Post-recession Sales and Operations Planning of companies in the South African manufacturing sector

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ABSTRACT

The South African manufacturing industry is critical to country's economic growth. The industry is considered to be one of the six major wealth-producing sectors of the economy. This industry alone contributes about 20% to the country's Gross Domestic Product. Since the lifting of the International Trade Embargo, the South African economy has been considerably opened up to international trade. This exposure has led to suffocation of the South African Manufacturing industry due to lack of competitiveness. Since then the industry's contribution to GDP has shrunk from 20% to about 17%. This has had catastrophic economic and social consequences. It is therefore necessary to understand the levers that the industry should pull in order to improve competitiveness.

The purpose of this research is therefore to determine how effectively South African manufacturers are executing their Sales and Operations planning processes as they seek to improve their competitive positions. This effectiveness is evaluated using S&OP maturity levels that compare current practices against best practice. The results of this study will provide insight into what local manufacturers can do to outperform rivals. This study is of a qualitative nature and was carried out by conducting face to face detailed interviews with senior managers from ten different organisations who operate in the industry. The data collected on the current Sales and Operations Planning (S&OP) practices was analysed and results compared to best practice.

The results revealed that the majority of companies had ineffective Sales and Operations planning practices. The results also showed that even organisations that seemed to have all by-the-book elements had inefficient practices that rendered their Sales and Operations Planning (S&OP) processes ineffective. The information systems elements were not robust enough to support the S&OP process. It is therefore recommended that companies improve the effectiveness of their business planning process then determine and implement appropriate information systems to support the Sales and Operations planning (S&OP) process requirements.

DECLARATION

I, Simon Avhaneti Phalanndwa, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Simon A Phalanndwa

Signed at …….. …….

On the …… day of …….. 2015

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1 CHAPTER 1: INTRODUCTION

This chapter introduces and describes the purpose of the research study. The next section contextualises the study by outlining the problems and issues that gave rise to the need for this research. Against this background, the problem statement and the gap in knowledge and / or practice are provided. The rationale for understanding Sales and Operations Planning (S&OP) processes is discussed. Delimitations are then outlined to narrow the scope of the research. The concluding section discusses the assumptions that were made and how they impact the usefulness of the findings.

1.1 PURPOSE OF STUDY

The purpose of this research is to determine how effectively Sales and Operations Planning (S&OP) processes and practices are being executed by South African companies in the manufacturing industry as they seek to improve their competitiveness.

1.2 CONTEXT OF STUDY

This section provides the framework for the research by discussing the challenges faced by the South African manufacturing industry and why reasons that justify why these challenges need to be addressed. The section concludes by providing a discussion on the business or management problem.

1.2.1 *Background of the South African manufacturing industry*

The Global CEO survey index (2013) cites that manufacturing sector is the economic fabric of nations. The survey stated that it is the Manufacturing sector that drives the economic prosperity of every nation. It further pointed out that the

manufacturing is the one sector that propels the economies of countries forward. They further elaborated on this by adding that the sector is a significant contributor to economic growth, job creation, poverty alleviation and overall improvement of quality of life. This holds true for the South African economy too.

South Africa today faces a number of challenges. This is compounded by the fact that South Africa lags behind the rest of the industrially active economies of the world in terms of competitiveness. The Global Competitiveness Index (2013) reported that the industry has been underperforming by any key measure. Recent statistics indicated that between 1993 and 2012 the industry's contribution to the economy has declined steadily from 19 % to about 17 %. In addition to this 20% of the one million jobs shed between 2008 and 2013 were in manufacturing. This has increased unemployment to about 25%. Poverty levels are on the increase while the inequality gap continues to widen (http:/beta2.statssa.gov.za, access date 4/03/2015). This level of performance by the manufacturing industry negatively impacts social cohesion and can lead to anarchy.

In an effort to improve the performance of the industry, the government introduced policies such as the IPAP II and ASGISA to facilitate the upgrade of manufacturing facilities and capabilities to increase domestic production and growth of exports. The ASGISA policy was introduced with the aim of increasing growth rates from 4.5% in 2005 to 6% in 2020 and also to halve unemployment and poverty rates from 2004 levels by 2014. All of these initiatives have not produced the desired results. Against this backdrop it is both necessary and critical to determine the means by which the manufacturing industry can improve its productivity in order to remain competitive.

Nahm, Vonderembse, Rao, and Ragu-Nathan (2006) argued that developing effective and efficient value chains is the most effective means to deliver sustainable superior performance. They continued to justify this argument by affirming that competition is no longer between organisations but among supply chains. Their view is that effective supply chains are fundamental to securing advantage over competition and improving organisational performance. This view

is also upheld by the Global Competitiveness Index (2013) which states that supply chain effectiveness is the 4th most important driver of Global competitiveness. It is ranked higher than the legal system, government investment, and infrastructure, attractiveness of local market, energy costs, and healthcare systems. These supplier networks are referred to as the well-oiled machines that give the manufacturing industry a competitive advantage.

Akinboade and Lalthapersad-Pillay (2009) also shared this view but further pointed out that in order to secure a sustainable competitive advantage it is not sufficient for an individual link in the chain to be effective. They say that all organisations in the value chain should be effective, both individually and collectively, as members of the chain. According to Stevens (1989) the journey to effective supply chains starts with effective organisations and if not the value chain will be as weak as the weakest of organisations that make up the chain. He further states that supply chain integration evolves in stages starting from within the organisation to inter-firm.

Reed (2012) said that since Sales and operations planning (S&OP) was originated by Oliver Wight in the early 1980s, it has become the business management process of choice for improving competitiveness for thousands of organisations all over the world. Adamczak , Domański and Cyplik (2013) later argued the point raised by Reed and said that improving the effectiveness of the Sales and Operations Planning process is the means to performance improve and gaining competitive advantage. They argue that an effective S&OP is the foundation upon which effective execution of other activities can be done. They suggest that performance improvement in the areas of cost, quality, delivery speed, dependability and flexibility is highly dependent on the effective execution of the Sales and Operations Planning function. The ultimate goal being optimised profitability.

According to (Tavares Thomé, Scavarda, Fernandez, & Scavarda, 2012), sales and operations planning (S&OP) is a process that integrates different business plans into one set of plans. It is critical to executing business strategies that lead

to the achievement of competitive performance. It is used to balance supply and demand and to link the strategic and operational plans of the organisation. It is the means by which to achieve alignment between the organisation's strategies, objectives, action plans, and decisions throughout the different levels of the organisation. It also helps achieve cross-functional and intra-functional integration, Stevens (1989).

It is in this context that the Sales and Operations Planning (S&OP) practices of manufacturing firms in South Africa will be researched. This will shed light and provide answers to how effectively these processes are being executed in as companies attempt to improve their competitive position.

1.2.2 *The business problem*

As stated previously the South African Manufacturing Industry continues to slide on the competitiveness scale. The influx of cheap quality imports from developed countries continues to erode competitiveness of the local industry (Manufacturing Circle Bulletin Quarterly Review First Quarter 2013). In order to stay afloat the local industry is required to meet high performance standards in quality, costs, speed, flexibility and agility to respond to the needs of the market.

According to Hausman, Montgomery, and Roth (2002), an effective S&OP is a determinant of superior firm performance. Thomé, Scavarda, Fernandez, and Scavarda (2012) also argued that in all the industrialised countries across the world evidence has shown that everything being equal, poor execution of Sales and Operations Planning processes was the primary cause of poor performance. South African manufacturing industry is no exception. Unless this becomes a core competence the industry will continue to suffocate due to competition from international players.

1.3 PROBLEM STATEMENT

1.3.1 Main problem

The main research problem of this study is to determine how effectively Sales and Operations Planning (S&OP) processes are executed in the South African manufacturing industry.

1.4 SIGNIFICANCE OF THE STUDY

The study is designed to help industry leaders and managers of manufacturing companies in South Africa determine the effectiveness of their Sales and Operations Planning (S&OP) practices by establishing where they are in the maturity scale. The maturity model also provides a framework which is useful in guiding implementation efforts (Lapide (2005b).

This research study is also significant in that it provides a state of the art business process which is the means by which organisations can execution their strategies. For the industry as a whole the ultimate aim is to strengthen and grow the economy of the country which is required to deal with or prevent the social instability that comes about as a result of unemployment, poverty and inequality.

In terms of filling the knowledge gap not much is written about the subject within the South African context. Fourie (2009) researched the topic but from an implementation point of view. His research was limited to how one specific FMCG company in Gauteng had gone about implementing the process and what benefits were realized.

1.5 DELIMITATIONS OF THE STUDY

This study focuses only on the manufacturing industry and therefore limits the applicability of the results to other industries. The qualitative nature of the study casts doubt on the accuracy of the findings. The sample size is quite small and was a convenience sample because it was drawn from senior management who participated in the Sales and Operations Planning process. The sample size and sampling method were chosen due to time and financial constraints.

1.6 DEFINITIONS OF TERMS

The terms which are repeatedly used in the research are defined below. This is to ensure consistency and accurate understanding of the report.

Sales and Operations Planning (S&OP)

Grimson and Pyke (2007) define Sales and Operations Planning (S&OP) as a business process that links the corporate strategic plan to daily operations plans and enables companies to balance demand and supply for their products and services. The ultimate goal is profit optimisation (Tavares Thomé et al. (2012).

Supply Chain (SC)

Stadtler (2005) define a supply chain (SC) as “a network of organizations that are involved, through upstream and downstream linkages in the different processes and activities that produce value in the form of products and services in the hand of the ultimate consumer”

Supply Chain Management

They define Supply chain management as a process of proactively managing the two way movement and coordination of goods, services, information, funds from raw materials through to end user.

1.7 ASSUMPTIONS

The following assumptions have been made:

- The sampled organisations are big enough to have the core functions reporting to different functional heads. These are Finance, Sales and Marketing and Operations / Manufacturing functions.
- The respondents are ethical and honest people, who have the right knowledge and experience, are objective, truthful and honest in their responses. The information they share is a true reflection of what is happening within their respective organisations.
- The sampled organisations do not operate in a monopolistic market.

2 CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter is a literature review on S&OP process and practices. It aims to provide understanding on the essence of S&OP. Best practice on the right use of the process is also reviewed. The chapter also appraises literature around the role S&OP plays as a key determinant of superior company performance in the supply chain.

According to Cao and Zhang (2011) the explosive and unpredictable nature of changes in the business environment threatens the business's ability to survive and grow in a sustainable manner. Muzumdar and Fontanella (2006) had earlier observed that shrinking profit margins, reduced customer loyalty, rising global competition and increased supply chain velocity, amongst many of the specific challenges faced by businesses.

Grimson and Pyke (2007); Thomé et al. (2012) revealed that an integrated and well implemented S&OP process is an effective tool organisations employ to deliver maximum customer and shareholder value. It is in light of these findings that this research aims to explore this subject within the South African context.

The first section provides an overview of Supply Chain and Supply chain Management to help locate and clarify the role played by S&OP. The second section introduces and discusses S&OP. It provides an exposition of Sales and Operations Planning (S&OP) which outlines its essence and the contribution it makes in the effectiveness of organisations. Key components of a Sales and Operations Planning (S&OP) process are discussed. This is achieved by outlining the evolution of the process from when it started to what it is today. Views from different authors are discussed, compared and contrasted.

The third section discusses Sales and Operations Planning best practices. The state of the art Sales and Operations Planning process and related practices are then discussed. The maturity level of integration framework used to evaluate the level of Sales and Operations Planning (S&OP) integration in an organisation is then discussed. This section concludes by a summary of the literature review from which the relevant hypothesis is given.

2.2 SUPPLY CHAIN MANAGEMENT OVERVIEW

According to Cao and Zhang (2011); Li and Womer (2012), Supply Chain Management (SCM) is the most common and most effective strategy for improving organisational competitiveness in the twenty first century. They pointed out that ccompetitive advantage is built upon a well-planned and executed SCM strategy. Put differently, companies that configure and operate the best supply chains gain competitive advantage and consequently become the market winners.

Peng Wong and Yew Wong (2011) also argued this point. He points out that this is the case because competition today is no longer between firms but between their supply chains. Fawcett, Wallin, Allred, Fawcett, and Magnan (2011) mentioned that organisations in the developed economies adopted and continue to use Supply Chain Management as the means for creating and sustaining competitive advantage. Their view is competitive advantage can be attained by systematic integration of network partners into key supply chains processes.

2.2.1 Supply Chain Definition

Over time researchers and practitioners have developed dozens of definitions to describe supply chains and supply management. Chopra and Sodhi (2012) defined a supply chain as set of three or more organisations linked directly by one or more of upstream or downstream flows of products, services, finances and information from source to customer. They elaborated on the definition by mentioning typical members included in a supply chain. These are suppliers, manufacturers, distributors, retailers and customers. This definition aligns with the one given previously by Mentzer and Moon (2004). They added that a typical supply chain includes all activities, functions and facilities (directly or indirectly) in the flow and transformation of goods and services from the material stage to the end user.

Stadtler (2005) define a supply chain (SC) as “a network of organizations that are involved, through upstream and downstream linkages in the different processes and activities that produce value in the form of products and services in the hand of the ultimate consumer”.

Seamless integration of value-added activities among supply chain members is a fundamental requirement for the supply chain to gain competitive advantage. This does not happen automatically. It requires a planning and controlling strategy. This planning and controlling strategy is called Supply Chain Management (Chopra and Sodhi (2012)).

2.2.2 Supply Chain Management (SCM) Definition

There are many definitions of Supply Chain Management. To help understand and essence and meaning of SCM, a few definitions of Supply Chain management (SCM) are given below.

According to Dougherty and Gray (2006) Supply Chain Management is the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole.Cao and Zhang (2011) in their definition provided more detail to the definition. They define Supply chain management as a process of proactively managing the two way movement and coordination of goods, services, information, funds from raw materials through to end user. The definition given by Fawcett et al. (2011) is different to the previous ones. Their definition does not only encompass management and control but starts at the design stage. They define Supply Chain Management as the design and management of seamless, value-added process across organisational boundaries to meet the real needs of the end customer.

It can be deduced from the definitions above that the focus of these definitions is predominately external. This necessitates the inclusion of a definition with an internal focus. A more relevant definition with an internal focus is given by Prajogo and Olhager (2012). They define Supply Chain Management as the coordination of and collaboration with processes and activities across different functions such as marketing, sales, production, product design, procurement, logistics, finance and information technology within the network of the organisation.

Chopra and Sodhi (2012) describes how time has become one of the most important sources of competitive advantage in manufacturing industries. The next section discusses how Supply Chain Management strategies and practices help deal with the complexities that result from this.

2.2.3 Objectives of Supply Chain Management (SCM)

Stadtler (2005) pointed out that the objective of Supply Chain Management (SCM) is to improve competitiveness of a Supply Chain as a whole. They said that although SCM is not a unique management paradigm it represents a new focus on how to link organizational units to best serve customer needs as well as improve the competitiveness of a Supply Chain as a whole.

Chopra and Sodhi (2012) concurred with Stadtler's view on what SCM aims to achieve. They also declared that the objective of Supply Chain Management (SCM) is to maximise value for members in the supply chain. It is their firm belief that the ultimate goal of the process should be to create and deliver customer and shareholder value. For this reason they called it a value delivery system. They reasoned that Supply Chain Management (SCM) is then about competing on value, collaborating with customers and suppliers to create a position of strength in the marketplace based on value derived from end consumer.

According to Prajogo and Olhager (2012), optimising the value chain activities enable organisations to leverage core competencies into a sustainable competitive advantage. They concluded this argument by revealing that organisations that will be future markets leaders are those that seek and achieve cost and service leadership excellence. Prajogo and Olhager (2012) suggest that integration of processes in the supply chain is the means by which this level of performance can be achieved.

2.2.4 Supply Chain Integration (SCI)

Cao and Zhang (2011) define Supply Chain Integration (SCI) as the extent to which a manufacturer strategically collaborates with supply chain partners and collaboratively manages internal and external organizational processes, in order to achieve effective and efficient flows of products and services, information, money and decisions, to provide maximum value to the customer.

