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**To what extent does visibility and collaboration in the supply side of a
Supply Chain assist in the mitigation of risk for an SME in the
manufacturing sector of South Africa?**

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Research Report: MSc (Eng)

Declaration

I, Darren Mansfield, declare that the work disclosed within this project is my own and that it has been prepared in accordance to the standards set out by the University of Witwatersrand.

On this the _____ day of March 2013

Abstract

SMEs, due to economies of scale are inherently less competitive than larger companies in terms of price and output. Thus techniques and initiatives are required in order to offset this perceived lack of competitiveness. Competitiveness in the form of flexibility and adaptability may be used to the advantage of the SME. The use of collaboration and visibility, if managed correctly has the opportunity to mitigate risk and enhance competitiveness.

In the dynamic political and business environments such as that organisations in South Africa operate in, it is imperative that risk mitigation techniques are used. External events such as strikes and variability in raw material availability require a manager to understand their operating environment in order to plan and mitigate those risks effectively.

This paper shows that visibility and collaboration, if used in the supply side of a supply chain allows for mutually beneficial risk mitigation behaviour to take place. Thus there is an opportunity for managers to mitigate risks while increasing competitiveness if these strategies are utilised effectively

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Nomenclature

ISO: International Organisation for Standardisation

NUMSA: National Union of Metal Workers South Africa

SCM: Supply Chain Management

SME: Small Medium Enterprise

SIEFSA: Steel and Engineering Industries Federation of South Africa

Chapter 1 - Introduction

1.1 Background

South Africa, Africa's largest economy, is increasingly gaining prominence on the international stage for instance, its adoption to the BRIC developing nations, now BRICS (Brazil, Russia, India, China, South Africa). There are, however, many constraints that have been facing the country since the first democratic elections of 1994 and its acceptance back into the world in the Post-Apartheid era.

"South Africa's developmental challenges are exceedingly complex, multidimensional and deep rooted" (The World Bank 2011). Many business challenges are currently being faced, in the wake of the global financial crisis. Economically South Africa has high unemployment faced with skills shortages, low GDP growth rates, high inequality and a decrease in investor confidence (Martinez & Wild 2012; South African Reserve Bank 2012)

In terms of aiding small business growth in South Africa, frameworks such as Ntsika, Khula Enterprise Finance and the Apex Fund provide micro loans in order to help support Small Medium and Micro Enterprises (Department of Trade and Industry 2007). Given this, South Africa still falls behind in terms of creating sustainable small businesses according to the Global Entrepreneurship Monitor.(SBP 2009) The inherent risks associated with a developmental economy such as South Africa's has an impact on how business is conducted and the perceptions on the country (Martinez & Wild 2012)

Supply Chains are increasingly being viewed as a fundamental concept in the success of a company and can be defined as *"A one way, integrated manufacturing process wherein raw materials are converted into final products and then delivered to customers"* (Beamon 2005). With globalisation and international trade ever increasing, as well specialisation, changing technology and outsourcing many companies are put under pressure. Pressures such as quality, service and costs (Nix *et al* 2004) to ensure products are delivered in the right quantities, to the right place in a cost-effective manner (Jüttner 2005a). In the past when firms manufactured in-house, sourced locally and sold directly to the customer, risk was less diffused and easier to manage. With the advent of increased product/service complexity, outsourcing and supply networks crossing international borders, risk is increasing and the location of risk has shifted through complex changing supply networks (Harland *et al.* 2003).

In business the traditional approach of information sharing between the supplier and buyer was purely one of 'arm's length'. However, given the difficult economic times of the 70's and 80's, there was on-going price negotiations in order to extract as much value out of a given price as possible (Skjoett-Larsen *et al.* 2003). These practises lead to suppliers and customers viewing themselves as

adversaries. To remain competitive a holistic approach was needed (Lummus & Vokurka 1999). Thus the whole or parts of the supply chain were needing to work together in order to increase efficiency (Skjoett-Larsen *et al.* 2003). This is termed “collaboration”. Supply Chain Management (SCM) involves participation from various managers from other organisation in the production and management of the production of a product. It is, thus, in the best interest of management to take an interest in the other companies operating in their supply chain (Narayanan, V.G; Raman 2004). Collaboration is a diverse term that when utilised in SCM is, at times, referred to as the sharing of risk, reward and information (Barratt 2004). Visibility is a term often loosely used in the context of SCM defined as “*The ability to access or view pertinent data or information as it relates to logistics and supply chain, regardless of the point in the supply chain where the data exists*”. (Barratt 2004) This research thus proposes that both visibility and collaboration are risk mitigation techniques and behaviours and may increase supply chain competitiveness.

