

**THE INFLUENCE OF SUPPLIER INFORMATION SHARING AND INFORMATION  
QUALITY ON STRATEGIC PARTNERSHIPS AND INTERNAL LEAN PRACTICES  
AMONG SMALL TO MEDIUM ENTERPRISES IN SOUTH AFRICA.**



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May 2015

## **DECLARATION**

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree

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This dissertation is being submitted in partial fulfilment of the requirements for the degree of Magister Technologiae: Logistics

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This dissertation is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references. A list of references is appended.

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## **ABSTRACT**

The focus of this study was to examine the relationship between information sharing, information quality, strategic partnership and internal lean practices among Small and Medium-sized Enterprises in South Africa. It is essential to understand practitioners' and entrepreneurs' current knowledge towards the topic at hand in order to determine what interventions would be most beneficial in helping to curb the problem of the lack of knowledge in this area and to understand the underlying causes behind the problem, while creating awareness and giving new insight to those who are already aware of this topic.

Data was collected from a sample of 350 Small to Medium Enterprises and the measurement items in the measuring instrument were measured using a 5-point likert scale. Thereafter the collected data was coded and analysed by means of structural equation modelling using the AMOS 21 software package.

The results indicate that supplier information sharing and information quality have a strong influence on strategic partnership and in turn strategic partnership has a strong influence on internal lean practices among Small to Medium Enterprises. This indicates that the level and quality of information shared between Small to Medium Enterprises and their suppliers has a positive effect on the strength of their partnerships as well as on the internal practices of each Small to Medium Enterprise. Based on these results, conclusions were drawn and recommendations were put forward on how internal lean practices in Small to Medium Enterprises can be improved by means of information sharing, information quality and strategic partnerships.

**KEY WORDS:** Supplier Information Sharing, Information Quality, Strategic Partnership, Internal Lean Practices, Small and Medium Enterprises

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## **LIST OF ACRONYMS**

SME	Small and Medium Enterprises
SCM	Supply Chain Management
SMME	Small Micro and Medium- sized Enterprise
OECD	Economic Co-operation and Development
VAT	Value Added Tax
SAMAF	South African Micro-finance Apex Fund
IDC	Industrial Development Corporation
GSA	Government of South Africa
GEM	Global Entrepreneurship Monitor
EU	European Union
ECU	European Currency Unit
SA	South Africa
R & D	Research & Development
FMCG	Fast Moving Consumer Goods
MNCs	Multi- national Corporations
RFID	Radio Frequency Identification
ADC	Advanced Data Capture
ASP	Active Server Pages
TPS	Transaction Process System
TOC	Theory of Constraints
CR	Composite Reliability
AVE	Average Variance Extracted

SEM	Structural Equation Modeling
GFI	Goodness of Fit Index
AGFI	Augmented Goodness of Fit Index
NFI	Normed Fit Index
IFI	Incremental Fit Index
TLI	Tucker-Lewis Index
CFI	Composite Fit Index
RMSEA	Random Measure of Standard Error Approximation
CFA	Confirmatory Factor Analysis
EFA	Exploratory Factor Analysis
BRICS	Brazil, Russia, India, China and South Africa

# **CHAPTER ONE**

## **OVERVIEW OF THE STUDY**

### **1.1 INTRODUCTION**

A supply chain is a system of suppliers, manufacturers, distributors, retailers, and customers with material, financial, and information flows connecting participants in both directions (Fiala 2005:419). Information-sharing in a supply chain refers to the act of capturing and disseminating knowledge and data for decision makers to plan and control supply chain operations (Togar, Alan & Ramaswami 2002:289). The type of information that is shared is not limited to what products are supplied, the amount of goods being produced or transported among the said supply chain partners and what consumers are demanding, as reflected in product sales.

Sharing accurate and timely information throughout a supply chain can yield significant performance improvements for the organisation as well as all members of the supply chain (Diaz 2000:4). Despite these benefits, a high number of organisations are reluctant to share information with their supply chain partners, due to the occurrence of an unequal distribution of risks, costs, and benefits among the partners (Kumar & van Dissel 1996:279). In an effort to compete in the ever-changing global economy, modern enterprises strive to develop a flexible supply chain system in order to sustain their competitive advantages. Supply chain management (SCM) is an effective tool in integrating the production, operational or even strategic activities that exist in the buyer–seller relationship. The unanswered questions are many, regarding information-sharing and information quality and its influence on strategic partnership and lean practices among organisations in South Africa. If we undertake empirical investigations into supplier information-sharing from the technical and the managerial aspects, there are still many areas worthy of investigation.

Despite the increasing complexity of the business environment, enterprises can transmit and share information easily and effectively through specialised divisions of human resources and internet connections and can achieve virtual integration with the supply chain suppliers (Hsu, Chiu, Chen & Liu 2009:102). In terms of the supply chain system as a whole, there is a complex relationship between the enterprises in a supply chain. Organisations want to make the most profit from the sales; on the other hand, they have to work with their supply chain partners and share the profits with them (Hsu *et al.*, 2009:102).

From the perspective of an organisation the objective of information management is to ensure that valuable information that will be useful to the business is acquired and exploited to its fullest extent (Hicks 2007:1). The activities in the process of information sharing can be considered to involve the creation, representation, organisation, maintenance, visualisation, reuse, sharing, communication and the disposal of information (Hicks 2007:1, Treasury Board of Canada 2005:51). Stating this conceptually, these elements can be considered to involve the process of adding value to information by virtue of how it is organised, visualised and represented, thus enabling information (and hence value) to flow through to the end-user through the processes of exchange, sharing and collaboration. Furthermore, it is desirable that these elements are performed effectively and efficiently with minimum waste.

In an effort to develop an understanding and a theoretical basis for the application of lean thinking within the context of information- sharing this study has discussed the development of a model of information- sharing, information quality and the key principles of strategic partnership and internal lean practices. It has also discussed the apparent importance of improving information sharing among organisations and highlighted the need for more fundamental approaches that support the overall improvement of the information sharing system, the study also looked into how strategic partnerships that comprise of information- sharing, and information quality can lead to internal lean practices within organisations.

## **1.2 PROBLEM STATEMENT**

There is a growing consensus on the importance of information- sharing and its advantages to the supply chain partners involved in a supply chain (Ellinger & Keller 2003:115). Since the environment of business networks is dynamic and complex, the finding of a suitable information technology solution for information and knowledge sharing is a severe problem. Small and medium-sized enterprises (SMEs) in particular suffer from a lack of efficient, flexible and reasonably priced software solutions for integrating their activities with those of their suppliers, customers and partners. Enterprises are not willing to take on one more software solution in addition to old ones which may become obsolete in the near future as the composition of the network changes. So far, the markets have not been able to provide flexible and cost-effective solutions for business networks.

However very few studies have investigated the specific impact of information- sharing and information quality on strategic partnership and whether this can lead to internal lean practices among organisations. Some studies have focused on the benefits associated with information sharing for organisations in the Supply Chain context (Chen 2004:22). The aim of this study was to examine the relationship between information-sharing, information quality, strategic partnership and internal lean practices among SMEs. A review on the quality of shared information, information management, and supply chain management literature reveals that few empirical studies exist that investigate the role of quality of shared information in strategic partnerships and how these aspects can lead to internal lean practices.

## **1.3 PURPOSE OF THE STUDY**

The purpose of the study was to determine the relationship between Supplier Information- Sharing and Information Quality on Strategic Partnerships and Internal Lean Practices among Small and Medium-sized Enterprises in South Africa. As well as to answer the research questions that will be stated below.



## **1.4 OBJECTIVES**

### **1.4.1 PRIMARY OBJECTIVES**

The main primary objective of this study is to investigate the relationship between Supplier Information- Sharing and Information Quality on Strategic Partnerships and Internal Lean Practices among Small and Medium-sized Enterprises in South Africa. To enable the fulfilment of the objectives of this study, the research objectives are categorized into theoretical and then later empirical objectives in order to fulfil the purpose of the study. The primary objectives are stated below:

#### **1.4.1.2 Theoretical objectives**

Theoretical objectives are based on the literature review and these objectives are formulated as follows:

- To review literature related to supplier information sharing;
- To conduct a literature review on information quality;
- To conduct a literature review on strategic partnership; and
- To conduct a literature review on internal lean practices among organisations.

#### **1.4.1.3 Empirical Objectives**

Empirical objectives are based on the relationships between the research variables. The empirical objectives are developed as follows:

- To investigate the influence of supplier information sharing on strategic partnerships amongst SMEs;
- To determine the influence of information quality on strategic partnerships amongst SMEs;
- To determine the impact of strategic partnerships on internal lean practices among SMEs.

## **1.5 RESEARCH QUESTIONS**

To gain in-depth knowledge on the research topic this study seeks to answer the following research questions:

- Does Information- sharing among organisations lead to stronger partnerships?
- Does the level of information quality enhance the strength of strategic partnerships?
- What impact do strategic partnerships have on internal lean practices?
- Does the sharing of information and its quality in strategic partnerships lead to leaner internal practices that in turn lead to less waste?

The study seeks to determine the relationship between the variables within the stated questions and to answer these questions, taking the views and opinions of the respondents' in the SME sector into account.

## **1.6 JUSTIFICATION OF THE STUDY**

In order to fill the identified literature gap, indicated above, the purpose of this study is to investigate the relationship between supplier information- sharing and information quality on strategic partnerships and internal lean practices among SME's in South Africa. There is limited research that has been done in South Africa with reference to the topic of this study, particularly in the SME sector. The attempt to conduct such a study is justified and this study makes a contribution to both academics and management practice. In order to fill the identified literature gap, indicated above, it is essential to know practitioners' and entrepreneurs' current knowledge of the topic in order to determine what interventions would be most beneficial in helping to curb the problem of the lack of knowledge in this area and to understand the underlying causes behind the problem, while creating awareness and giving new insight to those who are already aware of this topic.

On the academic front, this enquiry will hopefully generate new and supplement existing academic knowledge on small business external relationship management and how it can be beneficial to business enterprises. On the practitioners' front, the study is set to provide practical insights and recommendations as well as awareness, to the many managers in the SME sector on a business aspect that has been under researched.

## **1.7 SCOPE OF THE STUDY**

The scope of this study covered organisations in four provinces of South Africa, both private and public sector in the supply chain business environment with a focus on small and medium- sized enterprises.

## **1.8 RESEARCH DESIGN AND METHODOLOGY**

Punch 2010:47, defines research design as a strategy and the structure of conducting the research project. Quantitative research tools are reviewed as systematic and structured devices that aim to obtain information from respondents in a direct and open manner (Du Plessis & Rousseau 2007:21). Results from these research tools are easily quantifiable and the instruments have a potentially high degree of accuracy. Whereas, Qualitative research tools are those that are more unstructured, flexible, and diagnostic than quantitative research tools, and aim to obtain information from respondents in an indirect manner. Their results are more descriptive, but are difficult to quantify and prone to measurement error and bias (Hair *et al.*, 2010:4). The research design for this paper will encompass both a review of the literature and an empirical study using a quantitative research approach.

### **1.8.1 Empirical Study**

The empirical part of this dissertation includes the following methodological aspects:

#### **1.8.1.1 Target Population**

A population is the collection of elements (people or objects) about which the researcher wants to make inferences and the total group of people who could be asked to participate in the research study (Berndt & Petzer 2011:347). The database of the SMEs in South Africa will be used to collect information from all firms in four provinces including the Gauteng, North West, Free State and Limpopo province.

#### **1.8.1.2 Research Context**

The empirical contexts for this proposed study are the organisations and manufacturing industries of the supply chain in South Africa. Several factors were considered and prompted the choice of both the organisations and manufacturing industries of the supply chain sector as the research context.

#### **1.8.1.3 Sampling Design Technique**

Sampling techniques are divided into probability and non-probability sampling (Hair *et al.* 2010:20). This research will use probability sampling. A stratified sampling method will be used for validity and reliability reasons using the database from the Ministry of small and medium enterprises. With stratified sampling, the population is divided into mutually exclusive groups (industry sectors) and random samples are drawn from each group (Armstrong & Kotler 2007:111).

#### **1.8.1.4 Sample Size**

Sample size is a function of change in the population parameters under study and the estimation of the quantity that is needed by the researcher (Wegner 2000:86-87). Generally, larger samples result in more precise and robust statistical findings, while smaller samples result in less precise and unreliable findings (Terre Blanche *et al.*, 2006:236). A sample size of 350 was deemed to be adequate to provide a good

representation of supply chain organisations to be surveyed in the given provinces in South Africa; the chosen sampling size will be used to represent most of the South African organisations.

#### **1.8.1.5 Measurement Instrument**

The measurement instrument was designed in such a way that it suits the South African context. The measurement items were measured using a 5-point Likert scale using the following representative values: 1-strongly disagree to 5-strongly agree. The scale is based upon the assumption that each statement or item on the scale has equal attitudinal value, importance or weight in terms of reflecting attitudes towards the issued questions (Kumar 2005:145). The questionnaire item will contain four variables, namely, information sharing, information quality, strategic partnerships and internal lean practices.

### **1.9 DATA ANALYSIS AND STATISTICAL APPROACH**

Three hundred and fifty questionnaires were distributed to respective SMEs after making appointments and agreement with respective owners or managers of the organisations taking into account all ethical considerations. This is done because Structural Equation Modelling requires a large data set to obtain meaningful results (Hair *et al.* 2010:50). Self-administered structured questionnaires were used for validity and reliability reasons. The collected data was coded in an excel spread sheet and data cleansing performed. Descriptive statistics were obtained using SPSS 21 software and the CFA and path modelling were tested using AMOS 21 software.

To gain an understanding of the characteristics of each variable, descriptive statistics analysis was used which will be illustrated by the mean and standard deviation of each factor in the data analysis chapter. In addition, confirmatory factor analysis (CFA) was undertaken leading to a structural equation model (SEM).

### **1.9.1 Structural Equation Modelling (SEM)**

For this study SEM was undertaken using the AMOS 21 software package in order to test the structural paths of the conceptualised research model. SEM technique demonstrates and tests the theoretical underpinnings of a proposed study and the significance of the relationships between models constructs (Hair *et al.* 2010: 51). SEM stipulates a technique where separate relationships are allowed for each set of dependent variables and it provides an estimation technique for a series of separate multi-regression equations to be estimated simultaneously. It further contains two components namely the structural model, which is the path where independent, and dependent variables are being connected and the measurement model that enables this study to use several indicators for a single independent variable. By assessing each relationship simultaneously rather than separately, an incorporation of all the multi-scale items can be used to account for measurement errors within each scale (Hair *et al.* 2010:51).

## **1.10 VALIDITY AND RELIABILITY**

### **1.10.1 Reliability and validity of measurement scales**

The trustworthiness of the study is ascertained through the validity and reliability of the data collected. Validity refers to the extent in which an empirical measure adequately reflects the real meaning of the concept under consideration (Babbie, Moutton, Vorster & Prozesky 2011:122). Validity convinces the reader that the researcher is credible and that the results are worthwhile. An effect or test is valid if it demonstrates or measures what the researcher claims it does (Coolican 1992:35).

Reliability and validity is undertaken to check for consistency and meaningfulness of the collected research data. Factor analysis was done to check the reliability of the measurement items and the internal consistency of the research constructs. In

particular, the factor loadings, the Cronbach's alpha values and composite reliability (CR) values were determined using SPSS software in order to check measurement items reliability. Convergent and discriminate validity of the research constructs were determined by checking the inter-correlation between the research constructs and by determining the Average Variance Extracted (AVE).

## **1.11 ETHICAL ISSUES**

Ethics is a concern with the development of moral standards by which situations can be judged and it applies to all situations in which there can be actual or potential harm of any kind to an individual or group (Cant *et al.* 2003:220). In research, ethical issues can be examined as they relate to participants, researchers and sponsoring organisations. According to Kumar (2005:216) the participants, the researcher and the sponsoring organisations all have ethical issues which should be considered when formulating a research document.

This is important as this requires that permission to conduct the enquiry is sought and assurances of confidentiality need to be made to the participants. The researcher requested permission from the participants before conducting the study, indicating that permission had been obtained to conduct a study in the various SMEs that took part in the study. There is an imperative need to seek permission from owners or managers of the organisations and industries concerned to obtain the information that is needed. There is also a need, in this case, to complete an ethical or approval form from Vaal University of Technology. In addition, the respondents' information will be kept confidential and they will remain anonymous (Churchill 1991:54).

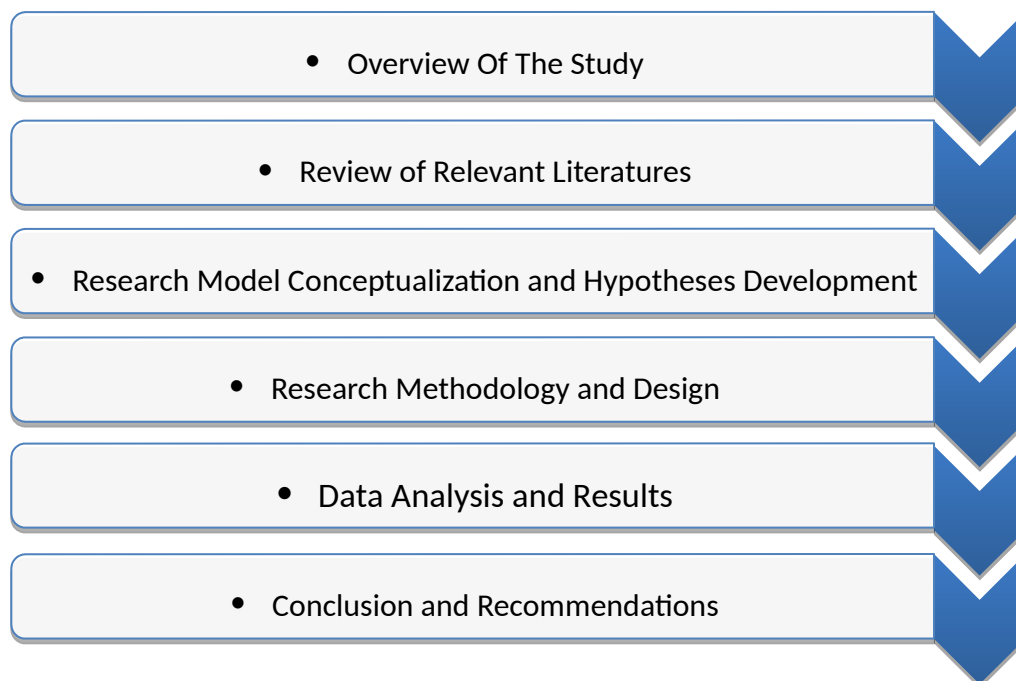
## **1.12 RESEARCH STRUCTURE**

A scientific research approach was adopted in this study which involved a step-by step logical, organised and rigorous sequence of identifying problems, gathering of data,

analysing the collected data and drawing conclusions. First, the author indicated the motivation for the research and identified the main purpose of the study by providing its overview. Second, the relevant literature on the problem of research interest is reviewed. Third, drawing from the reviewed theoretical and empirical literature, conceptual frameworks were built and research hypotheses developed for the study. Fourth, following hypotheses development, methodology was determined and implemented and data was collected. Fifth, the conceptualised model and posited hypotheses were empirically tested using data collected and the results were then interpreted. Finally, concluding remarks were provided, theoretical and practical implications of the study were extrapolated, and suggestions for future research directions were indicated.

Figure 1.1 below illustrates the six-stage research procedure followed by the author of this study:

**Figure 1.1: Research Flow**



**Source:** Adopted from Chinomona (2011:16)



### **1.13 OUTLINE OF THE STUDY**

This study consists of six chapters with the contents as mentioned below:

#### **Chapter 1: Overview of the study**

This chapter provides the research back ground. It provides an explanation of the background of the problem, purpose, research objectives, justification, scope and the significance of the study.

#### **Chapter 2: Small and Medium-sized Enterprises in South Africa**

This chapter discusses SME's in South Africa in detail. It also explains what is known about these organisations and their supply chain practises as well as how supply chain relationships are managed by these organisations.

#### **Chapter 3: Literature Review and Hypothesis Development.**

Chapter three presents and explains the coordination theory, as well as describing and empirically reviewing the variables based on the previous literature. A conceptual research framework is then developed based on the literature reviewed and the hypothesis statements are then outlined.

#### **Chapter 4: Research Methodology and Design**

Chapter five discusses the research methodology and design used in the study. Issues such as sampling technique, method of data collection and statistical techniques are addressed in this chapter.

#### **Chapter 5: Data Analysis and Results**

This chapter provides a statistical analysis of the data collected and the results obtained are discussed.

#### **Chapter 6: Conclusions and Recommendations**

This chapter presents the conclusions drawn from the research findings and the research objectives. Implications of the findings, recommendations, limitations and future research directions are also discussed in this chapter.

### **1.14 CONCLUSION**

This chapter provided an introduction to the researcher's interest in the topic of study. The problem with relevance to SMEs was outlined, through the problem statement and motivation for the study. The aims or purpose of the study was then presented, followed by the primary research objectives: both theoretical and empirical. The research questions are then stated followed by a justification of the study and the selected scope of the study. The research methodology and design of the study were discussed as well as ethical issues to be considered during the study. The chapter ends off with the research structure diagrammatically; and an outline of the forthcoming chapters of the study were stated according to the chapters' organisation.

Below in figure 1.2 is a diagrammatic representation of Chapter One

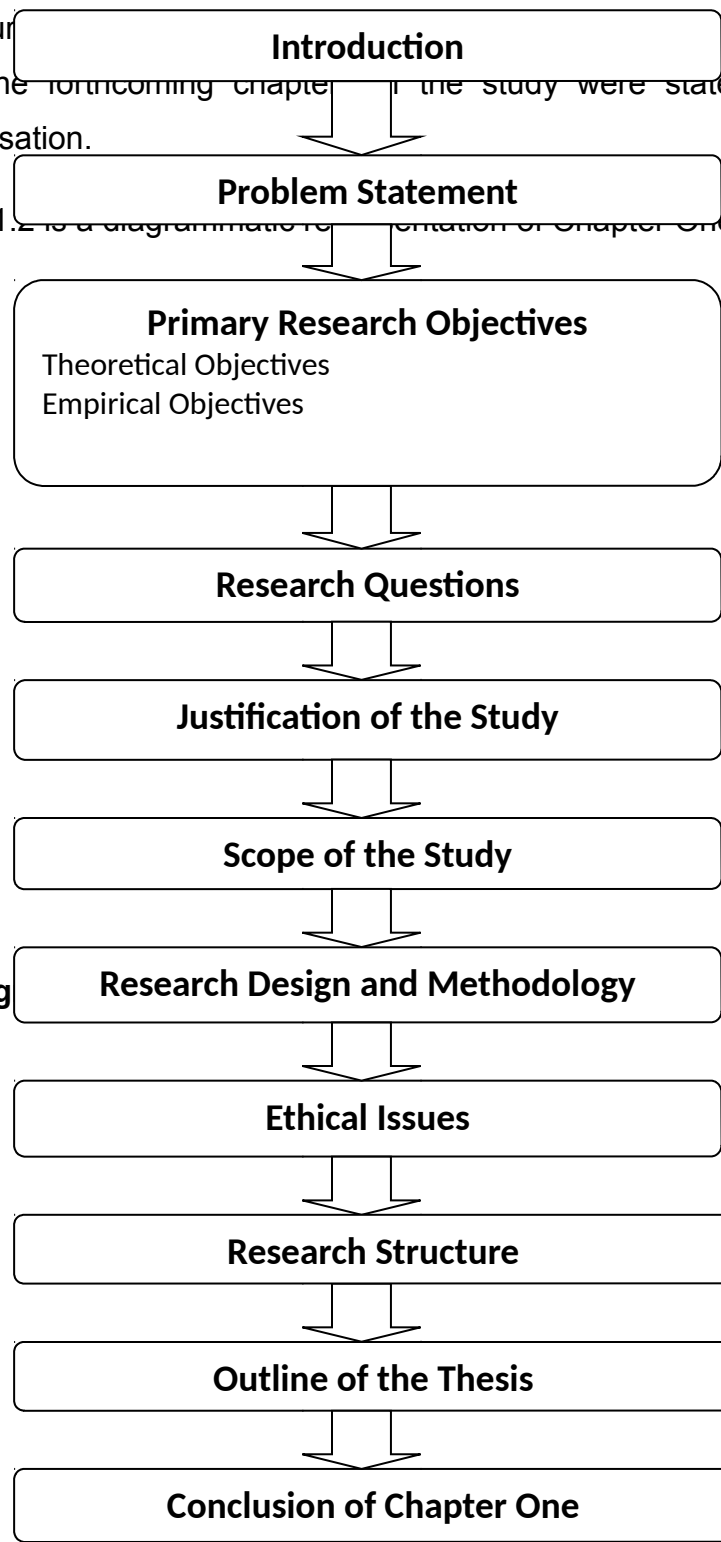


Figure 1.2: Diagrammatic representation of Chapter One



## **CHAPTER TWO**

### **SMALL AND MEDIUM SCALE ENTERPRISES IN SOUTH AFRICA**

#### **2.1 INTRODUCTION**

This chapter provides a discussion on the literature regarding small and medium enterprises in South Africa globally as well as their role and importance in the economy. The chapter begins with an introduction followed by a discussion on the background of the study with emphasis to SMEs in this case. Other aspects discussed include definitions to gain a broader understanding of the concept followed by government perspectives on SMEs, the role of these enterprises and lastly SMEs and the supply chain. The SME sector of the economy has been described as an important factor in the sustainability of economic growth as well as the development of many economies through the ability of these enterprises to adjust to environmental changes and technological orientation (Adams, Khoja & Kauffman 2012:22). It is therefore important to study this concept with the objective of providing a better understanding on the relative significance they have to the global economy. The chapter is then ended off with a conclusion.

#### **2.2 BACKGROUND OF THE STUDY**

Since 1994, South Africa has been faced with the double challenges of re-integration into global markets as a global economy, while at the same time positioning itself to realize the high expectations of its populace regarding a successful transition towards a more democratic order. While trying to achieve the objectives of economic growth through competitiveness on one hand and employment generation and income redistribution as a result of this growth on the other hand, South Africa's small micro and

medium sized enterprise (SMME) economy has been actively promoted since 1995 (Berry & von Blottnitz 2002:1).

The SMEs constitute by far the largest number of firms in the private sector, even though academics and policy-makers tend to focus on large organisations. The SMEs account for up to 90% of all registered organisations in an economy, and even more if the informal sector is included. In addition, SMEs are important providers of employment and producers of a large share of total industrial output, even in developing countries (Jeppensen, Kothuis & Tran 2012: 9).

The South African SME sector is faced with expectations to fulfil a number of roles, ranging from poverty alleviation and the creation of employment to international competitiveness. These objectives are not only very diverse policy objectives, but the policy instruments introduced to meet these objectives can also be equally different, ranging from literacy, training as well as technological advice (Berry & von Blottnitz 2002:5).

