearson Chi-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2*BME</td>
<td>BME</td>
<td>5.422</td>
<td>.367</td>
</tr>
<tr>
<td>Q2*BP</td>
<td>BP</td>
<td>4.147</td>
<td>.246</td>
</tr>
<tr>
<td>Q2*PC</td>
<td>PC</td>
<td>4.312</td>
<td>.365</td>
</tr>
<tr>
<td>Q2*CC</td>
<td>CC</td>
<td>1.204</td>
<td>.877</td>
</tr>
<tr>
<td>Q2*QS</td>
<td>QS</td>
<td>2.225</td>
<td>.694</td>
</tr>
<tr>
<td>Q2*EE</td>
<td>EE</td>
<td>16.202</td>
<td>.001</td>
</tr>
<tr>
<td>Q2*CS</td>
<td>CS</td>
<td>4.403</td>
<td>.354</td>
</tr>
<tr>
<td>Q2*GL</td>
<td>GL</td>
<td>3.311</td>
<td>.652</td>
</tr>
<tr>
<td>Q2*KPO</td>
<td>KPO</td>
<td>2.480</td>
<td>.648</td>
</tr>
<tr>
<td>Q2*E.CEO</td>
<td>E.CEO</td>
<td>9.677</td>
<td>.046</td>
</tr>
<tr>
<td>Q2*CCR</td>
<td>CCR</td>
<td>3.866</td>
<td>.425</td>
</tr>
<tr>
<td>Q2*IT</td>
<td>IT</td>
<td>2.906</td>
<td>.406</td>
</tr>
</tbody>
</table>

Source: Compiled from SPSS output
Besides EE and E.CEO, a visual on the bar charts in figures 4.14, 4.15, 4.16, 4.17 and 4.18 show that Business and marketing experience of a company, cultural similarities, geographical location, knowledge of partners organization, Education and experience of CEO are not important to FC’s but they are to the other companies.

**Figure 4.13:** Enterprise environment  
**Source:** SPSS outputs

**Figure 4.14:** Business and Marketing experience  
**Source:** SPSS outputs

**Figure 4.15:** Cultural similarities  
**Source:** SPSS outputs

**Figure 4.16:** Geographical location  
**Source:** SPSS outputs
Visualizing the bar charts in appendix 4, shows that business performance is very important to suppliers, core competence, cultural similarities and geographical locations are very important factors to manufacturers. IT is an important factor to all three groups, but it is more important to suppliers than manufacturer and retailers.

4.3. **Discriminant Analysis (DA) for Partners’ Selection Factors**

DA builds a predictive model for group membership. The model is composed of a set of discriminant functions based on linear combinations of the predictor variables (12 factors) that provide the best discrimination amongst the groups. The functions are generated from a sample of cases for which group membership is known - supplier, manufacturers or distributors/retailers. The procedure automatically chooses a first function that will separate the groups as much as possible. It then chooses a second function that is both uncorrelated with the first function and provides as much further separation as possible. The procedure continues adding functions in this way until reaching the maximum number of functions as determined by the number of predictors and categories in the dependent variables.
Table 4.10 shows the within-groups correlation matrix between the predictors – BME, BP, PC, CC, QS, EE, CS, GL, KPO, E.CEO, CCR and IT. The largest correlations occur between PC and CC, followed by KPO and GL and finally QS and PC, but it is difficult to tell if they are large enough to be of concern. The correlation table shows that there is a relationship between the production capacity (PC) of a company and its core competence (CC). Likewise, companies try to get information about their partners’ organization (KPO) before choosing them, if they have to consider their geographical location (GL). In the same vein, the quality system (QS) of a company goes alongside the production capacity (PC). If this correlation is large enough, the model will be influenced by the interaction of the predictor variables. Nonetheless, the structural matrix in table 4.13 shows that multicollinearity cannot be a problem.

There are several tables that assess the contribution of each variable to the model, including the tests of equality of group means, the discriminant function coefficients and the structure matrix. The tests of equality of group means (table 4.12) measure each factor’s potential before the model is created. Each test displays the results of a one-way ANOVA for the factors (independent variable) using the actors as grouping variable. If the value of significance is greater than 0.05 (5% level), the variable probably does not contribute much to the model.
Table 4.11: Pooled Within-Groups Correlation Matrices