1.2 Problem Statement

SMEs in South Africa are defined differently depending on the industry that the SME falls under. According to *National Business Act of South Africa 1996 Revised 2003*. A company is determined to be small or medium depending on the number of full time paid employees as well as the turnover of the organisation (Government 2003). The complex systems required to for full collaboration and visibility in large businesses require vast resources. This makes the systems infeasible for SMEs. Despite these constraints, SME’s are still able to assess and manage risk (Finch 2004). Simpler systems such as trust, reward and dependence which aid supply chain relationships are apparent (Matopoulos *et al.* 2007a)

Few studies have been done internationally on Supply Chain Management and Supply Chain Risk Management in SME’s. Predominantly work by (Thakkar *et al* (2008); Thakkar *et al.*(2008); Thakkar *et al.* (2009); Thakkar *et al.* (2011) seems to be on the fore-front of the subject addressing issues such as how do SMEs manage their supply chains, where do SME’s perceive themselves to be in a supply chain and their priorities that are associated with it, if existing models of SCM are applicable to SMEs and the learning potential that SCM has regarding SMEs. Other works by (Hong & Jeong (2006); Quayle (2003); Vaaland & Heide (2007) were also attempts to disseminate the subject.

Further investigation into the area is thus required. This case study will investigate how an SME in the manufacturing sector of South Africa utilises both varying degrees of visibility and collaboration in order to mitigate risks, possibly enhance turnover or operating margins and thus competitiveness. This was done from a participant observer point of view, supplemented by semi structured interviews as the company has been analysed on a consistent basis from January 2012-January 2013.

1.2 Motivation

Given the precarious situation the South African economy currently finds itself in, the manufacturing sector of the country specifically small and medium companies are found to be bound by legislative and financial woes. 35% of manufacturers in South Africa believe that they will not be in business in 10 to 20 years.(Manufacturing Circle 2012). The Aberdeen Group located in the United Kingdom found that 75% of SMEs based in a study on collaboration and integration were involved in what they termed B2B (back to back) integration and collaboration which formed part of their strategic initiative (Aberdeen Group 2010a). This has sparked an interest in how collaborative efforts and the ability to avert risk and be competitive, exist in the current context of business and supply chain management for manufacturing SMEs in South Africa. This led to the research question below.

Research Question: To explore the extent that visibility and collaboration in the supply side of a Supply Chain assist in the mitigation of risk for an SME in the manufacturing sector of South Africa?

1.3 Objectives

The objectives of this study house themselves within the social, structural and risk aspects of supply chain management with in a single firm in the manufacturing sector of South Africa.

Primary objectives include:

- Understanding the supply chain that the single SME exists within.
- Assess the risk in supply chains which pertain to SMEs
- Understand the impact that the SME has on the supply chain it operates in.
- To explore the extent of Visibility that a well-established SME has within a supply chain in the manufacturing sector.

Secondary objectives include:

- Clarifying if collaboration exists in SME supply chains in manufacturing in South Africa?
- Clarifying if collaboration exists, does it mitigate risks and increase the competitiveness of the supply chain?

1.4 Limitations and assumptions

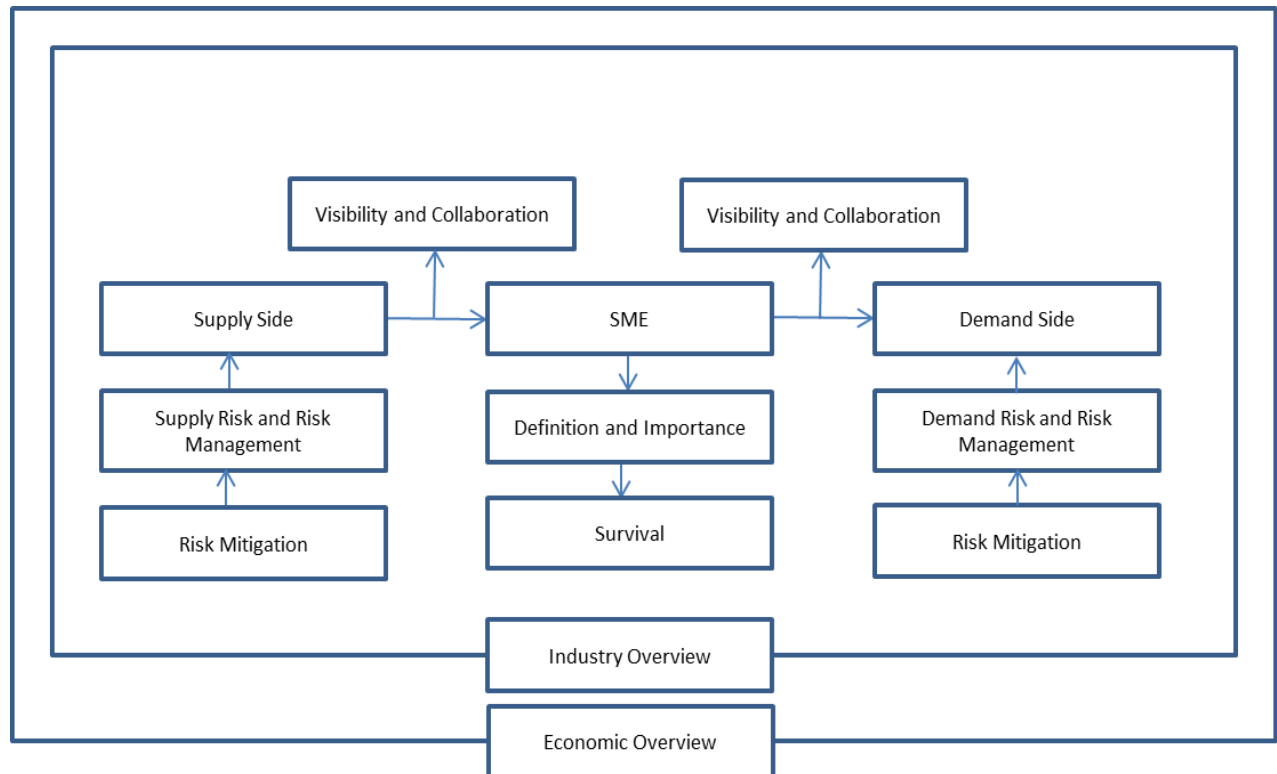
- The definition of a business according to the *South African National Business Act* is strict as a definitive criterion has been laid out.