One of the greatest difficulties confronting policy makers is how best to develop an approach to SMEs and small micro and medium sized enterprise that achieves a sufficient degree of co-ordination between the supply side effort and demand potential. Although there is the risk of investing resources in improving supply potential where demand constraints are high (e.g. low growth in demand because of regional stagnation), a major question is whether supply-side incentives have frequently been ineffective because of such demand problems or whether incorrectly specified supply policies/deficient service delivery are the true causes of lack of success (*Blueprint Strategy & Policy* 2005:9).

According to Mahembe, there is consensus among policy makers, economists, and business experts that SMEs are drivers of economic growth. A healthy SME sector contributes prominently to the economy through the creation of more employment opportunities, the generation of higher production volumes, increasing exports and the

introduction of innovation and entrepreneurship skills to the economy. The dynamic role of SMEs in developing countries insures these organisations as engines through which the growth objectives of developing countries can be achieved (Mahembe 2011:7).

Much of the literature on SMEs in South Africa concurs that the sector is not performing optimally, for a wide range of reasons. Some of the causal factors were inherited from the apartheid state, others are a result of globalisation and international economic pressures, but many are due to the poor performance of the regulatory environment and support agencies of the current South African State (Atkinson 2012: 6).

The benefits of Supply Chain Management (SCM) for SMEs are evident from previous studies, among these benefits are the obtaining of a competitive advantage through relationships between clients and suppliers as well as the positive impact on organisational performance (Alhourani & Saxena 2014:1). A number of recent and previous studies also highlight the contribution of SCM practices for innovations in SMEs (Zeng, Xie & Tam 2010:181-194; Bos-Browsers 2010:91-109; Wang and Kafouros 2009:606; Abereijo *et al.* 2009: 82-89; Kaminski, Oliveira & Lopes 2008:96; Kaufmann & Tödtling, 2002:147).

Small and medium enterprises (SMEs) have lately been identified as productive drivers of the overall economic growth and development in South Africa and around the world. Some researchers have estimated that, in South Africa, small and medium-sized enterprises make up 91% of formalized organisations, and provide employment to about 60% of the labour force and contribute total economic output accounts of roughly 34% of the GDP (The Banking Association South Africa 2013).

While contributing significantly to the economy, SMEs foster diversification through their development of new and unsaturated sectors of the economy. Additionally, innovative and technology-based small and medium enterprises can provide a platform for local, regional and international growth, especially in Brazil, Russia, India, China and South Africa (BRICS) economies. SMEs are considered an important contributor to the

economy as drivers for the reduction of unemployment, especially since the formal sector continues to shed jobs (The Banking Association South Africa 2013).

According to the minister of industry and trade, the development of a vibrant economy depends on how entrepreneurial the people are, and though some believe that entrepreneurs are born; the fact is that entrepreneurs are made. A strategic thinking is how to develop consistently, the capacity to making entrepreneurs. Business development is about seeing opportunities and developing the best ways of tapping into those opportunities to one's advantage. A country may have quite a number of natural resources but they are worthless until they are exploited and transformed into other consumable products that can be marketable. The Government supports initiatives to develop capacities to effect the transformation. The way the existing and potential entrepreneurs react to these efforts demonstrates how receptive the community is to business development initiatives. Active involvement of all stakeholders is a key factor to gradual and consistent organisational growth and development (Chami 2011:1).

The small enterprise sector in South Africa possesses the potential to make a significant contribution to economic growth and employment of the country. It is through the implementation of innovation that better service and increased employment becomes a natural consequence. Through information- sharing the supply chains in SME's can be improved and many benefits can thus be derived.

## **2.3 DEFINITIONS OF SMALL AND MEDIUM SCALE ENTERPRISES**

The importance of the SME sector and the informal sector is internationally acknowledged and every country has its own definition making it difficult to define the concept. There is no single, uniformly accepted definition of a small organisation (Storey 1994). Organisations differ in their levels of capitalisation, sales and employment. Therefore, definitions which apply measures of size (e.g. number of employees, rate of turnover, rate of profitability and net worth) when applied to one sector might lead to all organisations being classified as small, while the same size

definition when employed to a different sector might result in an unrelated result. The definition of these enterprises vary among researchers with capital assets, skill of labour, turnover level, legal status or method of production often forming the basis on which descriptions are formulated (Abor *et al.*, 2010:219).

This section presents a broad overview of small enterprise definitions that are utilized across the globe with the objective of gaining an understanding of SMEs. This understanding goes a long way in the comparison and benchmarking of results obtained from various different studies.

SME definitions can be broadly classified into two, “economic” and “statistical” definitions. Under the economic definition, an organisation is regarded as small if it meets the following three criteria (UNIDO 2005:9):

- It has a relatively small share of the market place;
- It is managed by owners, or part owners, in a personalized way and not through the medium of a formalized management structure; and
- It is independent in the sense that it is not part of a larger enterprise.

The statistical definition, on the other hand, is used in three main areas that include:

- Quantifying the size of the small organisation sector and its contribution to GDP, employment and exports;
- Comparing the extent to which the small organisation’s sectors of economic contribution have changed over time; and
- In a cross-country comparison of the small organisations’ economic contribution.

These definitions, nonetheless, have a number of weaknesses that aorganisation them. For instance, the economic definition, which states that a small business is managed by its owners or part owners in a personalized manner and not through the medium of a formal management structure, is found to be incompatible with the statistical definition of a small manufacturing organisation which may have up to 200 employees (Yon & Evans 2011: 2). According to UNIDO, the definition of SMEs is a



significant issue for the purpose of policy development and implementation and in most cases depends primarily on the purpose of the classification. For the motives of policy development, UNIDO generally advises countries to take into account the quantitative and qualitative indicators for SME definition. The table that follows below summarises the main qualitative indicators that can be used in order to differentiate between SMEs and large companies (Yon & Evans 2011:3).

**Table 2.1: Application for Qualitative Indicators**

<b>Category</b>	<b>SMEs</b>	<b>Large Companies</b>
Management	<ul style="list-style-type: none"> <li>• Proprietor entrepreneurship</li> <li>• Functions-linked personality</li> </ul>	<ul style="list-style-type: none"> <li>• Manager-entrepreneurship</li> <li>• Division of labour by subject matters</li> </ul>
Personnel	<ul style="list-style-type: none"> <li>• Lack of university graduates</li> <li>• All- round knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• Dominance of university graduates</li> <li>• Specialization</li> </ul>
Organisation Sales Buyer's relationships Production Research development	<ul style="list-style-type: none"> <li>• Highly personalized contacts</li> <li>• Competitive position not defined and uncertain</li> <li>• Unstable</li> <li>• Labour intensive</li> <li>• Following the market, intuitive approach</li> </ul>	<ul style="list-style-type: none"> <li>• Highly formalized communication</li> <li>• Strong competitive position</li> <li>• Based on long- -term contracts</li> <li>• Capital intensive, economies of scale</li> <li>• Institutionalized</li> </ul>
Finance	<ul style="list-style-type: none"> <li>• Role of family funds, self-financing</li> </ul>	<ul style="list-style-type: none"> <li>• Diversified ownership structure, access to anonymous capital market</li> </ul>

**Source:** UNIDO (2005:81)

The abbreviation "SME" occurs commonly in the European Union (EU) and in international organisations such as the World Bank (WB), the United Nations (UN) as

well as the World Trade Organisation (WTO). The term "small and medium businesses" or "SMBs" is predominantly used in the USA. In South Africa the term is "SMME" for small, medium and micro-enterprises, and elsewhere in Africa, MSME is used for micro, small and medium enterprises (Etumeahu, Okekeke & Kingsley 2009:14). As experienced in other countries, the issue of what constitutes a small or medium enterprise is a major concern in South Africa. Various authors have given different definitions of this category of business. A common definition of SMEs includes registered businesses with less than 250 employees (International Finance Corporation 2009:9).

In practice, SMEs are defined in a number of different ways, generally with reference either to the number of employees or to turnover bands (or a combination of both, as in the National Small Business Act of 1996, which also allows for variations according to industry sector). The definition of SMEs by size is necessary, but it is not sufficient for an understanding of a sector where the realities are not only complex, but also dynamic (Mahembe 2011:24).

Despite the importance of this sector, there is no generally agreed upon or universally applicable definition of SMEs. A number of factors, related to a given socio-economic environment, influence the definition of SMEs.

The following are some of the determinants for 'SME' that are given in literature (The Task Group of the Policy Board for Financial Services and Regulation 2001:24-25):

- The Organisation for Economic Co-operation and Development (OECD) views SMEs as firms with fewer than 500 employees.
- The Cruickshank Report focused on 'those firms which are no longer treated as personal customers by providers of money transmission services and credit, but are too small to have direct access to competitive capital markets', stating that

they consist mostly of enterprises with a turnover of up to £10 million (R178 789 273.20; 9/11/2014), or employment of up to 250 people.

- The Standard Bank of South Africa defines SMEs as firms with a turnover of between R150 000 and R5 million per annum.

The most widely used framework in South Africa is the definition from the National Small Business Act 102 of 1996, (Abor & Quartey 2010:221) which defines the five categories of business as follows:

- **Survivalist enterprise:** The income generated is less than the minimum income standard or the poverty line. This category is considered to be pre-entrepreneurial, and it includes hawkers, vendors and subsistence farmers. (In practice, survivalist enterprises are often categorized as part of the micro-enterprise sector.)
- **Micro enterprise:** The turnover is less than the VAT registration limit (that is, R150 000 per year). These enterprises usually suffer a lack formality in terms of registration. They include, for example, spaza shops, minibus taxis and household industries. They employ no more than five people.
- **Very small enterprise:** These are enterprises that employ fewer than 10 paid employees, excluding mining, electricity, manufacturing and construction sectors, in which the figure is 20 employees. These enterprises operate in the formal market and have access to technology.
- **Small enterprise:** The upper limit for employment is 50 employees. Small enterprises are generally more established than very small enterprises and they exhibit more complex business practices.

- **Medium enterprise:** The maximum number of employees here is 100, or 200 for the mining, electricity, manufacturing and construction sectors. These enterprises are often characterized by the decentralization of power to an additional layer of management.

The National Small Business Act's definitions of these different categories of business may be summarised as set out in Table 2.2 below.

**Table 2.2: Definitions of SMMEs given in the National Small Business Act**

<b>Enterprise Size</b>	<b>Number of Employees</b>	<b>Annual turnover</b>	<b>Gross assets, excluding fixed property</b>
Medium	Fewer than 100 to 200, depending on the industry	Less than R4 million to R50 million, depending upon the industry	Less than R2 million to R18 million, depending on the industry
Small	Fewer than 50	Less than R2 million to R25 million, depending on the industry	Less than R2 million to R4,5 million, depending on the industry
Very Small	Fewer than 10 to 20, depending on the industry	Less than R200 000 to R500 000, depending on the industry	Less than R150 000 to R500 000, depending on the industry
Micro	Fewer than 5	Less than R150 000	Less than R100 000

**Source:** Falkena *et al.* (2001:25)

## **2.4 GOVERNMENT PERSPECTIVES ON SMEs IN SOUTH AFRICA**

The importance of the SME sector has been recognised and the limitations on the growth of this sector have also been recognized at top levels in the South African Government. According to Government's New Growth Path of 2010, an important priority is enterprise development, promoting small business and entrepreneurship and eliminating unnecessary red-tape (Atkinson 2012:6).

The core components of the Government's strategy are included in the points below as adapted from (Atkinson 2012:6):

- To establish a one-stop shop and single funding agency for small and micro-business through the consolidation of Khula, SAMAF and IDC funding, amongst others, to improve access and to reduce the overhead costs of government in order to make more resources available to end-users;
- To fully implement government's long-standing commitment to pay small business suppliers within 30 days, with clear consequences (fiscal penalties) for non-compliance by public entities;
- To integrate small and micro-enterprise support systematically into all sector strategies; this is critical to ensure a space for smaller enterprises in the value chains of major industries and to support the development of clusters and sectoral regulations and market institutions that meet the needs of smaller producers;
- To initiate a red-tape elimination campaign to simplify regulated procedures and forms and remove any bias against smaller producers, for instance in zoning requirements, with results reported to Cabinet on a quarterly basis;
- To strengthen access to micro-finance for small enterprises in order to bring more citizens into economic activities and thus widen the enterprise pool in the country as one key step to promote the growth of new enterprises; and

- To address smaller businesses' concerns about access to and the cost of space in shopping malls.

According to the National Planning Development Commission it is worth making special mention of the limited expansion of small and medium-scale enterprises. In successful economies, it is in these organisations where most job creation takes place. South Africa is still attempting to successfully lay the ground for faster small, medium and micro enterprise (SMME) entry and expansion. Special concerns relate to difficult regulatory environment, limited access to financial resources and working capital and concentrated markets with limited niche opportunities (Diagnostic Report 2011:12).

In terms of the Government's analysis, the manufacturing sector is arguably more critical than the services sector. In recent years formal employment growth has come predominantly from the services sector, particularly in the wholesale and retail and business services sectors. However, these employment gains are currently uncertain. Business services employment growth has been driven predominantly by two factors: the outsourcing of activities such as logistics and catering; and the growth in the private security sector (Atkinson 2012:6).

The unsustainable dependence of retail and wholesale employment growth on private credit extension rather than income growth in productive sectors has been demonstrated by the large reversals of employment in this sector in the light of the collapse in credit extension as a consequence of the economic crisis. Therefore long-term increases in employment - in all sectors of the economy - need to be underpinned by higher growth in the production sectors of the economy, led by manufacturing. (Government of South Africa (GSA) 2010:6)

Both agro-processing and construction sectors can be regarded as closely linked to manufacturing and are therefore important sectors. (The GEM reports define these sectors as part of the “transformative” group of sectors, as opposed to the “extractive” and “service” sectors.) Manufacturing is likely to promote large-scale employment, particularly of semiskilled workers (Atkinson 2012:6).

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## **2.5 THE ROLE OF SMALL TO MEDIUM ENTERPRISES**

According to Etumeahu, Okekeke & Kingsley (2009:16) industrial policies have traditionally focused on large enterprises and individual sectors. Earlier, policies regarding industry mainly supported sectors that experienced problems due to structural changes in the economy. Policies regarding small enterprises and entrepreneurship have grown over the last two decades and an apparent shift has been seen in perspective from existing enterprises to an increased interest in the processes that contribute to the creation and survival of enterprises. There are several reasons why the focus of industrial policy has shifted more towards small enterprises. The main reason for this change is that small business enterprises have increasingly become an important source of employment and growth in many countries.

South Africa's SME sector has set expectations to fulfil a number of roles ranging from poverty alleviation and the creation of employment to international competitiveness. Not only are these very divergent policy objectives, but also the policy instruments introduced to meet these objectives can be equally different, ranging from literacy training to technological advice (Blueprint Strategy & Policy 2005:9).

Determining clear priority groups is an urgent action that needs to be considered. This can be achieved by either targeting more efficient promotion activities towards the more productive SMMs, or by trying to assist survivalist enterprises better, mainly the black-run endeavours. One of the greatest difficulties facing policy makers today is how best to develop an approach to SMEs and SMMs that can achieve a sufficient degree of co-ordination between supply side efforts and demand potential in these enterprises. Although some level of risk exists in investing resources in an effort to improve supply

potential where demand constraints are high (for example the low growth of demand due to regional stagnation). A major question to be considered is whether supply-side incentives have frequently been ineffective because of the existence of such demand problems or whether poorly specified supply policies or inefficient service delivery are the true causes leading to a lack of success.

It is now widely accepted that small businesses are the chief contributor to job creation worldwide, and this trend is also true for South Africa. Attempting to meet this challenge currently facing our country requires the creation of a better business environment; this may include for instance, a reduction in possible administrative and regulatory burdens on businesses and better access to finance. Achieving this goal will also require entrepreneurial attitudes that are innovative and prompt people to transform ideas into viable businesses and an attitude of learning from past failures. Countries will also need to develop more positive attitudes towards supporting entrepreneurial initiatives and an open mind to risk-taking.

SMEs are usually defined in terms of employment or turnover. In the EU, for instance, an SME is defined as a firm with fewer than 250 employees or annual turnover of less than ECU 40 million (European Commission 2003:14) this amount is approximately R 300 million in South African currency. In the South African context, these thresholds are too high, and would lead to over 90% of all firms (including listed companies) being classed as SMEs. It is therefore accepted that SA businesses with annual turnovers of less than R 50 million should be classed as SMEs.

Analysis of employment statistics as conducted by Stats SA, show that large companies are shedding jobs even as their businesses expand – the phenomenon of “jobless growth”. This is usually as a result of the introduction of technologies that increase productivity, as well as economies of scale (Datt 1994:407). Outsourcing of non-core functions also leads to organisations reducing head-counts; however, this creates numbers of small service organisations, which then show a proportionate increase in employment.

Smaller businesses have a number of advantages over large companies, for instance:



- They are nimble and can move quickly to seize opportunities;
- They are less bureaucratic;
- Most time is spent on activities that are directly client-related; and
- They are more innovative.

At the same time, there are also a number of problem areas faced by all smaller enterprises:

- Lack of access to finance (especially start-up capital);
- Registration processes are often bureaucratic and time-consuming;
- Legislative and regulatory compliance costs proportionately more;
- Lack of ability to access R&D and latest technology; and
- Disproportionate dependence on labour regulations.

Source: (Blueprint Strategy & Policy 2005:10)

Other problems facing small business enterprises in developing countries can mostly be differentiated from those of developed countries. The cause of such a result is that in most cases the governments of developed countries are able to make adequate provision for their enterprises through the implementation and use of policies that tend to be favorable to them (Etumeahu, Okekeke & Kingsley 2009:18).

The table below depicts a brief summary of the categories of problems facing small business enterprises in their process of development in many developing countries. Although these problems seem like they are general in nature they could be described as also being unfamiliar to those of developing countries and South Africa.

Some of the major constraints frequently mentioned as the limiting factor in the realization of the full potentials of small business enterprises in South Africa and other countries; are the poor management structures in place and other practices in these enterprises followed by a lack of proper record keeping and a lack of financial discipline within these small scale enterprises (Etumeahu, Okekeke & Kingsley 2009:18).

**Table 2.3: Categories of Small business- Problems**

<b>Categories of Small Business Problems</b>	<b>ADMINISTRATIVE PROBLEMS</b> Accounting Finance Personnel Management Issues
	<b>OPERATING PROBLEMS</b> Marketing Inventory Control Production Operations
	<b>STRATEGIC PROBLEMS</b> Planning Market Research Financial Analysis
	<b>EXTERNAL PROBLEMS</b> Infrastructure issues Corruption Technology Management issues

**Source:** Etumeahu et al., (2009:18)

## **2.6 SMALL TO MEDIUM ENTERPRISES AND THE SUPPLY CHAIN**

The rise of globalisation and internationalization of trade patterns as well as the liberalisation of domestic trade regimes imposes an unavoidable demand for international competitiveness on SMEs in developing countries and those of countries with economies transition. Meanwhile, it also provides those enterprises that can achieve such competitiveness with the opportunity of significantly increasing their profitability by enabling them to integrate themselves into global value chains. An

approach that can be applied to achieve this goal is the encouragement of partnerships that link SMEs either with larger domestic enterprises that have access to international markets or direct links with foreign organisations (UNIDO 2005:12).

Organisations can no longer compete effectively in isolation of their suppliers and other entities in the supply chain (Thakkar, Kanda & Deshmukh 2007:97). As organisations seek to develop partnerships and more effective information links with trading partners, internal processes become interlinked and span the traditional boundaries of firms. Various views and definitions have been reported on supply chain management (SCM). The following are examples as adopted from Thakkar, Kanda & Deshmukh (2007:97-98):

- The functions within and outside a organisation that enable the value chain to make products and provide services to the customer (Cox *et al.* 1995:270);
- SCM is defined as the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular organisation and across business within the supply chain, for the purposes of improving the long-term performance of the individual organisations and the supply chain as a whole (Mentzer *et al.* 2001:1-25);
- SCM is a melding of logistics (i.e. of distribution and production), procurement, industrial organisation economics, marketing and strategy, which emerged as a distinct area of research in the mid-1980s (London & Kenley 2001:777);
- SCM is the collaborative effort of multiple channel members to design, implement, and manage seamless value-added processes to meet the real needs of the end customer (Burt *et al.* 2004:27-39).

The field of supply management is evolving, developing positively, and addressing discipline and theory issues (Harland *et al.* 2006:730; Burgess *et al.* 2006:703). Supply (chain) management is ultimately about influencing behaviour in particular directions and in particular ways (Storey *et al.* 2006:754). Mainly, present focus of SCM research

is found to be inclined to large-scale organisations where small businesses act as ancillary or 1st and 2nd tier suppliers in their supply chain.

Specifically, fast moving consumer goods (FMCG) and the automobile industries have been found to be traditionally dependent on small and medium scale enterprises (SMEs) where the latter constitute as first tier suppliers. In many countries that are under the pressure of free trade and globalisation, the state has withdrawn the level of protection it used to provide to small-scale businesses. Large organisations can in most cases now take-up products and services which till recently were reserved for the small-scale sector; Products such as, Bio-engineering, Sports goods, Plastics products, Computer Software, etc. are affected. In an effort to minimize the system- wide costs large organisations often expect various kinds of changes from their SMEs supply chain partners. On the other hand, SMEs are often more likely to have a differentiation advantage more than a cost advantage. This occurrence is most often due to the existence of scale, scope and learning economies in the industry (Porter 1980:30). Based on this, the following is a more concise definition of SCM for SMEs:

Supply chain in SMEs is a set of business activities including purchase from open/spot market, manufacturing or processing of subcomponents/subassembly within the plant and delivery to large enterprises using hired transportation to enhance value of end product and in-turn to ensure long-term regular purchase orders (Thakkar, Kanda & Deshmukh 2007:98).

Superior features and quality, as well as superior customer service, are ways that SMEs often use to differentiate their products and services from those of the more commoditised LEs (Porter 1985:210). Supply chain inefficiency is one of the most prevalent issues facing the small- to mid-size enterprise (Lewis 2005:42). SCM appears to be a method for LEs to de-commoditise their products to reap a price premium from the market and, as an unfortunate side effect, to shrink the differentiated product territory of smaller firms (Elmuti 2002:49-57). Supply and process costs represent 30 per cent of an average manufacturing SME's budget and logistics costs incur about 40 per cent of total supply spending (John & Riley 1985:16).

On the other hand, SMEs are now more and more taking part in the global business network participating in many interlinked supply chains (Hvolby & Trienekens 2002:3). But sustainability and ability to meet changing needs for SMEs tend to be questionable when they do not have much flexibility in setting prices being a supplier to large organisations and for this, streamlining of their supply chain activities becomes equally important (Thakkar, Kanda & Deshmukh 2007:98).

The basis of global competition has drastically changed. Organisations are no longer competing against other organisations, but rather supply chains are competing against supply chains. The success of a business is now invariably measured neither by the sophistication of its products nor by the size of its market share. It is instead usually seen in the light of the ability to harness its supply chain, sometimes forcefully and deliberately so as, to deliver responsively to customers as and when they demand it (Asian Productivity Organisation (APO) 2002:3). This current necessity to change is brought about by the onset of new and emerging, albeit sometimes disruptive, technologies. The rapid penetration of new technologies such as the Internet is also transforming global commerce, shrinking the marketplace, forcing situations of highly unstable and unpredictable demand intensities, and shortening the lead times of critical information flow. In this setting, the literature, both trade and academic, has repeatedly reported how technology as a driver of change has influenced the supply chain practices of many multinational corporations (MNCs) (APO 2002:3).

These MNCs have their supply chains and they are intricately linked to the digital economy on a path of no return. Therefore supply chain management (SCM) will have to be linked to the new digital economy as demanding and technology-savvy customers around the world increasingly expect goods and materials to be delivered to their doorstep at click-speed, courtesy of broadband capabilities. Charles Fine (1999:6), in his book *Clock speed: Winning Industry Control in the Age of Temporary Advantage*, emphasized that the ability to capture and share Internet-enabled, real-time information has dramatically boosted the clock speed of many industries, dictating the key elements of survival (APO 2002:3).

Countries and organisations alike that desire to participate in global supply chains must understand and embrace without further hesitation the new mantra of SCM on which the new competition is premised (Morris 2010:284). Likewise, South African enterprises must adopt these new technologies to participate effectively and to navigate successfully in the new economy.

Against this background, countries should share their experiences in the practical applications of SCM which have contributed to increasing customer satisfaction, improved productivity, better work processes, and greater competitiveness. One prime concern to be highlighted is the financial and organisational ability, and perhaps willingness, of indigenous SMEs to invest in much-needed IT infrastructure (which might not yield a corresponding rate of productive return) and other related technologies [like Radio Frequency Identification (RFID), Advanced Data Capture (ADC), Active Server Pages (ASP), and so forth] to improve their supply chain processes. Issues such as complexity, time and space compression, and cooperating in e-marketplaces are all new challenges that SMEs must face and survive or risk being either marginalized to commodity players with a low value proposition at best or forced into oblivion in the worst-case scenario. In addition, SCM must integrate SMEs to ensure greater collaboration between supply chain partners, in particular SMEs that serve as suppliers to larger corporations responsible for either semi-finished or finished goods, and work toward a synchronized value collaboration network (APO 2002:3).

## 2.7. CONCLUSION

There is a question on how well the concept of Supply Chain Management (SCM) fits with the Small and Medium-sized Enterprises (SME) industry that remains open. Many firms with 500 and fewer employees, SMEs in this case, make a choice to make SCM part of their strategy implementation while many other SMEs shun it (Magretta 1998:102; Notman 1998:191; Kaufman *et al.* 2000:403; Tulip 2000:18-29; Hayward 2001:410; Quayle 2002:1148). SCM is a way of obtaining vertical integration benefits without its formal ownership costs. SCM, the integration of key business processes among industry partners to add value for customers, thus tightly linking together several consecutive elements of the industry value chain, from upstream suppliers to subassembly manufacturers to final manufacturers to distributors to customers, in an effort to make the process more efficient and the end products and services more differentiated (Lummus *et al.* 1998:426; Tan 2001:174; Wisner 2003:1-26).

To the entrepreneur, SCM has many potential benefits; mainly, it gives the SME the ability to leverage its scalable competences (e.g., in product design and radical process innovation) in a cooperative network through fast and feasible access to complementary partner assets. However, SCM also introduces new challenges in technology management to the SME because it is a much closer and technically intense and complex transaction set (Venkataraman & Van de Ven 1998:231) than most alternatives have. Organisations today face great challenges from the unpredictable, globalised and competitive business environment (Chong *et al.* 2009b:329). In order to respond to these challenges, organisations have sought various business strategies which will enable them to compete better with their business rivals. One way in which organisations have tried to improve their competitive advantage is through the implementation of supply chain management (SCM). The next chapter presents the literature review through theoretical grounding as well as hypotheses development.