<table>
<thead>
<tr>
<th></th>
<th>BME</th>
<th>BP</th>
<th>PC</th>
<th>CC</th>
<th>QS</th>
<th>EE</th>
<th>CS</th>
<th>GL</th>
<th>KPO</th>
<th>E.CEO</th>
<th>CCR</th>
<th>IT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlations</td>
<td>BME</td>
<td>BP</td>
<td>PC</td>
<td>CC</td>
<td>QS</td>
<td>EE</td>
<td>CS</td>
<td>GL</td>
<td>KPO</td>
<td>E.CEO</td>
<td>CCR</td>
<td>IT</td>
</tr>
<tr>
<td></td>
<td>1.000</td>
<td>.363</td>
<td>.022</td>
<td>-.204</td>
<td>.158</td>
<td>.182</td>
<td>.238</td>
<td>.010</td>
<td>.196</td>
<td>.095</td>
<td>.196</td>
<td>.202</td>
</tr>
<tr>
<td>BP</td>
<td>.363</td>
<td>1.000</td>
<td>.323</td>
<td>.333</td>
<td>.277</td>
<td>.087</td>
<td>.414</td>
<td>.278</td>
<td>.405</td>
<td>.439</td>
<td>.315</td>
<td>-.099</td>
</tr>
<tr>
<td>PC</td>
<td>.022</td>
<td>.323</td>
<td>1.000</td>
<td>.576</td>
<td>.514</td>
<td>.248</td>
<td>.288</td>
<td>.297</td>
<td>.241</td>
<td>.153</td>
<td>.315</td>
<td>-.046</td>
</tr>
<tr>
<td>CC</td>
<td>-.204</td>
<td>.333</td>
<td>.576</td>
<td>1.000</td>
<td>.359</td>
<td>.159</td>
<td>.268</td>
<td>.429</td>
<td>.346</td>
<td>.331</td>
<td>.297</td>
<td>-.108</td>
</tr>
<tr>
<td>QS</td>
<td>.158</td>
<td>.277</td>
<td>.514</td>
<td>.359</td>
<td>1.000</td>
<td>.475</td>
<td>.191</td>
<td>.129</td>
<td>.054</td>
<td>.166</td>
<td>.337</td>
<td>.265</td>
</tr>
<tr>
<td>EE</td>
<td>.182</td>
<td>.087</td>
<td>.248</td>
<td>.159</td>
<td>.475</td>
<td>1.000</td>
<td>.233</td>
<td>.063</td>
<td>.089</td>
<td>.200</td>
<td>.124</td>
<td>.406</td>
</tr>
<tr>
<td>CS</td>
<td>.238</td>
<td>.414</td>
<td>.288</td>
<td>.268</td>
<td>.191</td>
<td>.233</td>
<td>1.000</td>
<td>.394</td>
<td>.382</td>
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<td>.127</td>
</tr>
<tr>
<td>GL</td>
<td>.010</td>
<td>.278</td>
<td>.297</td>
<td>.429</td>
<td>.129</td>
<td>.063</td>
<td>.394</td>
<td>1.000</td>
<td>.523</td>
<td>.226</td>
<td>.162</td>
<td>-.087</td>
</tr>
<tr>
<td>KPO</td>
<td>.196</td>
<td>.405</td>
<td>.241</td>
<td>.346</td>
<td>.054</td>
<td>.089</td>
<td>.382</td>
<td>.523</td>
<td>1.000</td>
<td>.447</td>
<td>.347</td>
<td>.092</td>
</tr>
<tr>
<td>CCR</td>
<td>.196</td>
<td>.315</td>
<td>.315</td>
<td>.297</td>
<td>.337</td>
<td>.124</td>
<td>.234</td>
<td>.347</td>
<td>.415</td>
<td>1.000</td>
<td>.012</td>
<td>.012</td>
</tr>
<tr>
<td>IT</td>
<td>.202</td>
<td>-.099</td>
<td>-.046</td>
<td>-.108</td>
<td>.265</td>
<td>.406</td>
<td>.127</td>
<td>-.087</td>
<td>.092</td>
<td>.109</td>
<td>1.000</td>
<td>.012</td>
</tr>
</tbody>
</table>

Source: SPSS output
According to the results in this table, only five variables in the discriminant model are significant – BME, CC, QS, E.CEO and IT. Wilks' lambda is another measure of a variable's potential. Smaller values and corresponding large F values indicate that the variable is better at discriminating between groups. These five factors have the smallest Wilks' lambda and corresponding large F values. It suggests that IT is best variable, followed by BME, then CC, E.CEO and finally QS.

Source: SPSS output
In addition to these five factors which are significant in table 4.12, CS, PC and CCR were also identified as discriminating factors in the first function (table 4.13). The fact that these five factors appeared in the structural matrix (although the order of significance is not the same) showed that multicollinearity is not a major problem. The second function provides a further separation of the groups. BP, GL, KPO and EE are the factors that were involved in the second function.

Besides the measures for checking the contribution of individual factors to the discriminant model, the DA procedure provides the eigenvalues and Wilks' lambda tables which showed how well the discriminant model as a whole fits the data. This will indicate the extent to which this function can be generalized and the extent to which it can be used to allocate new members. Table 4.14, the Eigenvalues, provide information about the relative worth of each discriminant function. The canonical correlation is the multiple correlations between the predictors and the discriminant function. With two functions, the sum provides an index of overall model fit which is interpreted as being the proportion of variance explained. With a larger eigenvalues for the first function (0.412), means that the first function is more important than the second, (0.233) and it explain 63.9% of the variance while the second function explains 36.1%.

Table 4.14: Eigenvalues

<table>
<thead>
<tr>
<th>Function</th>
<th>Eigenvalue</th>
<th>% of Variance</th>
<th>Cumulative %</th>
<th>Canonical Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.412(^a)</td>
<td>63.9</td>
<td>63.9</td>
<td>.540</td>
</tr>
<tr>
<td>2</td>
<td>.233(^b)</td>
<td>36.1</td>
<td>100.0</td>
<td>.435</td>
</tr>
</tbody>
</table>

\(a. \) First 2 canonical discriminant functions were used in the analysis.

Source: SPSS output

A canonical correlation of 0.540 for the first function, suggest that it explains 29.16% of the grouping variables and a canonical correlation of 0.435 for the second function suggest that it explains 18.9% of the grouping variables.
Wilks' lambda (table 4.15) is a measure of how well each function separates cases into groups. It is equal to the proportion of the total variance in the discriminant scores not explained by differences among the groups. Smaller values of Wilks' lambda indicate greater discriminatory ability of the function. This shows that function 1 through 2 is highly significant \( (p < 0.01) \) than function 2 \( (p < 0.055) \), although both are significant at a 10% level of significance and provide the proportion of total variability not explained, i.e. it is the converse of the squared canonical correlation. Thus, 57.4% of function 1 through 2 is unexplained and 81.1% of function 2 unexplained.