- Organisations along the supply chain often view the business of an SME as less important than that of larger organisations. This may limit access to information as well as the upper level of management of these organisations.
- Given the nature of visibility, collaboration and the information it may encompass, some organisations may be reluctant to release information.
- Due to the fragile nature of business relationships and that SMEs by nature only have a few customers, it was deemed inappropriate to contact the downstream customers.

Chapter 2 - Literature Review

The purpose of this chapter is to explore the literature surrounding Supply Chain Management, Risk Management, Collaboration and Visibility. The literature is relatively contemporary in nature. The proposed research encompasses a number of areas in the above mentioned fields.

In order to disseminate the literary breakdown, a conceptual framework was created.



2.1 Economic Overview

South Africa is an economy that focuses primarily on the mining and agricultural sector with secondary sectors including construction, manufacturing and electricity. It is the largest economy in Sub-Saharan Africa (Africa 2011).

Though South Africa is the largest economy in Sub-Saharan Africa the country still suffers from high unemployment at 25% and an unequal income distribution. I.e. Gini index of 63.14% in 2011 (World Bank 2011). The disparity between incomes has seen large strikes take place particularly in the mining and agricultural sectors in 2012. This disrupted the country's growth and deteriorated rating agencies' outlooks on the country (Dykes 2013). Further to this, the high wage demands causing the strike action has caused job losses and an increase in inflation. The impact of the strikes have

deteriorated the value of the currency, the Rand, which is causing many organisation whom import raw material product to be put under pressure(Dykes 2013)

South Africa currently has a nominal GDP of around \$410 billion (South African Reserve Bank 2012). The real economic output has grown steadily since the financial crisis which affected South Africa in 2009. The real output for 2011 being 3.1% though having slowed to 2.7% in the first quarter of 2012 through to 2013 (South African Reserve Bank 2012)

2.2 Industry Overview

2.2.1 Manufacturing

Manufacturing has for many years been a relative strength in the South African economy. But given the global turmoil since 2008/9 there has been a weakening in the sector (Seria 2010) Manufacturing is diversified among different sectors represented in the below table showing relative growths for each sector.

Manufacturing contributes 15.3% to South Africa's GDP (Stats SA 2012). Manufacturing decreased in real terms from a 5.7% growth rate in 2010 to 2.4% in 2011 The sectors most affected were those supplying chemical products, rubber and plastic products; basic iron and steel, non-ferrous metal products and machinery. *"The weaker performance of the manufacturing sector in 2011 could be explained by fairly depressed global demand for South African manufactured products; subdued domestic demand conditions; industrial action; unplanned production stoppages in a number of subsectors; soaring production cost; as well as the strength and volatility of the exchange rate of the rand which hampered export-oriented manufacturers."* (South African Reserve Bank 2012) In 2012 the base grew by 1.9% quarter-on-quarter to the 3rd quarter of 2012 though cheap imports and the global economic slowdown are affecting the South African manufacturing industry (Manufacturing Circle 2012)

In terms of understanding the state of the manufacturing sector in South Africa, the South African Reserve bank reported that a measure of Capacity Utilisation be investigated. Capacity refers to the amount of production output that the economy can produce given its current resources and utilisation being the percentage of output relative to the total amount of output possible (South African Reserve Bank 2012). The highest measure was in 2007 whereby 87% capacity was reached. This has subsequently dropped to 80% as mentioned in the South African Reserve Bank Annual Economic Report of 2012(South African Reserve Bank 2012).

The SME under investigation falls within the steel and construction industries in South Africa. To gain insight into these industries and overview is given below.

2.2.2 Steel

Global steel output slipped by 0.1% to 128-million tons in June of 2012. This is due to weak demand and a falling steel price. In South Africa, steel manufacturers have experienced a difficult 2 years, with the country's steel output falling by 12.7% year-on-year to 6.7-million tons (Barradas 2013).