## **CHAPTER THREE**

### **LITRATURE REVIEW AND HYPOTHESES DEVELOPMENT**

#### **3.1 INTRODUCTION**

Conducting a review of related literature was essential as it strengthens the procedure to be used, restricts data collection to what is really of material value to the current study and assists with data verification (Babbie 2010:523). It includes the summarising of past results whilst revealing potential reasons for inconsistencies in past research findings and for directing future investigations (Alasuutari, Bickman & Brannen 2009:536). Various items of literature have been reviewed including material from books, journals, completed theses, and online information. From this an attempt was made to gain a clear understanding of the concepts involved in this study and their influence on each other. Both theoretical and empirical literature were reviewed and the variables that were reviewed will be discussed beginning with the theoretical framework followed by the empirical framework. The conceptual research framework was discussed and hypotheses also developed. The chapter was then ended off with a conclusion.

#### **3.2 THEORETICAL FRAMEWORK**

##### **3.2.1 The Coordination Theory**

“This theory is defined as a body of principles about how the activities of separate actors such as organisations and people can be co-ordinated to achieve the same set of goals (Malone 1988:87).” The co-ordination theory suggests that the process of supply chain restructuring is detailed without losing sight of the overall principle goals that are set to be achieved by the organisation. It is also helpful for supply chain partners in the integration of their business activities by facilitating information- sharing among them



and thereby creating synergies through this process of facilitation (Roh *et al.*, 2011:4517).

Given that the typical supply chain is comprised of multiple actors (such as supply chain partners, including suppliers, manufacturers and distributors) that are in pursuit of the same set of overall goals (for instance; meeting end-customers' needs, eliminating waste and reducing inventory across the supply chain, etc.), the co-ordination theory can be a very useful tool for the process of redesigning and restructuring the supply chain (Roh, Min & Hong 2011:1121).

The co-ordination theory is designed to address the following questions (Malone 1988:357-370):

- (a) How can overall set goals be sub-divided into tasks?
- (b) How can different tasks be assigned to each actor?
- (c) How can required resources be allocated among different actors?
- (d) How can required information be shared among different actors?
- (e) How can the different knowledge and conflicting goals of different actors be combined to create synergy required for the achievement of the overall set goals?

Although rarely utilized in the supply chain field due in part to a lack of a coherent body of theory, the co-ordination theory can be helpful in explaining how co-ordination mechanisms such as standardisation and early supplier involvement in new product design, can work towards restructuring the supply chain and can also help to develop information (e.g. point-of-sales system) and communication systems (e.g. electronic data interchange, extensible markup language) that are essential for the integration of business activities across the entire supply chain (Roh *et al.*, 2011:4530).

The Coordination theory also provides an approach to the study of processes. In this view, the design of a process depends on the coordination mechanisms chosen to

manage dependencies among tasks and resources involved in the process (Crowston 1997:157).

This theory can be used effectively in managing a supply chain, and it can be utilized to design and manage the supply chain of an SME. It can also assist in the process of supplier information- sharing and information quality on strategic partnerships and internal lean practices among Small and Medium Enterprises.

### **3.3 EMPIRICAL REVIEW**

#### **3.3.1 Supplier Information- Sharing**

Information- sharing refers to the extent to which critical and proprietary information is communicated to one's supply chain partner (Monczka, Petersen, Handfield & Ragatz 1998:553). Information- sharing is also referred to as the degree of access to and the sharing of important supply chain information between a organisation and its supply chain partners. This information may include forecasts; manufacturing schedules, as reflected in inventory drawdown rates; and inventory data at upstream locations (Chengalur-Smith, Duchessi & Gil-Garcia 2012:58-67).

As a society moves from the industrial to the information age, information is brought to the forefront as a factor of production and identified as the asset fundamentally responsible for organisational success (Grant 1996:375–387; Kogat 1992:383–397). Sharing information allows the participating organisations to integrate their knowledge, detect the window of opportunities in the marketplace and capture positions of advantage (Gavirneni, Kapuscinski & Tayur 1999:16–24; Sambamurthy, Bharadwaj, & Grover 2003:237). In particular, sharing of information between trading partners may enable the organisations to plan activities in the supply chain, such as conjunctive demand forecasts and replenishments. Nevertheless, the great potential benefits of information sharing do not lead most organisations, especially small and medium enterprises (SMEs), to enter such cooperative relationships (Ke & Wei 2007:297). Lack of information sharing with trading partners has been consistently found to be the most

critical failure factor in supply chain management (Elmuti 2002:49–57). The interest in the phenomenon of insufficient information sharing in supply chains motivated the research reported in this paper.

Monczaka *et al.*, (1998:786) define information sharing as the extent to which one party in the chain communicates critical and proprietary information to another party in the chain, and when all members have access to the same information the supply chain can become smoother and more responsive (Huang & Gangopadhyay 2004:122). According to Yu *et al.*, (2001:64) there are three levels of information sharing, the first level is called decentralized control and it refers to a situation where no information is shared in the supply chain and each segment makes all strategic decisions independently to reach individual optimization.

The impacts the decisions will have on suppliers and customers are not considered, in the worst case this can lead to situations where the organisation becomes more exposed to the danger of the bullwhip effect. The second level is called “coordinated control” and refers to when two inventories are coordinated based on sharing of customers’ order information. In such a situation the manufacturer receives information about customers’ demand along with retailer’s ordering information and based on these data the manufacturer makes decisions about the proper inventory level. The third and last level is called “centralized control”, where one single organisation or a small group of executives are the decision-makers for the entire supply chain, and processes all relevant information to execute decisions that, optimally, should assure better system efficiency and system wide optimization. To utilize information, information technology systems such as ERP (Enterprise Resource Planning) and EDI (Electronic Data Interchange) should be implemented in every participating organisation in order to easily share and store information and data so that anyone in the supply chain can access it at any time. The chances of the bullwhip effect and forecasting mistakes can then potentially be reduced, which could lead to a reduction in system wide costs and increase the chances of total supply chain optimization (Yu *et al.* 2001). Benefits from information sharing have been analysed by other researches as well, Gerard and Marshall (2000) found that when information sharing is introduced, the cost of holding

inventory and backorders can be reduced with 13.8%, while Lee *et al.*, (2000:534) found that if information is shared the overall cost has potential to decrease with 12-23%.

Inter-organisational relationships are built, maintained and enhanced to achieve business goals that might be difficult to accomplish by individual organisations alone. In a supply chain setting, inter-organisational relationships are usually reflected through partnerships or buyer–seller relationships. A supplier partnership in the supply chains implies the agreement between a manufacturing firm and its suppliers or subcontractors. It includes the sharing essential information with respect to limitations relevant to time and distance, including sharing risks and benefits that come along with the relationship. The buyer–seller relationships, for its part, reflect strategic relationships among independent firms (Tang, Shee & Tang 2001:49). Both partners involved in the relationship tend to collaborate together if they perceive that their cooperation with each other will bring benefits or value. For a supply chain as a whole to achieve its competitive advantage, collaborative behaviour and activities need to be promoted to build value-based relationships among members (Wang & Wei 2007:647-674; William & Diana 2007:108).

Information-sharing has increasingly become an important issue for the supply chains. Information sharing significantly has an effect in the reduction of supply chain costs (Gavirneni, Kapuscinski & Tayur 1996; Huang, Lau & Mak 2003:1483; Swaminathan, Sadeh & Smith 1997; Tan 1999), and the achievement of competitive advantage (Drucker 1992: 95-105; Li & Lin 2006:1641; Li, Ragu-Nathan & Rao 2006:107-124; Shin, Ishman & Sanders 2007:165-174). When we take a greater portion of information that is available and share it with partners (Ellinger, Taylor & Daugherty 1999:25; Pereira 2009:372) in the supply chain, such as subcontractors or suppliers, a business enterprise can make better decisions on ordering, capacity allocation and production/material planning so that the supply chain dynamics can be fully optimized (Huang *et al.* 2003:1483-1517). Inter-organisational information sharing within the supply chains has thus become a common practice in many organisations, because it enhances the competitive advantage of the supply chain as a whole.

To achieve the advantages of information sharing, it is of strategic importance for manufacturing firms to understand the factors pertaining to inter-organisational relationships that affect the information sharing behaviours of their partners. Existing research on this important issue has focused on modelling all the factors under investigation as precursors or independent variables that directly affect the behaviours of information- sharing (Cheng 2011:374). Information sharing is determined by the trade-offs among factors including dependence, uncertainty, exchange efficiency, and social satisfaction, among others (Dwyer, Schurr & Oh 1987:11-27). It is generally believed that willingness to share is greater if parties have a close relationship. In contrast to inter-organisational information sharing, intra- organisational information sharing is also briefly discussed below.

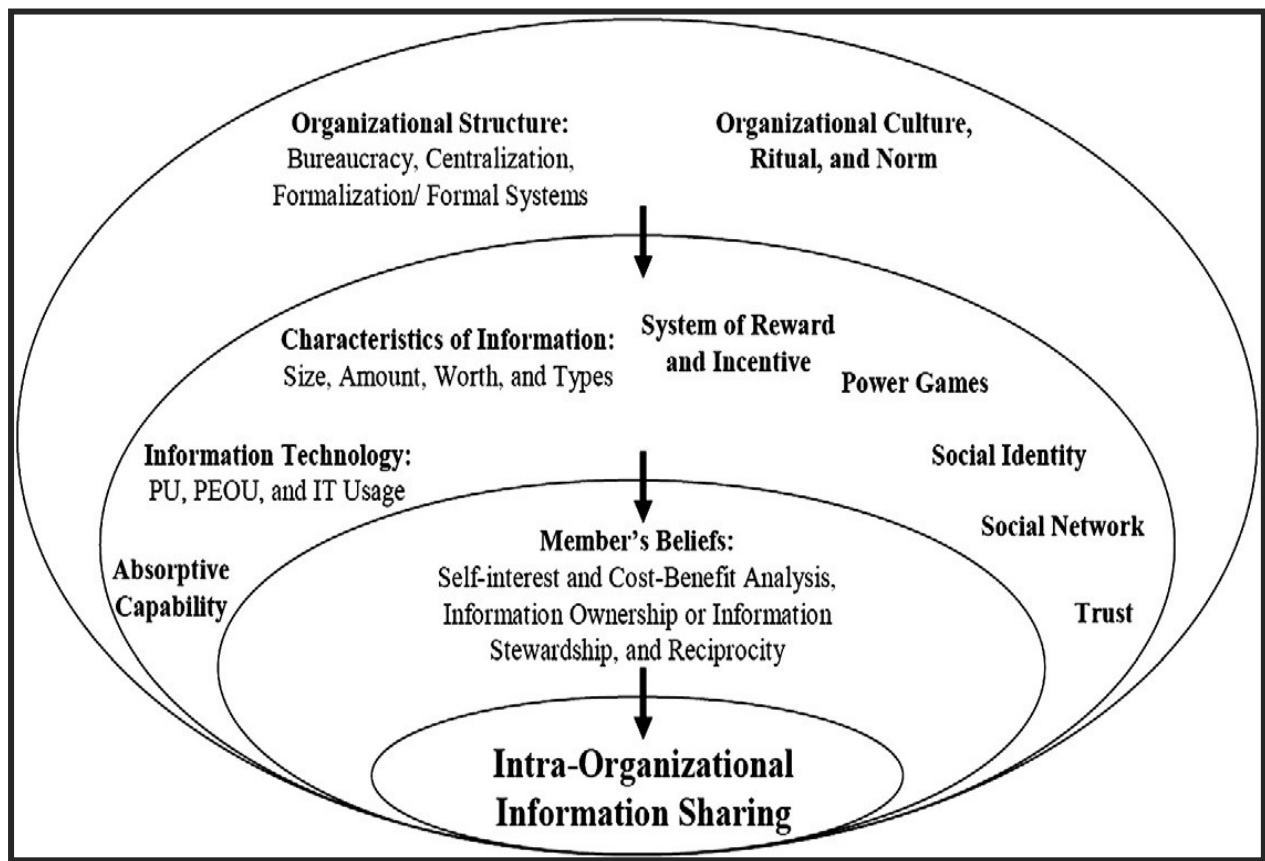
### **3.3.1.2 Intra-organisational information sharing**

Within organisations, there is a trend to encourage groups to share information and knowledge (Zhang, Dawes & Sarkis 2005). Wheatley (2006) indicates, however, that in the bureaucratic model, information flows in organisations are strictly controlled. With limited access to and sharing of information and knowledge, organisational members lack the capability to develop integrated solutions to problems. Often members of an organisation do not share information scattered among organisational groups (Ardichvill, Page & Wentling 2003; Cress & Kimmerle 2006). According to the literature, there are various factors that can influence intra-organisational information sharing (see Fig. 3.1).

The relationships between these factors are usually complex and each factor can influence the other. Organisational structure as well as organisational culture, ritual, and norm are the two factors comprising the outer layer in figure 3.1 that have a broad impact on all the activities of an organisation. The system of reward and incentive, power games, social identity, social network, and trust are factors that comprise the second layer in figure 3.1 that can be formed and influenced by organisational structure and organisational culture, and they can have an influence on members' beliefs in intra-organisational information sharing. Similarly, the characteristics of shared information,

the adoption of information technology (perceived usefulness and perceived ease of use), and the absorptive capability also affect members' beliefs. While influenced by the factors in layers one and two, members' beliefs toward intra-organisational information sharing (represented by the inner layer in Fig 3.1) can be developed and mediated by self-interest and cost–benefit analysis, information ownership and stewardship, and reciprocity (Yang & Maxwell 2011:165-168). Understanding information sharing on the intra-organisational level can provide insights into information sharing on the inter-organisational level. Some of the factors discussed in the intra-organisational information sharing may be applied to the inter-organisational scenarios.

**Figure 3.1: Factors influencing intra-organisational information sharing.**

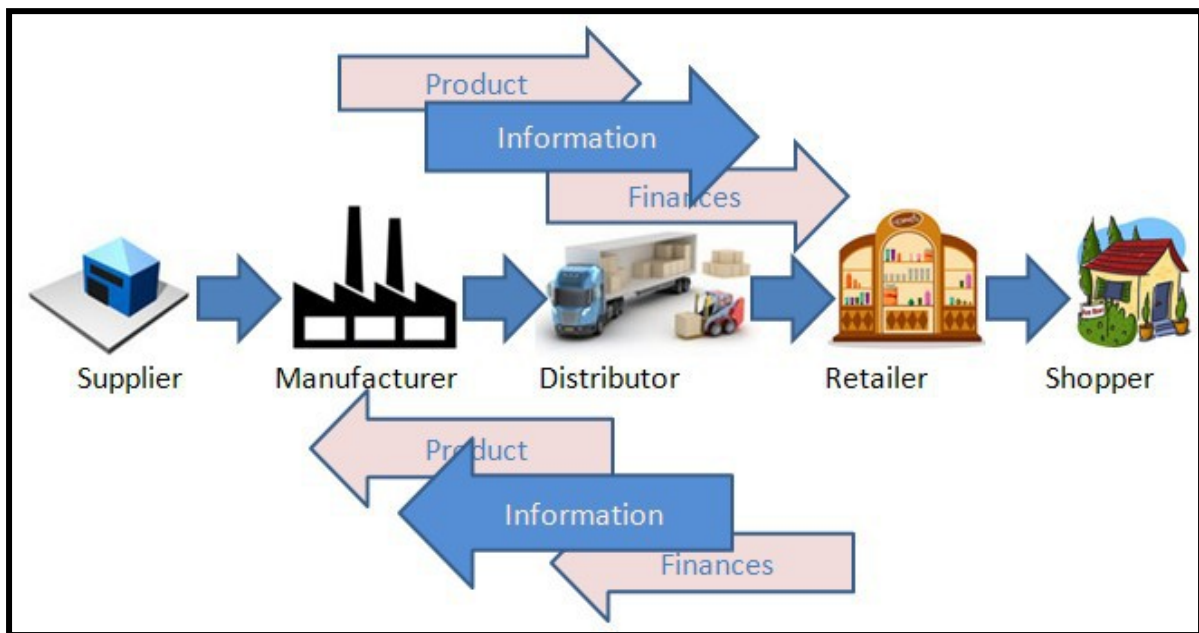


**Source:** Yang & Maxwell (2011:166)

### 3.3.1.3 The Importance of Information-sharing in a Supply Chain

Many researchers have emphasized the importance of information sharing in Supply Chain Management practice. Lalonde (1998:7) considers sharing of information as one of five building blocks that characterize a solid supply chain relationship. According to Stein and Sweat (1998:36) supply chain partners who exchange information on a regular basis are able to work as a single entity. Together, they can understand the needs of their end customer better and therefore can respond to market changes quicker. Moreover, Yu *et al.*, (2001:114) has pointed out that the negative impact of the bullwhip effect on a supply chain can be reduced or even eliminated by simply sharing information with trading partners. Again the empirical findings of Child house and Towill (2003:17) reveal that simplified material flow, including streamlining and making highly visible all information flow throughout the chain, is the key to an integrated and effective supply chain. Figure 3.2 below shows the information sharing among different partners from the supplier to the manufacturers, distributors, retailers and finally the end customers.

**Figure 3.2: Information flow in a supply chain.**



**Source:** Bell (2009:135)

Information- sharing is also referred to as the extent to which strategic information is shared with suppliers (Amir, Jin & Troege 2010:855). However, this concept leaves a question open on the extent to which information- sharing can be said to be advisable between third party logistics providers and their customers. Although the industry definition of Shared Services and information is generally seen as referring to the sharing of business processes, business functions or expertise, many different aspects of an organisation can be shared. Sharing may start with collaboration and adoption of best practices and develop from there as the greater the level of sharing, the greater the benefits to participating organisations (Amir, Jin & Troege 2010:855-866). A more detailed level of sharing leads to increased levels of efficiency, higher quality of service and an increased ability to react efficiently to the market or to legislative changes. However, these benefits come coupled with higher risks and the need for a strong change management culture for practitioners.

The concept of information- sharing in the SME sector can help in building strong relationships among suppliers, sharing of timeous strategic information can help these young organisations to become more efficient and effective in both the business and supply chain environment. A positive attitude towards this phenomenon should be cultivated and promoted in order to promote growth and profitability in these thriving entities. Practitioners and managers should be made aware of the benefits that they can reap if they embrace change and effect that change in their companies. History and recent success in the big companies has proven this to be effective.

### **3.3.2 Information Quality**

Information quality includes aspects such as the accuracy, timeliness, adequacy, and credibility of information exchanged (Monczka, Petersen, Handfield & Ragatz 1998:556). While information sharing is important, the significance of its impact on SCM depends on what information is shared, when and how it is shared, and with whom (Chizzo 1998:4). Jarrell (1998:253) also notes that sharing information within the entire



supply chain can create flexibility for the organisations involved, but for this to happen it requires accurate and timely information.

Information quality refers to the quality of outputs that the information system produces (DeLone & McLean 2012:781), which can be in the form of reports or online screens. Accuracy is agreement with an attribute about a real world entity, a value stored in another database, or the result of an arithmetic computation. Completeness can be defined with respect to some specific application, and it refers to whether all of the data relevant to that application are present. While consistency refers to an absence of conflict between two datasets, currency refers to up-to-date information. Researchers have used a variety of attributes to describe information quality. Nelson (2005:333) has used the constructs of accuracy, completeness, currency, and format for information quality; the additional construct used by these authors, format, is related to the presentation layout of information outputs. This concept mainly refers to how accurate, credible, current and adequate the information is that is exchanged between partners.

It is also well known that information in most cases notoriously suffers from delay and distortion as it moves up the supply chain (Müller 2003:188 & Towill 1997:137). Moreover, another consequence of the traditional culture is that, organisations can deliberately distort order information to conceal their true intentions from competitors, and also, in some instances, from their own suppliers and customers (Towill 1997:140). Most organisations usually perceive the disclosure information as a loss of power and this can likely lead to further distortion as orders are passed along the chain (Li & Lin 2006:1641). To reduce information distortion along the supply chain and to improve the quality of this information, the information that is shared has to be as accurate as possible and organisations must ensure that it flows with minimum delay and distortion.

Quality of information serves as the background for all steps in the communication process of the modern enterprise therefore; establishing, opening and strengthening of communication channels is an important aspect to be implemented. In most cases relatively small businesses, which operate locally, have limited ability to access and

utilize the large amounts of information. In such cases, managers mostly can operate their businesses relying mostly on their own experience. Large businesses, operating on global scale, require a well-established information system as a basis for effective communication among various subjects involved in a business process (Michnik & Lo 2009:859).

Information quality results from the information system which covers the organisational processes, procedures, and roles employed in collecting, processing, distributing, and using data. Thus a database should be available to provide such information. Data quality is at the heart of information quality in that poor data quality results in poor information quality. Poor data quality, and hence poor information quality, has adverse effects on organisations at operational, tactical, and strategic levels (Redman 1998:419). Organisations need to treat and view information as a product that ultimately serves as a tool to satisfy consumer needs.

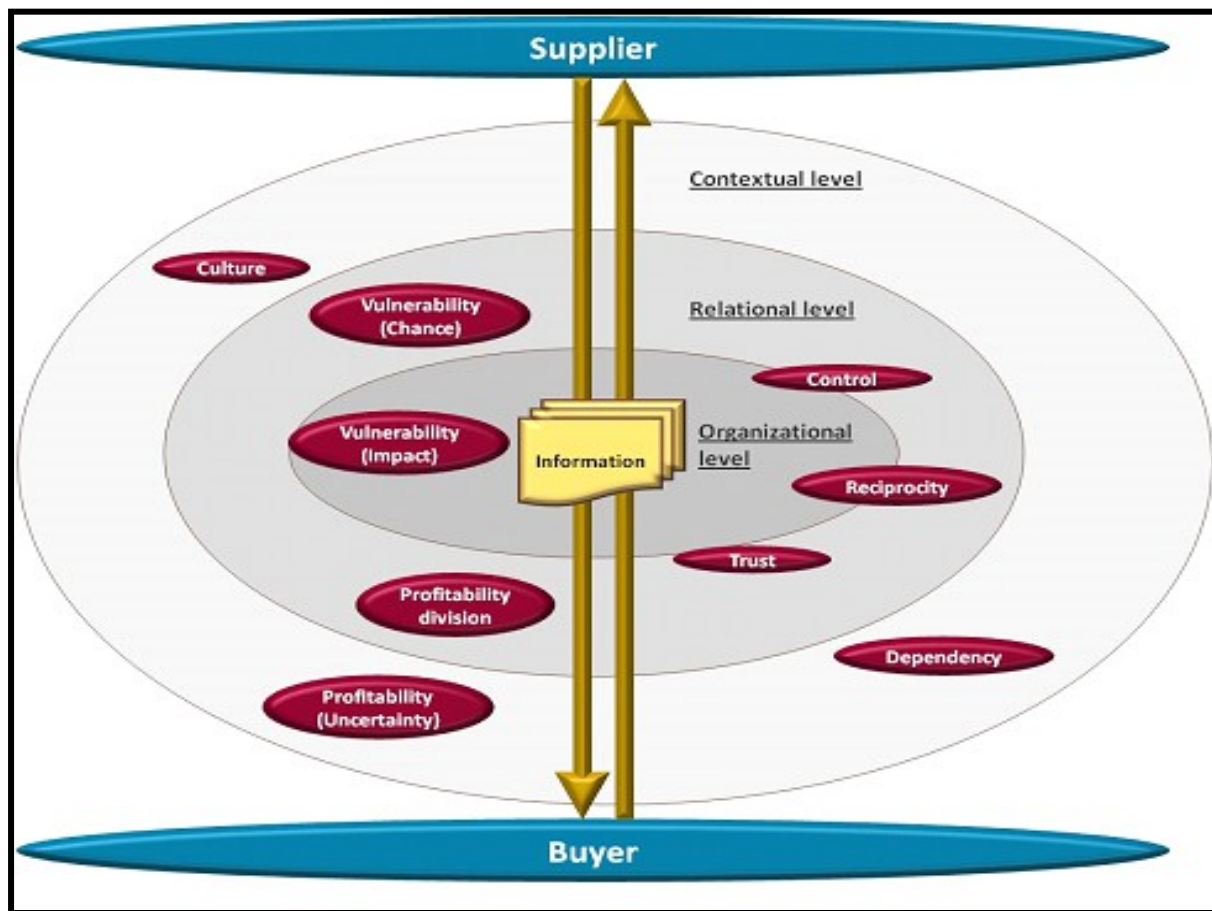
Information quality is achieved when a focal organisation and its supply chain partners share strategic and operational information in trust relationships. Supply chain performance is dependent on the quality of information shared among partnering organisations. The three dimensions of the quality of information sharing are classified as: accuracy, trustworthiness (reliability or credibility), and timeliness (Li & Lin 2006:1650; Zhou & Benton 2007:1348). Security is included as one of the essential attributes of information quality (Lee, Strong, Kahn & Wang 2002:133).

Thus, this study will also emphasize the importance of information quality, its accuracy, trustworthiness, timeliness, and security of information between a focal organisation and its main supply chain partners. When quality information is shared both parties can achieve the benefits of such information in many different aspects and operations of their respective organisations. It is said that “knowledge is power”, quality information can be a powerful tool for companies to utilise to their advantage in this present cut-throat business environment.

### 3.3.2.2 Information Quality Frameworks

Information quality (IQ) frameworks Kandari *et al.*, (2010:132) reviewed twenty major IQ frameworks in IQ literature that have been proposed by researchers in the field of IQ, since its inception in 1996. The authors in agreement with Knight (2008:546) contend that despite the varied research contexts of IQ frameworks there exists a remarkable commonality amongst the eventual elements identified by various researchers as being important dimensions of IQ. Kandari *et al.*, (2010:132) identified twenty three most frequently occurring dimensions in IQ literature. Figure 3.3 below provides a summary of the most common dimensions and the frequency with which they have appeared in the identified twenty IQ frameworks.

**Figure 3.3: Information Quality Frameworks**



**Source:** Knight (2008:112)

Information quality frameworks maintain the view that, data cannot be assessed independent of the people who use the data (Strong et al. 1997:56), and this is currently the most widely accepted view in quality literature. Shankar & Watts (2003:445), also highlight caution against defining quality using frameworks that are without a context. The literature reviews major information quality frameworks collated from 1996 to 2006. Although the frameworks are varied in their approach and application, these frameworks share distinct characteristics regarding ultimate classifications of the information quality dimensions (Knight 2008:112). The review is done in a chronological manner, with few exceptions when extended or derivative models have been discussed together.