Table 4.16: Classification Results\(^{b,c}\)

<table>
<thead>
<tr>
<th>Count</th>
<th>Suppliers</th>
<th>Manufacturers</th>
<th>Retailers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>Suppliers</td>
<td>12</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>%</td>
<td>Manufacturers</td>
<td>11</td>
<td>31</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Retailers</td>
<td>5</td>
<td>2</td>
<td>26</td>
</tr>
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<td>66.7</td>
<td>16.7</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td>Manufacturers</td>
<td>22.0</td>
<td>62.0</td>
<td>16.0</td>
</tr>
<tr>
<td></td>
<td>Retailers</td>
<td>15.2</td>
<td>6.1</td>
<td>78.8</td>
</tr>
<tr>
<td>Cross-validated (^a)</td>
<td>Suppliers</td>
<td>9</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>%</td>
<td>Manufacturers</td>
<td>13</td>
<td>29</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Retailers</td>
<td>6</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Suppliers</td>
<td>50.0</td>
<td>27.8</td>
<td>22.2</td>
</tr>
<tr>
<td></td>
<td>Manufacturers</td>
<td>26.0</td>
<td>58.0</td>
<td>16.0</td>
</tr>
<tr>
<td></td>
<td>Retailers</td>
<td>18.2</td>
<td>15.2</td>
<td>66.7</td>
</tr>
</tbody>
</table>

\(^a\) Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

\(^b\) 68.3% of original grouped cases correctly classified.

\(^c\) 59.4% of cross-validated grouped cases correctly classified.
The classification table (table 4.16) shows the practical results of using the discriminant model. The percentage of cases on the diagonal is the percentage of correct classifications. This table revealed that 12 of the 18 suppliers who responded to the questionnaire were, according to the discriminant function, classified correctly. 3 were to be classified as manufacturers and the other 3 as retailers. This gives a 66.7% correct classification. From the manufacturers, 31 were correctly classified (62.0%) while 11 were to be classified as suppliers and 8 as retailers. The best classification was recorded with retailers. 26 (78.8%) were correctly classified while 2 were to be classified as manufacturers and 5 as suppliers. In sum, 68.3% of the original group cases were correctly classified.

4.4. Efficiency and Effectiveness Metrics that Companies in SC Focus on to Measure Performance

Performance metrics were divided into efficiency and effectiveness metrics. Efficiency metrics are those that are focused within the company and effectiveness metrics considers all members in the chain ability’s to develop sustainable growth (table 4.17). The efficiency metrics were sub-divided into three groups – cost and resource utilization; quality and visibility; and flexibility and trust. Cost and resource utilization had five specific metrics with an average of 80.41%; quality and visibility had four averaging 81.88%; and flexibility and trust three with an average of 73.00%. Customer satisfaction seems to be the highest concern of SC members (87.33%) followed by delivery time (85.00%). Although flexibility and trust has the least average amongst the three divisions of efficiency metrics, it should be noted that consistency and reliance on partners has an average of 77.17% indicating dependence and trust amongst SC partners.

Effectiveness metrics, which were divided into two sub-groups – customers’ responsiveness and innovation, had comparatively lower averages to efficiency metrics. Customers’ responsiveness had an average of 68.95% while innovation averaged 71.29%. In customers’ responsiveness, the ability to provide rapid response to customers’ request had the highest score (76.67%) and identifying new markets was top on the list of innovation metrics.
Considering the fact that each company measures performance and the objective of this study is to identify the focus, the results of the 101 respondents on the six-point scaled questions (not at all important to very important) were coded in two groups. The last four were coded as group 1, while the top two as group two. This was to examine if these metrics were actually a focus of the companies in the SC. Table 4.18 shows the frequency and percentages of the second group (the top two). Many companies focus on customer dissatisfaction (87.1%) and delivery time (81.2%), which are efficiency metrics.

Table 4.17: Scores and Percentage Efficiency and Effectiveness Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Scores on 6</th>
<th>Percentage</th>
<th>Average % per group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost and resource utilization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating plants with precision and low cost</td>
<td>4.96</td>
<td>(83.00%)</td>
<td>80.41%</td>
</tr>
<tr>
<td>Production synchronization</td>
<td>4.61</td>
<td>(76.83%)</td>
<td></td>
</tr>
<tr>
<td>Delivery cost</td>
<td>4.76</td>
<td>(79.33%)</td>
<td></td>
</tr>
<tr>
<td>Optimizing capacity</td>
<td>4.84</td>
<td>(80.67%)</td>
<td></td>
</tr>
<tr>
<td>Manufacturing and distribution cost</td>
<td>4.94</td>
<td>(82.33%)</td>
<td></td>
</tr>
<tr>
<td>Quality and visibility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery time</td>
<td>5.10</td>
<td>(85.00%)</td>
<td>81.88%</td>
</tr>
<tr>
<td>Accuracy in operations</td>
<td>4.88</td>
<td>(81.33%)</td>
<td></td>
</tr>
<tr>
<td>Customer dissatisfaction</td>
<td>5.24</td>
<td>(87.33%)</td>
<td></td>
</tr>
<tr>
<td>Cycle time</td>
<td>4.43</td>
<td>(73.83%)</td>
<td></td>
</tr>
<tr>
<td>Flexibility and Trust</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistency and reliance on partners</td>
<td>4.63</td>
<td>(77.17%)</td>
<td>73.00%</td>
</tr>
<tr>
<td>Flexibility in material and process handling</td>
<td>4.12</td>
<td>(68.67%)</td>
<td></td>
</tr>
<tr>
<td>Degree of improvement and modification</td>
<td>4.39</td>
<td>(73.17%)</td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customers’ responsiveness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to provide rapid response to customers’ request</td>
<td>4.60</td>
<td>(76.67%)</td>
<td>68.95%</td>
</tr>
<tr>
<td>Ability to accommodate special or non-routine requests</td>
<td>4.15</td>
<td>(69.17%)</td>
<td></td>
</tr>
<tr>
<td>Ability to handle unexpected events</td>
<td>4.01</td>
<td>(66.83%)</td>
<td></td>
</tr>
<tr>
<td>Degree to which products/material are supplied to customers’ specific demand</td>
<td>3.78</td>
<td>(63.00%)</td>
<td></td>
</tr>
<tr>
<td>Innovation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify new markets</td>
<td>4.63</td>
<td>(77.17%)</td>
<td>71.29%</td>
</tr>
<tr>
<td>Launching new products</td>
<td>4.08</td>
<td>(68.00%)</td>
<td></td>
</tr>
<tr>
<td>Launching new technology</td>
<td>4.12</td>
<td>(68.67%)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from Questionnaire responses
Table 4.18: Frequency and Percentage of second group (top two of six point scale)