South Africa has been ranked the 21'st largest crude steel producing country in the world by the World Steel Association in 2010 (SAISA 2013) South Africa is also the largest steel producer in Africa, producing about 47% of the total crude steel production of the continent during 2010 (SAISA 2013).

The total South African crude steel production amounted to 7,617 million tonnes in 2010. This represents about 0,6% of world production which reached 1 411,9 million tonnes in 2010 according to the World Steel Association. This is an increase of 14,8% when compared with 2009 (SAISA 2013).

The majority of the manufacturing sectors' employers in South Africa are governed by an umbrella body called the Steel and Engineering Industries Federation of South Africa (SEIFSA). This oversees 34 different employer associations (Siefsa 2013). The employees involved in the steel industry are managed by a body called NUMSA (National Union of Metal Workers South Africa) which is the second largest union in the country (Numsa 2008). Many strikes take place as part of on-going wage negotiations (Cokayne 2012)); (SAPA 2013)) The manufacturing sector has recently lost 67000 employees along with its diminishing output.

2.2.3 Construction

Construction currently contributes around 3% of GDP or around \$16,5 billion (Stats SA 2012). Construction has remained stagnant over the 2012 year though rejuvenation of the South African Government spending should see this increase.(Insight et al. 2012; Stats SA 2012)

In terms of employment in the construction sector, 71 000 people lost their jobs over the 2011 and 2012 year. This is a 6.7% quarter-on-quarter decline. This is from 1 057 000 employees to 986 000 employees (Insight et al. 2012)

Table 1: Labour Force, Construction, by Province 1q2012

Province	2012Q1 ('000)	Q-Q % chg	Y-Y % chg
WC	135	-6.3%	8.9%
EC	108	-12.9%	-10%
NC	19	0%	35.7%
FS	47	-4.1%	-16.1%
KZN	210	-12.1%	-7.1%
NW	46	-6.1%	2.2%
GAU	265	2.3%	-6.7%
MPU	64	-17.9%	-7.2%
LIM	92	-3.2%	-1.1%
TOTAL	986	-6.7%	-4.4%

The above table shows the breakdown of employees per province and the change in the number of employees employed. This shows the concentration of construction projects and companies in the country. From the above it can be viewed that Gauteng, the province in which the company under investigation is located, has the highest concentration of labour in the construction industry

Construction is distinguished between residential and non-residential construction as well as public and private contracts. Contracts awarded in March 2012 by the private sector in residential areas were valued at R105 million (Insight et al. 2012). The moving average being R8,1 billion from the private residential sector which is down 22,9% compared to the year before (Insight et al. 2012)

Non-residential private sector increased R1,93 billion with the total value of the contracts being placed at R21 billion. (Insight et al. 2012)

Public sector is the majority of the construction industry contracts in South Africa with an increase of 63% from the previous year, totalling R13.6 billion. (Insight et al. 2012)

Thus, steel and construction together form an integral part of the South African economy.

2.3 Small Medium Enterprises (SME)

The term SME refers to that of a Small Medium Enterprise. In terms of defining an SME various countries do so differently. Japan rates a manufacturing entity as an SME if there are less than 300 employees and the market capitalisation is less than 100 million Yen (Approximately R9,5 million). France utilise labour as the measure of an SME with 10-99 employees being considered.

SMEs in South Africa are classified as previously stated by the *National Small Business Act of South Africa 2003* (Government 2003). Various industries contain differing definitions though ultimately this

study will fall under the manufacturing and construction sectors. This is defined according to the below table:

Table 2: Classification of a business' (Government 2003)

Sector or subsectors	Size or class	Total full-time equivalent of paid employees Less than	Total annual turnover Less than	Total gross asset value Less than
Mining and Quarrying	Medium	200	R39.00 m	R23.00 m
	Small	50	R 10 m	R 6.0 m
	Very small	20	R 4.00 m	R 2.0 m
	Micro	5	R 0.2 m	R 0.10 m
Manufacturing	Medium	200	R51.00 m	R19.00 m
	Small	50	R13.00 m	R 5.0 m
	Very small	20	R 52.00 m	R 2.0 m
	Micro	5	R 0.2 m	R 0.10 m
Construction	Medium	200	R20.00 m	R 4.00 m
	Small	50	R 5.00 m	R 1.00 m
	Very small	20	R 2.00 m	R 0.40 m
	Micro	5	R 0.15 m	R 0.10 m

A comparative example of the Mining and Quarrying sector and Construction Sector was given to illustrate the minor differences in the definitions. The definitions are based according to the amount of employees the company employs, the annual turnover and the gross asset valuation of the company(Government 2003)

2.3.1 The Importance of SMEs in the South African Economy

SMEs form an integral part of the South African economy which is ultimately measured as their contribution to GDP. SMEs contribute around 32% of South Africa's GDP and 44% of private sector employment.(Eybers 2010). Eybers (2010) also indicates that due to the nature of SMEs, they are more labour intensive, hence, the large contribution to employment which South Africa battles with. In 2007 there were approximately 39000 Small and medium companies in the formal sector of the South African economy.(Department of Trade and Industry 2007)