In order to investigate the effects of information quality on decision-making, we first need to measure and control levels of information quality. However, in current information quality research, a variety of results has arisen when deriving information quality dimensions. For example, Wang and Strong (1996:143) used an exploratory factor analysis to tailor 118 information metrics to 15 information quality dimensions. Based on Wang and Strong (1996)'s work, Lee *et al.*, (2002:23) carried out a correlation analysis of the 15 information quality dimensions with 261 subjects. Their result found high correlations among the dimensions, indicating that information quality dimensions are not inherently independent. With this result, they concluded that information quality is a multi-dimensional concept but a single phenomenon

Once the correlations between information quality dimensions have been confirmed, a practical assessment methodology needs to be developed. However, most information quality assessments fall into either objective or subjective methodology (Pipino *et al.* 2002:243). Objective assessment methodologies frequently employ software to automatically measure information quality using a set of quality rules. On the other hand, subjective assessment methodologies typically use surveys or interviews to measure information quality by information consumers. The advantage of objective assessment is to allow the automatic processing of large datasets and the obtaining of a single result, whereas subjective assessment typically focuses on a data sample and generates different assessment results from different users. The advantage of

subjective assessment is that it allows the measurement of information quality by a comprehensive set of dimensions. For example, certain dimensions such as believability and reputation are not suitable for objective assessments.

### 3.3.2.3 The Dimensions of Information Quality

The virtual business work flow depends on the information quality (IQ) which is an essential attribute of information. The IQ depends strongly on the organisation of the information system and how the information is processed throughout the entire work flow process. There are four aspects of information quality: (1) intrinsic, (2) contextual, (3) representational, and (4) accessibility. These four aspects are explained below according to Wang and Strong (1996:5-33):

- (1) **Intrinsic IQ** denotes the features which belong to the internal characteristic of information. This aspect includes the criteria of accuracy, objectivity, believability and credibility.

Their meanings are as follows:

- *Accuracy*: Freedom from mistake or error; conformity to truth or to a standard or model; degree of conformity of a measure to a standard or a true value.
- *Objectivity*: Relating to or existing as an object of thought without consideration of independent existence; relating to, or being an object, phenomenon, or condition in the realm of sensible experience independent of individual thought and perceptible by all observers: having reality independent of the mind “objective reality”.
- *Believability*: Capable of being believed especially as within the range of known possibility or probability.
- *Reputation*: Overall quality or character as seen or judged by people in general; recognition by other people of some characteristic or ability.

(2) **Contextual IQ** highlights the requirement that IQ must be considered within the context of the task at hand; that is, information must be relevant, timely, complete, and appropriate in terms of amount so as to add value.

The contextual aspect includes the five criteria:

- *Relevancy*: Having significant and demonstrable bearing on the matter at hand; affording evidence tending to prove or disprove the matter at issue or under discussion; means relating to or bearing upon the matter in hand; implies a traceable, significant, logical connection.
- *Value added*: Relating to, or being a product whose value has been increased especially by special manufacturing, marketing, or processing.
- *Timeliness*: coming early or at the right time appropriate or adapted to the times or the occasion.
- *Completeness*: Having all necessary parts, elements, or steps.
- *Amount of information*: To reach in kind or quality; to reach a quantity of information.

(3) **Representational IQ** and (4) **Accessibility IQ** put emphasis on the importance of the role the systems play. The system must be accessible but secure. It must present information in a way that is interpretable, easy to understand, and concisely and consistently represented.

A representational aspect covers four criteria:

- *Interpretability*: To explain or tell the meaning; to conceive in the light of individual belief, judgment, or circumstance; to represent by means of art; bring to realization by performance or direction.
- *Ease of understanding*: Easy to be recognized or formatted form.
- Concise representation: Marked by brevity of expression or statement; free from all elaboration and superfluous detail.

- *Consistent representation*: Marked by harmony, regularity, or steady continuity; free from variation or contradiction; marked by agreement; showing steady conformity to character, profession, belief, or custom.

Accessibility embraces three criteria:

- *Access*: Permission, liberty, or ability to enter, approach, or pass to and from a place or to approach or communicate with a person or thing; freedom or ability to obtain or make use of something; a way or means of access; the act or an instance of accessing.
- *Convenience*: Fitness or suitability for performing an action or fulfilling a requirement; something (as an appliance, device, or service) conducive to comfort or ease; a suitable or convenient time; freedom from discomfort.
- *Security*: Something that secures (protection); measures taken to guard against espionage or sabotage, crime, attack, or escape; an organisation or department whose task is security.

According to the discussion above; intrinsic information quality comprises of four dimensions: believability, accuracy, objectivity and reputation. Contextual information quality contains five dimensions: value-added, relevancy, timeliness, completeness and appropriate amount of data. Representational information quality includes four dimensions: interpretability, ease of understanding, representational consistency and concise representation. Finally, Accessibility information quality consists of three information quality dimensions: access, convenience and security (Michnik & Lo 2009:852). In this study, information quality is defined as a group of dimensions that capture the similar essence of information quality.

The dimensions are further summarised according to different academic author's views in the table 3.1 below:

**Table 3.1: The dimensions of information quality**

<b><i>The academics' views of information quality</i></b>				
	<b>Intrinsic IQ</b>	<b>Contextual IQ</b>	<b>Representational IQ</b>	<b>Accessibility IQ</b>
<b>Wang and Strong (1996:5–34).</b>	<i>Accuracy, believability, reputation, objectivity</i>	<i>Value-added, relevance, completeness, timeliness, appropriate amount</i>	<i>Understandability, interpretability, concise representation, consistent representation</i>	<i>Accessibility, ease of operations, security</i>
<b>Zmud (1978: 187–195)</b>	<i>Accurate, factual</i>	<i>Quantity, reliable/timely</i>	<i>Arrangement, readable, Reasonable</i>	
<b>Jarke and Vassiliou (1997:299-313).</b>	<i>Believability, accuracy, credibility, consistency, completeness</i>	<i>Relevance, usage, timeliness, source currency, data warehouse currency, non-volatility</i>	<i>Interpretability, syntax, version control, semantics, aliases, origin</i>	<i>Accessibility, system availability, transaction availability, privileges</i>
<b>Delone and McLean (1992:60-95).</b>	<i>Accuracy, precision, reliability, freedom from bias</i>	<i>Importance, relevance, usefulness, informativeness, content, sufficiency, completeness, currency, timeliness</i>	<i>Understandability, readability, clarity, format, appearance, conciseness, uniqueness, comparability</i>	<i>Usableness, quantitateness, convenience of access</i>



<b>Goodhue (1995:1827– 1844).</b>	<i>Accuracy, reliability</i>	<i>Currency, level of detail</i>	<i>Compatibility, meaning, presentation, lack of confusion</i>	<i>Accessibility, assistance, ease of use (of h/w, s/w), Locatability.</i>
<b>Ballou &amp; Pazer (1985:150– 162).</b>	<i>Accuracy, consistency</i>	<i>Completeness, timeliness</i>		
<b>Wand &amp; Wang (1996: 86–95).</b>	<i>Correctness, unambiguous</i>	<i>Completeness</i>	<i>Meaningfulness</i>	

**Source:** Adapted from Lee *et al.*, (2002:134)

Since more people have become aware of the importance of information quality, research in the field has developed extensively over the last two decades. Based on the foremost works, in this section we introduce the fundamental concepts used in this thesis. As information quality research is a branch of information system research, first it is necessary to illuminate the notion of information systems. In some literature, the information system is often referred to as a computerised database system. In this study, the term ‘information system’ covers collecting, processing, distributing and using data by organisational processes or people (Strong *et al.* 2007:17). It is also referred to as larger information system’s context by Huang *et al.*, (2005:1907) and Strong *et al.*, (2007:76). Within the context of information systems above, a novel approach in information quality research is to observe information manufacturing as product manufacturing (Ballou *et al.* 2009:667). Product manufacturing is a processing system that transforms raw materials into physical products. Analogously, information manufacturing can be considered as a process transforming raw data into information products. Therefore, information products can be defined as the results of manufacturing raw data into valuable information (Pierce 2004:187). In this study, we

define information manufacturing system as a system that operates on raw data to create information products.

Using the information manufacturing concept, treating information as a product can be a key strategy for organisations attempting to obtain a competitive advantage. However, some organisations still consider information as a mere by-product and are not aware of the importance of treating information as a product. Consequently this may lead to a variety of organisational losses such as making incorrect decisions and losing business opportunities (Wang *et al.* 1998:59). For example, an investment organisation sent a large amount of direct mail to the wrong target customers. This organisation lost its market share and incurred the need for significant reworking in their customer service. Once this organisation treated the information required for direct marketing as an information product, they were able to detect the root cause of the mail list problem and subsequently were able to improve their customer service (Huang *et al.* 1999:77). Therefore when companies cultivate the concept of information product into their organisational cultures, it can generate business growth and competitive advantage in the marketplace. In order to manage information as a product, it is proposed one follows the four principles outlined by Wang *et al.*, (2009).

### **3.3.3 Strategic Partnership**

A stream of literature supports the value of Strategic Supply Chain Partnerships. In early studies, Mohr and Speckman (1994:135) discussed partnership attributes, communication behaviours, and conflict resolution techniques as some of the important factors for partnership success. Since then, a lot of the research that has been conducted on this topic has been conceptual (Graham *et al.* 1994:419; Ellram & Hendrick 1995:41; Mentzer *et al.* 2000:549). Recently, several empirical studies have been conducted as well (Goffin *et al.* 2006:189; Nyaga *et al.* 2010:101; Sodhi & Son 2009:937). Goffin *et al.*, (2006:200) have examined the specific attributes of close supplier-manufacturer relationships in terms of potential benefits to be attained through such partnerships. Nyaga *et al.*, (2010:101) empirically examined the mediating role of

trust and commitment between inter-organisational collaborative activities, such as information- sharing, joint relationship efforts, dedicated investments, and relationship outcomes. Sodhi & Son (2009:940) scrutinized Korean supplier-retailer partnerships from two different angles, including strategic partner performance and operational partnership performance. Five factors that affect these partnership performance outcomes are information exchange, trust, joint partnership management, relationship specific assets, and partner asymmetry.

Based on this definition, in the present study, strategic partnership is defined as an inter-organisational relationship formed between two organisations in order to achieve shared goals of the participants. There are two types of strategic partnerships. The first type of partnership involves a client with certain needs for supplier functions from external sources and a vendor that provides such services in exchange for a service fee. For instance, supplier outsourcing or consulting is an example of this type of strategic supplier partnership.

Although supplier outsourcing has been a cost-effective way of accessing specialized computing power or system development skill, recent trends have shown that increasing attention has been paid to building a successful relationship between the client firm and the provider of these outsourcing services (Lee 2001). In this dissertation, the study primarily focuses on two types of outsourcing relationships that may have significant impact on SME goals and operations: alignment and alliance (Nam *et al.* 1996). Examples of the alignment relationship are IS consulting or technical supervision for supplier planning and design, and system conversion.

The second type of relationship is determined by the characteristics of information products, information quality requirements, and how information products are produced in the information manufacturing system. In this phase, they identify who assesses the quality of information products and which information quality dimensions are used in such assessment. The measurement phase is for assigning numerical or categorical values to information quality dimensions in a given setting (Ge & Helfert 2007). This

phase consists of different measuring methods that can be used to assess information quality. According to the assessment result, the analysis phase is for discovering the root cause of information quality problems and strategising an effective scheme for information quality improvement. Once the analysis phase is finished, considering budgetary constraints and resource allocation, the improvement phase is concerned with improving the quality of information products for intended use.

In the Total Data Quality Management (TDQM) cycle, the measurement phase is critical, because one cannot manage information quality without having measured it effectively and meaningfully (Stvilia *et al.* 2007). In order to measure information quality, information quality dimensions must be determined. Wang and Strong (1996) used an exploratory factor analysis to derive 15 information quality dimensions, which are widely accepted in the field of information quality research. In this study, we define information quality dimensions as a set of attributes that represent different constructs of information quality. In order to organise these information quality dimensions, Wang *et al.*, (1996) classify information quality into 4 categories: intrinsic, contextual, and representational and accessibility. Intrinsic information quality consists of context-independent dimensions. In contrast to intrinsic information quality, contextual information quality highlights the dimensions, which need to be considered in an application context. Representational information quality concerns whether the information is presented in an easily interpretable, understandable, concise and consistent way. Accessibility information quality emphasises that the data needs to be accessible yet still secure.

In the SME sector, strategic partnerships typically focus on two areas: 1. Revenue growth through access to Intellectual Property (e.g. technology, content, brands, reputation, payment systems) and customers (e.g. entry into new demographics or geographic markets); and/or 2. Sharing costs and/or risks – e.g. to reduce costs (e.g. print production, network sharing) or launch new, often risky platforms (e.g. mobile and IP distribution of TV). Potential partners can be found in an increasingly diverse set of industries as technology, economic and demographic change facilitates, if not compels,

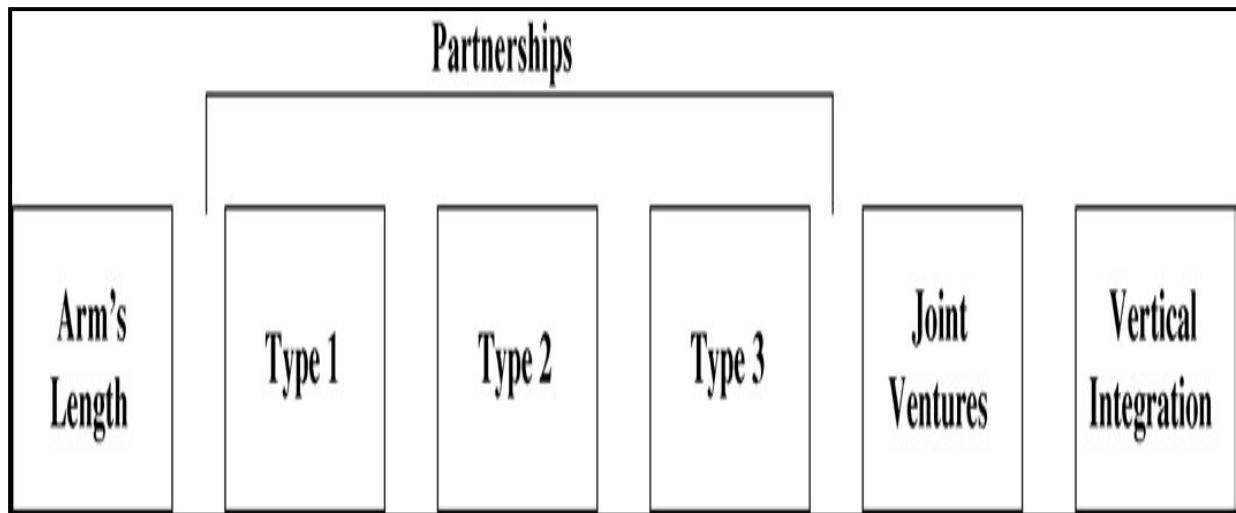
greater collaboration. Media companies, for example, work increasingly closely with financial services providers as new forms of monetisation of content become both a survival activity and the business model of the future; retail brands offer access to new demographics for media companies seeking new audiences; technology companies provide the infrastructure that may facilitate the increasingly targeted nature of advertising.

### **3.3.3.1 Types of Relationships**

Relationships have been perceived to be on a continuous sequence ranging from purely discrete transactions, through repeated transactions, to long-term relationships, to full partnerships (Mohr & Nevin 1990; Webster 1992). Placing too much focus solely on the number of transactions performed tends to ignore the fact that commodity components may be sourced regularly from a supplier without a close relationship being necessarily developed. Based on the proposition by Lambert *et al.*, (1996:1-17) there are basically three kinds of partnerships, depending on their character. They could be short- term (Type 1), long-term (Type 2) and long-term with no-end (Type3) as depicted in the figure below. It is a helpful tool to use the time dimension to differentiate between partnership types, although in practice, it cannot be assumed that a manufacturer and supplier in a long- term relationship see themselves in partnership.

It could just be that the particular manufacturer has purchased a certain product from a particular supplier for several years due to a consistently low price and the relationship between the two parties may not go anywhere beyond the placing of an order and its delivery (Goffin *et al.* 2006:192). Therefore, the time dimension offers an insufficient explanation of partnerships but Lambert *et al.*'s diagram does indicate that joint ventures and other formal business relationships should be differentiated from how the term partnership is applied to supplier relationships.

### **Figure 3.4: Types of Relationships**



**Source:** Lambert et al., (1996:2).

According to Knemeyer *et al.*, (2003:77) these three types of partnership reflect increased strength, long term orientation and the level of involvement between the parties. There is no particular type of partnership or relationship that is better than any other; the key to a successful relationship is to try and obtain the type or kind of relationship that is most appropriate and suitable to your business situation.

Partnering symbolises a shift from the traditional pressures exerted by larger customers on small and medium sized suppliers in which the latter were regarded as subordinates. The aim of partnering is to transform short-term adversarial customer-supplier relationships that are mainly focused on the use of purchasing power to secure lower prices and improved delivery into long-term cooperations that are based on mutual trust in which quality, innovativeness and shared values are the factors which complement cost competitiveness (Lysons & Farrington 2006:410).

Some comparisons between traditional and partnering relationships that exist are shown in the table 3.2 below:

**Table 3.2: Comparison of Traditional and Partnering Relationships**

<b>Comparison of Traditional and Partnering Relationships</b>	
<b>Traditional</b>	<b>Partnership</b>
➤ <i>Emphasizes competitiveness and self-interest on the part of both purchaser and supplier.</i>	➤ <i>Emphasizes on cooperation and a community of interest between the purchaser and the supplier.</i>
➤ <i>The emphasis is on 'unit price' with the lowest price usually the most important buyer consideration.</i>	➤ <i>The emphasis is on total acquisition costs, including indirect and hidden costs, such as production hold- ups and loss of customer goodwill due to late delivery of materials and components. Lowest price is never the sole buyer consideration.</i>
➤ <i>The emphasis here is on short-term business relationships.</i>	➤ <i>The emphasis is on long term business relationships with the involvement of suppliers at the earliest possible stage to discuss how the buyer's requirements can be met.</i>
➤ <i>Emphasis is on quality checks, with inspection of incoming supplies.</i>	➤ <i>Emphasis is on quality assurance based on total quality management and zero defects.</i>
➤ <i>The emphasis here is on multiple sourcing.</i>	➤ <i>The emphasis is on single sourcing, although it is not of necessarily confined to single sourcing. It will, however reduce the supplier base.</i>
➤ <i>Emphasis on uncertainty regarding supplier performance and integrity.</i>	➤ <i>Emphasis is on mutual trust between the purchaser and supplier.</i>

**Source:** Lysons & Farrington (2006:411).

### 3.3.3.2 The Importance of Strategic Partnerships

Strategic partnership clearly plays an essential role in increasing long-term benefits for the supply chain based on successful supply chain relationships and reducing risk (Mentzer *et al.* 2000:550; Lambert *et al.* 2004:58). Strategic partnership also involves trust, cultural compatibility, top management support, and effective information- sharing (Chen & Paulraj 2004:131; Li & Lin 2006:101). Organisations are forming partnerships in an effort to enhance their capabilities to improve product quality, innovation, and market reach (Dale, Lascelles & Lloyd 1994:292; Deming 1993:722; Feigenbaum 1996:725; Mohr & Spekman 1994:140; Porter 1985:53). Researchers and managers increasingly recognize that to capture potential synergy in such partnerships, the organisations must develop effective work relationships (Berry 1995:236; Cullen, Johnson & Sakano 2000:223; Gersick, Bartunek & Dutton 2000:1026; Kumar 1996:277; Wood & Gray 1991:139).

Regardless of whether the strategic alliance is a joint venture, research consortium, marketing agreement, or supply chain partnership, members from the organisations need to work together collaboratively (Wong *et al.* 2005:730). Strategic partnership plays an essential role in the increment of long-term benefits for the supply chain based on successful supply chain relationships and risk reduction (Mentzer 2000:551). The concept of strategic partnership also involves trust, cultural compatibility, top management support, and effective information- sharing (Li & Lin 2009:101). Thus, for the purpose of the current study, strategic partnership is defined as successful long-term relationships among trading partners in a supply chain that are characterized and enabled by mutual trust, organisational compatibility, top management support, and information- sharing.

Researchers have concluded that a considerable amount of evidence indicates that relationships have prevalent effects on the outcomes of collaborative efforts (Reis, Collins & Berscheid 2000:725). Theorists have also recently joined managers in arguing the value of effective relationships for facilitating coordination, teamwork, and



negotiation (Graen & Uhl- Bien 1998:340; Kumar 1996:277; Lewicki & Wiethoff 2000:86; Reis *et al.* 2000:730; Rousseau, Sitkin, Burt & Camerer 1998:393). Relationships have been thought to be critical for promoting exchange and integration across functional and organisational boundaries (Boddy, Macbeth & Wagner 2000:1003; Bouty 2000:50; Jassawalla & Sashittal 1999:50; Liedtka 1996:20).

In particular, developing inter-organisational relationships has been found to contribute immensely to bottom-line success (Peng & Luo 2000:486). In addition effective two-way communication has helped universities adapt to rapid changes (Kraatz 1998:621). Findings also suggest that inter-organisational relationships are instrumental in the process of promoting innovation (Goes & Park 1997:673).

Researchers have also argued that cross-organisational relationships tend to be often complicated and also require a great deal of skillful management (Dyer, Cho, Su, & Chu 1998:406; Lincoln, Ahmadjian, & Mason 1998:27). There are competing forces of cooperation vs. competition, learning from the other vs. protecting one's own assets, and short vs. long term vision (Das & Teng 2000:31; Kale, Singh, & Perlmutter 2000:45; Tiessen & Linton 2000:207). Time pressures, impatience, and a lack of skills can interfere with resolving issues that then fester and undermine relationships (Fisher 1997:105; Lascelles & Dale 1988:293). Alliance relationships can have extremely different dynamics and outcomes and can frustrate as well as contribute to organisational success (Humphrey & Ashford 2000:713).

Researchers also argue that effective, ongoing relationships are needed to accomplish the goals of the alliance (Bouty 2000:50; Gersick *et al.* 2000:725). A high level of commitment to the relationship appears to be especially important for working across organisational boundaries but these relationships cannot be assumed to develop easily (Griffith, Hu & Ryans 2000:303). Despite their original intentions, people responsible for implementing the new structure often come to doubt the sincerity and commitment of the other side. These doubts tend to undermine the alliance. A major source of failures in joint ventures and other alliances is that organisational representatives fail to forge an

effective relationship where they believe they are committed to working together over the long-term.

Although the number of collaborative efforts between small and large enterprises is seen to be growing, they are often problematic, as was observed by Hancke' (1998:237). Based on a study of inter-organisational relationships between small and large enterprises in France, he concluded that, due to asymmetrical power relationships, it turned out to be very hard to construct trust-based networks between them. The studies mentioned above show that partnerships between small and large enterprises have both advantages and disadvantages. Larger enterprises have a greater variety of options as compared to small enterprises in terms of resources, capabilities and power, although their activities, too, are constrained by personal and institutional factors. Innovative small enterprises are generally characterized as being flexible and having the ability to respond faster to the changing needs and environments. The increased importance of these small enterprises in networks as leaders in technology has significant implications for industrial innovation. Small enterprises that are technology-intensive can be world-class in particular niches. As a consequence of their capabilities, small enterprises can establish inter-organisational collaborations with suppliers and selected competitors and can construct powerful networks.

However, the ability of small enterprises to compete is constrained by conditions internal (e.g. lack of knowledge, skills, funds, people) and external to the enterprise (e.g. the market is dominated by a small number of major players or development of distribution channels is onerous) (Sawers 2008:176). Inter-organisational collaboration is a way that small enterprises can overcome some of these bottlenecks.

Both for small and large enterprises, collaborative efforts can be advantageous. Lawton Smith *et al.*, (1991:251) maintained that inter-firm collaboration can be beneficial to small enterprises because it provides, amongst others, the possibility of exploiting new technology; accessing new knowledge, expert users, new markets, and additional

funds; and the possibility to improve management skills. From the perspective of the large enterprise, collaborating with small enterprises can be profitable too. For example, small enterprises have people with the right combination of specialized skills to develop new products and enable large enterprises to monitor the development of new technology and equipment.

When small enterprises offer specialist, unique competencies and abilities to large enterprises, collaborative arrangements are more likely to be equal, and small enterprises may be able to negotiate advantageous contracts with larger organisations. Nevertheless, small enterprises are confronted by hazards of collaboration. Blomqvist *et al.*, (2005:497–498) maintain that ‘collaborative Research & Development (R&D) partnerships among asymmetric partners are becoming increasingly common, but given the asymmetry, the R&D context and the dynamic environment, there are inherent challenges. Small enterprises entering an asymmetric partnership often stake their reputation and future on the large partner’s integrity and willingness to find win-win solutions. Note that these authors define asymmetry not only in terms of different size, but also in terms of different power, management, capabilities and organisational cultures.

### **3.3.4 Internal Lean Practices**

Lean is a philosophy that promotes continuous improvements with its roots placed in the Japanese automotive industry (Womack, Jones & Roos 2007:73). Six-Sigma is another strategy for problem solving and engineering improvements with its roots in the American electronics industry. Both initiatives have been powerful movements for improved product quality, optimised material flow, reduced waste and numbers of defects within manufacturing and service worldwide (Krogstie & Martinsen 2013:610).