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Metrics Sub-Division</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>Cost and resource utilization</td>
<td>Operating plants with precision and low cost</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Production synchronization</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delivery cost</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Optimizing capacity</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manufacturing and distribution cost</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Quality and visibility</td>
<td>Delivery time</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accuracy in operations</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Customer dissatisfaction</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cycle time</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Flexibility and Trust</td>
<td>Consistency and reliance on partners</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flexibility in material and process handling</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Degree of improvement and modification</td>
<td>53</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>Customers’ responsiveness</td>
<td>Ability to provide rapid response to customers’ request</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ability to accommodate special or non-routine requests</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ability to handle unexpected events</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Degree to which products/material are supplied to customers’ specific demand</td>
<td>25</td>
</tr>
<tr>
<td>Innovation</td>
<td>Identify new markets</td>
<td></td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>Launching new products</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Launching new technology</td>
<td></td>
<td>37</td>
</tr>
</tbody>
</table>

Source: Compiled from Questionnaire responses
In effectiveness metrics, identify new markets (61.4%) was top followed by ability to provide rapid response to customers’ request as earlier seen. Although a number of efficiency metrics had percentages greater than even, only these two effectiveness metrics had percentages greater than 50.0%.

Bar charts were drawn to observe if the responses were influenced by a particular group (supplier, manufacturer or retailers) in the SC. But for delivery cost, customers’ dissatisfaction, degree to which products/materials are supplied to customers’ specific demand and identifying new markets, all other metrics contributed approximately the same to the averages. Retailers contributed comparatively higher to delivery cost and customer dissatisfaction, manufacturers to degree to which products/materials are supplied to customers’ specific demand and suppliers to identifying new markets as shown in figures 4.19 to 4.22.

Figure 4.19: Delivery cost

Figure 4.20: Customer dissatisfaction
Figure 4.21: Degree to which products/materials are supplied to customers’

Source: SPSS output

Figure 4.22: Identify new markets

Source: SPSS output
5. ANALYSIS AND DISCUSSION

This chapter analyses the empirical results presented in chapter four and relates it to the reviewed literature in the third chapter. It focuses on providing answers to the research questions. As such, it comprises two main sections corresponding to the two research question. The first section is sub-divided into the two sub-questions corresponding to the two sub-research questions, while section 5.2 deals with the second research question.

5.1. SC Partners’ Selection

The findings showed that growth, strategy and social indicators are highly favoured to customer and financial indicators by Swedish industries in choosing their SC partners. This means that companies are interested in organizations where people persistently expand their capacity to create the desired results with unrestrained patterns of thinking and collective aspiration; companies that facilitates the learning of all its members and continuously transform themselves. It also looks at companies from their visions, norms, working language, systems, beliefs and habits, than financial ratios. This is a great motivation for competitive advantage in the market. In addition, Companies in the SC do not use financial indicators because in most cases they are ratios which give indications of weak and strong points in a business but will not indicate why things do not work as planned. These ratios are difficult to compare across companies and industries. Thus, they can only be used to supplement other indicators. This verifies the proposals of Ye and Huo (2001) who advocated the importance of strategy and social indicators in addition to the four perspective of the balanced scorecard.

This study shows that prior to selecting SC partners it is important to carry out a market research and analysis. This test and confirms, to an extent, the SC partners selection process of Bochoa (2010) (figure 3.6) and its methodological framework by Ashayeri (2012) (figure 3.4).

The fact that only 3 out of the 12 factors had low means proved that partnership relationship can describe as a win/win game as described by Johnson (2008). In general,
quality system, production capacity, business performance and business and marketing experience of the company, core competence and IT where the top six most important factors in line with some suggestions of Bachao (2010), Ashayeri (2012), Power (2005), Zou et al. (2011) and Ye and Huo (2011). Quality systems are as expected top on the list, in view of the fact that with available market prices this raises organizational standards, creating superior value to customer and consequently be competitive. However, unlike the results of Al-Khalifa and Peterson (1999) and Wang and Kess (2006), Geographical location, Cultural similarities and Education and experience of CEO cannot be considered, in general terms, to be of paramount importance when choosing SC partners. In particular, education and experience is, as anticipated, not an important factor. Management is more often than not related to the corporate idea and culture and leadership quality. This accounts for the high interest in strategic indicators.

5.1.1. Factors Considered by Suppliers, Manufacturers and Retailers when Choosing their SC Partners

H1A: Suppliers, Manufacturers and Retailers take the same factors into consideration when choosing SC partners

The results from the summary descriptive statistics table (table 4.6) demonstrate that although some factors are generally important to all SC members, the extent to which they are vary across the chain. From the empirical data, (table 4.11) it showed that there are some factors amongst these factors that influence each other. The production capacity of a company is related to its core competence and the quality system. When companies look at the production capacity of their partners, at the same time they take into account those capabilities that can help them achieve competitive advantage and also the organizational structure, processes, resources that are needed to implement quality management. More so, companies seek to know more about their partners, particularly if they have different geographical location. This is particularly true with manufacturers and retailers alike.