The South African government, understanding the importance of SMEs, has a number of development institutions to aid the development of SMEs(Department of Trade and Industry 2007). They are

- Small Enterprise Development Agency
- South African Micro-Finance Apex Fund
- Khula Enterprise Finance Limited
- Umsobomvu Youth Fund
- National Empowerment Fund
- Land Bank
- Mafisa

These organisations form part of the Integrated Small Development Strategy of South Africa (Department of Trade and Industry 2007)

It has been estimated by international resources studies on developing countries that 95% of the resources for the SMEs stem solely from the majority shareholder and thus it can be assumed that the importance of sharing risk and creating a common understanding within the supply chain is critical for the survival of the entity (Berry et al. 2002).

SMEs according to Cass (2009) have relative strengths and weaknesses.

Strengths:

- Flexibility in response to changes as a result of less bureaucracy
- Close involvement of management with customers
- The acceptance of change

Weakness:

- Lack of strategic planning with a main focus on daily challenges.
- Low level of standardisation of work.
- Due to the size of the entity, often work security of staff is a problem.

2.3.2 SME Survival

South Africa is lagging behind in terms of creating sustainable SMEs (SBP 2009). Ultimately 8% of adult South Africans are the owners of businesses that are 3,5 years old or less though only 2,3% of them own their companies for longer than 3,5 years (SBP 2009).

The survival of an organisation is ultimately determined by the environment that it operates in. This would include competition, barriers to entry and stability (Eybers 2010). The lack of bargaining power compared to larger counterparts ultimately puts smaller organisations at risk. (Eybers 2010).

SMEs in South Africa have various obstacles that need to be overcome in order to survive the market conditions (Olawale & Garwe 2010). Olawale and Garwe (2010) have investigated that some of the major obstacles are, among others:

- Lack of access to finance
- Lack of collateral
- High production costs
- Bad credit record

2.4 Risk

Risk can be defined as “*a measure of the anticipated difference between expectation and reality.*” The difference exists because the future is unknown (Egbuji 2010a). Risk is inherent in everyday life and thus inherent in business. Dynamic markets lead to increased uncertainty in which a business operates (Tchankova 2002). To remain competitive, organisations need to start initiatives that may lead to possible different outputs. The possibility of these differentiated outputs occurring determines the risk in an organisations activity (Tchankova 2002). Risk categorisation is thus important. It is necessary to understand the risk and what aspects of the organisation it can affect.

Risk can be divided into the impacts and effects it has on business and the surrounding environment (Harland *et al.* 2003). See Table in Appendix C.

Risk may be expressed as a probability of loss and the significance of loss. It attributes the following to explain the perceived severity of the risk (Mitchell 1995).

$$\text{Risk} = (\text{Impact of Loss}) * (\text{Probability of Loss})$$

Furthermore Losses have been characterised by Harland (2001) into the following categories:

- Financial Loss
- Performance Loss
- Physical Loss
- Social Loss
- Time Loss

Given the above, all losses have a direct relationship to the amount of perceived risk with Total Risk being calculated as:

$$\text{Total Risk} = \text{Risk}_{(1)} + \text{Risk}_{(2)} + \dots \text{Risk}_{(n)}$$

“Managers however do not view the risk of an alternative with the variance of the probability of outcomes that come from choosing that alternative. They too do not treat the uncertainty of positive outcomes as an important aspect of Risk. Risk is perceived to be associated with negative outcomes” (Mitchell 1995).

2.4.1 Risk Management

Risk management is a managerial function aimed at protecting the organisation, its people, assets and profits against physical and financial consequences (adverse) of event risk. It involves planning, coordinating, directing risk control and financing activities of the organisations” (Valsamakis *et al*, 1999). The effectiveness of risk management is largely dependent on how and if the organisation can identify what hazards exist, how they come about and the understanding of the uncertainty that ultimately affects the activities that an organisation conducts (Egbuji 2010b). Risks can be grouped into an assortment of categories in order to understand the risks and how they may affect the organisation. Risks such as reputational risk, litigation risk, environmental risks and political risks to name but a few (Egbuji 2010b). The reactive or proactive response to the various risk types ultimately forms the core of the risk management process (Basu et al. 2011).

This process is described eloquently by Ellegaard (2008) whereby an explanation of how manager’s risk initiatives try to mitigate risk. The process involves

- Increased knowledge of risks
- Reduction of the probability of the risk occurring
- Reduction of the impact of the event

This can be illustrated as a continuous iterative process.