Olhager and Selldin (2007) explained that different functions and groups inside and outside organisations must collaborate to achieve a wide range of shared goals. As mentioned earlier Prajogo and Olhager (2012) pointed out that this is achieved through integration of the supply chain. Integration is defined by Oliva and Watson (2011) as the process of merging different groups, functions, or organisations, either formally or informally, physically or by information technology, to work jointly and often concurrently on a common business-related assignment or purpose.

Supply Chain Integration is put forward as a process of redefining and connecting entities through coordinating or sharing information and resources (Oliva and Watson (2011). Yu, Jacobs, Salisbury, and Enns (2013) investigated the relationships among internal integration, external integration (i.e. with customers and suppliers), customer satisfaction, and financial performance. The results suggest that internal integration significantly influences both dimensions of external integration, customer and supplier integration; and that supplier integration is significantly and positively related to financial performance.

External integration comprises both supplier and customer integration (Oliva and Watson (2011). Supplier integration is not just about providing information. It entails participating directly in the decisions making processes.

Oliva and Watson (2011) conducted a study which proved that internal integration has a significant positive effect on external integration, Customer and supplier integration and customer satisfaction. They also found that customer and supplier integration are positively linked to customer satisfaction. Another key finding they made was that customer satisfaction results in solid financial performance. In explaining this relationship they said that better comprehension of customer requirements improves performance which results in increased customer satisfaction. The customer satisfaction then drives increased loyalty which in turn yields a steady stream of future cash flows. This cycle of cause and effect relationships lead Oliva and Watson (2011) to the conclude that internal integration is antecedent to external integration which results in future cash flows. Put differently internal integration is financially beneficial to financial performance of the firm.

Supply Chain Integration is in essence a competitive strategy adopted by companies to achieve better coordination and collaboration amongst supply chain partners (Stadtler (2009). It is widely considered to be the core of successful Supply Chain Management. Yu et al. (2013) substantiates these claims by citing that integration is a pre-requisite for the implementation of effective Supply Chain Management.

Internal integration should cover a number of functional areas such as finance, engineering, logistics, service operations, production, new Product development and customer service. It is only when these different business functions act in perfect harmony that progression towards external integration can be sought (Oliva and Watson (2011).

According to Stevens (1989) the journey to effective supply chains starts with effective organisations and if not, the value chain will be as weak as the weakest of organisations that make up the chain. He further pointed out that supply chain integration evolves in stages starting from within the organisation to inter-firm. Lapide (2005a) declared that it is the Sales and Operations Planning (S&OP) process that drives the supply chain benefits. Adamczak et al. (2013) later also argued in support of the same declaration. They mentioned that improving the effectiveness of the Sales and Operations Planning process is the most common and most effective means of achieving internal integration. They suggested that performance improvement in the areas of cost, quality, delivery speed, dependability and flexibility is highly dependent on the effective execution of the Sales and Operations Planning function. The ultimate goal of executing an effective Sales and Operations Planning (S&OP) process is excellence in customer satisfaction and optimised profitability.

2.3 SALES AND OPERATIONS PLANNING (S&OP)

This section is a detailed review of literature on Sales and Operations Planning (S&OP). It describes the essence Sales and Operations Planning (S&OP) by defining providing a working definition. Key components of a Sales and Operations Planning (S&OP) process are discussed. The development or evolution of S&OP over time is discussed. Views from different authors are discussed, compared and contrasted. Best practice as it is known today is then outlined and used to explain the framework for the evaluation of the maturity level of organisations in relation to Sales and Operations (S&OP) practices.

2.3.1 Definition of Sales and Operations Planning (S&OP)

Various authors have formulated definitions of Sales and Operations Planning (S&OP). These definitions are given below and the working definition is then chosen from the list.

The first definition is that given by Grimson and Pyke (2007). They define Sales and Operations Planning (S&OP) as a business process that links the corporate strategic plan to daily operations plans and enables companies to balance demand and supply for their products and services.

The second definition is that given by Muzumdar and Fontanella (2006). They define S&OP as a set of business processes and technologies that enable the enterprise to respond effectively to demand and supply variability with insight into the optimal market deployment and most profitable supply chain mix.

The third definition is found in Cox, Blackstone and Spencer, (2002). They define S&OP as a process to develop tactical plans that provide management with the ability to strategically direct business to achieve competitive advantage on a continuous basis by integrating customer-focused marketing plans for new and existing products with management of the supply chain.

Other definitions have been given by different authors but were not included in this list because they were all covered in one way or another by the three given above.

The definition given by Cox, Blackstone and Spencer (2002) is adopted for this study. The rationale for this choice was that it captures the essence of S&OP as described by most authors on the subject. Muzumdar and Fontanella (2006), Thomé et al. (2012), Kjellsdotter Ivert and Jonsson (2010) and Stahl (2010) have identified the following key elements that capture the essence of S&OP:

i. It is a set of business processes across different sections within an organisation.

ii. Includes key customers and suppliers.

iii. The objective is cross-functional integration and alignment .

iv. The ultimate goals are maximum customer satisfaction and optimum optimum profitability achived by choosing the most profitable supply chain mix.

v. It aligns all functional plans towards business strategy.

vi. It is a business management tool that drives strategy execution.

vii. It is linked with the performance of the firm.

2.3.2 Objectives of Sales and Operations Planning (S&OP)

This section discusses objectives of Sales and Operations Planning (S&OP). These pertain to the individual organisations and to the supply chains of these firms. Many reasons have been put forward in terms of what Sales and Operations Planning (S&OP) intends to achieve. These objectives are categorised according to whether they are strategic, tactical or operational.

There are several strategic level Sales and Operations Planning (S&OP) objectives as pointed out in literature. According to T. F. Wallace (2004) the primary objective of any Sales and Operations (S&OP) process is to improve competitive advantage for the business. In support of this Muzumdar and Fontanella (2006) said that the objective of Sales and Operations Planning is to search and execute the most profitable strategy out of many scenarios. A similar version of this objective was given by Grimson and Pyke (2007) who cited that the key objective of the Sales and Operations Planning (S&OP) process is to drive business strategy by integrating operational plans with strategic plans in a way that supports corporate goals. Bower (2005) mentioned that Sales and Operations planning (S&OP) process should provide visibility required to monitor corporate strategy.

At a tactical level the key objective of Sales and Operations Planning (S&OP) process is to achieve integration across operational silos as well as trading partners. All functional plans are integrated into one set of plans that are used to drive the business Muzumdar and Fontanella (2006); T. F. Wallace (2004) and Feng, D'Amours, and Beauregard (2008) suggest the following Sales and Operations Planning (S&OP) objectives at a tactical level:

i. Balance supply and demand. The power of S&OP lies in its ability to compare the interaction of the business plans such as the financial, demand, supply, and inventory plans and this empowers the business to react timeously to address root causes or react issues before they become serious business challenges.

   According to Dougherty and Gray (2013) the ultimate objective of S&OP is to help execute business, financial, product and functional strategies. They argued that the S&OP process is the means by which to align financial and operational plans. They advanced this argument by mentioning that this process supplies critical updates for financial planning, budgeting, investment decisions and cash-flow management on a monthly basis. In rounding off this argument they said that the process is the best means by

which to link financial plans with detailed unit plans. In capital planning and investment decisions S&OP provides the rolling forecast numbers that inform the companies in deciding where to invest for the future.

Dougherty and Gray (2013) went on to say that if S&OP is properly interfaced with financial systems it functions as an early warning system to indicate sales or supply variances that affect profitability. The demand and supply plans provide the latest and most reliable product volumes which serve as justification for capital investments needed to support these product volumes.

ii. Enable enterprise-wide alignment and execution of the corporate strategy.
iii. Align decisions and plans across the value chain.
iv. To align and synchronise business decisions, business plans, strategies and goals to the corporate vision.
v. Foster stronger partnerships with supply chain partners.
vi. Assure the availability of strategic capacity across the value chain.
vii. Integrate the product mix with total volume of products.

At the operational level Dougherty and Gray (2013) suggest that the objective is to create a reality-based one number forecast from which demand plans are generated. Olhager and Selldin (2007) had previously pointed out that these day-to-day detailed plans, schedules and operations plans should be integrated, synchronised and linked with operational and financial plans.

2.3.3 Impact of Sales and Operations Planning (S&OP) on business performance

Grimson and Pyke (2007) have found that S&OP have a positive effect on strategic plans and financial performance. Feng et al. (2008) also later confirmed that a fully integrated Sales and Operations Planning (S&OP) process results in higher financial returns.

Muzumdar and Fontanella (2006) demonstrated that there is an explicit and clear relationship between the quality of an S&OP program and the actual business performance. Olhager and Selldin (2007) in their research concluded that S&OP is positively related to firm results. McCormack and Lockamy (2005) have also strongly suggested that a formal S&OP process in an organisation has an impact on firm performance. Hadaya and Cassivi (2007) also came to the same conclusion that S&OP has a positive effect on performance. Kilger, Reuter, and Stadtler (2015) also recently came to the same conclusion about the impact of S&OP on performance.

Hadaya and Cassivi (2007) also confirmed previous findings in his studies that effective use of Sales and Operations Planning (S&OP) leads to better operational performance. Paiva (2010) said that this operations performance is in most cases linked to competitive performance. Lapide (2011) propose measures in the areas of cost, quality, productivity and inventory turn-over for operations performance. Thomé et al. (2012) added delivery speed, delivery reliability, volume flexibility and mix flexibility to the list. They concluded this by showing that when different cross functional plans are integrated, product and service quality improve which results in an improvement in operational and business performance. Paiva (2010) further broke down business performance into financial and market measures.

Prajogo and Olhager (2012) suggest the following financial benefits that can be realised by implementing an effective and well integrated Sales and Operations Planning (S&OP) process): Improved Revenue, Improved Gross margin per product, Optimum profitability and Reduced Working Capital which improves cash flow.

ELBAUM (2005) and Grimson and Pyke (2007) suggest improvement in the following market measures as a result of implementation of a well-integrated Sales and Operations Planning (S&OP) process: Improved Customer satisfaction, Shorter customers and suppliers lead time, Better order fill rates and Better customer retention.

Grimson and Pyke (2007) and Muzumdar and Fontanella (2006) amongst many others declared that a well implemented and executed Sales and Operations Planning (S&OP) process should result in the improvement of the following operational measures:

i. Increased forecast accuracy
ii. Higher inventory turns
iii. Reduced Inventory
iv. Reduced product obsolescence
v. Better Asset utilisation
vi. Improved portfolio management

2.3.4 Development of Sales and Operations Planning (S&OP)

Manufacturing organisations have always tried to find ways of improving competitiveness Olhager and Selldin (2007). Sales and Operations Planning (S&OP) is one such initiative that manufacturing essentially developed as a process to support the running of the MRP II technology (McNeil, 2008). Hadaya and Cassivi (2007) , Cao and Zhang (2011) Thome, et al., (2012) have attributed this evolution to environmental factors such as increased competition, market volatility, environmental changes, changing customer preferences, technological changes and globalisation. Globalisation was cited by Ling and Coldrick (2009) as the major contributor to this evolution.

This section focuses on the development or evolution of Sales and Operations Planning (S&OP). This evolution is described below according to the planning level focus and by major breakthroughs.

Generally speaking there is an agreement amongst different authors that production planning and control started back in the early 1950's. Although the roots can be traced back to the 1950s, S&OP as it is recognized currently started in the late1980's (T. Wallace (2006), Dougherty and Gray (2006) Muzumdar and Fontanella (2006), and Olhager (2010). The evolution according to planning level focus is as per figure.1 below:

Evolution of S&OP planning level focus

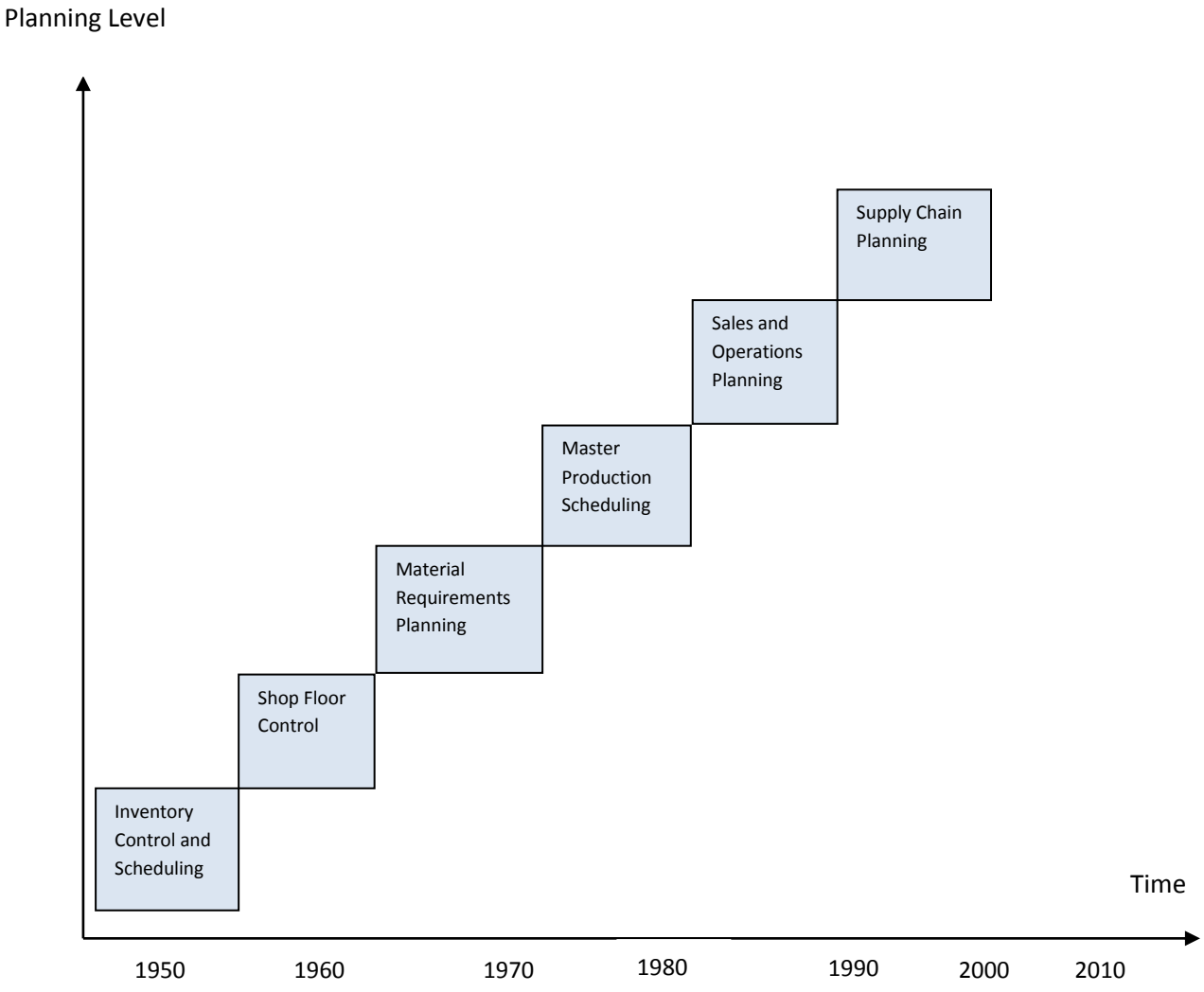

Figure 2.1: Evolution of S&OP planning levels (J. Olhager, 2010)

The early period (1950 up to the 1960's) - Inventory control and scheduling

The approaches to operations planning and controlling developed during this time took a very detailed perspective on manufacturing operations (Ling and Coldrick (2009). Most production techniques and tools of this era focused on improving manufacturing processes (Olhager, 2010).

The key challenge was an increase in uncertainty during decision making that led to poor economic results. Factors such as inadequate and inaccurate forecasts, fluctuating demand, increasing number of products, and discrepancies between different production plans were at the root of poor performance. The objective of was therefore to increase profitability. The strategy that was adopted was making material planning and manufacturing planning more stable by the manufacturing department (Ling and Coldrick (2009) and Singal and Singal , 2007).