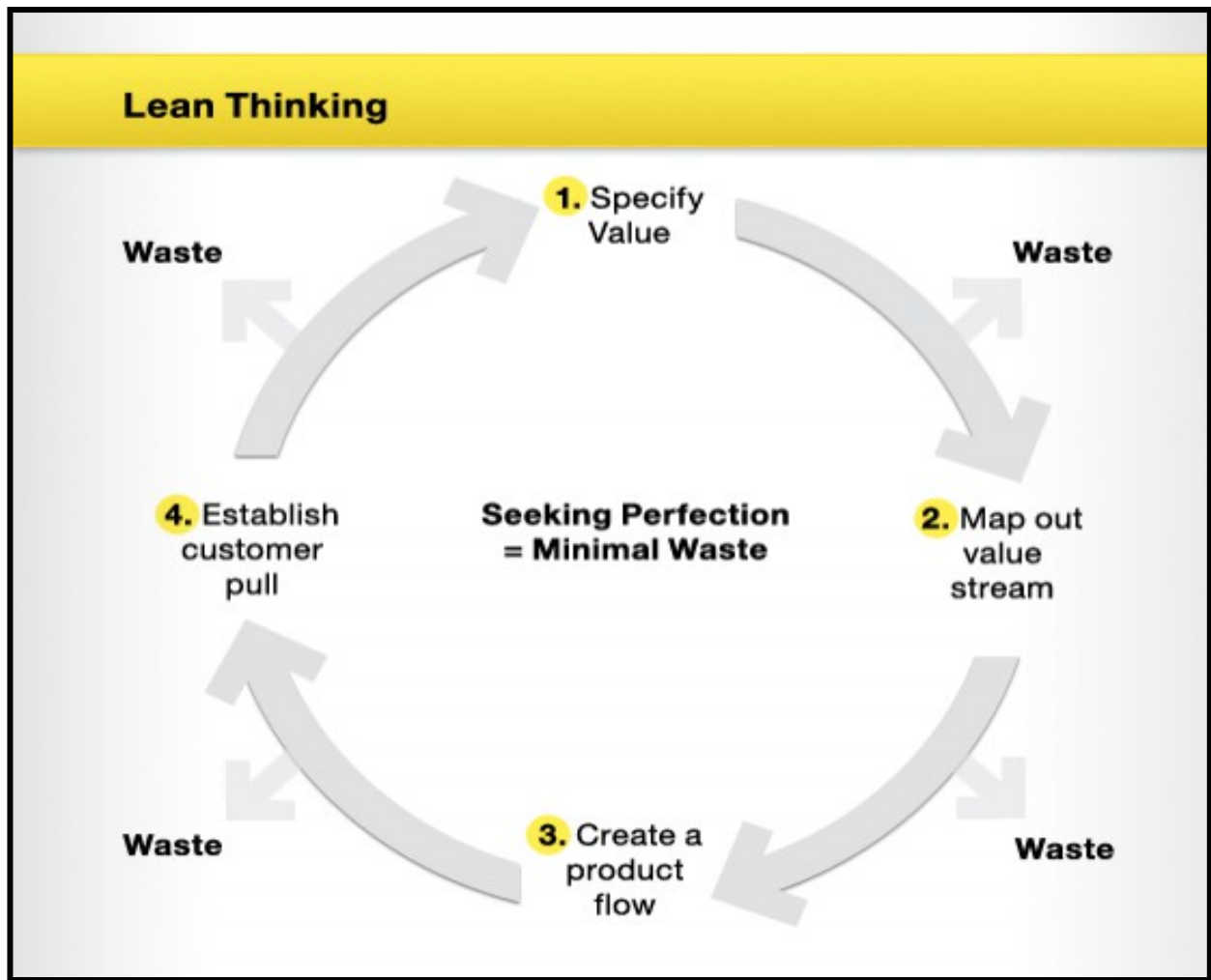
Lean is a business model that delivers far superior performance for customers, employees, shareholders and society at large. Whilst this entails delivering to the customer exactly what is required, it also involves freeing up capacity to deliver more value from the existing resources with fewer additional costs (Baggaley 2006:55).

### **3.3.4.1 What is Lean Thinking?**

Lean Thinking originated from the manufacturing methods used by Japanese automotive manufacturers. This was due to minimal resources and shortages; they then employed a production process that worked with minimum waste (Mangan *et al.* 2012:63). Their thinking soon spread through to all manufacturing areas, new product development and supply chain management (Krafcik & MacDuffie 1989). The first step in lean thinking is to understand what value is and what activities and resources are absolutely necessary to create that value. Once this concept is understood, everything else is waste. Since no one wants to consider what they do as waste, the job of determining what value is and what adds value is something that needs to be done at a fairly high level (Poppendieck 2002:3). To develop breakthroughs with lean thinking, the first step is learning to see waste. If something does not directly add value, it is waste. If there is a way to do without it, it is waste.

Lean Thinking involves a constant cycle of seeking perfection by eliminating waste and maximizing product value. This process means that end-customers don't pay for organisational inefficiencies and waste. There are four principles involved in achieving minimal waste, and these principles are depicted in figure 3.5 the below:

**Figure 3.5: The principles of lean thinking**



**Source:** Harrison *et al.*, (2011)

These principles are further explained and elaborated on below as depicted in the diagram above; according to the views of Alan Harrison & Remko V Hoek (2011):

1. **Specify value:** Customer value is identified and added along the supply chain network.
2. **Map out value stream:** Identifying all the processes along the supply chain network in order to eliminate all the processes that do not create or add value to the overall product. This process of mapping helps us understand how the value is created into the product from the customer's perspective.

3. **Create a product flow:** This entails applying the factors outlined in order to make valuable processes to occur in a smooth system thereby minimizing interruptions, inventories and downtime.
4. **Establish customer pull:** This entails manufacturing only in response from the customer that more is needed; implying that demand information is made available across the supply chain.

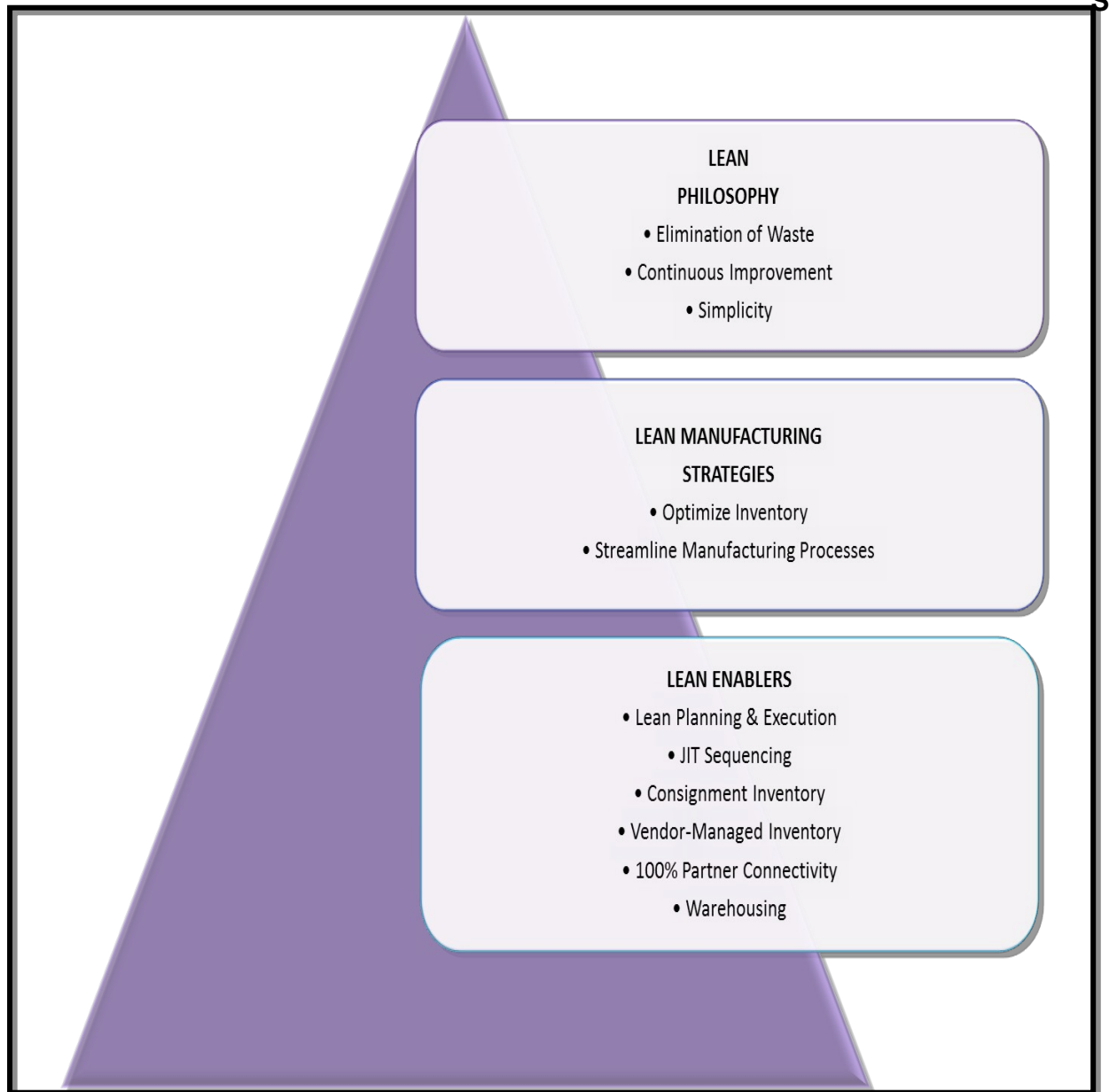
Each of these four processes should be perfected in order to progressively improve every process involved and minimize waste; this will in turn lead to maximized value.

#### **3.3.4.2 The Fundamentals of Lean**

The lean philosophy emphasizes eliminating waste, simplifying processes, and continuous improvement. The concept of lean is about doing more with less: less time, effort, space and money. Lean strategies allow manufacturers to systematically and continuously eliminate the waste that results from inefficient processes, which can include inventory, over production, waiting, transportation, motion, over processing, and defective products (QAD 2003:5).

Optimizing inventory and streamlining manufacturing processes are the two commonly deployed lean manufacturing strategies because automotive manufacturers realize that complicated business processes have added inefficiencies, costs and weeks to the industry's mass production business model. The key aspect of lean in any business environment is to ensure that value is added at every stage of the process ( 'the value stream') and steps in the process that do not add value are eliminated (Mangan *et al.* 2012:650). Lean enablers are the tools required to make these strategies work for the process of lean planning and execution, JIT sequencing, consignment inventory, Vendor-Managed Inventory (VMI), 100% partner connectivity and warehousing (QAD 2003:6). The diagram below depicts the fundamentals of leanness as explained above:

**Figure 3.6: Fundamentals of lean**



**Source:** QAD (2003:7)

### **3.3.4.3 The Lean Supply Chain**

The lean supply chain is a strategy mainly based on cost reduction and flexibility, with a focus on processes improvements, through the reduction or elimination of the all “waste” (non-value adding operations). The strategy embraces all the processes through the product life cycle, beginning with the product design all the way to the product selling, from the customer order stage to the delivery stage. Reichhart and Holweg (2007:1144) extended the concept of lean production to the downstream or distribution level by defining lean distribution as minimizing waste in the downstream supply chain, while making the right product available to the end customer at the right time and location. To Vonderembse (2006:223) a lean supply chain is the one that employs continuous improvement efforts that focus on eliminating waste or non-value adding steps along the chain. Being lean focuses on cost reduction and flexibility, for already available products, through the continuous elimination of waste or non-value added activities across the chain.

This approach seeks to find ways to deliver exceptional value to end customers by finding ways of eradicating waste and inefficiency throughout the supply chain (Womack and Jones 1996:140 & Hines *et al.* 2000:994). Womack and Jones (Wong & Wong 2011:2164) define waste as any human activity which absorbs resources but creates no value. ‘Muda’ is a Japanese word for waste and Ohno (Lewis 2000:959) has identified seven types of waste which are also known as Ohno’s seven muda. They are overproduction, waiting, transportation, unnecessary motion, inappropriate processing and defects. Waste is always linked to lean. But later, the eight wastes have been added to Ohno’s original list by other authors, namely as “underutilised people”. However, Liker (Goodson 2002:105-113) uses a different term for the same type of waste which is known as “unused employee creativity”.

The description of the eight types of wastes has been discussed and agreed by many scholars.

The eight types of waste include:



#### **i. Waste of overproduction**

Overproduction is making too much, too early or just in case. Ohno believed that this type of waste is crucial as it is the root of so many problems and other wastes (Massachusetts Institute of Technology and University of Warwick 2001:15-75 & Womack, Jones & Daniel 1996:15-320).

#### **ii. Waste of waiting**

Waste of waiting is directly relevant to flow and it is probably the second most important waste. It occurs when time is not being used effectively. In a factory, this type of waste occurs when goods are not moving and it affects both the goods and workers (Massachusetts Institute of Technology and University of Warwick 2001:15-75 & Womack, Jones & Daniel 1996:15-320). According to Bicheno and Holweg (2001:41-49), waiting is directly relevant to lead time which contributes to competitiveness and customer satisfaction.

#### **iii. Waste of unnecessary motion**

Unnecessary motion refers to both human and layout dimensions. The human dimensions relate to the ergonomics of production, where operators have to physically stretch, bend and pick up or move in order to see better and such waste is exhausting for the employees and is likely to lead to poor productivity and quality problems (Wahab *et al.* 2013:1292-1298). The layout dimensions refer to poor workplace space arrangements that lead to micro- waste movement. From other studies conducted, motion waste is also considered to be a health and safety issue (Massachusetts Institute of Technology & University of Warwick 2001:15-75).

#### **iv. Waste of transportation**

Movement of materials and double handling is also considered as waste. This will affect productivity and quality issue (Massachusetts Institute of Technology and University of Warwick 2001:15-75 & Womack, James, Jones & Daniel 1996:15-320).

#### **v. Waste of processing**

This waste refers to machines and processes that are not quality-capable. A capable process requires correct methods, training and a required standard that does not result in making defects. The problem of over-processing also occurs in situations where overly complex solutions are utilized for simple procedures such as using a large inflexible machine instead of several small flexible ones (Wahab *et al.* 2013:1292-1298).

Over-complexity generally discourages an attitude of ownership and encourages the employees to overproduce in-order to recover the large investment in the complex machines. Such an approach also tends encourages poor layout, leading to excessive use of transport and overall poor communication. The most ideal action, therefore, is to have the smallest possible machine, capable of producing the required quality, located next to preceding and subsequent operations (Massachusetts Institute of Technology and University of Warwick 2001:15-75 & Womack, Jones & Daniel 1996:15-320).

#### **vi. Waste of inventory**

There are three types of inventory such as raw material, work in process and end items. Excess inventory tends to increase lead time, prevents or hinders rapid identification of problems, and increases space that would affect communication (Massachusetts Institute of Technology and University of Warwick 2001:15-75 & Womack, Jones & Daniel 1996:15-320).

#### **vii. Waste of defects**

Defects in internal failure are scrap, rework and delay while the external failure includes warranty, repairs, and field service. Defects are direct cost for both immediate and long term business finance. Defects in transaction process system (TPS) are an opportunity to improve rather than something to be traded off (Massachusetts Institute of Technology and University of Warwick 2001:15-75).

#### **viii. Waste of underutilised people**

Refers to having more people involved in a job than necessary, not involving the associates in process improvement, not leveraging the individual potential to the fullest, not using the creative brainpower of employees, not giving the right assignment/work, uneven work distribution/load balancing, and losing time, ideas, skills, improvements, and learning opportunities by not engaging or listening to your employees (Goodson 2002:105-113 & Ohno 2010:287).

Based on the research conducted by Bayou and Korvin (2008:287), manufacturing leanness is a strategy applied to earn less input to better achieve the organisation's goals through producing better output, where "input" refers to the physical quantity of resources used and their costs, and "output" refers to the quality and quantity of the products sold and the corresponding customer services." In another review of lean manufacturing, Narasimhan *et al.*, (2006:440-457) have concluded that the efficient usage of resources through the minimisation of waste is the essential aspect of leanness as the main aim of lean manufacturing is to reduce waste and non-value added activities.

However, most of the companies that have implemented lean have assessed lean practice in their own unique way. The reason for this scenario lies in their internal issues such as lack of knowledge and their understanding of lean, culture, skills and so on (Wahab *et al.* 2013:1292).

This investigation looked into the performance levels of the medium and small organisations as opposed to large organisations implementing the lean concept.

Equally, it is considered that the findings will be of enormous help to both lean managers and organisations embarking upon their lean journeys by distinguishing the possible focus of concentration when it comes to lean management.

#### **3.3.3.4 Lean thinking and the theory of constraints**

There are many areas of agreement between the advocates of lean thinking and theory of constraints (TOC). These areas include value and flow; and they are briefly discussed below:

(1) **Value** - Both TOC and Lean embrace the value principle in that the customer's perception of value is crucial. Lean's perspective is that value can only be defined by the ultimate customer. Similarly, TOC suggests that throughput is not generated until a customer's cheque for the product has been cleared by the bank. For TOC, the customer's perception of value is a major determining factor in increasing a product's throughput. A product that relieves prospect's problems brings benefits the more and bigger problems that it relieves the greater the benefits. Clearly the focus is on the customer's perception of value (Wahab *et al.* 2013:1292). According to Martin & Patterson (2006:82) the value stream whether called a value stream by Lean or a value-added lane by TOC the concept is the same; an explicit acknowledgment that customer value is created by a chain of interdependencies that extends far beyond the walls of the manufacturing plant. Both approaches also inherently recognize that the job of every person in the organisation is to turn inventory into throughput. Defining the system and creating an understanding of the actual process flow (with process flow and other diagrams) is an early step in both TOC and Lean implementations (Martin & Patterson 2006:82).

(2) **Flow** – this concept has long been a buzzword with respect to improving manufacturing operations. Schonberger's book called Japanese Manufacturing Techniques (1982); highlights the Nine Hidden Lessons in Simplicity. It also stresses the importance of flow in a chapter entitled Simplify, and states that goods will flow like

water. Synchronous manufacturing devotes a section to “a river analogy” which describes the flow of goods through the system. The first principle in synchronous management is to balance flow not capacity. It is clear that both TOC and Lean philosophies advocate flow. In Lean Thinking, Womack and Jones have logically expanded the concept well beyond the manufacturing plant and back into the feeding processes of design and order entry (Chizzo 1998:4). There is absolutely no conflict between the two philosophies on the concept of the importance of flow. These two concepts can be applied and adopted by organisations to achieve the benefits that come with lean management.

After conducting the literature review on all the variables above it is necessary to develop the hypothesis. This is done to support the reviewed literature. Thus the following section 3.4 will provide the conceptual model and hypotheses development of the study.

### **3.4 CONCEPTUAL FRAMEWORK AND HYPOTHESES DEVELOPMENT**

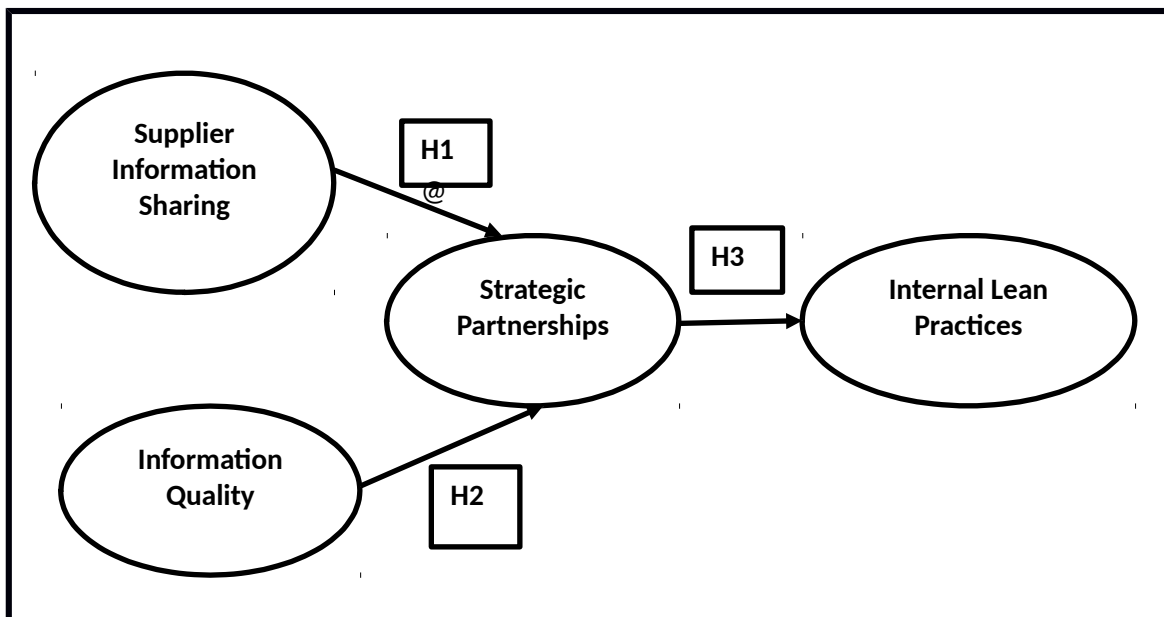
The purpose of this chapter is to establish a conceptual framework of the influence of supplier information- sharing and information quality on strategic partnerships and internal lean practices among Small and Medium Enterprises’ in South Africa. Premised on the reviewed literature in this chapter, a conceptual framework and hypotheses for the study was formulated for further empirical examination.

Drawing from the literature review a research model was conceptualised. Hypothesised relationships between research constructs were then developed thereafter. In the conceptualised research model, supplier information- sharing and information quality were the predictor variables, with Internal lean practices as the outcome variable, while strategic partnership was positioned to be a mediating variable. Figure 3.6 below illustrates the conceptual research model.

#### **3.4.1 Conceptual Framework**

The proposed conceptual framework consists of two antecedents which are supplier information- sharing and information quality, these are the predicator variables. The mediating variable is strategic partnership while the consequence for the SMEs or outcome variable is internal lean practices. The key objective of this study is to explore the factors that affect the level of trust and commitment in supply chain relationships when it comes to information- sharing and the level of quality of that information that is shared. Conceptually, the study tests the linkage between the information that is shared and the quality of that information in a certain supply chain as well as the level of trust and commitment that can be attained or achieved through strategic partnerships. Additionally, this study also postulates that the relationships built through strategic partnerships and the high the level of trust that can arise among supply chain partners, can in fact lead to the outcome variable of internal lean practices through the positive -effects of the predicator variables, information- sharing and information quality. Below is figure 3.7 a diagram of the conceptual research framework:

**Figure 3.7: Conceptual Research Framework**



### 3.4.2 Hypothesis development

#### 3.4.2.1 Supplier Information-Sharing and Strategic Partnership

Information sharing is an important element of cooperation in the process of supply chain management (Cheng & Wu 2005:1159), and should be at the core of collaborative, supply chain based business models (Fawcett, Osterhaus, Magnan, Brau & McCarter 2007:358-356). Information sharing plays a key role in the process of matching supply with demand to reduce the cost of excess inventory and loss of profits from the effect of stock outs (Martin & Patterson 2006:82-92). Supply and demand mismatch in the supply chain is often caused by uncertainty from lack of information sharing in forecasting (Kwon & Suh 2005:26-33). Information asymmetries can be significantly reduced by sharing inventory, production, and sales data, along with planning and forecasting information (Patnayakuni, Rai & Seth 2006:13-49). Transaction risks can also be reduced by sharing, monitoring, and controlling, information, such as performance metrics, and production and delivery schedules (Kim & Umanath 1999:546).

Making use of a multi-organisational case study, Ghosh and Fedorowicz (2008:453-470) concluded that an information- sharing relationship between retailers and suppliers is essential to build up trust over time. Effective inter-firm communication plays a key role in information sharing that increases understanding of both parties and can contribute positively to better partnership quality (Lee & Kim 1999:29). Information- sharing is essential to the trust-building process as the sharing of information enables each firm to understand each other's routines better, and to develop conflict resolution mechanisms (Kwon, Suh 2004:4-14 ;Nyaga, Whipple & Lynch 2010:101-114).

When members are hesitant in providing and sharing information with other parties in the supply chain, this can hinder the strategic partnership- building process. A greater level of information sharing tends to reduces uncertainty and it increases the level of trust and openness in the relationship, in this case the strategic partnership. Based on the arguments above, the author hypothesizes that:

*H1: There is a positive relationship between supplier information- sharing and strategic partnership.*

### **3.4.2.2 Information Quality and Strategic Partnership**

While information- sharing is an important factor, the significance of the impact it has on supply chain management is dependent upon what information is shared, when and how it is shared, and with whom (Chizzo 1998:4-9). The shared information must exhibit certain attributes in order to create value for the partner firm (Ghosh & Fedorowicz 2008:453). Information quality includes aspects such as the accuracy, timeliness, adequacy, reliability, credibility, understandability and ease of use of the information that is exchanged (Monczka, Petersen, Handfield & Ragatz 1998:5553-5577). Information quality is achieved when a focal firm and its supply chain partners share strategic and operational information in trust relationships. Supply chain performance is dependent on the quality of information shared among partner-firms. Three dimensions of the quality of information sharing are: accuracy, trustworthiness (reliability or credibility), and timeliness (Li & Lin 2006; Zhou & Benton 2007:1655). Security is included as one of the essential attributes of information quality (Lee, Strong, Kahn & Wang 2002:133-146).

Inter-organisational cooperation increases the need to share confidential information (Hallikas, Virolainen & Tuominen 2002:5553). Only when firms share vital and often proprietary decision making information, can trust be established (Fawcett, Osterhaus, Magnan, Brau & McCarter 2007:358). If all parties in the network do not have real-time information about product specifications, transaction costs can be expected to increase due to the complexity and uncertainty of the available information (Hallikas, Virolainen & Tuominen 2002:45-55). Kwon and Suh (2004:4-14) found that the presence of such uncertainty tends to impede the development of trust in supply chain relationships. Information of low quality cannot be expected to raise the level of trust that exists in the supply chain. For high level trust to occur, information shared must be accurate and timely in nature (Jarrell 1998:58).

Relationships have been thought to be particularly critical for promoting exchange and integration across functional and organisational boundaries (Boddy, Macbeth, & Wagner 2000:1003-1017; Bouty 2000:50-65; Jassawalla & Sashittal 1999:50-63 & Liedtka 1996:20-35). In particular, developing inter-organisational relationships has been found



to contribute to bottom-line success (Peng & Luo 2000:486-501). Effective two-way communication has helped organisations adapt to rapid changes (Kraatz 1998:621). Findings by some researchers have also suggested that inter-organisational relationships are instrumental in promoting innovation within the organisations involved (Goes & Park 1997:673-696). Therefore:

*H2: There is a positive relationship between Information quality and strategic partnership.*

### **3.4.2.3 Strategic Partnership and Internal Lean Practices**

Strategic partnerships involve a commitment that exists over an extended time period, and the sharing of information, expected risks and rewards (Ghalami 2004: 5). The relationship between organisations is said to be strategic when a firm perceives that it needs the relationship in order to be competitive in the industry and that if the partner were to go out of business, it would have to change its competitive strategy due to that occurrence. On this basis, the number of partners offering a certain product or service cannot usually be more than one in strategic partnering (Mentzer et al. 2000:549-568). The implications of this in supply chain management and strategic partnership makes the supplier selection, decision even more important. Effective partnership relationships require a clear understanding of expectations from parties, accompanied by open communication and information exchange, mutual trust, and coupled with a common direction for the future shared by the partners.

This last issue, a common direction for the future, implies that the partnership relation requires a long-term view (Ghalami 2004:5). As compared to large firms, innovative small and medium sized South African organisations show a far higher level of partnership activity (Sawers *et al.* 2008:176-182), which is a second indication of the relevance of this study. The implementation of a particular lean practice will not only have a direct performance benefit, but it can also improve the contribution of other existing lean practices in a firm. Given the synergistic interaction among various lean

practices, managers should look at the system-wide effects of practices that are adopted in their operations (Hofer *et al.* 2012:242-253) Also, interactions between various practices should be assessed to determine the total performance effect of a given lean practice.

The relative success and commercial benefits derived from lean thinking include a focused enterprise-wide approach to continuous improvement, increased productivity, improved quality and improved management. As a consequence, both academia and industry are now beginning to investigate the application of the lean philosophy to go beyond the primary manufacturing system (Hicks 2007: 234). Supply chain partners, including the upstream suppliers and downstream customers of that chain, can then work together as a team to provide value to the end user customer through applying leanness. In order to achieve a Lean supply chain, partners have to work, together as well as individually, to eliminate all wasteful processes and excess inventory across the channel.