By considering the averages (means) of responses, QS is the most important to all three groups of actors. The best average is noticed with retailers and FC’s. The particular
concern of retailers with quality is due to the fact that they are concerned with the final consumers. If the final product delivered to the market is of low quality, this may tarnish their reputation. Consequently, they will experience a loss of market share. This is evident with exceptionally higher value in responses (kurt. = 9.968). This is undoubtedly, the most important factor to retailers. The fact that QS is valuable to both manufacturers and suppliers is primarily due to the fact that in most business relationships, the cost of return of defective items is born by the selling company, rather than the customer company. In some cases the contract may have an insurance clause to guide against defective or items below standard. Therefore, the selling companies do thorough control in order not to incur this cost.

Furthermore, BP, PC and BME are also considered of great significance. This implies that the companies assess the organizational procedures, processes and/or resources; the extent of efficient utilization of resources and the extent to which the products can be made available to the market. In particular, IT which is considered valuable to suppliers and retailers is considered average for manufacturers. Suppliers principally have an extensive use of IT in their business activities. Until when the materials or component parts reach the customers (manufacturers), most of the work requires the use of IT – Request for quotation, transmission of purchase order and advanced shipment notification, electronic settlement advice etc. This may be the reason for the comparatively exceptionally high values associated with suppliers.

From the discriminant analysis, IT, BME, QS, E.CEO and CC are factors that are valuable in grouping these three actors. IT, QS and CC were confirmed in the cross-tabulation method and GL was also identified as distinguishing factors.

By using both the discriminant function and the cross-tabulation methods in the analysis, it showed that in total six factors (BME, QS, PC, CC, GL and E.CEO) are associated with the separation of these three groups of actors. This means that there is a pattern associated with the responses from the individual group of actors regarding these factors. Thus, the manner in which a respondent responded to the questions can identify the company as supplier, manufacturer or retailer. The other factors, though important, are not considered as being significance in the distinguishing attitude giving a 5% level of error.
There is a very thin line in the factors ability to separate these actors into the various group (0.9 < Wilks’ Lambda < 1). Despite this close range, there is evident that the importance attached to these factors by each of the groups is not the same as observed in the bar charts. Although the DA model is not a perfect one, with the correlation between the factors and the functions generated slightly less than 50% (48.06%), the main function explains 63.9% of the variance in the groupings.

Out of these factors, a visual on the bar charts demonstrated that CC, GL and E.CEO are more important to manufacturers than other actors. The importance of GL to Swedish manufacturers ties with the research of Wang and Kess (2006) with Finnish manufacturing firms. However, this is more pertinent to manufacturer’s responding from suppliers’ perspective than those responding from retailers’ perspective. This is apparently due to the fact that they want to ensure supplies of raw materials and component parts in time to avoid hinges in the production process. In the same vein, manufacturers are interested in the central way a supplier works, what they are best at - CC – to guarantee constant supply of quality raw materials and component parts. E.CEO, which had been found important to joint ventures (Al-khalifa and Peterson, 1999), was identified as important to manufacturers from the suppliers’ perspective. Selecting CEO of companies is not a probabilistic issue. Even though CEO selection is mainly based on integrity, personality, technical skills and experience, all of which are intangible this must be given due consideration in view of the fact that an organization is reflected from the top management.

The importance of CCR to manufacturers test and confirms the request of Ye and Huo (2011) to include strategic and social value dimensions in the four perspective of the balanced scorecard for SC partners’ selection criteria. CCR could be accounted for by the fact that manufacturers try to anticipate the probability of the future behavior of their partners by considering strategy and social factors in the selection. This should particularly apply to retailers’ selection because it has an advantage when other companies’ products are available at similar prices and quality. Although CS is not a significant factor, it is more important to manufacturers from suppliers’ perspective, unlike the results of Wang and Kess (2006) findings and the theory of Zou et al (2011).
Surprisingly, business and marketing experience of company is slightly more important to retailers than manufacturers has been influenced by the large number of manufacturers responding from a specific supplier’s perspective in conformity with Wang and Kess (2006).

In sum, suppliers, manufacturers and retailers do not attach the value to the same factors when choosing SC partners and therefore hypothesis $H_{1A}$, which states that Suppliers, Manufacturers and Distributors take the same factors into consideration when choosing SC partners is rejected.

5.1.2. Factors Considered by FC’s/VSC’s (suppliers, manufacturer or retailers) in Choosing SC Partners

$H_{1B}$: FC/VSC (Suppliers, Manufacturers and Distributors) do not take the same factors into consideration as any other company when choosing SC partners

The descriptive statistics summary showed that, like retailers, FC’s are also more interested in the QS - organizational structure, processes, resources that are needed to implement quality management – of their future partners. This is proven to be the most important and even compared to the other member as associated with the greater number of exceptionally high values and relatively greater percentage of positive responses. However, the cross-tabulation results showed that EE and E.CEO are the two main factors that can be used to differentiate FC’s from the other companies regarding the pattern of responses. This means that FC’s regard the systems/networking infrastructure used within a partner’s organization in a relatively different manner compared to other SC members. This explains why most FC’s have to invest and improve partners’ facilities to facilitate communication and increase system compatibility. As many authors (Andersson and Larsson, 2006; Hanf and Pall, 2009; Balaya et al. 2009) have pointed out, a FC/VSC is that company with great size, competence and power, that has the business idea, designs it and manages the other SC members, investing in their capacities, in order to improve it and achieve this strategic objective. They also believe that an organization is reflected from the top management principles, mission vision and its culture. This is
why the integrity, personality, technical skills and experience of the CEO is given due consideration.