Ling and Coldrick (2009) pointed out that this period coincided with the introduction of computers. He continued by saying that different methods of optimising manufacturing operations were developed. He mentions that this covered areas such as inventory control, production planning and scheduling. Computer based shop floor control methods were developed to facilitate the use of scheduling and sequencing methods.

The introduction of computers addressed a few of the planning challenges of the time. It was also revealed that during this time key processes such as annual business planning, sales planning and production planning were completely unrelated exercises. There were multiple sets of numbers on separate spread sheets. Improvements were functional and disconnected and as a result, there were no tangible business results. MRP II became the main planning and execution piece (Ling and Coldrick (2009).

Holt (2002) cited that the most important result to come out of this was not related to economic benefits. According to him it was a lesson that led to a better understanding of the business. It was a revelation that production planning was the responsibility of different unrelated functions within an organisation. Ling, et al. (2007) also said the same thing and further mentioned that even after Sales had come up with a number; manufacturing still changed the volumes without the involvement of others.

The 1970's -The MRP era

The short comings of the previous era as well as the lessons learned led to the use of the MRP system for operations planning and control. This was referred to as MRP crusade. All the approaches, tools and techniques used during the time had an internal focus. Some degree of improvement and better coordination of activities was achieved Olhager (2013).

The 1980's up to the 1990's - The Master Production Scheduling and MRP II

According to Olhager (2013), this decade brought about a major shift in how operations could be made more efficient and effective. It was during this decade that organisations started to judge performance of operations on both internal and customer focused measures. Berry and Hill (1992) were the first to take into consideration market and product related attributes as well as strategic choices at the master schedule level. The key objective was still to optimise internal conditions.

Different factors have been cited as key drivers of evolution of this era. These are increasing globalisation, adoption of information technology, and the introduction of e-business Muzumdar and Fontanella (2006). Globalisation was singled out as the most influential driver of evolution in this era. The supply chains which were becoming more global brought many rewards, but a lot of challenges as well (McCarthy, Davis, Golicic, and Mentzer (2006).

These longer supply chains resulted in longer lead times. Companies had to develop capabilities that enabled them to deal with increased volatility in the environment in demand forecasting as well as capacity management. New capabilities in management control and scenario modelling were required to better manage and execute strategies. The quality and accuracy of data was compromised and all organisations had to be agile enough to be able to respond to new business opportunities or threats in real time. All that could be achieved with this approach were improved internal efficiencies (McCarthy et al. (2006)

Olhager (2013) observed that in the late 1980's organisations started to realise that competing on internal efficiencies was impossibility in the global market. The market was changing at a fast pace. Increased innovation and customer responsiveness became the key drivers of evolution. The agility to cope with the impact of these drivers was crucial to the competitiveness of the organisations.

According to Muzumdar and Fontanella (2006) this required an understanding on two fronts. Firstly it required a common understanding of competitive priorities informed by the needs of the ultimate customer at the end of the supply chain followed by a common view on the planning and control of the internal and external supply chain. They pointed out that the fundamental reason for this was that in the global markets competition was no longer between companies but between supply chains.

This led to the development and adoption of a set of managerial practices called Sales and Operations planning (S&OP). Its development according to its breakthroughs is as shown in figure 3.2.

Evolution of S&OP according to breakthroughs

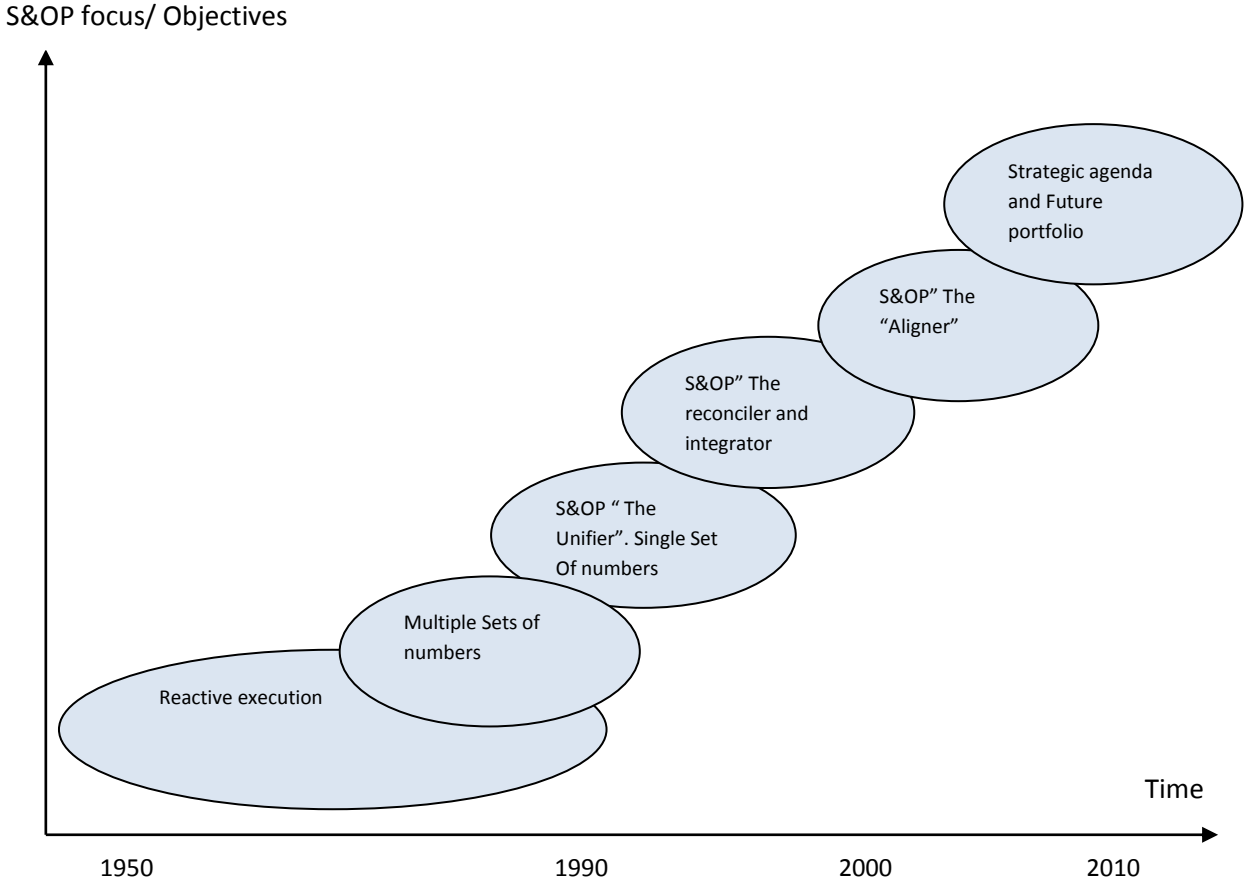

Figure 2.2: Evolution of S&OP by major breakthroughs (Ling & Coldrick, 2009).

The late 1980 to 2000 - Traditional Sales and Operations Planning (S&OP)

Sales and Operations Planning (S&OP) as we know it today is said to have started developing around 1987. Its main focus was to make MRPII work in a single manufacturing plant within a business. Getting control over manufacturing operations was the main focus. This argument is also supported by many other authors who have written literature on the development of the subject. At the time, processes such as annual business planning, sales planning and production planning were completely separate exercises. Finance was a neutral function with no role to play (Ling and Coldrick (2009).

The introduction of Sales and Operations Planning (S&OP) supposedly forced Sales, Marketing and Manufacturing to agree on a set of numbers for sales, production and inventory. This was to resolve issues around supply and demand imbalances. The view that balancing demand and supply was an end in itself promoted behaviours that led to a new set of problems (Olhager (2013).

The period post 2000 - S&OP the integrator and driver of strategic agenda

During this period Sales and Operations Planning (S&OP) was viewed as a logistics function focusing merely on demand and supply volume planning. The focus was on year end only. The S&OP process was perceived to be a middle management logistics function and only relevant to organisations with limited innovations, committed to cost leadership (Ling and Coldrick (2009).

According to Paiva (2010) the objectives of the different functions started competing and conflicting. Sales and marketing were interested in the range of products, forecasting was no longer a priority; manufacturing and the supply chain were measured differently. There were massive disconnects which made it impossible to balance supply and demand. This brought about a need for more collaboration and integration among different functional areas in order to strengthen their capabilities and improve business performance.

The improvement in the use of the Sales and Operations (S&OP) process brought about tangible benefits to organisations.

The effects of globalisation compounded the issues and consequently undermined the organisations competitiveness. Globalisation trends continued to put growing pressures on the traditional Sales and Operations Planning practices. Factors such as declining brand loyalty, increase in the demand for customised and configured solutions, forced companies to concentrate efforts and resources on products, customers, markets and channels (Grimson and Pyke (2007).

The market dynamics of the late 2000's rendered the traditional Sales and Operations Planning processes, practices and technologies obsolete. Competition had migrated from company level to the supply chain level. Using Sales and Operations Planning processes to balance supply and demand was no longer sufficient. Sales and operations Planning (S&OP) processes were then more about searching and executing the most profitable strategy. Enhancing the vital few factors that gave the business a sustainable competitive advantage (Muzumdar and Fontanella (2006).

The benefits to be realised from this are improved customer service, reduced inventories, growth and optimal profitability Ling and Coldrick (2009).

2.3.5 Key components / elements of Sales and Operations Planning (S&OP)

Muzumdar and Fontanella (2006), Grimson and Pyke (2007) as well as Wagner, Ullrich, and Transchel (2014) maintain that successful enterprises focus their S&OP on profitability and continuous improvement. All agree that a Sales and Operations Planning (S&OP) process is made up of five elements. Lapide (2005b) called them structure, meetings, information systems, integration and measurement. Grimson and Pyke (2007) on the other had labelled them differently. They called these people, process, technology, strategy, and performance respectively. Wagner et al. (2014) rearranged these elements and called them dimensions. The meetings and parts of S&OP plan integration were called Process effectiveness, Measurements and the remaining parts of S&OP were called Process efficiency, People and Organisation as well as Information technology remained unchanged.

Grimson and Pyke (2007) went further to classify these dimensions. He called the first three business processes while the last two are information processes. They however stated that the process elements are the most critical. They went further and claimed that a Sales and Operations Planning (S&OP) process can still achieve results without the information process elements. This view was shared by Wagner et al. (2014).

The paragraphs that follow provide details on each of the five elements starting with the process elements and progressing to the information elements.

2.3.5.1 People

Lapide (2005b), and Muzumdar and Fontanella (2006) agree that involving the right people is the key to running an effective S&OP. Executive sponsorship is a necessary condition for the success of a Sales and Operations Planning (S&OP) process (Muzumdar and Fontanella (2006). Lapide (2005a) argued that executive buy-in and sponsorship is necessary to make sure participation by all key cross-functional members and other required supply chain partners. The ideal structure should be as follows:

i. The process is sponsored by executive-level.

ii. There is an S&OP champion who takes accountability for this meeting.

iii. It is driven by cross-functional teams that consist of sales and marketing (demand management and forecasting), operations (purchasing, inventory management, supply chain operations, master production scheduling, finance, product development, and R&D.

iv. There is formalised collaboration with the business network partners.

2.3.5.2 Process / meetings and collaboration

According to Lapide (2011) S&OP is an on-going process of monthly planning, reviewing, and evaluation to generate one set of integrated profit maximizing plans by ensuring the involvement of all key stakeholders. Further to this he added that effective Sales and Operations Planning (S&OP) comprises holding formal meetings. His view is that these meetings are about having real-time supply and demand visibility and continuous real-time monitoring of business intelligence at a strategic level and tactical levels. Prior to that Muzumdar and Fontanella (2006) had cited that all key functional areas of the business and key supply chain partners must be involved in the Sales and Operations Planning (S&OP) meetings.

Lapide (2004a) argued that an effective Sales and Operations Planning (S&OP) should have a formal policy document that guides how the process will work. In elaborating this point he mentions that the policy document should include amongst other things elements such as objectives, frequency of scheduled meetings, key participants, agenda as well as a business and an S&OP key Performance indicators (KPIs).

Lapide (2011); Stahl and Wallace (2012); T. F. Wallace (2004) all agree that the S&OP is a five steps process. The five process steps are outlined in figure 2.3 below:

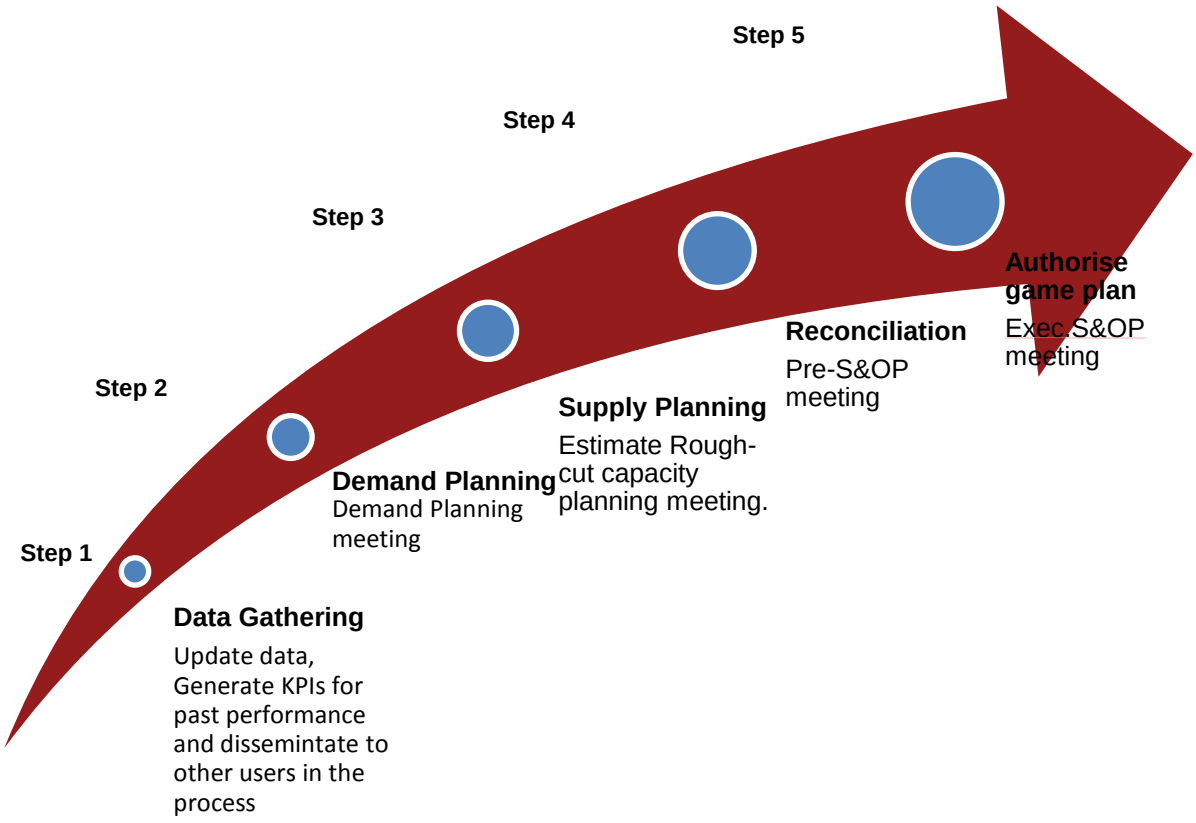

Figure 2.3: Sales and Operations Planning (S&OP) Meetings Structure (Wallace and Stahl, 2005)

Step 1: Data gathering

According to Stahl and Wallace (2012) this step comprises data gathering preparation, consolidation, and dissemination of data for use in other phases of the process. They recommend that data collection should be performed automatically by relevant IT systems. This takes into account updating the previous month's data such as actual sales, production and inventories.

Data on Key Performance Indicators (KPIs) such as forecast error, actual production rates and other reports regarding past performance is generated to evaluate past business performance. The information is then consolidated according to the planners' requirements and disseminated to other users Lapide (2004a).