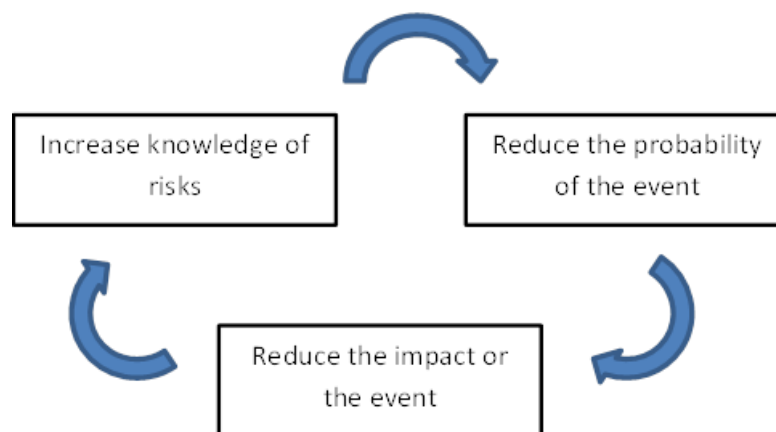


Figure 1: Iterative process of a risk mitigation initiatives (Ellegaard 2008)

Given the definition of risk above and its applicability to business, supply chain and supply chain management may be explored.

2.5 Supply Chain and Supply Chain Risk Management

2.5.1 Supply Chain Management

In order to stay competitive, firms cannot act in isolation from one another but rather act in a cohesive manner (Matopoulos et al. 2007b). Various definitions of Supply Chain Management are available in literature though the seemingly most complete could be that “*A supply chain is all activities involved in delivering a product from raw material and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, delivery to the customer, and the information systems necessary to monitor all these activities*” (Lummus & Vokurka 1999). The increase in interest in the subject could stem from the fact that companies are beginning to specialise in order to remain competitive. Thus they are now dependent on various companies that too are specialists in their own ‘field’ to supply a cost effective (due to competitive advantage) product to themselves as the buyer. Thus, it is in the best interest of both parties to work together and integrate themselves. This ultimately forming the core of SCM.

Supply Chain Management is the network of organisations that are involved through upstream and downstream linkages (Mentzer *et al.* 2001). Upstream linkages referring to the suppliers and downstream linkages referring to the customers (Croson & Donohue 2005). Furthermore one can distinguish between 3 types of supply chains (Mentzer et al. 2001), namely:

- Direct supply chains
- Extended supply chains
- Ultimate supply chains

Direct supply chains referring to a supplier, organisation and a direct customer. Extended supply chains refer to a supplier of the immediate supplier and customer of the immediate customer. All who are involved in the upstream and downstream flow of what is required to fulfil the requirement of the product. An ultimate supply chain involves all organisations upstream and downstream whom are involved in production and reception of a product (Mentzer et al. 2001). Below these concepts are illustrated.

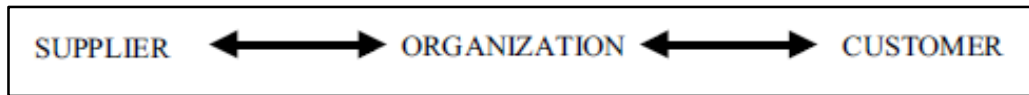


Figure 2: Direct Supply Chain (Mentzer et al. 2001)

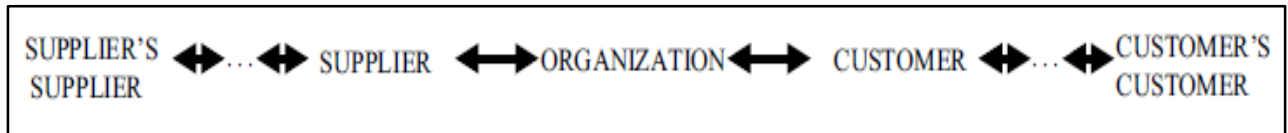


Figure 3: Extended Supply Chain (Mentzer et al. 2001)

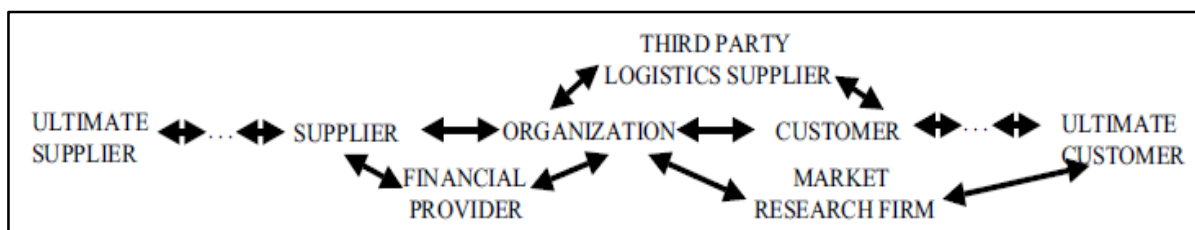


Figure 4: Ultimate Supply Chain (Mentzer et al. 2001)

2.5.2 Supply Chain Risk Management

Given that Supply Chain Management is increasingly being viewed as a fundamental concept. It is understood that to remain competitive, strategic business has moved away from a single entity but to the collaboration of a few. While this collaboration has the ability to enhance competitiveness and benefit a firm (Fawcett et al. 2008), the added heterogeneous collaborators in the supply chain adds to the complexity of the risk profile (S. K. Cheng & Kam 2008).