Due to the fact that lean systems operate with low levels of capacity, enterprises that use them need to have a close relationship with their suppliers as supplies should be shipped frequently, have short lead times, arrive according to schedule and be of high quality. The lean philosophy looks for ways to improve efficiency reduce inventories throughout the entire supply chain. Close cooperation between companies and their suppliers can be a win-win situation for everyone, in the quest to achieve leanness (Krajewski, Ritzman & Malhotra 2010: 318). In general, a reduction in waste will also result in a reduction of costs for the supply chain. Therefore:

*H3: There is a positive relationship between Strategic partnership and lean practices.*

Table 3.3 below provides a summary of the hypotheses for the study that constitutes this dissertation.

### **Table 3.3: Summary of the Hypotheses**

## Summary of The Influence of Supplier Information- Sharing and Information Quality on Strategic Partnerships and Internal Lean Practices among SMEs

### HYPOTHESES OF THE STUDY

H/ No	Hypothesis Statement	Hypothesised Relationship
<b>H1</b>	There is a positive relationship between supplier information- sharing and strategic partnership.	Supplier Information Sharing → Strategic Partnership. (+)
<b>H2</b>	There is a positive relationship between Information quality and strategic partnership.	Information Quality → Strategic Partnership. (+)
<b>H3</b>	There is a positive relationship between Strategic partnership and lean practices.	Strategic Partnership → Lean Practices. (+)

### 3.5 CONCLUSION

This chapter presented two main sections of related literature review as well as the conceptualised model for the research study that constitutes this dissertation. The two main sections are the theoretical literature review and the empirical literature review.

The theoretical literature review section discussed the main theory that forms the theoretical grounding of this dissertation. This chapter began with a general introduction followed by the theoretical framework that discussed the theory applied to this study which is the coordination theory. The author then followed with an empirical review of the literature on all the variables related to this study, beginning with supplier information- sharing, information quality, strategic partnership and internal lean practices.

Thereafter the conceptualised framework for the research study that constitutes this dissertation was provided, in the conceptual model and hypotheses development section that followed after the literature review. The research framework was diagrammatically illustrated in figure 3.7. The research hypotheses for the research study were presented and the linkages explained. The study focused on the direct effects of supplier information- sharing and information quality and on how they can lead to strategic partnerships which then finally lead to internal lean practices in an organisation. The chapter was finally concluded with a conclusion.

## **CHAPTER FOUR**

### **RESEARCH METHODOLOGY AND DESIGN**

#### **4.1 INTRODUCTION**

This chapter of the dissertation presents the research methodology and design that was undertaken for this study. It is important to outline the methodology of a study as it helps the reader acquire confidence in the techniques used (De Vos, Strydom, Fouche & Delport 2005). This section is also important because it enables the reader to understand the various methods and principles that were employed in conducting the study. The aim of a research methodology chapter is to ensure that a study can be replicated. This chapter will discuss the research philosophy of the study; followed by the research design which is an outline for the collection, measurement and analysis of data. This is followed by a section on the discussion of the data analysis and statistical approach applied in the study, lastly the research model fit assessment and all related aspects are also discussed. The chapter ends with a conclusion

#### **4.2 RESEARCH PHILOSOPHY**

According to Moksha (2013:36) a research philosophy is a belief about the way in which data about a phenomenon should be gathered, analysed and used. The term epistemology as opposed to doxology encompasses the various philosophies of research approach. Two major research philosophies have been identified in the Western tradition of science, namely positivist (sometimes called scientific) and interpretive also known as anti-positivist (Clarke 2005: 13).

Quantitative research is generally associated with the positivist paradigm (Porta & Keating 2008: 23-24). This approach usually involves collecting and converting data into numerical form so that statistical calculations can be made and conclusions drawn from

the collected numerical data (Moksha 2013:24). Hence the reason the author is using the research approach as explained below as the preferred approach for the study.

Quantitative research aims to measure the quantity or amount and then compares it with past records and tries to project this for future period. In social sciences, quantitative research refers to the systematic empirical investigation of quantitative properties and phenomena and their relationships (*Source*: <http://en.wikibooks.org> [Viewed: 7/14/2014]). The objective of quantitative research is to develop and employ mathematical models, theories or hypotheses pertaining to phenomena.

The process of measurement is central to the quantitative research process because it provides a fundamental connection between empirical observation and mathematical expression of quantitative relationships. Statistics is the most widely used branch of mathematics in quantitative research. Statistical methods are used extensively within fields such as economics and commerce. Quantitative research involving the use of structured questions, where the response options have been pre-determined and a large number of respondents is involved in this type of research: For example, the total sales in the soap industry in India in terms of rupees and the quantity in terms of lakhs per ton for a particular year, say 2008, could be researched. This could then be compared with the past 5 years and then figures could be projected for 2009; Example drawn from the internet (online) Available at <[wikibooks.org](http://en.wikibooks.org)> [Viewed: 7/14/2014].

In essence quantitative research begins with a problem statement and involves the formation of a hypothesis, a literature review, and a quantitative data analysis. Creswell (2003:21) states, quantitative research “employ strategies of inquiry such as experimental and surveys, and collect data on predetermined instruments that yield statistical data” The findings from quantitative research can be predictive, explanatory, and confirming ( Moksha 2013:25).

For the purpose of this study quantitative research tools were reviewed as systematic and structured devices that aim to obtain information from respondents in a direct and open manner (Du Plessis & Rousseau 2007:21). Results from these research tools are

easily quantifiable and the instruments have a potentially high degree of accuracy. Whereas, Qualitative research tools are those that are more unstructured, flexible, and diagnostic than quantitative research tools, and aim to obtain information from respondents in an indirect manner. Researchers are interested in gaining a rich and complex understanding of people's experience and not in obtaining information which can be generalized to other larger groups. Their results are more descriptive, but are difficult to quantify and prone to measurement error and bias (Hair *et al.* 2010:4). The research design for this paper has encompassed both a review of the literature and an empirical study using a quantitative research approach.

#### **4.3 RESEARCH DESIGN**

The research design refers to the overall strategy that the researcher chooses to integrate the different components of the study in a coherent and logical way. This ensures that the researcher is able to effectively address the research problem; it constitutes the outline for the collection, measurement, and analysis of collected data (Bless, Higson-Smith & Kagee 2006:71). Types of research design can include; Descriptive, Correlational, Field (survey), Experimental, Review, Qualitative, Meta-analysis and many others depending on different authors' views.

For the current study the cross-sectional survey design was utilized. This type of research design has three distinctive features: no time dimension; a reliance on existing differences rather than change following intervention; and, groups are selected based on existing differences rather than through random allocation. The cross-sectional design can only measure differences between or from among a variety of people, subjects, or phenomena rather than a process of change. Thereby, researchers using this design can only employ a relatively passive approach to making causal assumptions based on findings (Hall 2008: 173).

#### **4.3.1 Target Population**

The entire set of people or objects which is the focus of the research and about which the researcher wants to determine some characteristics after identification is called the population (Bless, Higson-Smith & Kagee 2006:97). The subset of the whole population which is actually investigated by a researcher and whose characteristics will be generalised to the entire population is called the sample (Bless, Higson-Smith & Kagee 2006:97).

The target population refers to a group of population (people) who are to be reached, through some form of action or intervention (online) Available at <speakapp.com.> [Accessed: 2010/10/29]. The target population for this study was obtained from the database of the supply chain SMEs in four South African provinces including the Gauteng, North West, Free State and Limpopo province. These four provinces were obtained to provide a broader and a variety of both developed areas and disadvantaged areas.

#### **4.3.2 Sampling Method and technique**

**Sampling Method and Technique** Determining the process of how the sample units are to be selected is an important decision for a quantitative study and this decision requires the selection of a sampling method. The choice between probability and non-probability sampling methods often involves both statistical and practical considerations (Levy & Lemeshow 2008). Statistically, probability sampling allows the researcher to demonstrate the representativeness of a sample, an explicit statement as to how much variation is introduced, and identification of possible biases (Kumar, Aaker & Day, 2002:306). Therefore, based on the above reasoning, probability sampling is considered appropriate for this survey-based study. To be more precise, SME owners/managers in the previously mentioned provinces were sampled, using simple random sampling where each population element had a known non-zero chance of being selected. This sampling technique has the following advantages: it is an easy-to-use method, and it minimises the selection bias which enhances the reliability of results.



#### **4.3.3 Research Context**

The empirical contexts for this study are the firms and manufacturing industries in the relevant supply chains in South Africa. Several factors were considered and prompted the choice of both the firms and manufacturing industries of the supply chain sector in South Africa as the chosen research context.

#### **4.3.4 Sampling Design Technique**

The sampling techniques available in research are divided into probability and non-probability sampling (Hair *et al.* 2010:20). Non-probability and probability sampling are two approaches that can be used to select a research sample (Zechmeister, Zechmeister & Shaughnessy 2001:94). Probability sampling affords an equal likelihood that each person in the population is included, whereas with the application of non-probability sampling the likelihood of individuals being selected in the population is unknown (Zechmeister *et al.* 2001:94-106; Terre Blance & Durrheim 2002:94).

This research study has used probability sampling; this type of sampling allows the researcher to estimate the accuracy of the generalisation from the sample that was randomly selected to the whole population. A stratified sampling method was utilised for validity and reliability reasons using the database from the Ministry of small and medium enterprises. This technique facilitates in the selection of the sample without decreasing the quality of the sample in any way. With stratified sampling, the population to be studied is divided into mutually exclusive groups (industry sectors) and random samples are drawn from each group (Armstrong & Kotler 2007:111).

#### **4.3.5 Sample Size**

Sample size determines the statistical precision of the findings. It provides a basis of the estimation of sampling error. Thus, sample size is a function of change in the population parameters under study and the estimation of the quality that is needed by the researcher (Wegner, 2000:23). Generally, larger samples result in more precise and

robust statistical findings, while smaller samples result in less precise and unreliable findings (Terre Blanche et al., 2006:236). The determination of the final sample size involves judgment especially where probability sampling was employed, and calculation where random sampling was used by the researcher. Using a sample size similar to the previous studies" sample sizes provides the researcher with a comparison of other researchers" judgement. According to Kumar et al. (2002:318), four factors determine the sample size: the number of groups within the sample, the value of the information and the accuracy required of the results, the cost of the sample, and the variability of the population. Sample size has a direct impact on the appropriateness and the statistical power of structural equation modelling to be used in the current study (Jackson, 2003). While the technique does not use individual observation, sample size plays an important role in the estimation and interpretation of SEM results (Hair *et al*, 2006).

Terre Blanche and Durrheim (2002:274) define sampling as the process used to select cases for inclusion in a research study. Sampling is used to define the parameters for data collection where it is impossible or either impractical to collect data about the whole population that is under study. Sampling is an important element of the research study because it helps in determining the type of conclusions that can be drawn from the research study (Terre Blanche & Durrheim 2002:275; Silverman 2006:37). The sampling frame for any probability sample applied in a study is a complete list of all the cases in the population from which your sample will be drawn (Saunders, Lewis & Thornhill 2009:72).

The size of the sample should neither be excessively large, nor too small. It should be optimum. An optimum sample is said to be one which fulfills the requirements of efficiency, representativeness, reliability and flexibility. In the process of deciding the size of the sample, the researcher must determine the desired precision as an acceptable confidence level for the chosen estimate. The size of population variance needs to be considered as in the case of a larger variance a bigger sample might be needed. The parameters of interest in a research study must be kept in view, while deciding on the size of the sample. Costs also dictate the size of sample that a

researcher can draw. As such, budgetary constraints must be taken into consideration when deciding on the sample size (Kothari 2009:56).

For the purpose of this study, three hundred and fifty (350) questionnaires were distributed to selected firms after making appointments and agreements with respective owners or managers of the firms, taking into account all ethical considerations. This was done because Structural Equation Modelling requires a large data set to obtain meaningful results (Hair *et al.* 2010:50). Self-administered structured questionnaires were used for reasons of validity and reliability.

#### **4.3.6 Measuring Instrument**

The measuring instrument was designed in such a way that it suited the South African context. Research scales were operationalized mainly on the basis of previous works by other researchers. Minor adaptations were made in order to accommodate the current research context and purpose of study. The questionnaire was adapted from Jengchung V. Chen, David C. Yen, T.M. Rajkumar, & Nathan A. Tomochkov (2011). Other contributions were obtained from HICKS, B.J (2007); and Christina Maria Dões, Kim Hua Tan & Ming Lim (2013).

The measurement items were quantified using a 5-point Likert scale with the following representative values: 1-strongly disagree to 5-strongly agree. This scale of measurement is based upon the assumption that each statement/item on the scale has equal attitudinal value, importance or weight in terms of reflecting attitudes towards the issued questions (Kumar, 2005:145). The questionnaire items consisted of four variables, namely, information- sharing, information quality, strategic partnerships and internal lean practices. The full measurement instrument is attached as annexure1.

#### **4.3.7 Data Collection**

The collection of data was done through the use of structured self-completion questionnaires. The questionnaire was accompanied by a brief cover letter in which a brief introduction and the purpose of the research study, and the individual, non-

commercial academic nature of the study is stressed (Dillman 2007). Additionally, the significance of the study, the importance of their assistance, and the assurance of confidentiality and anonymity of the response are highlighted.

The questionnaires were distributed to the various respondents by the author with the help of research assistants who met the respondents face to face and explained any questions the participants had, where necessary. Others questionnaires were also distributed via email, after gaining permission from the respondents telephonically. The highest response rate was from the questionnaires that were distributed face to face.

After collection of the data, data was coded, cleansed and analysed to get the results that will be depicted and discussed in chapter five.

#### **4.4 DATA ANALYSIS AND DATA ANALYSIS APPROACH**

The collected data was coded in an excel spread sheet and data cleansing was performed. Descriptive statistics were obtained using SPSS 21 software and the CFA and path modelling were tested using AMOS 21 software. To gain an understanding of the characteristics of each variable, descriptive statistics analysis was used which is illustrated by the mean and standard deviation of each factor. In addition, a confirmatory factor analysis (CFA) was done leading to a path modelling for structural equation modelling (SEM).

##### **4.4.1 Reliability and Validity of Measurement Scales**

Wilks (1961: 6-7) suggests that there are three requirements of measurement. First, measurement must be an operationally definable process. Second, measurement should be valid or accurate (validity). Third, the outcome of the measurement process must be reproducible (reliability). The total error of a measurement consists of systematic errors, which involve with validity test, and random errors, which are measured by reliability test (Aaker 2007:20).

Reliability and validity is undertaken to check for consistency and meaningfulness of the collected research data. Factor analysis was undertaken to check the reliability of the measurement items and the internal consistency of the research constructs. In particular, the factor loadings, the Cronbach's alpha values and composite reliability (CR) values were determined using SPSS and Amos 21 software in order to check measurement items reliability. Convergent and discriminate validity of the research constructs were determined by checking the inter-correlation between the research constructs and by comparing the Average Variance Extracted (AVE) and shared variance (discriminate validity). However, convergent validity was assessed using item-to-total correlation values, item loadings and AVE values as indicators.

#### **4.4.2. Structural Equation Modelling (SEM)**

This study made use of SEM, using the AMOS 21 software package in order to test the structural paths of the conceptualised research model. SEM technique demonstrates and tests the theoretical underpinning of a proposed study and the significance of the relationships between models constructs (Hair et al. 2010: 51). SEM stipulates a technique where separate relationships are allowed for each set of dependent variables and it provides an estimation technique for a series of separate multi-regression equations to be estimated simultaneously. It further contains two components namely the structural model, which is the path where independent, and dependent variables are being connected and the measurement model that enables this study to use several indicators for a single independent variable. By assessing each relationship simultaneously rather than separately, an incorporation of all the multi-scale items can be used to account for measurement errors within each scale (Hair et al., 2010:51).

##### **4.4.2.1 What is Structural Equation Modeling?**

Structural equation modeling (SEM) is a statistical methodology that takes a confirmatory approach to the analysis of structural theory that is bearing on some phenomena (Byrne, 2001:55-86). It makes use of various types of models to predict

relationships among the observed variables, with the basic goal of providing a quantitative test of a theoretical model that is hypothesised by the researcher. According to Schumacker and Lomax (2004: 3) the goal of performing a SEM analysis is to determine the extent to which the theoretical model is supported by the sample data.

If it is found that the sample data that is tested, supports the theoretical model then more complex theoretical models can therefore be hypothesised. If the sample data does not support the theoretical model then the original model needs to be modified and then re-tested. “In other words the researcher must operationally define the latent variable of interest in terms of behaviour believed to represent it (Byrne 2001:55-86).” Therefore, the latent (unobserved) variable is linked to one that is observed, making its measurement possible. In SEM the unobserved latent variable is represented by a circle (or an ellipse).

Second, observed or manifest variables are a set of variables that researchers use to define or infer the latent variables (Schumacker & Lomax 2004:3). These variables serve as indicators of the underlying construct that they are presumed to represent. In SEM the observed variable is represented by a square (or a rectangle). In addition, these two types of variables can be defined as either independent variable (exogenous) or dependent variable (endogenous). According to Schumacker and Lomax (2004:3), an independent variable is a variable that is not influenced by any other variable in the model. A dependent variable is a variable that is influenced by another variable in the model.

#### **4.4.2.2 Basic Model**

SEM in this study relates to three types of model. First a measurement model of confirmatory factor analysis (CFA) is a model that solely focuses on the link between factors and their measurement variables. According to Byrne (2001:55-86) there are two basic types of factor analysis: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

In contrast to EFA, CFA is appropriately used when the researcher has some level of knowledge of some underlying latent variable structure. Based on this knowledge of theory, empirical research, or both, he or she postulates relationships between the observed measures and underlying factors *a priori* and this hypothesised structure is then reflected statistically (Byrne, 2001:55-86). Thus, in CFA a researcher specifies a certain number of factors, which are correlated, and for which the observed variables can measure each factor. In CFA a researcher has an *a priori* specified theoretical model and in EFA the researcher does not have such a model. This current study uses CFA since the measures have been adopted from previous literature and have been widely used by several researchers in the past.

The second type of model is a Path Model or a Path Analysis which involves the estimation of presumed causal relations among observed variables. According to Kline (2005: 94) in path analysis the researcher specifies a model that attempts to explain why X and Y are correlated. Part of this explanation may include presumed causal effects (e.g. X causes Y), or presumed non-causal relations, such as a spurious association between X and Y. The overall goal of the path analysis is to assess how well the model accounts for the data that is the observed correlations or co-variances. The researcher can hypothesize the impact of one latent construct on another construct in modeling of causal direction. The model is termed full because it consists of both a measurement model (CFA) and a structural model (depicting the links among the latent variables) (Byrne, 2001:55-86).

#### **4.5. RESEARCH MODEL FIT ASSESMENT (CFA & PATH MODELLING)**

A measurement model of confirmatory factor analysis (CFA) is a model that focuses exclusively on the link between factors and their measurement variables. CFA seeks to statistically test the significance of a hypothesised factor model developed by the researcher. It assumes that commonalities are initially one, implying that the total variance of the variables can be accounted for by means of its components (or factors) and there is thus no error variance. CFA is appropriately used when the researcher has

some knowledge of some underlying latent variable structure. Based on such knowledge of theory, empirical research, or both, the researcher postulates relationships between the observed measures and underlying factors a priori and this hypothesised structure, statistically (Byrne 2001:54). Thus, in CFA, the researcher specifies a certain number of factors which are correlated, and for which observed variables measure each factor. In this study, CFA is employed since the measures have been adopted from previous literature and have previously been widely used by several researchers. It is recommended that data screening be performed.

Confirmatory factor analysis involves the division of a large number of variables into a smaller number of factors within which all variables are related to each other (Schumacker & Lomax 2004:167). The purpose of factor analysis is to explore the underlying variance structure of a set of correlation coefficients. A confirmatory factor analysis was also done to establish whether or not the model was fit for the conceptualised research model. Model fit indicators such as Chi-square/degrees of freedom, Goodness of Fit Index (GFI), Augmented Goodness of Fit Index (AGFI), Normed Fit Index (NFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI), Composite Fit Index (CFI) and the Random Measure of Standard Error Approximation (RMSEA) were used to assess the model fit. The chi-square should be less than 0, 3 to show positive results and the CFI, GFI, IFI, NFI, & TLI should be above 0, 9 while the RMSEA should be less than 0, 08 ( Schumacker & Lomax 2004:176-177). The model fit indicators are briefly discussed below:

#### **4.5.1.1 Chi-square ( $\chi^2$ )**

Chi-square is a very useful index in SEM which is used to evaluate differences between observed and estimated covariance matrices. The main aim in SEM is to achieve a non-statistical significance which reveals a small difference between the sample variance-covariance matrix and the reproduced implied covariance matrix (Schumacher 2006:83). The difference between these two covariance matrices is enclosed in a residual matrix. A chi-square value of zero signifies a perfect fit or no difference between the values in some covariance matrix and the reproduced implied covariance matrix.



Thus, when the chi-square value is close to zero or non-significant, the residual values in the residual matrix are close to zero, it reveals that the theoretically specified model fits the sample data (Schumacher 2006:83). Therefore, a smaller chi-square value (less than 3) and a larger p-value ( $>0.05$ ) are preferred and recommended.

#### **4.5.1.2 Goodness-of-fit Index (GFI)**

This test enables us to see how well does the assumed theoretical distribution (such as Binomial distribution, Poisson distribution or Normal distribution) fit to the observed data. When some theoretical distribution is fitted to the given data, we are always interested in knowing as to how well this distribution fits with the observed data (Kothari 2004:237). GFI ranges between 0 and 1. Nevertheless, the index in theory can produce meaningless negative values. Relatively, it is the percentage of observed covariance explained by the model.

GFI is similar to R square in multiple regressions, except that it cannot be interpreted as the percentage of error explained by the model. In other words, while R-squared in multiple regression deals with error variance, GFI on the other hand, deals with error in reproducing the variance-covariance matrix. GFI value increases when the sample grows larger. In principle, an acceptable model fit is reached where the GFI value is equal to or greater than 0.90 (Bollen 1990:446).

#### **4.5.1.3 Root mean square residual (RMR)**

RMR stands for the average residual value those results from the fitting of the variance-covariance matrix for the posited model to the variance-covariance matrix of the sample data. These residuals are difficult to interpret, since they are relative to the sizes of the observed variance and covariance. Consequently, these residuals are best interpreted in the metric of correlation matrix. The outcome from the matrix embodies the average value across all standardised residuals and varies from 0 to 1. Therefore, an RMR value that is closer to 0 for the tested model improves the model fit (Hu & Bentler 1995:72).

#### **4.5.1.4 The norm fit index (NFI)**

NFI was developed originally to alternate CFI though it does not require making chi-square assumptions. It ranges from 0 to 1, with 1 representing a perfect fit. NFI reveals the proportion by which the researcher's model improves fit compared to the null model (random variables). In principle, NFI values below 0.90 shows a need to re-specify the model (Hu & Bentler 1995:76).

#### **4.5.1.5 The comparative fit index (CFI)**

CFI is commonly referred to as the Bentler Comparative Fit Index. It is used to compare the existing model fit with a null model that assumes that the latent variables in the model are uncorrelated. The CFI index compares the covariance matrix posited by the model to the observed covariance matrix. In addition, it evaluates the null model with the observed covariance matrix in order to estimate the percentage of lack of fit which is accounted for by going from the null model to the researcher's SEM model. CFI varies from 0 to 1. A CFI value close to 1 indicates a very good model fit. In principle, CFI should be equal to or greater than 0.90 to accept the model, showing that 90 percent of the covariation in the data can be reproduced by the given model (Hair *et al.*, 2006:37).

#### **4.5.1.6 The incremental fit index (IFI)**

IFI is basically computed in the same way as the NFI, except that it takes into consideration the degrees of freedom. It was developed by Bollen (1990) to deal with the NFI related limitations in the issues of parsimony and sample size. The recommended value for IFI that gives an acceptable model fit should be greater or equal to 0.9. However, the IFI value can also exceed 1, under certain circumstances (Hair *et al.*, 2006:39).

#### **4.5.1.7 Root mean square error of approximation (RMSEA)**

RMSEA is an index whose value answers the question of how well the research model will fit the population covariance matrix if it were available, with unknown but optimally chosen parameter values (Browne & Cudeck 2002:137). It takes into consideration the error of approximation in the population. RMSEA expresses such discrepancies per degree of freedom, hence sensitising the index to the number of estimated parameters in the model. The recommended threshold value for RMSEA that yields a good model of fit should be less than or equal to 0.05. However, a value of less than, or equal to, 0.08 for the RMSEA index gives an adequate model fit (Browne & Cudeck 2002:138).

#### **4.5.2 Path modelling**

The Path Model or a Path Analysis involves the estimation of presumed causal relations among observed variables. According to Kline (2005:94), in path analysis, the researcher specifies a model that attempts to explain why X and Y are correlated. Part of this explanation may include presumed causal effects (e.g. X causes Y), or presumed non-causal relations, such as a spurious association between X and Y. The overall goal of the path analysis is to assess how well the model accounts for the data, that is, the observed correlations or covariance. To better understand the model, two major types of variables were introduced. First, latent variables or factors were recognised as variables that are not directly observed or measured. They are indirectly observed and are therefore inferred from a set of variables that researchers measure using statistical techniques such as tests or surveys. In other words, the researcher must operationally define the latent variable of interest in terms of the behaviour believed to represent it (Byrne, 2001:7). Therefore, the latent (unobserved) variable is linked to one that is observed, making its measurement possible. In SEM the unobserved latent variable is represented by a circle (or an ellipse). Alternatively, observed or manifest variables are a set of variables that researchers use to define or infer the latent variables (Schumacher, 2006:5). These variables serve as indicators of the underlying construct that they are presumed to represent. In SEM the observed variable is represented by a square (or a rectangle). In addition, these two types of variables can be defined as either independent variables (exogenous) or dependent variables (endogenous).

## **4.6 CONCLUSION**

This chapter outlined the research design and methodology of the current study. It began with an introduction; followed by a discussion of the research philosophy. The research design was discussed with aspects such as the target population, research context, sampling technique, and sample size which ended with an explanation of the measurement instrument and an explanation on how data was collected. The fourth aspect outlined was the data analysis and statistical approach which included reliability and validity of measurement scales and structural equation modeling (SEM). The fifth aspect was the discussion of the research model fit assessment, which explains the confirmatory factor analysis (CFA) and path modeling. Finally the chapter ended with a conclusion.

## **CHAPTER FIVE**

### **DATA ANALYSIS AND INTERPRETATION OF RESULTS**

#### **5.1. INTRODUCTION**

The data after the collection process has to be processed and analysed in accordance with the outline laid down for the purpose at the time of developing the research plan. This is an essential part of the scientific study and is important for ensuring that we have all relevant data for making contemplated comparisons and analysis. In more technical terms, processing implies editing, coding, classification and tabulation of collected data so that they are amenable to analysis (Kothari 2005:122).