Step 2: Demand Planning

Dougherty and Gray (2006) said that in this phase marketing and sales people come together in formal, informal, pre-meetings to review the data that was gathered in the previous stage. They said that this is done to generate the new consensus-based unconstrained baseline demand forecast for a period of at least 12 months. Muzumdar and Fontanella (2006) added that this forecast should integrate new product introduction and cannibalization plans, promotional activities, and other external factors such as more market intelligence. The last step is converting the new volumetric forecasts into financial terms to facilitate continuous financial reconciliation with the business plan. The preferred scenario should be chosen based on its impact on profitability (Dougherty & Gray, 2013); Lapide (2011); (Muzumdar & Fontanella, 2006).

Step 3: Supply Planning

Muzumdar and Fontanella (2006) mentioned that this phase of the process happens in parallel to the demand planning phase. They elaborated on the specifics of this stage. They said that at this stage, operations perform analysis to compare actual against planned performance on different performance indicators such as inventory levels and capacity utilization.

New supply plans are generated considering the new demand plans, customer order backlogs, inventory levels, material and/or capacity availability, production and lead times, and other contingencies (Mentzer & Moon, 2004). According to Dougherty and Gray (2006) a rough- cut capacity plan is then generated using resource requirements planning modules such as MRPII or similar ones. It is their view that potential deviations are analysed and underlying assumptions validated. Lapide (2004a) added that an agreement on available capacities is reached once cconstrains are assed. According to Mentzer and Moon (2004) the outputs of the supply planning phase include a high-level supply plan and information on future capacity issues. They also mentioned that one of the key outputs of this stage is the agreement on actions required to relieve capacity constraints.

Step 4: Pre-S&OP meeting

This step is about formally reconciling supply and demand plans. It is used to understand and reconcile how different views contribute to optimal profits. This phase involves the joint generation of an aligned and integrated set of plans. A cross-functional team of representatives from demand and supply side organizations, new product development, finance, and the S&OP process owner assemble to discuss, adjust, and validate supply and demand plans (T. F. Wallace (2004).

Stahl and Wallace (2012) recommended that to ensure alignment of plans, the policies, strategies, and the business plan should be used as the framework within which decisions relating to the balancing of supply and demand should be made. Their view is that it is the use of this framework that a single set of aligned recommendations to be presented in the executive meeting can be aligned. Dougherty and Gray (2006) proposed that at this stage the S&OP team identifies gaps between current demand plan and financial plan and make adjustment to all functional plans based on their impact on profitability. They said that these adjustments are made till one set of numbers is agreed on by the supply side and demand side of the organisation.

Grimson and Pyke (2007) in support of this view also said that the volumes and product mix that will result in optimum profits for the planning period should be chosen. In addition to that they said that an updated financial report of the business should be generated to compare actual performance against the business plan. Finally, attendees prepare the material to be presented in and set the agenda for the executive meeting which tracks progress against strategic intent and business plan implementation.

Step 5: Executive S&OP meeting

The executive S&OP meeting is the last step in this process. In this meeting executives use an executive scorecard to review actual business performance against plan. Executives also approve the work from the functional pre-meetings, make decisions on issues outside the scope of authority of the pre meeting team and grant authority to the S&OP team to implement the planning decisions (Bower (2005); Dougherty and Gray (2006).

Stahl (2010) and Bower (2005) added that over and above this strategy execution is reviewed because the objectives set at this level set the tone for all that happens within an organisation. They went further and mentioned that strategic and operational plans are synchronised to ensure that operational plans and the latest view are in line with the strategic plan. Muzumdar and Fontanella (2006)

had also expressed this when they said that S&OP process is used to drive business strategy and as such financial plans and future strategies should be updated and validated.

In expressing his view Bower (2006) said that the executive team examines significant demand and supply issues, gaps, and gap closing opportunities. He says that in order to prioritise these issues it is necessary to convert them into financial numbers then provide direction, information and make decisions on actions and resources required to support demand fulfilment.

2.3.5.3 Technology / Information system

Information systems and software is crucial for the success of the Sales and Operations Planning (S&OP) process (Lapide (2004b). They further mentioned that a lot of companies with excellent Sales and Operations (S&OP) process are hamstrung by poor technology. Transaction, decision support, and business intelligence capabilities should be exploited in a real-time environment Wu, Yeniyurt, Kim, and Cavusgil (2006).

2.3.5.4 Strategy / Plan integration

Getting things right in the three strategic elements will deliver the results. The three elements mentioned are the alignment of supply and inventories to demand. According to the formal alignment of supply and inventories to demand should be the first element to be addressed. Demand management poses the greatest risk to achieving business objectives and as such should be improved on first (Bower (2006).

Profitability is the second strategic element that requires attention. All scenarios are assessed and selected based on their impact on profitability. The third strategic element is about paying attention to the value chain. The organisation needs to work in collaboration with customers and suppliers Lapide (2005a).

The final element that requires focus is continuous improvement. Predicting the risks and market changes is complex and inaccurate and makes deploying plans too far into the future difficult (Grimson and Pyke (2007).

2.3.5.5 Performance / Measurement

According to Bower (2005) metrics are vital to the success of the S&OP process because they point out the core temperature and pulse of the business. He said that over and above this they clearly illustrate progress on efforts to drive improvements. Lapide (2005b) supported this view and specifically stated that executive S&OP dashboards are an integral part of a successful S&OP process. Both including Wagner et al. (2014) agree that at the least the executive team needs to have a score card with metrics that cover the following areas:

i. Measurement of major strategic initiatives
ii. Forecast accuracy measures
iii. Sales measures
iv. Critical market measures
v. New product forecast accuracy measures
vi. Measures on major financial indicators
vii. Measures on key supply chain performance indicators.

Lapide (2004a) suggests business metrics such as gross margins, product and customer profitability, order fill rates, customer satisfaction or retention, sales per employee, percentage volume growth, and gross margins. For operations he recommends measures such as line fill, inventory on hand, obsolete inventory, expediting frequency, stock outs, variance to standard costs, quality and capacity utilisation.

In cases where new product introduction is important, Bower (2006), proposes that measures such as development costs, time to market, ramp up time, and number of successful introductions should be used. His other proposition is that the sales team's performance should be measured in terms of market share, revenue, top line sales growth, forecast accuracy and variance to baseline

forecast. Financial measures such as market share, revenue, share price and return on investment on capital invested.

Grimson and Pyke (2007) later added another set of measures that focus on the effectiveness of the S&OP itself. These measures focus on the continuous improvement of the S&OP process and the contribution of each member in different meetings. They however admitted that in their experience these measures are rare and none of the other researchers had constructs to measure this.

2.4 MEASURING ORGANISATIONAL S&OP MATURITY LEVEL

Assessment of the S&OP maturity level is through an integration framework first developed by Lapide (2005b) then improved by Grimson and Pyke (2007) and later by Wagner et al. (2014). Lapide (2005b) described a model made up of four stages namely Marginal (stage 1), Rudimentary (stage 2), Classic (stage 3) and a stage 4 called the Ideal process. He described each stage in terms of three characteristics. The characteristics he uses are structure of meetings held, demand and supply plan alignments and enabling technologies.

Grimson and Pyke (2007) later described another variation of this model. They broke dissected the previous model into five stages of maturity and five characteristics to define each stage. The five process levels of maturity are described as: No S&OP process (stage 1), Reactive (stage 2), Standard (stage 3), Advanced (stage 4) and stage 5 which called Proactive process.

The characteristics used for each stage are meetings and collaboration, organisation, measurements, information technology and S&OP plan integration. Grimson and Pyke (2007) called the first three dimensions business processes while the last two are information processes. Wagner et al. (2014) later observed that these frameworks were not comprehensive enough. They had found that they varied in terms of S&OP process components, objectives, prioritization, and

maturity levels as well as the characteristics used to define each stage. In light of this they developed a more comprehensive framework that synthesises these models and frameworks. They developed a more comprehensive S&OP maturity model as shown in table 2.4.1

The model according to Wagner et al. (2014) discriminates among six levels of S&OP maturity levels. These maturity levels are: “undeveloped” (level 0) Rudimentary (level1), Reactive (level 2), Consistent (level 3), Integrated (level 4) and a level 5 called “Proactive” which is the ideal and highest level any organisation should aim for. In explaining the essence of these stages Wagner et al. (2014) stated that the levels up to stage 4 are all about trying to achieve internal integration while in stage 5 entails extending collaboration and alignment efforts throughout the supply chain.

Wagner et al. (2014) propose four dimensions against which to evaluate each maturity level. These are Process Effectiveness, Process Efficiency, People and Organization, and Information Technology. They further dissected each dimension into stage specific characteristics used as a criterion to determine the maturity level. These dimensions and characteristics are not entirely different to those used in the models by Lapide (2005b) and Grimson and Pyke (2007). The model will described below.

2.4.1 Process effectiveness

Wagner et al. (2014) defined process effectiveness as doing the right things. They said that this dimension defines all features, activities and/ or practices an S&OP process should include. Grimson and Pyke (2007) had earlier given a similar description. He said that the theme or dimension describes all by-the-book elements that make up the processes. Wagner et al. said that this dimension is made up of three sub-dimensions namely degree of formalization, Scope, as well as collaboration and alignment.

The degree of formalization definition view of Wagner et al. (2014) is that this sub-dimension covers different aspects that account for the importance of a high

degree of S&OP formalization. Grimson and Pyke (2007) mentioned having a documented S&OP policy, formal structured routine meetings with agendas and a scorecard as some of the formalisation elements of the process.

The second sub-dimension Wagner et al. talk about is the scope of the process. This provides an indication of what activities and information should be performed and considered to make the S&OP function effectively. Grimson and Pyke (2007) made it clear that having a functioning and well understood S&OP process is more important than having an elegant information system. They argued that a good S&OP process can achieve excellent results even when it is enabled by spread sheets.

The last sub-dimension considered is around collaboration and alignment which incorporates aspects related to information sharing and other alignment capabilities required for proper process integration.

As explained by Cao and Zhang (2011), communication is the glue that holds partners together. To clarify this further, they stated that communication is the life blood, foundation and essential requirement for effective collaboration. They defined collaboration in terms of seven interconnecting components. These are:

i. Information sharing - this is the extent to which members share a variety of relevant, accurate, complete information in a timely manner.

ii. Goal congruence between the different functions and alignment with the strategy. This assesses the extent to which different firms understand that their goals are met by meeting the goals of others.

iii. Decision synchronisation which refers to the process by which different functions orchestrate decisions within the organisation and with outside stakeholders in the value chain.

iv. Incentive alignment. The incentives of the different functions should not encourage behaviours that undermine the objectives and efforts of other functions.

v. Resource sharing. Functions are expected to be able to leverage the resources of other functions.

vi. Collaborative communication – This is measured in terms of frequency, mode, direction and influence. Open, balanced, two-way, multilevel communication is generally an indication of effective relationships.

vii. Joint knowledge creation – this is the extent to which different functions work together to develop a better understanding of response to the market and competitive environment. They defined the two types of knowledge creation activities as exploration and exploitation.

Table 2.4.1 below is a detailed description of the process effectiveness characteristics of the comprehensive S&OP maturity model.

Dimension	**Sub-Dimension**	**Level 0** Undeveloped	**Level 1** Rudimentary	**Level 2** Reactive	**Level 3** Consistent	**Level 4** Integrated	**Level 5** Proactive
Process Effectiveness	• Degree of formalisation • Scope • Collaboration and alignment	• No formalized planning process • No scheduling of review meetings • No consideration of capacities • No promotions and price changes planned • No risk management in place • No product life cycles and new product introductions planned • No efforts made to align supply and demand-side plans	• Slightly formalized planning process • Meetings not routinely scheduled • Not all SKUs/product families considered in planning process • Issues like promotions, price changes, capacities, risk management, new products, and life cycles planned but not considered in S&OP • Little attempts to develop a consensus supply and demand plan jointly and/or to consider information from others • Existence of multiple supply and demand plans	• Moderately formalized planning processes and typically routinely scheduled meetings • Most SKUs/product families considered in planning process • Issues like promotions, price changes, capacities, risk management, new products, and life cycles insufficiently planned and considered • Demand-side provides a synchronized consensus demand plan so that supply-side organizations can generate a more or less aligned supply plan • No alignment with financial plans	• Level 2 plus: • Very formalized planning processes • Routinely scheduled meetings • All SKUs/product families considered in planning process • Issues like promotions, • Price changes, capacities, risk management, new products, and life cycles internally sufficiently planned and considered • Demand- and supply-side organizations (without finance) jointly generate an aligned set of plans • Financial targets/plans primarily drive decisions, instead of being discussed and aligned together	• Level 3 plus: • Internally completely formalized planning processes • Routinely scheduled and event-driven meetings • Issues like promotions, price changes, capacities, risk management, new products, and life cycles internally, but not externally sufficiently planned and considered • Demand- and supply side organizations • generate together with finance an aligned S&OP plan • No interactions with supply chain partners	• Level 4 plus: • Planning process is formalized across the supply chain • Event-driven meetings • Issues like promotions, price changes, capacities, risk management, new products, and life cycles internally and externally entirely planned and considered • All relevant information is shared across supply chain to improve visibility • External supply chain partners participate in alignment process to ensure plan feasibility and cross company profit maximizing decision making

2.4.2 Process Efficiency

Wagner et al. (2014) have upheld the view raised by Grimson and Pyke (2007) who had earlier said that process efficiency is about alignment and integration of plans with minimal effort. They share a view that S&OP plan integration is the goal of all the other process activities and practices. Wagner et al. provided the three sub-dimensions of process efficiency. These are Information preparation and sharing, meeting efficiency, performance measurement. They said that information preparation and sharing describes redundancies in planning efforts that come about if information is not properly shared. Meeting efficiency includes features about the scheduling and structuring of S&OP meetings. Performance measurement describes characteristics that relate to the firm's capability to measure S&OP performance and identifies potential indicators for continual improvement. Grimson and Pyke (2007) highlighted the fact that measurements are for both the company performance as well as the effectiveness of the S&OP process.

Dimension	**Sub-Dimension**	**Level 0 -** Undeveloped	**Level 1 -** Rudimentary	**Level 2 -** Reactive	**Level 3 -** Consistent	**Level 4 -** Integrated	**Level 5 -** Proactive
Process Efficiency	• Information preparation and sharing • Meeting Efficiency • KPIs/Measurement	• All planning is done manually • Information only partially available • Many redundancies • Frequent re-planning necessary • No planning meetings • No plan alignment • Planning efficiency and effectiveness not measured • No KPIs in place to measure planning performance • No performance tracking efforts made	• Many redundancies in information preparation due to decentralized information storage, • High degree of friction losses in cross departmental information flows • Meeting attendees not authorized to make decisions • Poor plan alignment makes frequent re-planning • Inevitable • Basic KPIs defined but only sporadically managed • KPIs not aligned across departments, with business strategies, and bonus schemes	• Partially centralized information storage reduces redundant work in information preparation • Moderate friction losses in cross-departmental information flows • Due to rudimentary plan alignment, frequent replanning required • Meeting attendees typically authorized to make decisions • Basic KPIs defined and regularly managed • Most KPIs harmonized across departments and partially aligned with bonus schemes • Some efforts of tracking performance	• Level 2 plus: • Relevant information is automatically shared and prepared • Very little friction losses in cross-departmental information flows • Meetings are formalized and executed that way (e.g., authorized attendees) • Due to appropriate plan alignment, less frequent re-planning necessary • Planning effort fits partially to the organization's requirements • Structured mechanism for S&OP performance evaluation • Regular reporting and Performance tracking	• Level 3 plus: • People receive only information they actually need • No friction losses in cross-departmental information flows • Meetings typically exception-focused and event-driven • Due to sufficient plan alignment, re-planning becomes very rare • Planning effort perfectly fits to the organization's requirements • Full alignment of KPIs across departments, with business strategy and bonus schemes • Internal S&OP benchmarks irregularly performed	• Level 4 plus: • External participants are integrated via systems such as EDI to avoid redundant data entry • S&OP meetings event-driven only and on a virtual basis • Supply chain partners participate in alignment process to avoid rescheduling due to, capacity restrictions of suppliers • KPIs also consider • performance of supply chain partners and are aligned with payment modes • Internal and external S&OP benchmarks regularly performed

2.4.3 People and Organisation

Involving the right people is crucial to running an effective S&OP Muzumdar and Fontanella (2006). Ling and Coldrick (2009) concurred with this and provided details on how the S&OP process was to be constituted in order for it to be effective. They prescribed that the process should have these elements: it should have Executive level sponsorship in order to get buy in and support from inside and outside the organisation, an S&OP champion who takes accountability for the meetings, should be driven by cross-functional teams and finally, formalized collaboration with external network partners.