The management of this is thus of utmost importance. Attitude towards risk is influenced by the nature of the business conducted and experience and behaviour of those involved (Harland *et al.* 2003). Risk associated with supply chains comes in varying forms and have an effect on a firm in a variety of ways. These risks can be categorised into 3 groups according to their place of origin (Oehmen 2009). According to Oehmen (2009) they are

- ‘Inside their own company’
- ‘Inside the supply chain’
- ‘External factors’

These are extended on by Jüttner (2005b) whereby there is an understanding that risks could be categorised as Environmental Risk Sources, Demand and Supply Risk Sources, Process Risk Sources and Control Risk Sources though prefers to categorise them as:

- Environmental Risk Sources
- Demand and Supply Risk Sources

The Environmental sources refer to External Factors, an example, being fuel price increases. These are exaggerated by process and control risks referred to as risk amplifiers or absorbers, (Jüttner 2005b).

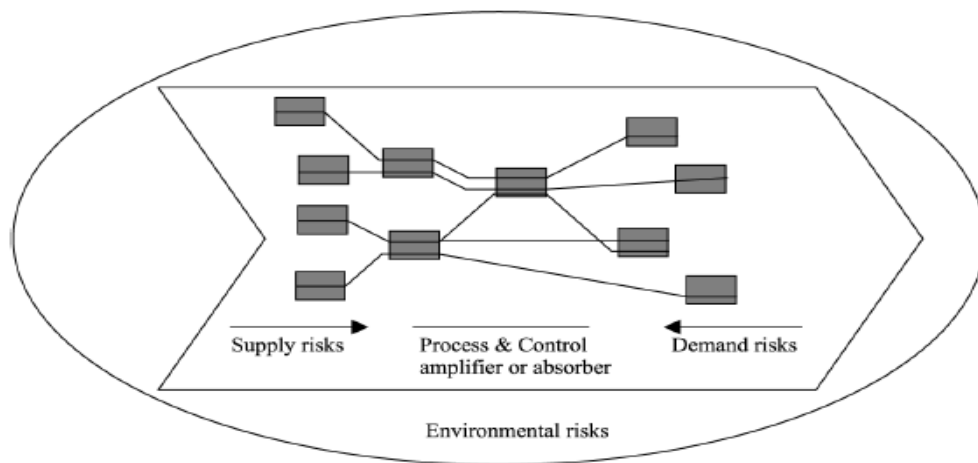


Figure 5: Supply Chain Risks adapted from Mason-Jones and Towill (1998), (Jüttner 2005b)

Supply Risks refer to the uncertainty associated with supplier activities and general supplier relationships. Demand risk is risk associated with the outbound logistics flows of product demand. These are caused by disruptions such as seasonality, volatility and short product life cycles (Jüttner 2005b).

These risk types are further extended by Harland *et al.* (2003) where by the classification of risk types are:

- Strategic Risk
- Supply Risk
- Asset Impairment Risk
- Reputational Risk
- Financial Risk
- Fiscal Risk
- Legal Risk

See Appendix C for the full breakdown of these risks and their sources.

2.5.3 Risk Mitigation in Supply Chains

Given the increasing competitive behaviour that exists in supply chains, supply chain vulnerability has become an issue with increasing significance (Basu *et al.* 2011). Vulnerability refers to the exposure to risk, (Peck 2005). Mitigation entails that the risk will be avoided or be less harsh if mitigation is pursued (Faisal *et al.* 2006). Four approaches that a firm could employ to mitigate risks are supply management, demand management, product management and information management (Faisal *et al.* 2007). Along with these approaches there are certain mitigation techniques/enablers have been analysed according to Faisal, Banwet and Shakar (2006). These techniques are elaborated on in the below table.

Table 3: Risk Mitigation Enablers, (Faisal *et al.* 2006)

Enabler	How it is considered to mitigate risk
1) Sharing	Collective efforts and sharing of information provides basis for concerted actions with a diverse functional base
2) Agility	Adaptability to a changing environment
3) Trust	Mutual trust for long term relationships to avoid dependence on outsourcing
4) Collaboration	Leads to cohesive market focus and co-ordination of sales and demand fulfilment over and above relying on forecasting.
5) Information Security	Confidentiality protects intellectual property and indicates a high level of trust
6) Corporate Social Responsibility	Ethical behaviour
7) Aligning Incentives and revenue sharing	Creates focus to strive for overall improvement
8) Strategic Planning	Developing plans and strategies for risk mitigation
9) Risk Sharing	Risk distribution allows the pressure to be taken off a single entity.
10) Knowledge	Allows improved decision making as awareness is heightened.
11) Continual Risk Analysis	Allows the monitoring of risk change

Interpretive structural modelling was utilised to structure order to relationships that exist within a supply chain. The results of Faisal *et al.* (2007) expresses dependence on the enablers explored in earlier research (2006) as listed above, to mitigate risks inherent in the supply chain.