More so, FC’s value the production capacity of their partners. They also seek to know if their partners have the capacity to supply them with materials, component parts or products and if they can be relied upon as pointed out by Lorenzoni and Baden Fuller (1995). FC’s are not very interested in culture similarities, contrary to the assertion of Lorenzoni and Baden Fuller(1995) who pointed out that not only power, resource and technological fit is important, rather the similarity in management culture and decision making process.

In conclusion, FC’s consider factors different from other companies when choosing SC partners. Consequently, we accept hypothesis H\textsubscript{IB}, which states that FC’s do not take the same factors in consideration as any other company when choosing SC partners.

### 5.2 Efficiency and Effectiveness Metrics that Companies in SC Focus on to Measure Performance

H\textsubscript{2}: In measuring SC performance, companies focus more on efficiency metrics than effectiveness metrics

The analysis showed that out the 19 performance metrics, the first effectiveness metrics was eighth position. This implies that companies focus on controlling their operating margins and working capital requirement (visible in cost and resource utilization metrics) than developing strategies for sustainable growth. However, the fact that in customers’ responsiveness, the ability to provide rapid response to customers’ request had the highest score (76.67%) and identifying new markets was top on the list of innovation metrics provides indication that SC members focus on offering value to the customers. These findings validate the results of Mouzas, (2006) who found out that companies rarely balance the achievement of efficiency and effectiveness simultaneously in performance. As illustrated in figure 3.11, this will lead to ephemeral profitability and consequently, preventing sustainable growth.
Despite the fact that Chan (2003) pointed out that qualitative measurements are conceptual ideas with no bases or standardize means of measurement, quality and visibility metrics which are qualitative in nature, seem to be more solicited than cost and resource utilization, which are quantitative in nature. As Lebal (1995) had indicated performance is about future capabilities, which is evident in high percentage of customers’ dissatisfaction metrics (87.33%) and identifying new markets (77.17%). The above explanation is consolidated in table 4.18, where the pattern of importance is still maintained after dividing the respondents in two categories. This clearly showed focus on 10 out of the efficiency metrics assembled from the extended enterprise performance measurement success factors of Folan and Brown (2005); performance metrics links to SCOR of Gunasekaran et al. (2001); and the seven categories of performance measurement metrics identified by Chan (2003). On the other hand, only 2 metrics from Chan (2003) have averages above 50.0%. Moreover, the focus on non-financial metrics found by Martin and Petterson (2009) by companies practicing SCM is visible in this study.

The extended analysis to examine the particularly focus of each SC actor showed that delivery cost and customer dissatisfaction are significant to retailers and degree to which products/materials are supplied to customers’ specific demand to manufacturers as earlier studies (Gunasekaran, et al. 2001; Folan and Browne, 2005) had proven. However, unlike the results of Folan and Browne (2005) who associated identifying new markets with retailers, this research shows that this metrics is to a greater extent associated with suppliers and manufacturers than retailers.

In sum, we accept hypothesis H2, which states that in measuring SC performance, companies focus more on efficiency metrics than effectiveness metrics.
6. CONCLUSION

This chapter concludes the research, providing a summary of results obtained and answers to research questions. It highlights both theoretical and practical contributions and suggests recommendations for further studies.

6.1 Do manufacturers, suppliers and retailers prioritize the same factors when choosing SC partners?

This study was aimed at testing and scrutinizing the factors that suppliers, manufacturers and retailers consider most important in the decision process of choosing their partners. It has shown that SC actors prefer growth and strategy indicators to financial indicators in this process. In general, quality system, production capacity and business performance leading were identified as most important. Geographical location, cultural similarities and education and experience of CEO were respectively the last three.

An analysis of these factors with respect to the three groups of actors showed that quality system and IT capabilities were most important to retailers than suppliers and manufacturers; business and marketing experience of company was most important to manufacturers from retailers’ perspective; production capacity, core competence, corporate culture and reputation, geographical location, cultural similarities and education and experience of CEO were most important to manufacturers from suppliers perspective.

In sum, the importance of any of these factors in any situation cannot be regarded as predetermined. This greatly depends on the position and the influence of the company in the SC. Irrespective of which factor had a higher average with respect to any of the supply chain actors, IT capabilities, Business and marketing experience, Quality system, Education and experience of CEO and Core competence are the main factors that can be used to effectively differentiate these three groups of SC actors. These factors couple with the partners’ selection process presented by Bochoa (2010) and the methodological framework of Ashayeri (2012) will be very cooperative.
6.2. Do FC’s consider the same factors as any other company?

This study has shown that quality system is the most important factors to FC’s in the decision process in choosing their SC partners, alongside core competence and business performance. This is also an important factor to other SC members in choosing future partners. In addition, quality system, enterprise environment, education and experience of CEO and corporate culture and reputation had higher averages than all other groups. In general, FC’s have a pattern associated with responses regarding the networking/systems and the integrity, personality and education of the CEO of their future partners. Therefore, the distinguishing factors are enterprise environment and the education and experience of the CEO.