This is about empowering all members of the cross-functional S&OP team, gaining top management support and sponsorship (Wagner et al. (2014). They viewed this dimension as being made up of two sub-dimensions namely roles and responsibilities as well as peoples' knowledge of S&OP process. The specific characteristics that make up this dimension are roles and responsibilities, organisational structure, knowledge, commitment and executive ownership.

Dimension	**Sub-Dimension**	**Level 0 -** Undeveloped	**Level 1 -** Rudimentary	**Level 2 -** Reactive	**Level 3 -** Consistent	**Level 4 -** Integrated	**Level 5 -** Proactive
People and organisation	• Roles, Responsibilities and • Organizational Structure • Knowledge, Commitment and Executive Sponsorship	• No assignment of roles and responsibilities with regard to planning tasks and activities • No planning organization established • Employees do not understand the necessity of, and requirements for, S&OP • Insufficient planning know-how • No management commitment	• Deficiencies in planning organization (no clear role descriptions, organization not aligned with business) • People are not held accountable for their plans and performance • Little skills, aptitude, and attitude of employees toward S&OP • Insufficient commitment and executive sponsorship	• Roles and responsibilities clearly defined but not yet successfully implemented • No dedicated S&OP owner • People partially held accountable for their plans and eformance • Insufficient knowledge to perform advanced S&OP activities • Moderate commitment and executive sponsorship	• Level 2 plus: • New planning organization with dedicated S&OP process owner established • S&OP responsibilities clearly specified in job descriptions, people know and stick to them • Sufficient knowledge to perform advanced S&OP activities • Great commitment and executive sponsorship	• Level 3 plus: • Planning organization entirely aligned with the business • Planning is agile and enables fast response to unexpected changes • Sufficient knowledge to perform additional planning related activities, such as risk management • Excellent commitment and executive sponsorship	• New organizational structure with dedicated S&OP process owner who coordinates planning efforts for the entire supply chain • Employees and top management highly committed and strive for continuous improvement • Top management of all partnering companies sponsor and participate in S&OP

2.4.4 Information Technology

Liu, Ke, Wei, and Hua (2013) indicated that the use Information Technology within the supply chain can bring about the following benefits: improve supply chain agility, reduce cycle time, achieve higher efficiency, and help deliver products to customers in a timeously.

Lapide (2005b) cited that the focus of information technology is on information processes and not business process. Wagner et al. (2014) provided the three sub-dimensions that constitute this dimension. These are Systems and Functionalities, Degree of Integration, and Master Data. They defined Systems and Functionalities as the degree to which demand and supply side planning systems, S&OP workbenches and other transactional business systems are employed to support the process requirements. When it comes to the Degree of Integration sub-dimension they said that it encompasses elements that are used as criteria to evaluate the degree to which data can flow through different systems, departments, and companies.

The descriptions of these dimensions and corresponding characteristics are detailed in table 2.4.4 below.

Dimension	**Sub-Dimension**	**Level 0 -** Undeveloped	**Level 1 -** Rudimentary	**Level 2 -** Reactive	**Level 3 -** Consistent	**Level 4 -** Integrated	**Level 5 -** Proactive
Information Technology	• Systems and Functionalities • Degree of Integration • Master Data	• No planning systems • Heterogeneous spread sheets existent and in use • Master data not (accurately) defined • No harmonization of master data throughout the organization	• Isolated demand and supply planning systems with a very limited scope of functionalities implemented • No integration of demand and operations planning software • Planning systems do not have access to all relevant planning data • Inconsistent master data definitions • Master data not harmonized throughout the organization	• Demand planning software and multi-facility production planning systems with more advanced functionalities such as statistical analyses to generate (sequentially) optimized plans employed • Information from other systems need to be manually entered or uploaded (no interfaces) • Planning systems have access to most relevant planning data • Most master data consistently defined but not entirely harmonized throughout the organization	• Level 2 plus: • Multi-facility APS system in place • S&OP workbench and software that provides workflow support • All planning modules and tools are linked via interfaces to the underlying ERP-system and have access to all planning data • Plan adjustments are Automatically incorporated in all modules • Master data consistently defined and harmonized throughout the organization	• Level 3 plus: • Systems continuously keep track of plans and trigger automatically alerts in case of unexpected deviations • Software suggests resolution alternatives if required • Simultaneous/real-time feasibility analyses supported • One 'single truly integrated system' in place • Master data proactively managed internally but not externally	• Level 4 plus: • Software supports CPFR, TPM and other visibility tools to integrate supply chain partners in IT infrastructure • IT systems are completely aligned throughout the supply chain • All relevant data (including capacities of third-party manufacturers, etc.) is available • Master data consistently defined and harmonized throughout the supply chain

2.5 CONCLUSION OF LITERATURE REVIEW

Organisations have always sought ways and means to improve their performance. Production planning and control gained momentum in the 1950's as a way of improving performance. This was mainly for shop floor control. The 1960's saw a paradigm shift. Computer based systems were introduced which enabled organisations to optimise their performance given their conditions at that time. The MRP system was the dominant feature in all organisations that were attempting to move ahead. In the 1980's, Master production scheduling was introduced.

A new paradigm shift occurred. Organisations realised that they could change their current internal conditions to improve performance. Most organisations adopted this new way of balancing supply and demand. It worked for a while. With globalisation driving the evolution, more challenges were introduced to the environment. Competition was no longer between companies but between supply chains. Organisations started integrating with both customers and suppliers to maximise their profits. The S&OP process has now taken centre stage. It has become the process by which strategies are executed and businesses managed. The focus is now on using S&OP as a tool to drive the strategic intent and future business portfolio of organisations.

2.5.1 Research question

What is the level of S&OP maturity of companies in the South African Manufacturing industry?

3 CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

The purpose of this chapter is to describe the research methodology used to analyse the effectiveness of S&OP practices within the South African Manufacturing industry. The research design was of a qualitative nature. Data was gathered from a sample of senior S&OP practitioners who operate in the manufacturing using semi-structured interviews. Thematic content analysis method was used to analyse the collected data. According to Guest, MacQueen, and Namey (2011), the aim of the methodology was to analyse facts of the respondents' contents and identify themes relating to the research problems. Bryman and Bell (2011) defined thematic content analysis as a matrix based method for ordering and synthesising data.

According to Yin (1999), this methodology is valuable because the depth of inquiries helps in answering the who, why and how questions in management research. Stake and Mabry (1995) has also added that this methodology is ideal when focusing on the description of a process or a series of events.

This section is divided into the following sections:

i. The first part describes the adopted methodological approach in detail,

ii. The population of the research is then defined in terms of its appropriateness for the study,

iii. This is followed by description of the actual research instrument showing how each part addresses the different areas of the research problem,

iv. The procedure for data collection and analysis is then described,

v. Finally, the limitations of the study, validity and reliability of the research are discussed.

3.2 RESEARCH DESIGN

The qualitative methodology was chosen for this research. The aim was to compare the “As–Is” S&OP processes as used by South African organisations in the manufacturing sector to best practice.

Face-to-face, semi-structured interviews were used for data collection. The interview questionnaire contained both open-ended and close-ended questions. This was preferred because the research was primarily exploratory and descriptive in nature. Moser and Kalton (1971) supported this approach by stating that open-ended questions allow for comprehensive and rich responses to be elicited from the respondents. The research instrument was designed to probe specific areas that were identified in the literature review. The major disadvantage of this instrument as presented by Moser and Kalton (1971) is that there is a possible loss of information or ambiguity in the responses.

3.3 POPULATION AND SAMPLE

3.3.1 Population

The study population is defined as the total number of elements that qualify for a specific study. This is where a sample is selected. The purpose of a sampling is to select a set of elements that best represent the parameters of the targeted population Babbie and Mouton (2001).

The population of relevance in this study were manufacturing organisations within the Gauteng Province in South Africa. It is from these chosen samples that senior managers and executives were chosen to provide the necessary information through structured interviews. Fourie (2009) in his research at SAB also chose senior managers and S&OP practitioners as participants because of the knowledge that they have on the industry, the business and the S&OP process.

3.3.1 Sample and sampling method

The non-probability sampling method was used to identify the study elements. Babbie and Mouton (2001) defined this as a sampling technique in which the sample selection items are not determined by chance, but rather by personal convenience, expert judgement, or by conscious selection. This is due to the constraints in time, cost and the effort required due to the detailed nature of the research. According to Freimer, Linderoth, and Thomas (2012) this kind of sampling method leads to bias.

Despite this the participants were purposively chosen from 10 organisations. Senior executives and managers who had knowledge of the business and their respective S&OP processes were contacted and interviewed. Face-to-face and telephonic interviews were conducted to collect the required data. Follow up telephonic interviews were held to seek for clarity around certain practices that were not covered during the initial interviews.

3.4 THE RESEARCH INSTRUMENT

As already mentioned in the research design section the views and opinions of the participants on actual S&OP practices were obtained through semi-structured interviews. Open ended and close ended leading questions were posed to the respondents and depending on the completeness of the response, follow up questions were asked for clarity. During the interviews respondents were allowed to provide additional information that they thought would be relevant or help the researcher to better understand their practices. The cover letter to the participants and the interview schedule are included in appendix A and B respectively.

3.5 DATA COLLECTION PROCEDURE

A semi-structured interview was used for data collection. Telephone calls were made to individual respondents to request their participation in the study. The research topic, the purpose of the research, its significance, and ethical considerations as well as how the data collection process would unfold were explained to the respondents. Appointments were then set up. The cover letter and the interview schedule were then forwarded to the respondents ahead of time to help them prepare.

The interview schedule as in Appendix B was used to guide the discussions. A digital recorder was used to record the conversations. A note book was used to capture points that required further probing. The collected data was then captured and coded immediately after each interview.

3.6 DATA ANALYSIS AND INTERPRETATION

This study was of a descriptive nature and as such required the use of thematic content analysis method to analyse and interpret the collected data. Leedy and Ormrod (2005) recommended this approach for studies where the researcher intended to validate and extend knowledge on existing theory content.

Leedy and Ormrod (2005) defined this method as a detailed and systematic examination of the contents of a particular body of material for the purpose of identifying patterns and themes. It involves identifying and interpreting themes presented in the data and applying the themes to the original text in the literature review. This method of analysis was preferred because it would produce the most useful responses to the main research question. After the data was analysed it had to be linked back to the theoretical elements in the literature review. Themes were drawn from the responses given to understand how the S&OP practices were being applied in the sampled companies.

Descriptive statistics method was used to analyse the demographics of the participants such as age, tenure in the organisation, role and number of years in the role. These demographic variables ensured credibility of the sources from which information was collected and that the respondents were knowledgeable enough about the industry, the business and their organisations' S&OP practices.

3.7 LIMITATIONS OF THE STUDY

The research was limited to companies in the manufacturing industry within the Gauteng province. This therefore imposes limits on the generalisability of the findings.

The respondents could have provided ideal responses based on their knowledge of the subject and not necessarily provide information on their current processes or practices. The sampling method used limits the likelihood of the equal and proper representation of the targeted population within the industry.

The thematic method of analysis presents reliability challenges. It involves the researcher's interpretations of the themes and patterns, which compounds the issues.

3.8 VALIDITY AND RELIABILITY

The next sections discuss the validity and reliability of this research study. In a qualitative research reliability and objectivity of the process is a key requirement in order to ensure credibility of the findings. Validity refers to whether the findings of a study are true and accurately reflect the situation and that the findings can be supported by evidence Cooper, Schindler, and Sun (2006). Triangulation procedure can be used to limit bias and ensure validity of the findings by looking for convergence amongst multiple and different sources of information to formulate themes and categories in a study. This is applicable in those instances where the research brings to light new aspects that were not picked up in a literature review (Golafshani (2003).

3.8.1 External validity

External validity was described by Babbie and Mouton (2001) as the degree to which the findings could be extrapolated to other organisations. They further stated that validity takes more than one form namely: face, content, criterion as well as construct validity. This was supported by Leedy and Ormrod (2005) who added that if the settings and variables being used for the study were replicated, the same results should be obtained.

The nature and size of sample could limit the value of the research findings. To improve external validity the sample was chosen in such a way that it would be as representative as possible. The sampled companies included multinationals and local companies that were operating in South Africa. Conclusions were also possible because the sampled respondents were senior managers who had a solid understanding of their organisations and their S&OP processes.

3.8.2 Internal validity

Internal validity is defined as the extent to which a researcher is able to draw clear-cut conclusions based on the information provided by the respondents. Leedy and Ormrod (2005)

To maximise internal validity, senior executives who have a working knowledge of S&OP, were identified as respondents. An interview guide was also employed to provide a structure for the interviews. Telephonic follow up interviews were also conducted to clarify facts of the interviews.

3.8.3 Reliability

Leedy and Ormrod (2005) defined reliability as the extent to which a similar methodology or measuring instrument would yield similar or consistent results for the same characteristic. To ensure consistency the interviews were personally conducted. An interview schedule was used to guide the discussions to ensure that all questions were phrased in a similar manner. These interviews were also recorded.

4 CHAPTER 4: FINDINGS CHAPTER

4.1 INTRODUCTION

This chapter presents the results or findings of the data collected, as defined in chapter 3. The purpose of this study is to establish and describe the Sales and Operations planning processes as practised by manufacturing organisations in South Africa. The reported results are based on intense semi-structured interviews conducted with senior managers who are knowledgeable and have a deep understanding of their organisations Sales and Operations planning processes.

Including the introduction, this chapter is made up of four main sections. The introduction is followed by a description of the demographic characteristics of the sampled interviewees and their organisations. These characteristics are presented in tables. This is then followed by a presentation of themes of the Sales and Operations planning practices as they are being implemented by the sampled companies. Frequency tables as well as descriptive paragraphs are used to present the observations. The last section summarises the chapter.

4.2 DEMOGRAPHIC PROFILE OF RESPONDENTS

The study targeted senior managers from ten companies operating in the manufacturing industry. Most of the sampled companies are located within the Gauteng province. Intensive interviews were held with all ten participants by the researcher and follow-up calls were made to clarify issues. The composition of the participants is further analysed below.

4.2.1 Job Title

Table 4.2.1: Summary of Roles interviewed

Roles of managers interviewed
S&OP and customer Service Manager
Group Supply Chain Manager
National Supply Chain Manager
National Sales Director
Supply Chain Development Manager
Projects Manager
Regional Sales Manager
Marketing Product Manager
Managing Director
Sales and Marketing Manager

Table 1 above is a detailed description of the roles of the senior managers interviewed. These people occupying very senior roles in their organisations were targeted because of their involvement and understanding of the S&OP processes within their respective organisations. The two unexpected candidates, namely the Managing Director and the Project Manager, were facilitating the Sales and Operations Planning processes.

4.2.2 Age

Table 4.2.2: Analysis by age

Age in Years	Frequency	Percentage
Under 30 years	1	10%
Between 30 - 40 years	5	50%
Between 40 - 50 years	3	30%
Above 50 years	1	10%
Total	**10**	**100%**

Table 2 above is an age distribution of the managers who participated in the research. The majority of participants were between the ages of 30 and 50 years. Only two of the participants fell outside this age group. The youngest participant was below 30 years while the eldest was above 50 years of age.

4.2.3 Gender

Table 4.2.3: Analysis by gender

Gender	Frequency	Percentage
Female	2	20%
Male	8	80%
Total	**10**	**100%**

The breakdown by gender as shown in table 3 above indicated the majority of participants (i.e. eight) were males, while only two were females.