This chapter of the dissertation will present the data analysis and results, up to the assessment of research model fit. The hypothesis testing part, using Structural Equation Modeling (SEM) will also be presented. This chapter will commence by discussing the data screening process, followed by the presentation of data analysis procedure. The sample description is then provided, and then following sample description, a test of measures and accuracy analysis statistics are given. This section of the chapter mainly tests for the measures' reliability and validity using different methods to ascertain the accuracy of the study.

For measure reliability, the Cronbach's Alpha, the Composite Reliability (CR) value and the Average Value Extracted (AVE) are used to check it while for validity; Factor Analysis is used to check convergent validity and correlation matrix and chi-square - CFA difference are used to check for discriminant validity. This section is followed by a presentation of the research models fit. Numerous indicators such as the chi-square value, Goodness of Fit Index (GFI), Normed Fit Index (NFI), Lewis-Tucker Index (TLI), Incremental Fit Index (IFI), Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA) used to ascertain if the research model fits the collected data. Finally, a summary of the chapter is provided.

## **5.2. DATA SCREENING**

Following the data collection, the next step is the data screening process as suggested by Malhotra (1999:160-183) and Churchill (1999:250), was implemented to ensure that the collected data is cleaned before performing any further statistical analysis. Screening the collected data is the first step towards obtaining some insights into the characteristics of that data. It is also an important aspect in ensuring the accuracy of the data entry and assessment of outliers before proceeding to analyse the summary statistics for the survey responses that were collected (Schumacker & Lomax 2004:32). The major analytical tasks involved in the data screening process include questionnaire checking, editing, coding, and tabulation. The responses were carefully coded with an identification number that is related to a specific SME. Using the SPSS software, each data field was tested for the mean and standard deviation to detect any typographical errors and possible outliers. The data was cleaned after the errors in data entry were corrected.

### **5.2.1 Data Analytical Procedures**

To analyse the empirical data, several relevant statistical methods were employed. First, coefficient alpha and adjusted item-to-total correlations were used in assessing the internal consistency of each construct. The data was analysed using SPSS. For the assessment of final measures, confirmatory factor analysis (CFA) was performed using the AMOS 7 software program.

Statistical procedures used to validate measures consisted of the assessment of items and scale reliability, uni-dimensionality, and convergent and discriminant validity. Details of structural equation modeling (SEM) will be analysed in this chapter. The interpretation of results will also be discussed as well as the procedures of statistical analysis will be undertaken in this chapter.

### 5.3 Descriptive Analysis Results

Table 5.1 provides a summary of the full demographic statistics results, the frequencies and percentages achieved are presented below to support the results that will further be elaborated on in the sections that follow below.

**Table 5.1: Demographic Profile of SMEs**

Variable		Frequency	Percentage %
<b>1. Type of business</b>	Cooperative	26	7.4
	Sole proprietor	104	29.7
	Close corporation	90	25.7
	Private organisation	91	26.0
	Partnership	39	11.1
	<b>Total</b>	<b>350</b>	<b>100</b>
<b>2. Nature of the business</b>	Manufacturing	75	21.4
	Retail	105	30.0
	Construction	68	19.4
	Transport	56	16.0
	Community/Personal Service	46	13.1
	<b>Total</b>	<b>350</b>	<b>100</b>
<b>3. Number of employees in the business</b>	Less than 20	60	17.1
	20 – 50	127	36.3
	50-100	101	28.9
	100- 200	53	15.1
	200 -500	8	2.3
	500 +	1	0.3
	<b>Total</b>	<b>350</b>	<b>100</b>
<b>4. Number of years</b>	Less than 5	49	14.0

<b>the business has been operating</b>	5 – 10	155	44.3
	10 – 15	119	34.0
	15 – 20	19	5.4
	20 +	8	2.3
	<b>Total</b>	<b>350</b>	<b>100</b>
<b>5. Province where the organisation is located</b>	Gauteng	198	56.6
	Limpopo	86	24.6
	Free State	42	12.0
	North West	19	5.4
	Mpumalanga	3	0.9
	Other	2	0.6
	<b>Total</b>	<b>350</b>	<b>100</b>

The descriptive analysis in Table 5.1 presents the demographic information regarding the enterprises that were surveyed in this study. These demographic results apply to and support all the variables surveyed in this study. Note that the frequency represents the number of participants (enterprises) that took part in the study, each section shows the numbers that add up to the required total sample of 350 and the percentage numbers that add up to a total of 100 percent.

In the section that follows the five aspects of the demographic section that were included in the questionnaire will be dealt with separately and the achieved results will be discussed. The information collected begins with; type of business, followed by nature of business, number of employees, years of business operation and lastly the province in which the business enterprise operates or is situated. The individual categories of the demographic profile of respondents are interrogated separately and in detail in sections 5.3.1 to section 5.3.5 accordingly.

Figure 5.1 below depicts the frequencies and percentages of the type of businesses that took part in the study for each variable.



### **Figure 5.1: Type of business**

According to the results as depicted in figure.5.1above, they present the types of businesses that took part in this study. The results indicate that the sole proprietor had the majority share of respondents with 30% (n=104), followed by the close corporation which had a share of 26% (n=104) and the private companies which had a share of 26% (n=91) of respondents. Lesser responses were obtained from partnerships at 11% (n=39) and cooperatives at 7% (n=26). The table 5.1 above depicts the full demographic statistics of the study as stated here.

#### **5.3.2 Nature of the business**

Figure 5.2 below depicts the frequencies and percentages of the nature businesses that took part in the study for each variable.

## **Figure 5.2: Nature of the business**

Above shown are the results for descriptive statistics under nature of the business. Figure 5.2 presents the nature of businesses that took part in the study, the majority of respondents were in the retail sector with 30% (n =105), followed by the manufacturing sector with 22 % (n=75), then the construction sector at 19% (n = 68), the transport sector had a share of 16% (n=56) and lastly community/personal service with a share of 13% (n=46). Therefore it can be concluded that the majority of the firms that took part in the study were in the retail sector. The table 5.1 depicts the full demographic statistics of the study.

### **5.3.3 Number of employees in the business**

Figure 5.3 below depicts the frequencies and percentages of the number of employees in business that took part in the study for each variable.

**Figure 5.3: Number of employees in the business**

The above figure 5.3 above depicts the number of employees employed by the business and the results show that a majority of the organisations that took part in the study are in the less than 20, followed by the 20 – 50, then the 50-100 and the 100- 200 range. It is shown that only 2% (n =8) were enterprises with employees that are between the 200-500 range and 0% (n =1) for enterprises which employ above 500 employees, 17% (n=60) were enterprises which employ less than 20 people, 15% (n=53) were firms which employ 100 – 200 people and 29% (n=101) were firms which employ 50-100 employees and finally the largest part of the population studied were enterprises which employ 20-50 people at 37% (n=127). From the above demographic results it is clear that the majority of the organisations which participated in the study

were small enterprises. This is shown by the number of employees a firm can employ and also according to the South African definition of SMEs.

#### **5.3.4 Number of years the business has been operating**

Figure 5.5 below depicts the frequencies and percentages of the number of years the business that took part in the study has been operating for each variable.

#### **Figure 5.4: Number of years the business has been operating**

Figure 5.4 above shows the results for number of years which the enterprises have been operating. From the above results it shows that a majority of the enterprises have operated from between 5-10 years with a percentage of 44% (n=155), followed by 10-15 years with a percentage of 34% (n=119), those that have operated for less than 5 years have a percentage of 14% (n=49) , in the 15-20 years range have a percentage of

6% (n=19) and lastly those in the above 20 years range have a percentage of only 2% (n =8). The results show that most of the SMEs have not operated for many years hence they are still quite new (young) and positively growing in the industry and the economy.

### **5.3.5 Province where the organisation is located**

Figure 5.4 below depicts the frequencies and percentages of the province where the organisation that took part in the study is situated or located for each variable.

### **Figure 5.5: Province where the organisation is situated**

Figure 5.5 above depicts the provinces in which the enterprises are situated. Knowing the provinces in which organisations or enterprises are situated is important for the study. The above figure shows that the majority of the enterprises which participated in this study were from Gauteng province with a percentage of 56% (n=198) followed by Limpopo with a percentage of 25% (n=86), Free State is on the third place with a percentage of 12% (n=42), in fourth place with 5% (n=19) is the North West province

and lastly Mpumalanga with 1% (n=3). On other unmentioned provinces only 1% (n=2) of responses were obtained. As shown above the majority of the enterprises are in Gauteng the reason can be that the researcher is situated in the Gauteng province or Gauteng constitutes a large number of SMEs than other provinces.

#### 5.4 SCALE ITEM RESULTS

Frequencies and percentages pertaining to the results of the analysis of the measurement scale items are reported in Table 5.2. All research variables were measured on a 5-point Likert scale.

**Table 5.2: Scale item results**

Variable	Measurement Item	Scale									
		Frequency & Percentage (%)									
		Strongly disagree		Disagree		Moderately agree		Agree		Strongly agree	
		Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Supplier Information Sharing	1	103	29	50	14	61	17	69	20	67	19
	2	63	18	33	9	78	22	96	27	80	23
	3	86	25	55	16	55	15	74	21	80	23
	4	84	24	51	15	61	17	80	23	74	21
	5	82	23	57	16	89	25	61	17	61	17
Information Quality	1	111	32	91	26	77	22	36	10	35	10
	2	60	17	38	11	75	21	77	22	100	29
	3	113	32	95	27	75	21	36	10	31	9
	4	128	37	72	21	45	13	63	18	42	12
	5	103	29	53	15	68	19	59	17	67	19
Strategic Partnership	1	131	37	84	24	68	19	38	11	29	8
	2	111	32	67	19	60	17	62	18	50	14

	3	132	38	56	16	76	22	52	15	34	10
	4	100	29	83	24	52	15	73	21	42	12
	5	146	42	88	25	44	13	38	11	34	10
<b>Internal Lean Practices</b>	1	156	45	100	29	43	12	28	8	23	7
	2	165	47	65	19	71	20	30	9	19	5
	3	138	39	64	18	43	12	41	12	64	18
	4	105	30	69	20	96	27	44	13	36	10
	5	96	27	63	18	70	20	56	16	65	19

Having measured the construct “supplier information- sharing” with five measurement items, results indicate that respondents mostly agreed with all five of the measurement items. This is evident by the percentage of respondents providing a positive response that accumulates to between 40 % and 61% for the moderately agree to strongly agree scale.

The research construct “Information Quality” appears to have a response pattern similar to that of “supplier information- sharing” as well. Five measurement items were employed to measure this variable. The results indicate that respondents mostly agreed with all five of the measurement items and this is evident by the range of respondents being between 40% and 72% for the measurement items.

“Strategic Partnership” was also measured with five measurement items. Respondents in this instance appear to have been in line with moderately agree and disagree scale. Results indicate a range of respondents that is between 47% and 51.9% for measurement items.

Lastly, the research construct “Internal Lean Practices” was measured using five measurement items and in this case respondents were mostly in line with disagree to moderately agree scales with results indicating a range that is between 50% to 55% for measurement items. This could be due to the fact that most of the respondents were not very knowledgeable on the concept of lean. But the study helped in getting them to become aware of this concept and how it can benefit their enterprises.

## **5.5 RELIABILITY TESTS**

### **5.5.1 Confirmatory Factor Analysis (CFA) Results**

Confirmatory factor analysis was conducted in order to ascertain three psychometric properties, which are reliability, validity, and model fit. The results of these tests are reported in Sections 5.5.1 to 5.5.3.

#### **5.5.1.1 Composite Reliability**

One method now commonly used to check internal consistency of the measurement model is the Composite Reliability (CR) index. It is calculated using the following formula:

$$(CR): CR_{\eta} = (\sum \lambda_{yi})^2 / [(\sum \lambda_{yi})^2 + (\sum \epsilon_i)]$$

Composite Reliability = (square of the summation of the factor loadings) / {(square of the summation of the factor loadings) + (summation of error variances)}.

The resultant coefficient is similar to that of Cronbach's  $\alpha$ . The threshold for Composite Reliability (CR) index of 0.5 for basic research and 0.6 for exploratory research were suggested by Nunnally (1967). The value was later adjusted to 0.7 by Nunnally (1978) and is also recommended by Hair *et al.* (2006).

#### **5.5.1.2 Average Value Extracted (AVE)**

The average variance extracted estimate reflects the overall amount of variance in the indicators accounted for by the latent construct. Higher values for the variance extracted



estimate (greater than 0.50) reveal the indicators well represent the latent construct. The formula below is used to calculate Average Variance Extracted (AVE):

$$V\eta = \Sigma \lambda y_i^2 / (\Sigma \lambda y_i^2 + \Sigma \epsilon_i)$$

AVE = {(summation of the squared of factor loadings) / {(summation of the squared of factor loadings) + (summation of error variances)}}

Altogether, the construct reliabilities and the average variance extracted estimates suggest the scales are internally consistent. Below in table 5.3 are the results.

### 5.5.1.3 Scale Accuracy Analysis

Three methods where used to test for accuracy and reliability. They include: Cronbach's alpha test (Cronbach  $\alpha$ ), Composite Reliability test (CR) and Average Value Extracted (AVE) test these methods where used in this dissertation to check on the reliability of the research measures. Table 5.3 below show the results of the entire three tests used to check the research measure reliability.

Table 5.3 below depicts the scale accuracy results:

**Table 5.3: Scale Accuracy Analysis**

Research Construct		Descriptive Statistics		Cronbach's Test		CR Value	AVE Value	Factor Loading
		Mean	SD	Item-total	$\alpha$ value			
Supplier	SIS5	2.85	1.505	.655	.826			.657
	SIS4	3.28	1.390	.565	.847			.861

<b>Information Sharing (SIS)</b>	<b>SIS3</b>	3.02	1.507	.760	.796	0.972	0.875	.826
	<b>SIS2</b>	3.03	1.478	.782	.791			.617
	<b>SIS1</b>	2.89	1.402	.570	.846			.719
<b>Information Quality (IQ)</b>	<b>IQ5</b>	2.41	1.299	.397	.724	0.940	0.842	.724
	<b>IQ4</b>	3.34	1.431	.482	.694			.782
	<b>IQ2</b>	2.36	1.272	.469	.699			.602
<b>Strategic Partnership (SP)</b>	<b>SP4</b>	2.29	1.293	.534	.697	0.922	0.749	.744
	<b>SP3</b>	2.64	1.443	.366	.759			.661
	<b>SP2</b>	2.43	1.373	.605	.669			.607
	<b>SP1</b>	2.64	1.394	.623	.661			.537
<b>Internal Lean Practices (ILP)</b>	<b>ILP5</b>	2.03	1.218	.396	.801	0.957	0.851	.714
	<b>ILP4</b>	2.07	1.227	.578	.750			.556
	<b>ILP3</b>	2.51	1.542	.717	.698			.883
	<b>ILP2</b>	2.53	1.312	.539	.761			.720

NOTE: C.R.: Composite Reliability; AVE: Average Variance Reliability; SD: Std. Deviation.

According to Chin (1998:295), research variables should have an average variance extracted (AVE) of more than 0.5 and a composite reliability of more than 0.7 (convergent validity), and inter-construct correlations should be less than the square-root of the AVE (discriminant validity). As can be seen (Table 5.3), all constructs exceed these criteria, with AVE and CR generally equal or greater than 0.6 and 0.9, respectively.

Furthermore, as indicated in Table 5.3, the square-root of the lowest AVE is 0.82 and this is greater than the highest inter-construct correlation value (0.787). All in all, these results confirm the existence of discriminant validity of the measurement instrument used in this study.

### 5.5.2 Discriminant Validity

One of the methods used to check the discriminant validity of the research constructs is the evaluation of whether the correlations among latent constructs are less than 1.0. As indicated in the Table 5.4 below, the inter-correlation values for all paired latent variables are less than 1.0, indicating the existence of discriminant validity (Bagozzi & Yi 1988:74-94; Nunnally & Bernstein 1994:67). The correlation coefficient values obtained in this study are reported in table 5.4.

**Table 5.4: Correlations between Constructs**

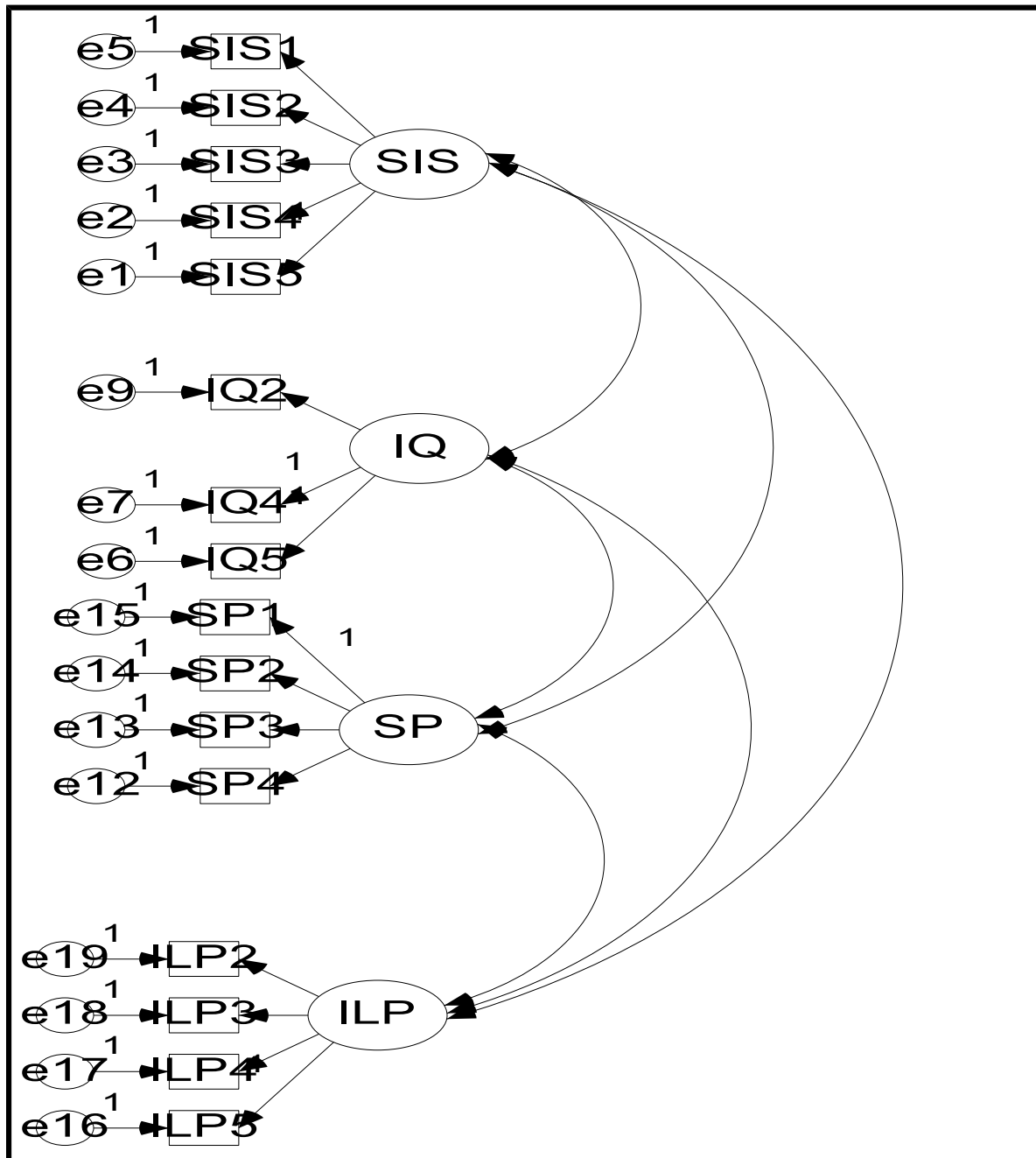
Research Construct	Construct Correlation			
	SIS	IQ	SP	ILP
Supplier Information- Sharing (SIS)	1			
Information Quality (IQ)	0.702	1		
Strategic Partnership (SP)	0.645	0.692	1	
Internal Lean Practices (ILP)	0.591	0.645	0.725	1

NOTE: Significance level: All were significant at level <0.001

#### 5.5.2.1 Confirmatory Factor Analysis (CFA) Model

The CFA model below shows that Supplier Information- Sharing (SIS) has a relationship with Information Quality (IQ), Strategic Partnership (SP) and Internal Lean Practices (ILP). This model also shows that all the variables have an interlinking relationship with each other, as shown below: SIS ↔ IQ, SIS ↔ SP, SIS ↔ ILP, IQ ↔ SP, IQ ↔ ILP and SP ↔ ILP

Figure 5.6: CFA Model



Not

e: SIS = Supplier Information- Sharing, IQ = Information Quality, SP = Strategic Partnership and ILP = Internal Lean Practices.

### 5.5.3 Conceptual Model Fit Assessment

According to the two-step procedure suggested by Anderson and Gerbing (1988:411), that should be applied prior to testing the hypotheses, confirmatory factor analysis (CFA) was mainly performed to examine the scale accuracy (including reliability, convergent validity, and discriminant validity) of the multiple-item construct measures using AMOS 7. Initial specification search led to the deletion of some of the items in the construct scales in order to provide an acceptable fit and the resultant scale accuracy. Acceptable model fit was indicated by the chi-square value over degree of freedom ( $\chi^2/df$ ) of value between 1 and 3, the values of Goodness-of-Fit Index (GFI), Comparative Fit Index (CFI), Incremental Fit Index (IFI), and Tucker-Lewis Index (TLI) equal to or greater than 0.90, and the Root Mean Square Error of Approximation (RMSEA) value to be equal to or less than 0.08. The recommended statistics for the final overall-model assessment showed acceptable fit of the measurement model to the data. These results are depicted in table 5.5 below:

**Table 5.5: CFA Model fit criteria and results**

<b>Model Fit Criteria</b>	<b>Results</b>
Chi-square ( $\chi^2$ )	2.69
Goodness-of-fit (GFI)	0.89
Augmented Goodness-of-fit (AGFI)	0.87
Comparative fit index (CFI)	0.99
Tucker-Lewis Index (TLI)	0.96

Root mean square error of approximation (RMSEA)	0.060
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As seen in table 5.4 and table 5.5 above all correlation values were less than 0.8, the measurement model produced a ratio of chi-square value over degree-of-freedom of 2, 69 and GFI, AGFI, CFI, TLI and RMSEA were 0.89, 0.87, 0.99, 0.96, and 0.060 respectively. Since an acceptable CFA measurement model fit was obtained, the study proceeded to the hypothesis testing stage using structural equation modeling with the AMOS 7 software program.

## **5.6 HYPOTHESES TESTING**

In order to test the proposed relationships simultaneously, structural equation modeling (SEM) is required. With SEM the structure of relations can be modeled pictorially enabling a clearer conceptualisation of the theory that is under study. The hypothesised model can be tested statistically in a simultaneous analysis of the entire system of variables to determine the extent to which it is consistent with the tested data. In this dissertation the AMOS 7 software program was used as a tool to analyse SEM. The program is powerful and very easy to use. It helps to establish a model that reflects complex relationships with the ability to use observed variables to predict any numeric variables. Furthermore, it is the only program that allows researchers to analyse SEM in graphical form, rather than using complicated command functions.

### **5.6.1 Structural Equation Modeling (SEM) Results**

SEM was undertaken to measure three aspects, namely, model fit, hypotheses tests and significance. The obtained results are discussed in section 5.6.1 to 5.7.3.

#### **5.6.1.1 Model Fit and Hypotheses Testing Results**

The assessment of the proposed conceptual model proceeded using the same data set. The ratio of chi-square over degree-of-freedom was 2.89. This value is less than the recommended threshold of less than 3.0 and therefore, it confirms the model fit. Additionally GFI, AGFI, CFI, TLI, and RMSEA values were 0.89, 0.87, 0.98, 0.96, and 0.065. These results are depicted in table 5.6 below:

**Table 5.6: SEM Model fit criteria and results**

<b>Model Fit Criteria</b>	<b>Results</b>
Chi-square ( $\chi^2$ )	2.89
Goodness-of-fit (GFI)	0.89
Augmented Goodness-of-fit (AGFI)	0.87
Comparative fit index (CFI)	0.98
Tucker-Lewis Index (TLI)	0.96
Root mean square error of approximation (RMSEA)	0.065

All these model fit measures were above recommended marginally accepted threshold of greater than 0.8 for GFI, AGFI, CFI, TLI and less than 0.8 for RMSEA, which suggested that the proposed conceptual model converged well and could be a plausible representation of the underlying empirical data structure collected in South Africa. After finding that the model fit is acceptable the study proceeded to test the research hypotheses.

The corresponding coefficients of the research hypotheses that posited the existence of positive relationships between the predictor variables supplier information- sharing and information quality, the mediator variable strategic partnership and outcome internal lean practices; consequences was then observed. This can be seen in figure 5.7.

### 5.6.1.2 SEM Conceptual Model Fit Assessments

The following section presents SEM results. It starts by establishing an acceptable model fit using the same indices as in CFA. These are discussed in detail below and the results are shown in Table 5.5. Figure 5.7 below depicts the SEM model which states the correlation relationships.