6.3. Is there a balance in the usage of efficiency and effectiveness metrics in SC Performance Measurement?

The second part of this research which was aimed at identifying if companies in the SC equally use both efficiency and effectiveness metrics in measuring performance showed that there is an unbalance in their usage. Companies tend to focus on managing their operating margins and working capital paying little attention to strategies for sustainable growth, which in most cases leads to ephemeral profitability. By so doing, companies to not maximize their performance considering the fact that performance is the product of efficiency and effectiveness. This research also showed that companies focus on qualitative metrics which have no standard of measurement compared to quantitative metrics. It also provides evident that there is an increasing degree of trust amongst SC partners aiming at providing value to customers.
6.4. Theoretical Contribution

As earlier mentioned, there is no literature that has assessed and tested the importance of the factors in partners’ selection. Most studies have focused on suppliers’ selection factors and to an extent retailers’ selection, ignoring the fact that the philosophy of SCM emphasizes the SC as a single entity, rather than as a set of fragmented parts, each performing its own function. This piece of research has provided a framework for this process. It has highlighted a number of factors that can be used as the groundwork for the SC partners’ selection process. These factors (and the discriminant function) can be used to correctly classify SC members as suppliers, manufacturers or retailers. Furthermore, it has tested some proposed theories and methodologies of the partners’ selection process. Finally, the second section has actually confirmed that SC partners focus more in improving internal efficiency than increasing the effectiveness of the chain, which is, to a greater extent, not in agreement with the management philosophy of SCM.

6.5. Practical Contribution

Although this study was conducted with Swedish companies, the fact that is agrees with some theoretical literature proves that it will not add practical value only to Swedish companies but also to many companies practicing or aspiring to practice SCM. In particular, the degree of misclassification in this study showed that some companies in the SC identify themselves with the wrong category – suppliers, manufacturers or retailers. This is because at every point, a company can be a supplier, manufacturer or retailer. This distinguishing factors identified, will help companies to correctly classify themselves. Furthermore, an increase in the focus on effectiveness metrics, will in addition to the focus on efficiency metrics, improve not only the company’s performance, but the SC.
### 6.6. Recommendations for Further Studies

The degree of originality of, and intricacy associated with this piece of research has created a wide range of opportunities for further research. This piece of research identified factors that can be used to separate the various groups of SC actors. It also identified factors that distinguished FC’s from the other groups of actors. Further research can study and scrutinize how these responses are actually related to these groups of actors. This will be more effective by selecting a couple of simple SC’s – that is choosing about five manufacturers, their most important suppliers and their most important retailer. More so, it can also be used as the basis to completely test the methodological framework for partners’ selection of Ashayeri (2012) and the SC partners’ selection process of Bochao (2010). Finally, a further study can also be carried out to locate a system or approach of maximizing SC effectiveness thereby increasing total SC performance.
REFERENCE


Neuman, W.L., (2003), Social research methods: qualitative and quantitative approaches. Allyn and Bacon, Boston.


APPENDIX 1: QUESTIONNAIRE

Supply Chain Partners Selection and Performance Measurement

We are two students of the final year of the Business Process and Supply Chain Management Master Programme at Linnaeus University.

We are writing our essay on "Partners Selection and Performance Measurement in Supply Chain". We would be grateful if you could spare a few minutes of your time to answer the following questions to enable us complete this piece of research. A copy of the project will be sent to you. It takes about 10 minutes to complete the survey. Responses are anonymous and cannot be traced back.

![Diagram of supply chain partners]

Complete the questionnaire from the perspective of your MOST IMPORTANT/SPECIFIC Supply Chain and the position of your company in the SUPPLY CHAIN (See diagram above)

Thank you for your cooperation.

Penekeh Pechu (pp222au@lnu.se)
Vedat Zulfu (vz222an@lnu.se)
BACKGROUND QUESTIONS

1. What is the approximate number of years of your company's existence?

2. From the figure above, where do you locate your company? *(If you are not manufacturer, skip Questions 3 and 4)*
   - Supplier
   - Manufacturer
   - Distributor/Retailer

3. Please indicate the manufacturing industry with which your company can be identified.
   - Manufacturing food products, beverages, tobacco products
   - Manufacturing of wood products, furniture, paper and paper products
   - Manufacturing of rubber and plastic products, coke, chemicals and refined petroleum products
   - Manufacturing of machinery and equipment, motor vehicles, trailers and semi-trailers and other transport equipments
   - Manufacture of basic metals and metal products
   - Other (Please Specify):

4. If you are a manufacturing company, please (where applicable) choose to answer the questions either with respect to your most important/specific supplier or distributor/retailer NOT BOTH. I am responding with respect to:
   - specific SUPPLIER
   - specific DISTRIBUTOR/RETAILER

5. How often do your business partners accept the business idea you propose to them?
   - Never
   - Occasionally
   - Usually
   - Every time
6. How often do you influence business intentions and actions of your business partners?

- Never  - Occasionally  - Usually  - Every time

7. Do you invest in your business partners' facility in order to improve their skills and competencies?

- Yes  - No

QUESTIONS ON CHOOSING SUPPLY CHAIN PARTNERS

1. The following 5 business indicators concerning your partner's business are important when developing evaluation criteria for the selection of business partners. Rank them in order of importance (1 for most important and 5 for least important). Please do not use the same rank twice.