4.2.4 Race

Table 4.2.4: Analysis by Race

Race	Frequency	Percentage
African	2	20%
Indian	2	20%
White	6	60%
Total	**10**	**100%**

Table 4 is an analysis of participants by race. White people made up 60% of the sample while Africans and Indians made up 20% each.

4.2.5 Tenure in the organisation

Table 4.2.5: Analysis by tenure

Tenure in Years	Frequency	Percentage
1 - 5 years	3	30%
6 - 10 years	2	20%
11- 15 years	4	40%
16 - 20 years	0	0%
21 to 25 years	0	0%
26 to 30 years	0	0%
31 to 35 years	0	0%
36 to 40 years	1	10%
Total	**10**	**100%**

Table 5 is an indication of analysis by tenure. 70% of the participants had been with their organisations for more than five years. Two extreme cases were observed. The lowest tenure was two years while the highest had been with the organisation for 38 years.

4.2.6 Number of years in role

Table 4.2.6: Analysis by number of years of involvement S&OP process

Tenure in Years	Frequency	Percentage
0 - 5 years	7	70%
6 - 10 years	1	10%
11- 15 years	2	20%
Total	**10**	**100%**

Table 6 is an analysis of participants by number of years of involvement in S&OP process. As indicated in table 6 above, only 30% of the participants have been in this role for more than five years. 40% have less than two years Sales and Operations Planning experience.

4.2.7 Industry

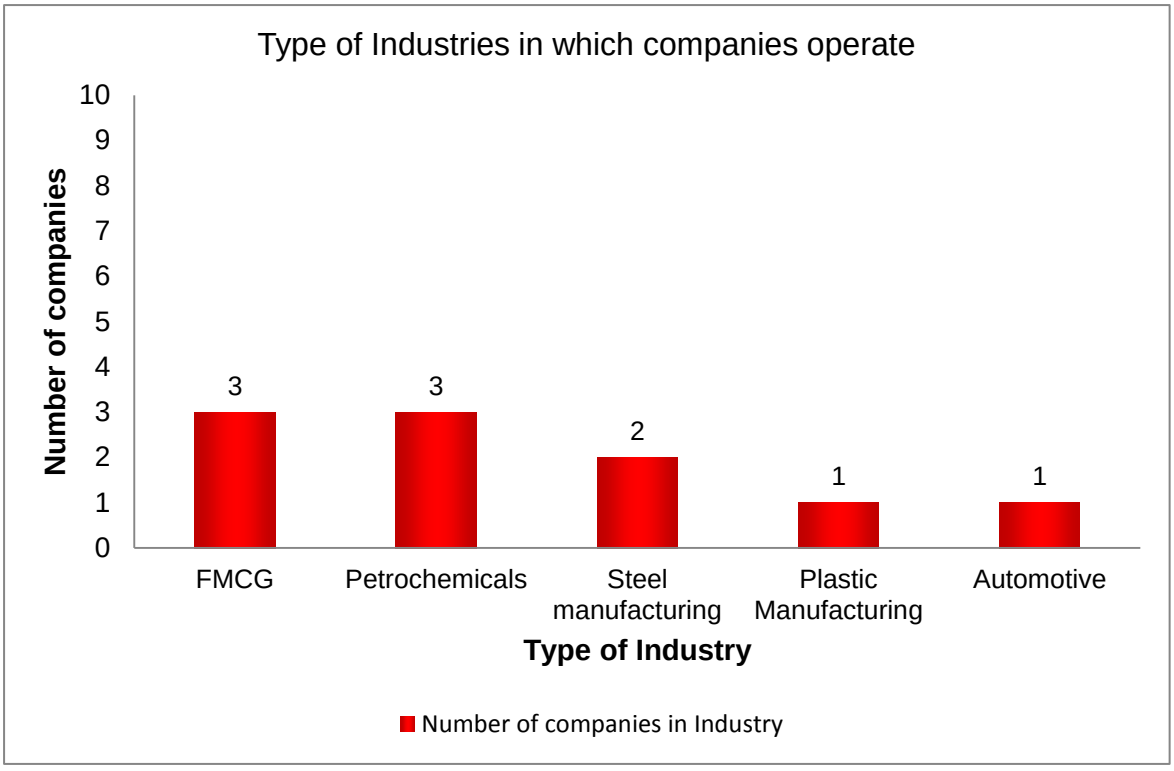

Figure 4.2.1: Analysis of companies by Type of Industry

The analysis by industry is indicated in figure 4.2.77 above. The FMCG and Petrochemicals form the majority of the sampled companies. They each have 30%. They are then followed by companies from the Steel industry at 20% and lastly the Plastic and Automotive industries at 1 % each. The plan was to sample two companies per industry. This could not be achieved.

4.2.8 Scope

Table 4.2.7: Analysis by geographical scope

Geographical scope	Frequency	Percentage
South Africa	1	10%
Africa	2	20%
Global	7	70%
Total	**10**	**100%**

Table 8 indicates the analysis of sampled companies by geographical scope of activities. Seven (n=7) have a global presence, two (n=2) compete only within the African continent and only one competes only within the South African market.

4.2.9 Market Position

Table 4.2.8: Analysis of companies by market position

Market Position	Frequency	Percentage
1	5	50%
2	2	20%
3	0	0%
4	2	20%
5	1	10%
Total	**10**	**100%**

100% of these companies, shown in table 9, are leaders in their chosen markets. The positions they hold and their market shares did not explain this fact clearly.

4.2.10 Type of process

Figure 4.2.2: Analysis of companies by Type of process

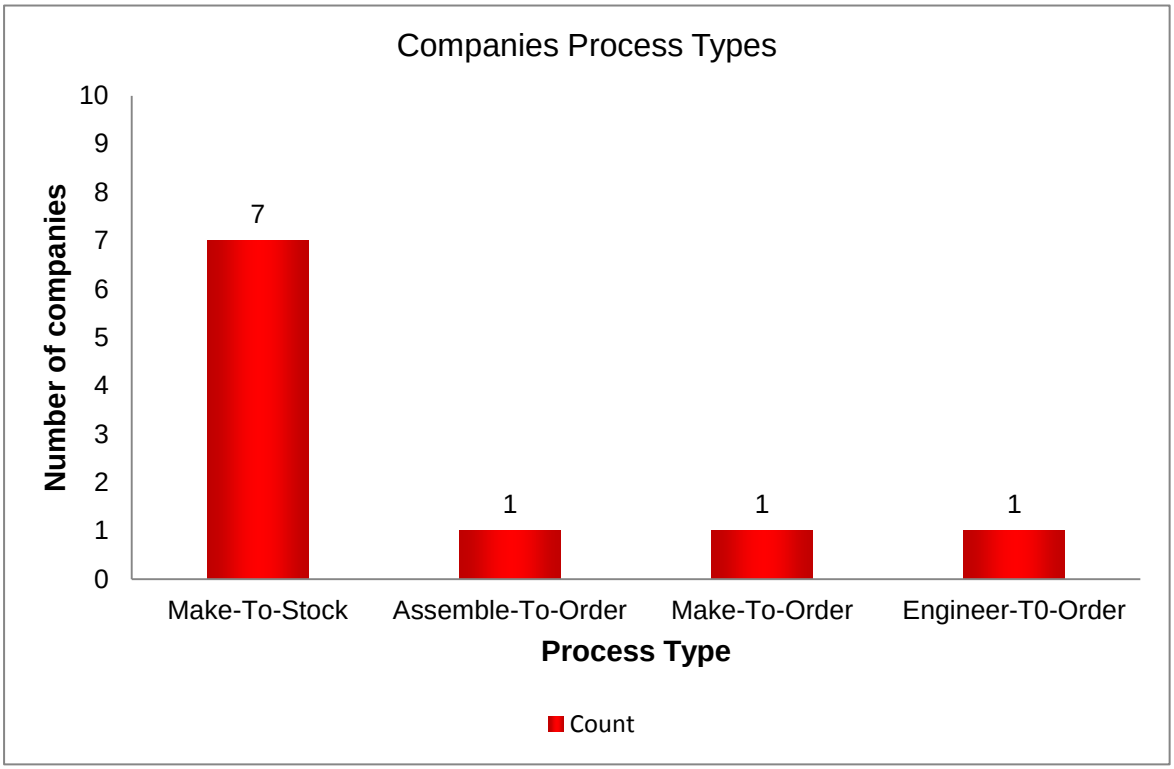

Figure 4.2.10 is a distribution of companies by process types. The majority (n=7) have a Make-To-Stock process type.

4.3 RESULTS PERTAINING TO THE MAIN RESEARCH QUESTION

The main aim of the research was to assess how effectively S&OP practices are being employed by South African companies in the manufacturing sector.

To address the research question, the S&OP practices were explored and evaluated against best practices. The S&OP maturity model elements were used to evaluate the maturity level of these companies on the application of S&OP best practices. Questions were asked around the five elements, as given by the model.

Thematic content analysis was applied to the responses given by the studied companies based on the themes. The themes, which also happen to be elements of the maturity model, are: Process effectiveness, Process efficiency, People and organisation and Information Technology.

The results on all these themes are given below:

4.3.1 Processes Effectiveness

The following questions were asked under the process theme:

a. Do you have a structured formal S&OP process?
b. Do you have a documented and up to date S&OP policy?
c. What meetings make up the S&OP cycle?
d. What is the planning horison of the S&OP process?
e. Which functions are represented in the S&OP meetings?
f. How do you involve key suppliers and customers in the S&OP process?

Figure 4.3.1 below is a graphical representation of the maturity levels results of these companies as per criterion indicated in the framework in Table 2.4.1

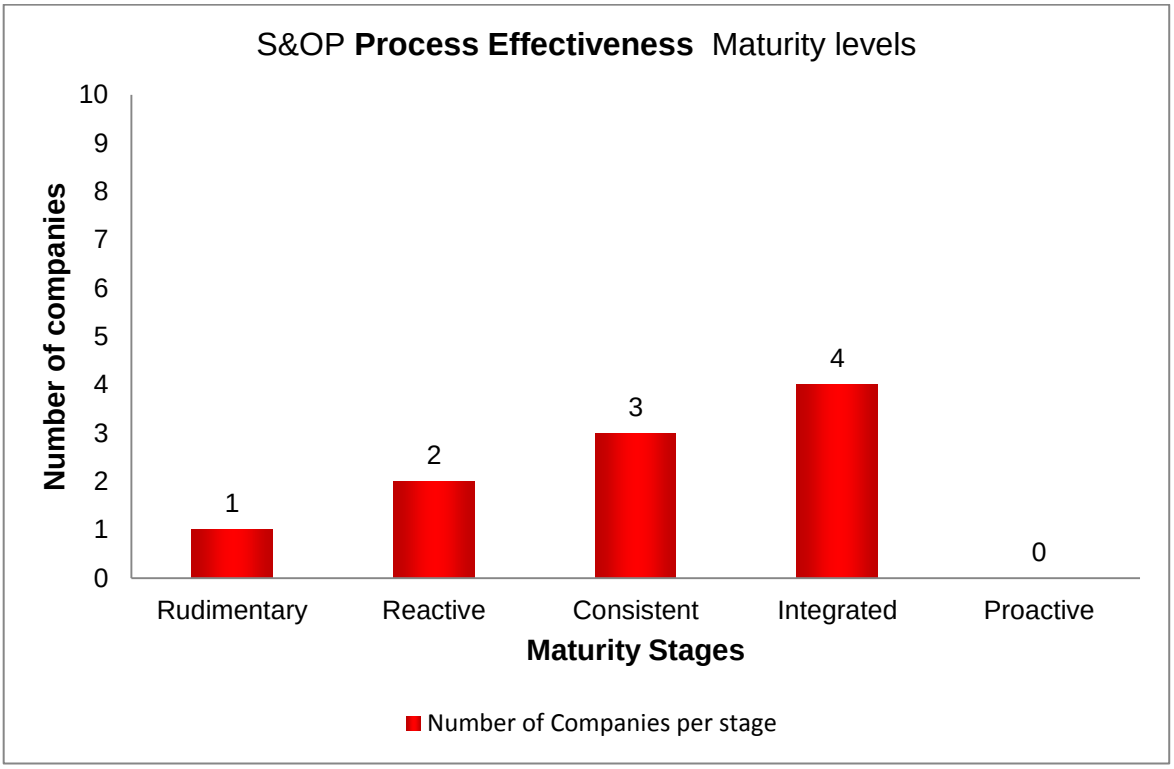

Figure 4.3.1 Process Effectiveness maturity levels

Seven companies from different industries had processes that have been working for some time. They had formal structured S&OP processes. Four of the seven companies had a level 4 maturity. The other three out of the seven fell between level 2 and level 3. All participants indicated that they did have routine monthly S&OP meetings where attendance by key cross-functional heads was compulsory. Three of the seven had a documented S&OP policy in place. Three were in the process of developing one. The seventh company said they did not see the need for a documented policy.

Two of the seven companies, that had a formal S&OP process, effectively collaborated with both their demand side and supply side network partners. The other five collaborated more with their demand side partners. This collaboration and communication was limited to sharing of information required for forecasting and demand planning stages of the S&OP process. The suppliers were only informed of the plans once they were finalized and were expected to comply. One respondent alluded to this by saying that:

> *"We do not involve them in our S&OP meetings. We are not at that level yet. The industry requirements also do not necessarily require us to have that level of integration. If there are any customers' related issues, the Sales team will deal with it at their level and if its supplier related it will be dealt with by the Procurement team".*

4.3.2 Process Efficiency

The questions asked under the Process Efficiency theme were:

a. Do you have an S&OP Workbench or scorecard?
b. What are your S&OP Metrics?
c. What are the primary and secondary goals of the S&OP?
d. What is the level of integration with your supply chain partners?
e. How do you assess the effectiveness of the S&OP process itself?

f. How do you measure the size of the impact of S&OP on Business performance?

Figure 4.3.2 below graphically represents the maturity levels results of these companies as per criterion indicated in the framework in Table 2.4.2

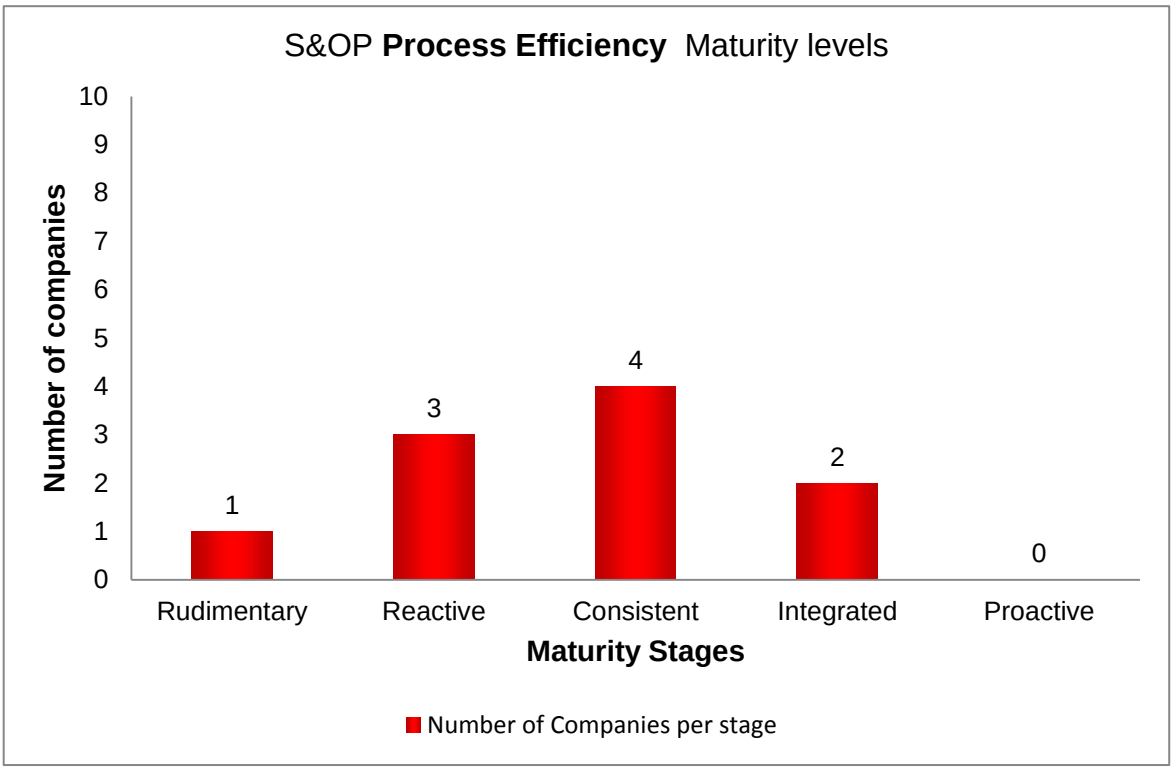

Figure 4.3.2: Process Efficiency maturity levels

Figure 4.3.2 is a representation of the companies' maturity level with regards to the Process Efficiency practices (i.e. Plan integration and performance measurement practices). Seven of the ten companies had planning processes that were still lacking in terms of fully achieving internal integration. They had regular and formal cross functional meetings which facilitated communication, collaboration, alignment internally as well as externally. They satisfied the internal integration requirements to some degree but fell short on integration with their supply chain partners.