**Figure 5.7: SEM Model**

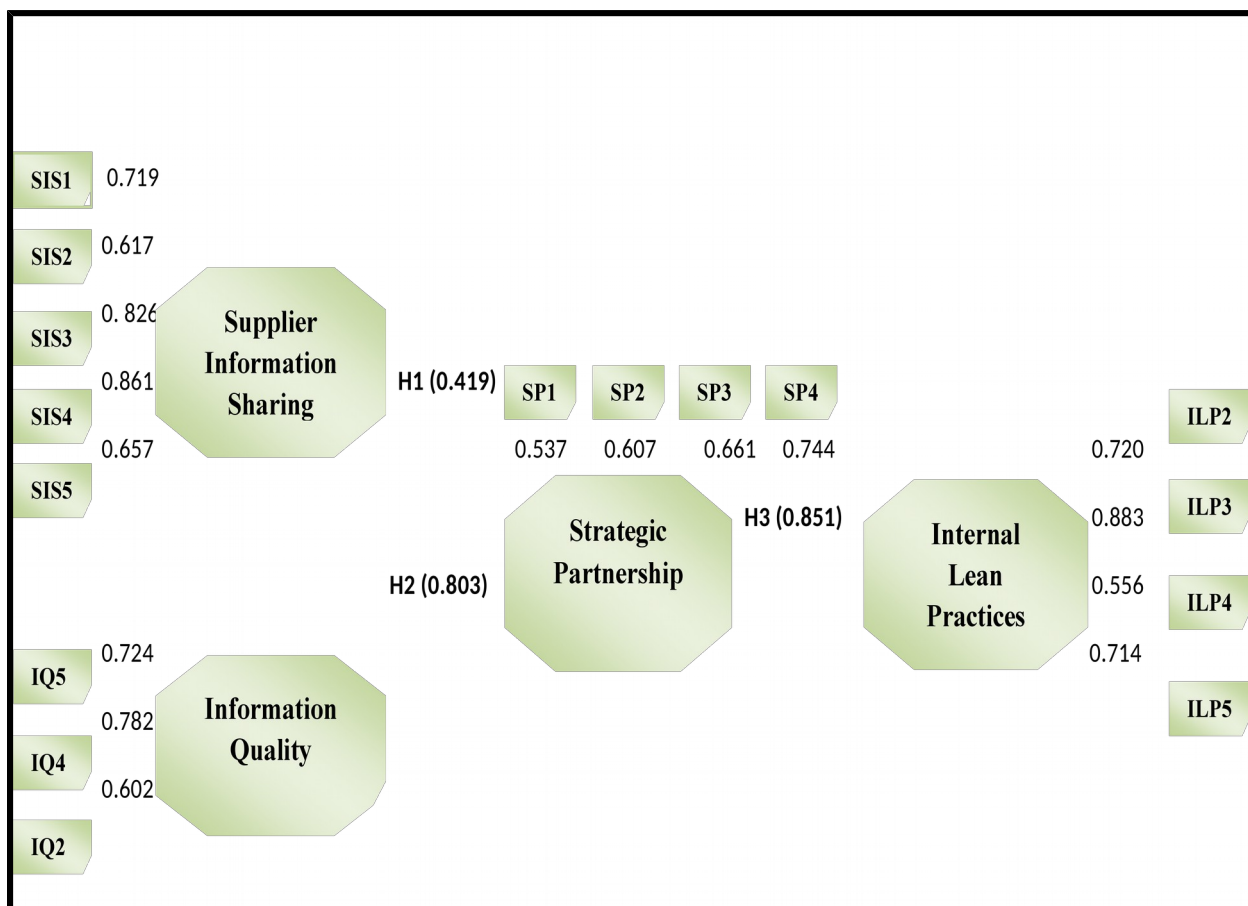


Figure 5.7 is the Structural Equation Model (SEM); this model shows the relationship between the variables taking into account some unobserved models. According to the model, the predictor variables; Supplier Information- Sharing (SIS) and Information Quality (IQ) have a relationship with the mediator variable; Strategic Partnership (SP) and Strategic Partnership (SP) has a direct link relationship to the outcome variable;



Internal Lean Practices (ILP). The model shows the direct link relationships between the variables as depicted below:  $SIS \rightarrow SP$ ,  $IQ \rightarrow SP$  and  $SP \rightarrow ILP$ .

### 5.6.1.3 Hypothesis Testing Results

For the hypothesis testing results all hypotheses coefficients were positive at a significant level of  $p < 0.01$ . The corresponding coefficients of the research hypotheses that posited the existence of positive relationships between the two predicting variables Supplier Information Sharing; Information Quality and the mediator Strategic Partnership as well as the outcome variable Internal Lean Practices. The consequential results were then observed. Table 5.7 tabulates these results.

**Table 5.7: Results of Structural Equation Model Analysis**

Proposed Hypothesis Relationship			Hypothesis	Factor Loading	P Value	Rejected / Supported
SIS	$\longrightarrow$	SP	H1	0.419	***	Supported
IQ	$\longrightarrow$	SP	H2	0.803	***	Supported
SP	$\longrightarrow$	ILP	H3	0.851	***	Supported

Note: SIS = Supplier Information Sharing, IQ = Information Quality, SP = Strategic Partnership and ILP = Internal Lean Practices.

The results above in table 5.7 indicate that there is a positive relationship between SIS and SP as well as IQ and SP. SP and ILP also have a positive relationship therefore all the relationships are supported and significant. The results provide support for the proposed positive relationships between the three relationships (i.e. H1, H2 and H3). Hence, the results depicted in Table 5.7, indicates that all of the posited relationships are statistically significant as none of them produced a negative result. The regression paths are also significant at three stars (\*\*\*) indicates that  $p < .001$ ). These paths can be interpreted just like a normal linear regression (Schumacker & Lomax 2004: 5).

## **5.7 DISCUSSION OF THE RESULTS OF HYPOTHESES TESTS**

The present study aimed to examine the relationship between information- sharing, information quality, strategic partnership and internal lean practices among the SMEs in South Africa. The purpose of the study was to determine the relationship between Supplier Information- Sharing and Information Quality on Strategic Partnerships and Internal Lean Practices among SME's in South Africa. To test the proposed hypotheses, data were collected from SME's in South Africa. The empirical results supported all of the three posited research hypotheses in a significant way. As seen in Table 5.7 the results show that all hypotheses were significant at  $<0.001$ .

### **5.7.1 The Influence of Supplier Information Sharing on Strategic Partnership**

According to the results and the posited relationship:

**H1:** There is a positive relationship between supplier information- sharing and strategic partnership. This relationship is supported as it was greater than the required significant rate of  $<0.001$ . So the result shows a positive relationship between supplier information-sharing and strategic partnership at 0,419. This implies that an improvement in the level of information shared among supply chain partners may stimulate their level of willingness and openness to sharng information in their partnerships. This study supported and accepted the stated hypothesis ( $H_1$ ). This is due to the fact that a moderate and positive significant relationship was observed between information sharing and strategic partnership. Information- sharing is essential to the trust-building process as the sharing of information enables each firm to understand each other's routines better, and to develop conflict resolution mechanisms (Kwon, Suh 2004:4-14 ;Nyaga, Whipple & Lynch 2010:101-114).

These results further imply that information sharing may increase or improve strategic partnerships.

### **5.7.2 The Influence of Information Quality on Strategic Partnership**

According to the results and the posited relationship:

**H2:** There is a positive relationship between information quality and strategic partnership. This relationship is also supported as it was greater than the required significant rate of  $<0.001$ . This relationship was supported at a significant rate of 0.803. This finding illustrates that an improvement in the level of information quality shared among supply chain partners may motivate supply chain partners to heighten their level of willingness and openness to sharing information that could further strengthen their partnerships. This study has thus supported and accepted the stated hypothesis (H2). This is due to the fact that a positive and strong significant relationship was observed between information quality and strategic partnership. Inter-organisational cooperation increases the need to share confidential information (Hallikas, Virolainen & Tuominen 2002:5553). Only when firms share vital and often proprietary decision making information, can trust be established (Fawcett, Osterhaus, Magnan, Brau & McCarter 2007:358).

These results further imply that information quality may strongly improve strategic partnerships.

### **5.7.3 The Influence of Strategic Partnership on Internal Lean Practices**

According to the results and the posited relationship:

**H3:** There is a positive relationship between strategic partnership and internal lean practices. This relationship is also supported as it was greater than the required significant rate of  $<0.001$ . This relationship was supported at a significant rate of 0.851. The findings imply an influence on strategic partnership by internal lean practices does indeed exist. Supply chain partners may improve their internal lean practices through

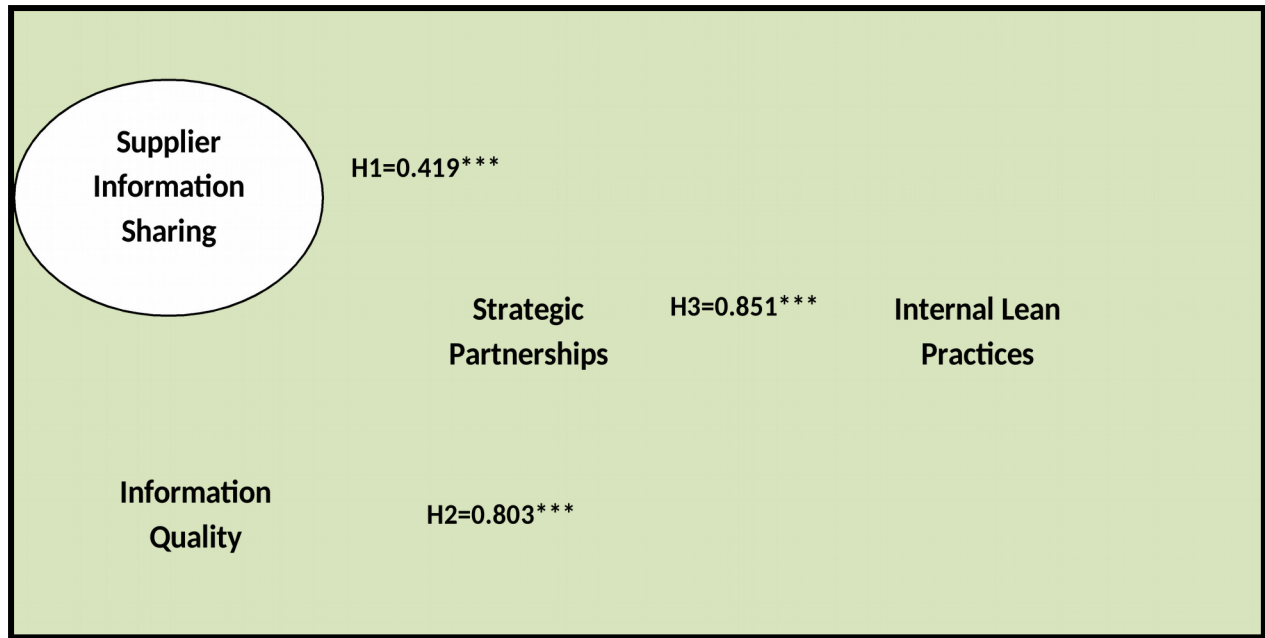
the benefits that can be derived from strategic partnerships. This study strongly supported and accepted the stated hypothesis (H3). This is due to the fact that a strong positive significant relationship was observed between strategic partnership and internal lean practices. Close cooperation between companies and their suppliers can be a win-win situation for everyone, in the quest to achieve leanness (Krajewski, Ritzman & Malhotra 2010: 318). These results further imply that strategic partnerships may positively improve the enterprise's internal lean practices.

By implication these findings indicate that information sharing has a strong influence on strategic partnership. Information quality also has a strong influence on strategic partnership and in turn strategic partnership has a strong influence on internal lean practices among these organisations. This indicates that the level of information shared and the quality of the information that is shared within the supply chains of these organisations has a positive effect on the strength of their partnerships as well as on the organisation's internal practices.

## **5.8 RESULTANT CONCEPTUAL MODEL**

Integration of all the findings of the study resulted in the conceptual research model illustrated in Figure 5.8.

### **Figure 5.8: Conceptual Research Model**



The conceptual research model shows the strength of the relationships that exist between each dimension of all the three antecedents and the outcome variable (Internal Lean Practices). Supplier information sharing has a moderate but significant association ( $r = 0.419$ ;  $p < 0.01$ ) with strategic partnership. The model also indicates that information quality has a strong positive and significant relationship ( $r = 0.803$ ;  $p < 0.01$ ) with strategic partnership. Another result reported in the conceptual model is that strategic partnership has a strong positive and significant relationship ( $r = 0.851$ ;  $p < 0.01$ ) internal lean practices.

In comparing the strengths of the factors relative to each other, the conceptual model shows that information quality exerts a higher influence ( $r = 0.805$ ) on strategic partnerships than supplier information sharing ( $r = 0.419$ ). The model further indicates that strategic partnership has a strong influence ( $r = 0.851$ ) on internal lean practices.

Based on these research findings, research implications are discussed and future research directions suggested in the chapter that follows.

## 5.9 CONCLUSION

This chapter began with an introduction followed by a discussion on data screening. This was done to ensure that collected data is cleaned before performing further statistical analysis. Descriptive analysis results were then provided followed by discussion on the scale item results. These are the results pertaining to the analysis of the measurement scale items for all the research variables. Reliability tests were then undertaken making use of CFA, that was used to test reliability, validity and model fit. This was then followed by hypotheses testing. SEM was used to test the proposed relationships simultaneously. SEM measures the model fit, hypothesis tests and significance. Lastly a discussion of results of hypotheses were discussed individually for H1, H2 and H3 and the resultant conceptual research presented and discussed followed by the conclusion.

## **CHAPTER SIX**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **6.1 INTRODUCTION**

Chapter five examined the results of the current study. Chapter six will present a conclusion for the study that constitutes this dissertation and drawn from the research findings. It will also provide the implications of the research findings. The chapter also discusses suggestions for directions of future research taking into consideration the limitations of this study. Lastly an overall conclusion and contribution of this dissertation to academics will be presented followed by a conclusion to the chapter.

#### **6.2. REVIEW OF THE STUDY**

The purpose of the study was to determine the relationship between Supplier Information- Sharing and Information Quality on Strategic Partnerships and Internal Lean Practices among Small and Medium-sized Enterprises in South Africa. The

dissertation of the study was divided into six chapters. Chapter one introduced the study by discussing the research background., it provided an explanation of the background of the problem, purpose, research objectives, justification, scope and the significance of the study. In the second chapter, a review of literature related to the context of study (SMEs) was conducted. It also explained what is known about these organisations and their supply chain practises as well as how supply chain relationships are managed by these organisations. Chapter three provided an extensive literature review focusing on factors of the study, namely information sharing, information quality, strategic partnership and internal lean practices; theories implemented to ground the study as well as the development of the identified hypotheses drawn from the conceptual framework of the research were also discussed. Chapter four discussed literature related to the research methodology and design that was implemented in the study. Chapter five dealt with all aspects related to the data analysis and interpretation of the research findings. Chapter six provides overall conclusions of each aspect and element discussed throughout the study and suggested some recommendations as well as highlighted the limitations of the study and the implications for further future research.

### **6.3 CONCLUSIONS OF THE STUDY**

The current research study was primarily concerned with investigating the relationship between information- sharing, information quality, strategic partnership and internal lean practices among SMEs in South Africa.

Hence this study concluded that, despite the extent and level of information shared as well as its transparency; as indicated within the responses to the questions in the questionnaire of this study, the findings showed that significant information distortion still existed within the information shared. This finding supports the view that supplier information- sharing (SIS) alone is not sufficient and that there is a need for other factors to be considered in order to strengthen and encourage this phenomenon within the SMEs sector. This suggests that this factor, of information- sharing, is only an enabler rather than a driver of supply chain performance, and should be implemented in combination with other socio-technical factors (Kate Bailey & Mark Francis 2008:10).

The ability to provide accurate information during a transaction indicates that the partner is committed to a successful transaction (Nikolaou, Ibrahim & van Heck 2013: 989). The level of information quality has the ability to provide a good foundation for building strong relationships that can be beneficial to both parties. Improved information quality is expected to reduce the uncertainty and risk because the focal organisation is able to then conduct more extensive and elaborate monitoring making use of that information. Receiving high quality information indicates that the partner can measure the performance of its internal processes and provide transparency (Nikolaou, Ibrahim & van Heck 2013: 989). According to these authors such level of transparency can enable the focal organisation to decide whether partner performance under those particular circumstances is acceptable or not. In accordance with this factor, improved information quality (IQ) can be expected to reduce uncertainties and any ambiguities that may exist regarding business partner performance and inherently decrease performance-risk. Hence information quality is important to these business organisations as supported by the results and it is important in maintaining good relationships that can yield benefits to all the parties involved.

Previous studies support the relationship between lean practices and quality performance (Shah *et al* 2008:471; Sunder 2013:153; Vinodh & Joy 2012:1598). Lean management comprises a set of operating practices that aims at reducing non value-added activities within the organisation (Hajmohammad *et al.* 2013: 315). Companies in a variety of economic sectors have adopted Lean Management (LM) in recent decades and in many cases this has enabled them to improve their results and their competitiveness (Moyano-Fuentes & Sacristán-Díaz 2012:551).

Strategic partnerships are known to be strategic in nature and to involve a commitment over an extended time period that involves a sharing of information, risks and rewards of the relationships (Ghalami 2006:14). Hence the need to evaluate carefully the partner you choose to engage in a relationship with, but once this is done research has proven that strategic partnerships can improve overall business performance. In this regard the SME business sector can also yield good benefits from strategic relationships and grow



their businesses into the next level while also building strong supply chains that may one day become world class.

#### **6.4 IMPLICATIONS OF THE STUDY**

The current study attempted to undertake a research in an often most neglected context but yet an important sector of the South African economy. Therefore, the findings of this empirical study are expected to provide fruitful implications for both practitioners and academicians. The implications on the academic front are that a contribution is made to the existing literature on the SME sector with regard to the relationship between information- sharing, information quality, strategic partnership and internal lean practices among these organisations in South Africa. The study should hopefully also inspire future research on the topic in order to further increase the knowledge on this topic.

On the practitioners' side, the current study submits that managers in the SME supply chain sector can benefit from the implications of the research findings mainly in the following ways:

In today's competitive environment, companies are forced to cooperate closely with their suppliers and customers in order to meet various challenges, such as the requirements of low costs, high quality, better delivery, flexibility, customer service, innovation, and to do this while responding to a rapidly changing environment (Zhao et al. 2011:27). The findings indicate the importance of forming strategic partnerships while doing business in order to create an effective and efficient supply chain that will result in yielding good benefits for both parties involved in the relationship, as well as providing seamless service to the customers. Creating these strategic relationships that are based on sharing of quality information can indeed lead to improved internal practices that are characterised by leanness within the business. Hence the current research submits that more particular attention should be accorded to information quality within strategic partnerships as this can lead to better performance in internal lean practices over and above other benefits.

## 6.5 LIMITATIONS OF THE STUDY

Although this study is set to make important contributions to both theoretical development and to the provision of empirical evidence on the influence of supplier information-sharing and information quality on strategic partnerships and internal lean practices among Small and Medium Enterprises' (SMEs) in South Africa. It is not without its limitations which may merit future research. Some of the limitations encountered by the researcher during the study are briefly stated below:

- The respondent's where reluctant to answer questions asked by unknown interviewers about things they consider to be private about their businesses;
- Due to some of the respondent's being busy, they did not want take the time to answer the questionnaire;
- Respondents tried to help by giving pleasant answers even though they were not entirely honest;
- Some respondents were unable to answer because they could not remember or never gave a thought to what they do and why;
- The study is confined to the respondents' in the said province therefore the findings will only be based on these respondents and cannot be generalised to the whole of South Africa;
- Cost and time constraints also posed a problem; and
- Lastly some of the respondents in the sector being studied were not very knowledgeable on the topic.

Although this study makes significant contributions to both academia and practice and in spite of the positive results achieved, there are some limitations which open up other avenues for further research. The data were gathered from the SME sector in South Africa in only a few provinces. The results would be more informative if data from all the provinces are collected and compared. Future studies might consider collecting data from all the provinces across South Africa, for further empirical investigation.

Also, while this study focused on South Africa, extending this study to other African countries is also another possible future research direction that might enable

comparison of results with the current study findings and create a different point of view. Another factor would be to increase the sample size while replicating this study. Overall, these suggested future studies stand to provide increased insights and to significantly contribute new knowledge to the existing body of literature on the relationship between information- sharing, information quality, strategic partnership and internal lean practices among organisations in the SME sector in South Africa and other African countries. Based on these various limitations of the study conducted that have been discussed, recommendations for future research can therefore be made.

## **6.6 RECOMMENDATIONS**

With the growing importance of relationship commitment and recognition of different types of partnerships through supply chain integration, over the past decade it is essential to improve our understanding of these constructs and their associated interrelationships (Zhao et al. 2011: 29). The findings of this study contributed significantly to the existing knowledge base regarding the relationship of the variables of study and the views of the SME business owners and managers. However, specific aspects regarding SME supply chains that have emerged from this study need further exploration and investigation. An example would be supplier information- sharing and its relationship to strategic partnership.

It is therefore recommended that the current study be replicated using a larger sample group and separated into focus groups according to demographic variables, such as nature of the business, number of years in the business and location of the business etc. Such a study would allow for the comparison of different SME groupings' perceptions of the relationship between information- sharing, information quality, strategic partnership and internal lean practices among organisations in the SME sector. It would further give more insight into how these organisations run or manage their supply chains.

## 6.7 CONCLUSION

The study has proven to be beneficial in developing a different view of insightful knowledge that can be used to supplement the understanding of the topic that has been studied. This chapter addressed through discussion, the conclusions of this study as well as the implications, the limitations of the study were also discussed and lastly also provided some recommendations for further future research to be considered. The chapter then ends with a conclusion.

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## **ANNEXURE 1**



**Vaal University of Technology**

## **Questionnaire**

### **The Influence of Supplier Information- Sharing and Information Quality on Strategic Partnerships and Internal Lean Practices among SMEs in South Africa.**

Thank you for paying attention to this academic questionnaire. The purpose of this questionnaire is to gather information on the influence of supplier information- sharing and information quality on strategic partnerships and internal lean practices among Small and Medium Enterprises' in South Africa.

I am therefore, requesting your assistance to complete the questionnaire below. The research is purely for academic purposes and the information obtained will be kept confidential. It will take you approximately 5 minutes to finish the whole questionnaire.

**Researcher: T.M. SIKHWARI**

## **SECTION A**

## **GENERAL INFORMATION**

The section consists of questions about your organisation background. Please indicate your answer by ticking (☐) in the appropriate box.

A1 Please indicate your type of business

Cooperative	<input type="checkbox"/>
Sole proprietor	<input type="checkbox"/>
Close corporation	<input type="checkbox"/>
Private organisation	<input type="checkbox"/>
Partnership	<input type="checkbox"/>

A2 Please indicate the nature of your business

Mining/Quarrying	<input type="checkbox"/>
Manufacturing	<input type="checkbox"/>
Retail	<input type="checkbox"/>
Construction	<input type="checkbox"/>
Transport	<input type="checkbox"/>
Community/personal service	<input type="checkbox"/>
Tourism	<input type="checkbox"/>
Finance /insurance	<input type="checkbox"/>

A3 Please indicate the number of people employed by the business

Less than 20	<input type="checkbox"/>
20 - 50	<input type="checkbox"/>
50-100	<input type="checkbox"/>
100- 200	<input type="checkbox"/>
200 -500	<input type="checkbox"/>
500 +	<input type="checkbox"/>

A4 Please indicate the number of years your business has been operating

Less than 5	
5 - 10	
10 - 15	
15 - 20	
20 +	

A5 Please indicate the province where your organisation is located

Gauteng	
Limpopo	
Free State	
North West	
Mpumalanga	
Other (Specify)	
.....	

## **SECTION B**

### **Supplier Information- Sharing**

**Below are statements about Supplier information- sharing you can indicate the extent to which you agree or disagree with the statement by ticking the corresponding number in the 5 point scale below:**

**1=strongly disagree 2= disagree 3= moderately agree 4= agree 5= strongly agree**

***Please tick only one number for each statement***

B1	Our organisation's major suppliers share their production capacity information with us.	Strongly disagree	1	2	3	4	5	Strongly agree
B2	Our organisation shares production plans with our major supplier.	Strongly disagree	1	2	3	4	5	Strongly agree

B3	Our suppliers keep us fully informed about issues that affect our business.	Strongly disagree	1	2	3	4	5	Strongly agree
B4	Our organisation's major suppliers share their available inventory capacity with us.	Strongly disagree	1	2	3	4	5	Strongly agree
B5	Our organisation shares strategic information (such as marketing information, technology development) with suppliers / customers.	Strongly disagree	1	2	3	4	5	Strongly agree

## **SECTION C**

### **Information Quality**

**Below are statements about Information quality, you are requested to indicate the extent to which you agree or disagree with the statements below by ticking the appropriate number provided:**

**1=strongly disagree 2= disagree 3= moderately agree 4= agree 5= strongly agree**

***Tick only one number for each statement.***

C1	Information exchange between our suppliers and our organisation is credible and understandable.	Strongly disagree	1	2	3	4	5	Strongly agree
C2	Information exchange between our suppliers and our organisation is adequate.	Strongly disagree	1	2	3	4	5	Strongly agree
C3	Information exchange between our suppliers and our organisation is timely.	Strongly disagree	1	2	3	4	5	Strongly agree
C4	Information exchange between our suppliers and our organisation is accurate.	Strongly disagree	1	2	3	4	5	Strongly agree
C5	Information exchange between our suppliers and our organisation is reliable.	Strongly disagree	1	2	3	4	5	Strongly agree

## **SECTION D**

### **Strategic partnership**

**Below are statements about Strategic partnership. You may agree or disagree with each statement by ticking the appropriate number provided below:**

**1=strongly disagree 2= disagree 3= moderately agree 4= agree 5= strongly agree**

***Please tick only one number for each statement***

D1	Our organisation's procedures are compatible with our supply chain partners' business procedures.	Strongly disagree	1	2	3	4	5	Strongly agree
D2	The goals and objectives of our organisation are compatible with our supply chain partners' in business dealings.	Strongly disagree	1	2	3	4	5	Strongly agree
D3	Managers from our organisation and those of our supply chain partners have compatible approaches to business dealings.	Strongly disagree	1	2	3	4	5	Strongly agree
D4	Information sharing on important issues has become a critical element to maintain our partnerships.	Strongly disagree	1	2	3	4	5	Strongly agree
D5	In general, our organisation is very satisfied with the quality of the relationships that we have with our supply chain partners.	Strongly disagree	1	2	3	4	5	Strongly agree

## **SECTION E**

### **Internal lean practices**

**Below are statements about internal lean practices. Please indicate the extent of agreement or disagreement with each statement by ticking the appropriate number provided:**

**1=strongly disagree 2= disagree 3= moderately agree 4= agree 5= strongly agree**

***Please tick only one number for each statement***

E1	Our organisation promotes a better understanding of the value of lean thinking within our supply chain.	Strongly disagree	1	2	3	4	5	Strongly agree
E2	Our organisation is able to identify areas in our business processes where waste can be eliminated.	Strongly disagree	1	2	3	4	5	Strongly agree
E3	Our organisation believes that lean education and training must be expanded outside of the traditional manufacturing area.	Strongly disagree	1	2	3	4	5	Strongly agree
E4	Our organisation monitors all the firms involved in our supply chain and reports on performance.	Strongly disagree	1	2	3	4	5	Strongly agree
E5	Our organisation believes that adopting green practices can help us to become leaner and to realize the benefits of internal lean practices.	Strongly disagree	1	2	3	4	5	Strongly agree

## **ANNEXURE 2**

Asoka ENGLISH language editing CC

2011/065055/23

Cell no.: 0836507817

21 PONSFORD CRESCENT, ESCOMBE, KWAZULU NATAL



## **DECLARATION**

This is to certify that I have English Language edited the dissertation:

**THE INFLUENCE OF SUPPLEIR INFORMATION-SHARING AND INFORMATION QUALITY ON STRATEGIC PARTNERSHIPS AND INTERNAL LEAN PRACTICES AMONG SME's IN SOUTH AFRICA.**

Candidate: Sikhwari T.

**SATI member number: 1001872**

**DISCLAIMER**

Whilst the English language editor has used electronic track changes to facilitate corrections and has inserted comments and queries in a right-hand column, the responsibility for effecting changes in the final, submitted document, remains the responsibility of the candidate in consultation with the supervisor/promoter.

Director: Prof. Dennis Schaffer, M.A.Leeds, PhD, KwaZulu Natal, TEFL, TITC Business English, Emeritus Professor UKZN, Cambridge University Accreditation for IGCSE (Drama).