   - Financial (profitability rate, assets and liability rate, etc.)
   - Social (corporate reputation, credit evaluation, social responsibility)
   - Customer (Quality level, service level, etc.)
   - Growth (Learning and innovation, improvement ability etc)
   - Strategy (Cooperation idea, Corporate culture,Leader quality, Environmental protection level)

2. Market research and analysis is an important starting point in our selection of business partners

- strongly disagree  - disagree  - Neither disagree nor agree  - agree
- strongly agree
3. How important are the following factors when selecting your business partners? (see diagram above)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Not at all important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business and Marketing experience of company</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Business Performance (accomplishments of the company)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Production Capacity</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Core competence</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Quality System</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Enterprise Environment (systems/networking infrastructure used within the organization)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cultural similarities</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Geographical location</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Knowledge of Partners’ organization</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Education and experience of CEO</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Corporate culture and reputation</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IT capabilities</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
PERFORMANCE MEASUREMENT
Performance within your company - Efficiency

1. Rate the importance of the following performance metrics regarding cost and resource utilization in your company

<table>
<thead>
<tr>
<th>Metric</th>
<th>Not at all important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating plants with precision and low cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production synchronization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optimizing Capacity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing and distribution cost</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Rate the importance of the following performance metrics regarding quality and visibility in your company

<table>
<thead>
<tr>
<th>Metric</th>
<th>Not at all important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy in operations (waste minimization)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer dissatisfaction (customer complaints and returns)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cycle time (time required to complete one cycle of an operation, function, job, or task)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Rate the importance of the following performance metrics related to flexibility and trust in your company

<table>
<thead>
<tr>
<th>Metric</th>
<th>Not at all important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistency and reliance on partners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexibility in material and process handling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of improvement and modification</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Performance in the Supply chain (Your company and your business partner) - Effectiveness

Rate the following performance metrics regarding customers’ responsiveness in Supply Chain

<table>
<thead>
<tr>
<th>Metric</th>
<th>Not at all important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to provide rapid response to customer requests</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to accommodate special or nonroutine requests</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to handle unexpected events</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree to which products/materials are supplied to customers’ specific demand</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rate the following performance metrics regarding innovation in Supply Chain

<table>
<thead>
<tr>
<th>Metric</th>
<th>Not at all important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying new markets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Launching new products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Launching new technology</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you need a copy of this study, please enter an e-mail to which it can be sent.
APPENDIX 2 – KMO and Bartlett’s Test of validity

KMO and Bartlett’s Test for Suppliers

<table>
<thead>
<tr>
<th>KMO and Bartlett’s Test&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</td>
</tr>
<tr>
<td>Bartlett’s Test of Sphericity</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Only cases for which O2 = 1 are used in the analysis phase.

KMO and Bartlett’s Test for Manufacturers

<table>
<thead>
<tr>
<th>KMO and Bartlett’s Test&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</td>
</tr>
<tr>
<td>Bartlett’s Test of Sphericity</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Only cases for which O2 = 2 are used in the analysis phase.

KMO and Bartlett’s Test for Distributors

<table>
<thead>
<tr>
<th>KMO and Bartlett’s Test&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</td>
</tr>
<tr>
<td>Bartlett’s Test of Sphericity</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Only cases for which O2 = 3 are used in the analysis phase.
# APPENDIX 3 - Supply Chain Management Definitions

<table>
<thead>
<tr>
<th>Year</th>
<th>Authors</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>Olive and Webber</td>
<td>SCM covers the flow of goods from suppliers through manufacturing and distribution chains of end users.</td>
</tr>
<tr>
<td>1985</td>
<td>Jones and Riley</td>
<td>SCM deals with the total flow of materials from the suppliers through end users…</td>
</tr>
<tr>
<td>1989</td>
<td>Stevens</td>
<td>The objective of managing the SC is to synchronize the requirements of the customer with the flow of materials from suppliers in order to effect a balance between what are often seen as conflicting goals of high customer service, low inventory management and low unit cost.</td>
</tr>
<tr>
<td>1992</td>
<td>Christopher</td>
<td>…processes and activities that produce value in the form of products and services in the hands of the ultimate consumer.</td>
</tr>
<tr>
<td>1994</td>
<td>Berry et al.</td>
<td>SCM aims at building trust, exchanging information on market needs, developing new products and reducing supplier base to a particular Original Equipment Manufacturer (OEM) so as to release management resources for developing meaningful long-term relationships.</td>
</tr>
<tr>
<td>1997</td>
<td>Cooper et al.</td>
<td>SCM is an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user.</td>
</tr>
<tr>
<td>1998</td>
<td>Monczka, Trent and Handfield</td>
<td>SCM requires traditionally separate material functions to report to an executive responsible for coordinating the entire material process and also requires joint relationship with suppliers across multiple tiers, whose primary objective is to integrate and manage the sourcing, flow and control of materials using a total system perspective across multiple functions and multiply tiers of suppliers.</td>
</tr>
<tr>
<td>1998</td>
<td>Lambert et al.</td>
<td>SCM is the integration of the key business processes from end user through original suppliers that provide products, service and information that add value for customers and other shareholders.</td>
</tr>
<tr>
<td>2000</td>
<td>Walters and Lancaster</td>
<td>SCM is the management of the interface relationships among key stakeholders and enterprise functions that occur in the maximization of value creation which is driven by customer needs satisfaction and facilitated by efficient logistics management.</td>
</tr>
<tr>
<td>2001</td>
<td>Croxton et. al.</td>
<td>SCM is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders.</td>
</tr>
<tr>
<td>2003</td>
<td>Simchi et al.</td>
<td>SCM is defined as a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system-wide costs while satisfying service level requirements.</td>
</tr>
<tr>
<td>2006</td>
<td>Handfield, Bozarth</td>
<td>SCM is defined as the active management of SC activities and relationships in order to maximize customer value and achieve a sustainable competitive advantage. It represents a conscious effort by a firm or groups of firms to develop and run SC in the most effective and efficient way possible.</td>
</tr>
</tbody>
</table>

Stock and Boyer (2009) 117
APPENDIX 4 – Bar Charts for the three Groups of FC’s

Business Performance

Source: Compiled from SPSS

Core Competence

Source: Compiled from SPSS

Cultural Similarities

Source: Compiled from SPSS

Geographical Location

Source: Compiled from SPSS

IT Capabilities

Source: Compiled from SPSS