An illustration of this practice was made by a respondent who said that:

> *"We have instances where the marketing team is running promotions for products that we have no raw materials for which goes to show that there is no proper communication between the operations team and the marketing team".*

On integrating with external supply chain partners they said that:

> *"We have tried to have our customers involved in our forecasting process but it is difficult. It is only on one product that it is working well. On the normal stock they keep about 10 days stock. We have our own people who sit inside our customers operations to do stock control. They are called DC control agents. They check inventory every morning of what is in the DC and in the store to ensure that orders are generated timeously.*
>
> *The communication between the DC and our DC happens via email. A lot of these orders are done automatically through EDI but this system does not know about promotions and things like that. That is why it has to be done manually through emails. Our agents do sit in our customers planning meetings.*
>
> *We pay for it and then we get it. We get Sell Out data which compares your product sales at the till against your competitors and how much profit you made".*

The seven companies still used S&OP as a tool for volumetric balancing of supply and demand. Only three of the ten had profit optimization as a motive and used S&OP as a means to achieve that objective. One respondent elaborated on this very clearly when they said:

> *"It boils down to one thing and one thing only, availability of products to customers".*

Six had an S&OP workbench or dashboard which measured business and functional results. The S&OP effectiveness metrics were not included in the workbench. Evaluation of contribution by individual team members was not a normal practice because there was neither knowledge nor understanding on what KPI's to use. They could also not measure the impact that S&OP was having on the business performance. This impact was assumed. In response to the question raised about their S&OP effectiveness practices one respondent said that:

> *"We have only started running it this year; it has been nine months now. We never had a formal process. On the metrics side we have not seen any improvement that we can attribute to that but from an integration point of view we are doing much better".*

4.3.3 People and Organisation

The following questions were asked under the people theme:

a. Do you have a formal S&OP function?
b. Who is the S&OP process sponsor?
c. Who champions the S&OP process?
d. What is the involvement of the executive team?

Figure 4.3.3 below represents the maturity levels of People and Organisation practices as per criterion indicated in Table 2.4.3.

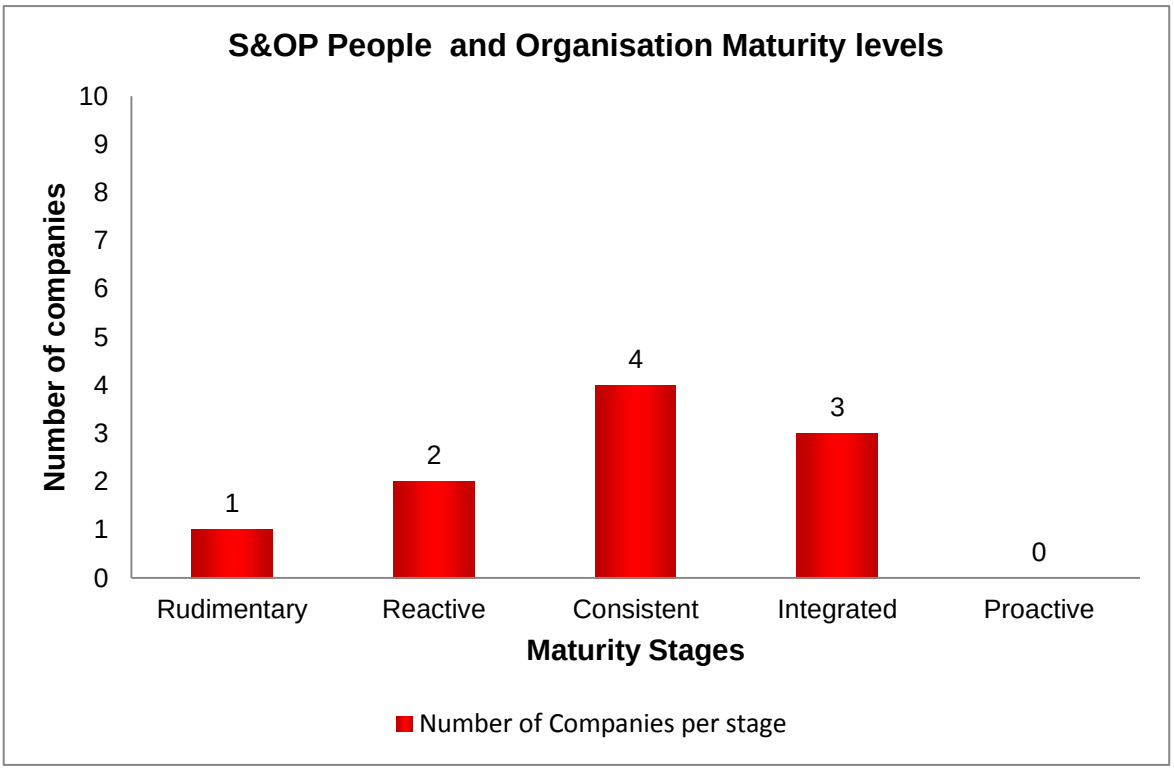

Figure 4.3.3: People and Organisation maturity levels

Figure 4.3.3 is indicates the results of analysis on maturity levels of the S&OP People and Organisation element. Only three of the ten companies had a formal S&OP function to drive the process. In four of them the S&OP responsibilities resided in other functions. Seven had executive level sponsorship. To illustrate this point one respondent said:

> *"We then go into week four where we do an S&OP review. This forum is chaired by the S&OP manager. The supply review and demand review are all feeders into this meeting. In the meeting we would have all the MD's, the Operations Managers, Commercial Managers and Product Managers and Global Supply chain Managers. Exco members are not part of this meeting because they sit in the Executive S&OP meeting that happens two weeks after this meeting".*

Some companies reported that having the right people in the meetings was not good enough for an effective S&OP. Unclear and confused reporting lines prevented accountability. To illustrate this point one respondent said:

> *"We are not an optimised structure. We have two structures that are not aligned. We have two planning functions reporting to different heads and being measured in different KPI's. This creates a huge misalignment".*

4.3.4 Information Technology

The following questions were asked under the technology theme:

a. What IT infrastructure or technology do you use to support the S&OP process?
b. Does the software support real-time demand dashboards, collaborative demand planning, automated financial reconciliation and profit-based problem solving and "what-if" scenario planning?
c. How do you access suppliers and customers' data? Is it real time?

Figure 4.3.4 below represents the maturity levels of Information Technology practices as per criterion indicated in Table 2.4.4

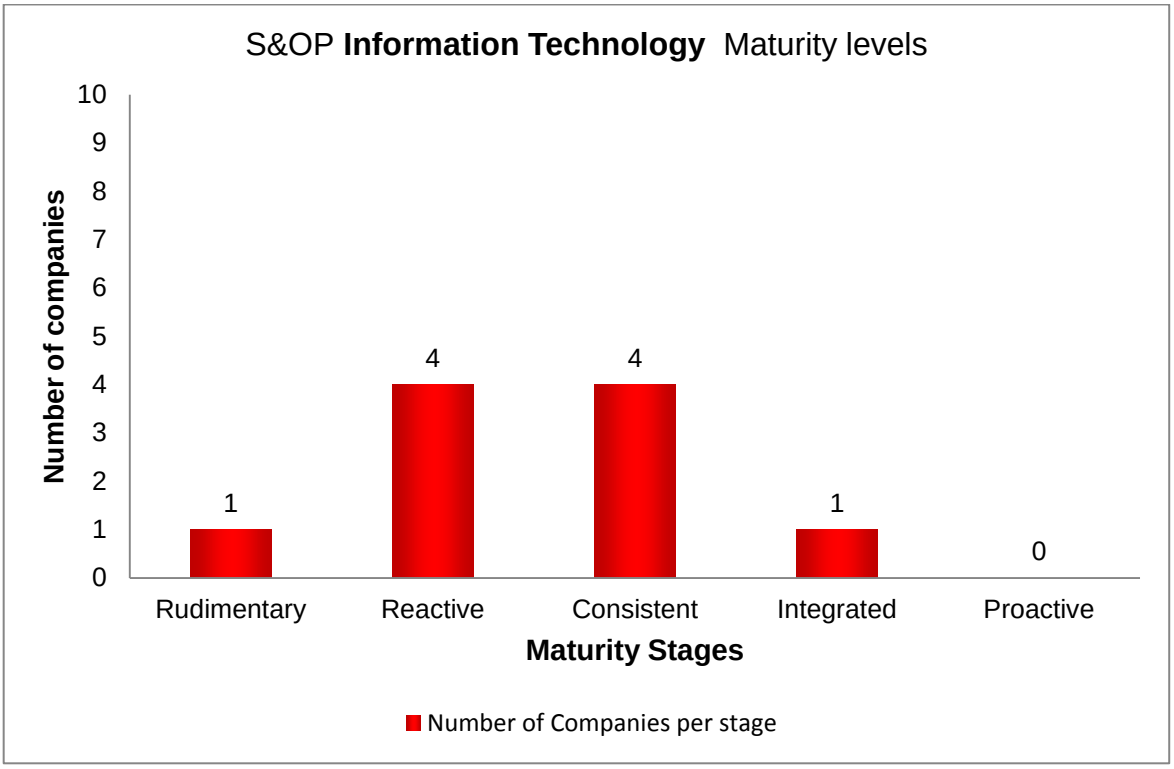

Figure 4.3.4: Information Technology maturity levels

Eight of the ten companies interviewed had very poor information systems to support their S&OP needs. They do have some MRP and ERP system systems which centralizes their data and information. Their planning and information systems were not fully integrated to support the S&OP requirements. They still rely heavily on spreadsheets for planning purposes. This makes it a difficult, if not impossible, task to consolidate information required for planning. The S&OP workbench was done on excel spreadsheets and is not real time.

Even though they had a SAP System that could be set up to provide them a comprehensive and consolidated view across all functions, most of the planning, analysis and reporting was still being done on spreadsheets outside SAP. When asked about the IT infrastructure they used to support their S&OP process one respondent said:

"From a planning perspective we have SAP but it is not currently set up to use as a planning tool. We would use it if we had SAP APIL. What we do now is put Forecast numbers in SAP, take them out and put them in a spread sheet. We do a whole lot of analysis, we have discussions with them. The plant planners then take the numbers in SAP and generate their own weekly plans. It's in and out of the system. We can only have continuity when everybody is working with one system. Because of this we actually don't have one set of numbers that we work with across all planning levels. We have actually opened up ourselves to all sorts of issues.

Just to recap this flow of information, the sales people who represent the markets will put their forecast numbers into SAP, the demand planner will extract the forecast from SAP and massage the numbers and put them in a excel format that will be easy for them to understand. We don't have reports in SAP that do the analysis for us"

Only one company operating in the Automotive industry was found to be quite advanced in their information systems practices. They were at a level 4 maturity. Their information systems provided them with quality data and information that enabled them to transact, supported decision making, as well gather business intelligence. This however, was not in real time.

"We have integrated SAP into our business. We also use a system called Barnton to process data and generate reports at each stage in the S&OP process".

None of the organisations had level 5 maturity practices. Level 5 companies are required to have information systems that are fully integrated, internally and externally with the network partners. The systems at this level are also required to be capable of tracking supply and demand in real time and alert the S&OP team for a need to schedule an S&OP meeting.

4.4 SUMMARY OF THE RESULTS

The aim of this chapter was to present the results on the effectiveness of Sales and Operations Planning processes within the Manufacturing industry in South Africa post-recession. Data was collected from ten companies operating in the manufacturing industries in South Africa. One senior manager who had knowledge and understanding of the Sales and Operations planning practices was interviewed.

The respondents' demographics showed that the sample consisted mainly of White males aged between 30 – 50 years with about five to 15 years of experience with their organisations. Seven of the respondents had less than five years of S&OP experience.

The companies' demographics showed that The FMCG and Petrochemicals industries dominated the interviews with three representatives each. Seven of the sampled companies had a global presence and were the biggest or second biggest in terms of market share. The Make-To-Stock process type was the most dominant at seven.

From the data presented on the research question, four of the ten companies interviewed had S&OP practices that fully satisfied the basic criteria of an effective S&OP as advocated by professional organisations such as APICS and the Oliver Wight training consultants. They had most of the by-the-book elements. They had good business processes. The information technology systems required to support their S&OP bordered on being substandard but was sufficient to qualify them as standard.

The six remaining organisations had serious challenges with both their Business processes and their information systems. The goal of their S&OP was volumetric balancing of supply and demand. The planning processes and meetings aimed at fostering collaboration, goal congruency and alignment of plans in order to achieve internal integration, were not yielding results.

Integration with external network partners was practiced only on the demand side of the business. This resulted in Sales and Marketing planning for promotions for which Suppliers had no raw materials.

Poor information systems led to a reliance on Excel based spreadsheets for planning purposes which made information consolidation and plan integration impossible.

Performance measurement was poor because of poor alignment between functional, S&OP metrics and overall profitability objectives.

The findings in this chapter are analysed and linked back to the literature review in the discussion of results chapter.

5 CHAPTER 5: DISCUSSION OF THE RESULTS

5.1 INTRODUCTION

This chapter provides an analysis and discussion of the results presented in the previous chapter. The discussion of the results will draw from the literature review in chapter two. The aim of this study was to evaluate how effectively S&OP processes were being applied by South African companies in the Manufacturing sector post-recession as they seek to improve their competitiveness.

The first section discusses the demographic profiles of both the respondents and the organisations they represented. This is followed by an in-depth analysis and discussion of the collected data in response to the research question. The summary of the findings and the conclusions regarding the research question conclude the chapter.

5.2 DEMOGRAPHIC PROFILE OF RESPONENDTS

Ten respondents from ten companies participated in the research. These companies compete in various industries within the Manufacturing sector. The FMCG and Petrochemicals were represented by three companies each; two represented Steel manufacturing while the Plastic and Automotive industries were represented by one company each.

The plan was to have two companies from five sectors represented. Five sectors were represented but getting two willing participants per sector could not be achieved. The knowledge of S&OP processes was critical because it determined the quality of responses from the participants. Seven participants had less than five years of S&OP experience. This could have impacted the accuracy of the responses provided.

5.3 DISCUSSION PERTAINING TO THE MAIN RESEARCH QUESTION

The main aim of this research study is to assess how effectively S&OP processes were being used by manufacturing companies in SA. This section discusses the S&OP practices of the different organisations along five dimensions or themes. Organisations find themselves under severe pressure to develop strategies to master business environments that are increasingly unstable, explosive and unforgiving.

Hausman et al. (2002) explained that that application of an effective S&OP enabled organisations to manage risks, optimise profitability and achieve higher levels of integration across the value chain. This was further corroborated by Lapide (2005a), when he said that management practices such as S&OP were able to integrate all the key functions of the business which led to improved business and operational performance.

The sub-sections below discuss details of the key elements that ensure optimal profits, internal and external integration.

5.3.1 Process effectiveness

The first element discussed is the process effectiveness element. The meetings and collaboration practices were just at a standard level. They were not robust enough to achieve the integration and collaboration required for an effective S&OP as advocated by Paiva (2010), who highlighted the importance of S&OP by arguing that it was more than just a process for cross-functional decision making. It is a business management process aimed at reaching consensus on a single operating plan to which executives had to hold themselves accountable and allocate critical resources of people, equipment, materials, time and money to satisfy customers in a profitable way.

Muzumdar and Fontanella (2006) qualified the claim made by McAdam and McCormack (2001). They said that the S&OP process was made up of a series of routine monthly meetings attended by key cross-functional heads to share information that was critical for effective planning and collaboration. Their view is that meetings are meant to facilitate the collaboration and sharing of relevant, timely, accurate and complete information between supply chain partners.

Seven companies had these meetings religiously as scheduled. This was in line with the literature review. These meetings did facilitate communication and collaboration but only internally. The exclusion of external partners made external collaboration impossible. The only involvement external network partners had with these companies was limited to the provision of demand information. Communication was mainly one way and this did not enable integration to take root. The Automotive and FMCG industries had the most advanced S&OP compared to the rest. In both the Automotive and FMCG industries this could be attributed to the application of pull model of supply which is demand driven. The rest of the industries are still pushing their products downstream in the supply chain.

Except for the Automotive and FMCG industries the supply side partners were not integrated into downstream processes. The only contact they had with these companies was when orders were placed. In addition, the challenges experienced by the suppliers were not taken into account in the planning meetings. Automotive industry had good practices because 70% of the value is created by outsourced components manufacturers. This necessitated full integration from design of components and processes to manufacturing and distribution.

For the rest of the industries external integration was lacking. They were internally focused. They were still trying to achieve a level 3 maturity level which is mainly about internal integration. The integration part of process effectiveness had gaps that prevented true integration both internally and externally. Generally speaking the goal of the S&OP as it is currently conducted was volumetric balancing of supply and demand as opposed to profit optimization. This explained why finance was not an integral part of the process. Finance got involved at the end of the

process just to monetize the volumes agreed amongst the team members. If profitability is the goal of S&OP, surely finance should lead the S&OP as is already the practice in three of the organisations (Lapide (2011).

They however were able to align their supply and demand plans. Channel members developed their forecasts and plans independently of each other. Mello (2013) suggested that when it comes to external integration, business practices such as CPFR (Collaborative planning, forecasting, and replenishment) should be applied. In justifying his claim he pointed out that these practices combine intelligence of multiple trading partners in the planning and fulfillment of customer demand and are capable of facilitating internal and external collaboration across the supply chain. He reasoned that sharing of key information, such as forecasts, with supply chain partners could better align supply and demand.

According to Feng et al. (2008), the S&OP integrates and aligns strategic, tactical views and decisions, directs operational planning and execution. Internal integration should be achieved in three critical areas according to Thomé et al. (2012). The first area of alignment is that of supply and inventory to demand. This is critical because all other functional plans are derived from the sales plan. If this is not correct, all plans will be incorrect. The second area of alignment is profitability (Lapide (2011). Grimson and Pyke (2007) argued that all plans should be chosen, based on their impact on profitability. They advocated that finance people should be involved at every step to help monetise operational plans and align them with financial objectives.

5.3.2 Process Efficiency

This section discusses the process efficiency practices of the sampled organisations. The maturity levels of these practices fell between level 3 and level 4.

Muzumdar and Fontanella (2006) found that alignment between strategic, S&OP and functional metrics was foundational for an effective S&OP. They reasoned that when this is done properly, strategic goals are made relevant and actionable at operational levels and kept in alignment with business goals. Grimson and Pyke (2007) cited that S&OP effectiveness must be measured against business performance. They are of the opinion that S&OP effectiveness metrics should include continuous improvement measures as well as a formal evaluation of each team member in the S&OP.

All ten companies had business and functional metrics that were reviewed in the planning meetings. Six of the ten had an S&OP dashboard which included S&OP effectiveness measures. All six organisations that had S&OP metrics agreed that they did not have a way or have any knowledge of how to quantify or measure the impact that the S&OP process was having on business performance. They also did not assess the cross-functional team members' contribution in the S&OP. This agrees with what was said in the literature review where it was suggested that measuring this was a difficult task that no company was able to do. Some use S&OP metrics to measure the contribution of fellow members. Actions closure rate was considered as well.

A few organisations had allocated KPI's to specific functions to ensure the accountability necessary for the improvement of such KPI's. There were some organisations where KPIs were just measured and displayed with no accountability at all. This undermined the objective of having these measures in the first place because without ownership, no improvement would take place. All S&OP dashboards had no real time visibility of supply and demand as they were Excel based.

5.3.3 People / S&OP Organisation

The People or S&OP organisation element of an effective S&OP process was analysed. The research results indicated that seven companies had people practices that could be described as just basic. Current practices on the major elements justified the assigned level 3 rating. These were: an formal S&OP function with the right knowledge of the process, defined S&OP roles and responsibilities included in their role descriptions, Executive sponsorship and compulsory cross-functional representation in the S&OP and formalized participation with the network partners.

It was pointed out in the literature review that involving the right people was key to running an effective S&OP Muzumdar and Fontanella (2006). They prescribed that the for an S&OP process to be effective it should have all the key elements. The first element is executive level sponsorship in order to get buy in and support from inside and outside the organisation. Secondly an S&OP champion, who takes accountability for the meetings. Thirdly the meeting should be driven by cross-functional teams and finally, formalized collaboration with external network partners.

Seven of the ten companies had no dedicated S&OP function. The S&OP responsibilities resided with other functions. No formal S&OP policies were in place and the S&OP roles and responsibilities were not part of their role description. This created accountability issues. Only three companies had policies in place while another three were in the process of developing them.

Formal and documented S&OP policies are critical, as already alluded to by Grimson and Pyke (2007). They pointed out that documented policies serve as a framework that provides guidance on governance on how the S&OP should run. They reasoned warned that when this policy is not in place, the other mechanisms required to guide execution lose their effectiveness.

The achievement of company objectives is highly dependent on the collaboration of both internal and external role players. Almost eight of the companies had the right representation of empowered personnel from key functional areas. Their

processes had executive sponsorship. This improved their chances of getting internal integration right.

Practices related to external integration were worse than those pertaining to internal integration. In eight (n=8) of the companies the only external partners that had an active part in the S&OP were the demand side partners. Their involvement was limited to providing information that was required. Some companies stated that they tried to involve customers in their forecasting and planning meetings but it did not work out. Lack of trust played a part in this because both sides felt they were being asked to give away information that could compromise them.

The supply side partners were completely left out of the equation. The consensus was that unless they were supplying a scarce resource there was no need of integrating them into the chain. The companies felt that if suppliers were not coping, they could easily replace them or enforce penalties. This goes against best practice. The argument put forward was that if the forecasts and demand plans were right, then all the other plans would have to be right as they are derived from the demand plan.

5.3.4 Information Technology

The last section assessed the maturity level of information technology infrastructure and practices. Eight of the ten companies interviewed had information systems were lacking. They had MRP and ERP systems that are good enough to transact and plan to a degree but were inadequate to support the requirements of an effective S&OP. The requirement is that companies should have information systems that are fully integrated, internally and externally with the network partners (Lapide (2004b). He pointed out that the systems are also required to be capable of tracking supply and demand in real time and alerting the S&OP team for a need to schedule an S&OP meeting. The systems in use should be able to do transaction, decision support and business intelligence capabilities exploitation in a real time environment.

Execution of plans requires availability of clean, accurate, reliable information. Without information, functional heads found it difficult to make decisions that were congruent and synchronised. Organisations were using stand-alone systems that were not integrated. Customized systems and Excel spreadsheets made consolidation of information difficult. This delayed completion of activities and resulted in wasteful use of resources because information required for decision making took time to produce.

5.4 CONCLUSION

This chapter concludes the discussion of the main findings of this study. The study addressed the research question asked in chapter one within the context of the existing literature. The discussion provided valuable insight into the demographic profile of respondents and the companies they represented. The S&OP practices of the various companies were discussed and compared to best practice.

From the discussion of the key S&OP elements, it was concluded that the people practices were lacking and were not robust enough to fully achieve neither internal nor external integration. This was reflected by the overall process effectiveness level 3 rating with the exception of the Automotive and FMCG industries who were both sitting on a level 4 on the S&OP maturity model. Lack of formalisation of activities resulted in poor accountability by the cross-functional teams. Only three companies were found to have properly constituted S&OP structures while the rest had S&OP responsibilities residing in other functions.

The S&OP process is inefficient. As can be seen on the maturity the process efficiency dimension floated between the Reactive and Consistent levels. There is very little alignment and integration of plans and processes within and amongst firms. Collaboration between the demand side and supply side network partners is poor. Companies only go as far as incorporating each other's information in their planning processes. There is very little integration of systems and processes. Poor collaboration practices with network partners prevented external integration to take root.

The performance measurement systems in place do track business and other functional performance KPIs but do not include measures for strategic initiatives as well as the effectiveness of the S&OP performance.

The information systems though good enough for transacting and processing were not supportive of the S&OP process. Companies were still using stand-alone systems and Excel documents for S&OP planning which made consolidation of information time consuming and prone to errors which resulted in poor data quality.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

In this report the effectiveness of S&OP processes as applied by companies from the manufacturing industry in South Africa was examined, from a literary angle and from a practical investigation into current practices. The current practices were investigated by conducting interviews with S&OP practitioners from ten organisations.

The chapter is made up of three sections. The first section summarises the significant findings of the research. The second section draws conclusions, which are then followed by recommendations for future research.

6.2 SUMMARY OF SIGNIFICANT FINDINGS

Lapide (2005b) affirmed that excellent business and operational performance was determined by the effectiveness of the S&OP process. Authors such as Grimson and Pyke (2007) also added to this and cited that management practices such as S&OP process were able to integrate all the key functions of the business which led to improved business and operational performance.

The data collected revealed that current S&OP practices in both the business processes efficiency and information systems dimensions were reactive. This rendered their S&OP processes ineffective. It was found that even those organisations that had some by-the-book elements of an effective S&OP practiced them in ways that could not deliver optimum profitability and higher levels supply chain integration.

The poor practices in people, meetings and collaboration, as well as the plan integration elements contributed significantly to the reactive rating. The scheduled S&OP meetings failed to bring about collaboration amongst network partners. Different companies were internally focused and were not concerned with the impact of their plans on other network partners. This was shown by how they

engaged customers and suppliers at different stages in the S&OP process. Poor goal congruency between channel members and reluctance to share plans with network partners also affected the level of integration.

The information systems practices had pockets of excellence. Most organisations had executive dashboards and S&OP workbenches that included business, functional as well as S&OP metrics. There were two significant findings with regard to the information systems practices. These were the poor alignment between functional and S&OP KPIs and the heavy reliance on Excel based spreadsheets which made consolidation of information difficult. This prevented the planners from having a comprehensive view of all the functions in the business. Poor IT infrastructure also prevented real time visibility of changes in supply and demand as well as quick flow and sharing of information which was critical for decision making purposes.

6.3 RECOMMENDATIONS

This section provides recommendations to planners and senior managers who are charged with the responsibility of improving the competitiveness of businesses. Literature has shown the positive impact that an effective S&OP process has on business performance. Lapide (2005a) cited that S&OP was a key determinant of superior performance.

The recommendation to both managers and planners is to implement an S&OP process with all-by-the book elements and practices. Included in these recommendations are managers in those organisations that do not have an S&OP in place and those who have the elements but do not have practices that make their processes effective.

Another element for consideration is mandatory involvement and ownership of the process by the executive level (Muzumdar and Fontanella (2006). They put this clearly and beyond doubt when they said that visible leadership was critical for the smooth functioning of any S&OP process. The also pointed out that executive

should clearly define and align functional goals and S&OP metrics and the business goals. This will facilitate accountability and performance measurement.

It is also recommended that all companies formalise their collaboration with network partners in order to achieve a truly integrated supply chain. According to Mello (2013), this will enable participating supply chain members to synchronise their supply and demand through collaborative development of manufacturing, replenishment, and merchandising strategies.

The information infrastructure was another area of concern. Real time information sharing capability was proven by literature to be critical for decision making across the value chain. Once processes are in place and proven to work, companies can then enhance the effectiveness of their S&OP by implementing technologies that support these processes. This includes technologies that enable them to transact, perform data analysis and gather business intelligence, as well as provide demand supply visibility in real time. As stated in the literature review, this will also provide management with a comprehensive view of the business in real time.

6.4 SUGGESTIONS FOR FURTHER RESEARCH

The sample used for this study was chosen on a convenience basis. The sample consisted only of organisations that were accessible to the researcher and were willing to participate. This could have compromised the findings. Further studies need to be conducted with a bigger sample covering all the sectors in the manufacturing industry. The maturity levels were assigned based on the responses provided which could have been subjective. A quantitative method of evaluation the maturity levels of the different dimensions could improve accuracy and provide more insight to the real situation.

7.1 CONSISTENCY MATRIX

Table 7.1: Consistency matrix

Research problem stated here					
Main-problem	**Literature Review**	**Hypotheses or Propositions or Research questions**	**Source of data**	**Type of data**	**Analysis**
South African manufacturing Industry has ineffective S&OP processes.	Lapide (2005) Grimson and Pyke (2007), Muzumdar and Fontanella (2006) Feng and D'Armours(2008) Fernandez, Scavarda Tavares and Thomé (2012)	The S&OP integration level within South African manufacturing Industry is immature.	Primary data required to prove this will be collected using semi structured face-to-face interviews.	Qualitative – interviews data	Thematic content analysis

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APPENDIX A

INTRODUCTION LETTER

Dear Participant

I trust you are well.

I am final year MBA student with Wits Business School. I am conducting a research as part of fulfilment requirements for the MBA. My topic is on the "**Post-recession sales and operations planning of companies in the South African manufacturing sector".**

I would like to get an understanding of how your organisation goes about aligning and integrating the different business plans that are used to drive the business.

The discussion will take the Q&A (Questions and Answers) interview format which takes about **40 - 60 minutes**. Could you please assist me in this regard or at least refer me to the relevant person in your organisation?

I have attached the interview questions that will be used to guide our discussion.

Thank you for your assistance.

Phalanndwa Simon Avhaneti

APPENDIX B

ACTUAL RESEARCH INSTRUMENT

Section A

1. Demographic information

1.1. Personal information

1.1.1. What is your name?

1.1.2. What is the name of your organisation?

1.1.3. What is your role?

1.1.4. How long have you been in the role?

1.1.5. How long have you been with this company?

1.2. Organisation and market information

1.2.1. Which industry are you in?

1.2.2. Which markets do you serve?

1.2.3. What is your market position and what percentage market share do you have?

1.2.4. Who are the other key players?

1.2.5. What is your market position and what percentage market share do you have?

Section B: The S&OP process

2.1 People

2.1.1 Do you have an S&OP function?

2.1.2 Who is the S&OP sponsor?

2.1.3 Who champions your S&OP process?

2.1.4 Which functions are represented in the S&OP meetings?

2.1.5 Are there clearly defined S&OP roles and responsibilities for members?

2.1.6 What is the level of involvement of your key supply chain partners?

2.2 Process

2.2.1 Do you have a formal S&OP process?

2.2.2 Do you have a documented and up to date S&OP policy?

2.2.3 What meetings make up the S&OP process?

2.2.4 What is the content and objective of each meeting in the process?

2.2.5 What is the frequency of your S&OP meetings?

2.2.6 What is the planning horison?

2.2.7 How do you involve your key suppliers and customers?

2.3 Technology

2.3.1 How do you access suppliers and customers data?, is it real time?

2.3.2 What IT infrastructure and or tools do you use to process data and generate reports at each stage?

2.3.3 Does your software support "What- if" scenario planning, real time dashboards, collaborative demand planning, automated financial planning reconciliation and profit-based problem solving?

2.4 Strategy

2.4.1 What are the primary and secondary objectives of the S&OP process?

2.5 Measure

2.5.1 What contribution is each function's representative expected to make?

2.5.2 How is this contribution evaluated?

2.5.3 How do you assess or evaluate the effectiveness of the S&OP process itself?

2.5.4 What are the S&OP metrics?

2.5.5 How do you measure the size of the effect that S&OP has on business performance?