2.5.4 Risk Mitigation Enablers

2.5.4.1 Sharing

Communication is essential to success as increasing the visibility of information across the supply chain reduces risk (Faisal *et al.* 2006). With effective knowledge sharing, the strategic intent of inter-organisational collaborations for a sustainable competitive advantage can be achieved by combining the relevant resources (J.-H. Cheng *et al.* 2008). According to Faisal *et al.* (2006) sharing of information is the pre-emptive enabler to trust.

2.5.4.2 Agility

Agility is the ability to adapt to a changing business environment. Ultimately this is a business wide capability that must embrace various structures in the organisation such as logistics process, information systems and the mindsets of the employees, (Faisal *et al.* 2006). Agility has been recognised as an organisational enabler that enables a firm to establish a competitive advantage; furthermore the agility of the supply chain has been deemed a critical factor, (Gligor & Holcomb 2012).

2.5.4.3 Trust

Ultimately supply chain management is built on the foundation of trust, (Spekman *et al.* 2005) therefore lack of trust is considered to be a major factor that contributes to supply chain risks, (Faisal *et al.* 2006). A development of trust through effective communication and the belief that partners will not act in an opportunistic manner can create a competitive advantage in the supply chain, (Faisal *et al.* 2006). Trust may house itself in various forms such as faith, reliance and confidence in a supply chain and its participants, (Spekman *et al.* 2005).

2.5.4.4 Collaboration

This will be discussed in detail in Section 2.8 below.

2.5.4.5 Information Security

Information and intellectual property of supply chains and an organisation in instances are the most critical success factors. Therefore, the goal of information security is to reduce the risk to enterprises should there be a loss or intrusion of the information that is deemed confidential and critical to the success of the supply chain (Faisal *et al.* 2006). Faisal *et al.* (2006) conclude that information security risks are that of intrusion, misuse of the system, abuse of privilege, fraud and tampering.

2.5.4.6 Corporate Social Responsibility

The world bank defines corporate social responsibility as ‘*a company’s obligation to be accountable to all of its stakeholders in all its operations and activities*’ (Faisal et al. 2006). This is not limited to only the supply chain but also the surrounding environment and human beings. The risk and risk mitigation associated with corporate social responsibility is that of company policies and actions. How these policies are structured and acted on will determine environmental and human impacts for which there are consequences, (Faisal et al. 2006).

2.5.4.7 Aligning Incentives and revenue sharing

Supply chains are becoming viewed as competitors more than just the companies that operate within them. Thus, it is in the interest of the upstream suppliers and downstream customers to work together in order to align themselves. To remain competitive, a holistic approach is needed, (Skjoett-Larsen et al. 2003). This alignment is said to work well if the incentives of the companies are aligned, thus, requiring the risk, costs and rewards of doing business be divided fairly across the network.

2.5.4.8 Strategic Planning

Formulating an effective strategy can have the ability to mitigate certain risks, (Finch 2004). Given that strategic supply chain risk management is a relatively new concept it is ultimately becoming required in order to meet the needs of the customers, (Faisal et al. 2006). The strategic planning process may include efforts in maintaining information systems and addressing issues such as ‘make-or-buy’ decisions, (Spekman et al. 2005).

2.5.4.9 Risk Sharing

A fundamental concept in supply chain management is the sharing of risks and rewards between the members of the supply chain, (Mentzer et al. 2001). This concept develops further in that a company should not only be concerned of the risks that inherently only affect them but also the risks effecting members upstream and downstream of the supply chain, (Jüttner 2005b).

2.5.4.10 Knowledge of risk

In Section 2.5.2, certain risks as categorised by Harland *et al* (2003) were noted. These risks are classified in classes as to how they affect an organisation. The better the understanding of the risks the better the decision to be made based on the effects of the risk, (Hallikas *et al.* 2004).

2.5.4.11 Continual Risk Analysis

Business environments are dynamic and subjected to changes in both the political and economic conditions, (Faisal et al. 2006). Continuous monitoring of the risks in the supply chain aids in the above ‘knowledge enabler’. This continual analysis allows an assessment to take place on ‘what could go wrong, the risks that have caused this and how to implement the changes necessary to mitigate this risk’ (Faisal et al. 2006).

2.6 Supply Chain Management in SMEs

Given that the main focus on SCM studies has been on large organisations and their management of the supply chain they are a part of, (Fawcett et al. 2009), the general focus on SMEs has been one where the SMEs are either the 1st or 2nd tier supplier to the large organisations. (A 1st tier supplier being those that supply directly to manufacturers and 2nd tier suppliers being those that supply first tier suppliers). SMEs are more likely to offer a differentiation advantage than a cost advantage does, most often due to the existence of scale, scope and learning economies in the industry, (Thakkar & A. K. and S. G. Deshmukh 2008).

The definition of SMEs within a supply chain is provided by Thakkar & A. K. and S. G. Deshmukh (2008) “A supply chain in SMEs is a set of business activities including purchase from open/spot market, manufacturing or processing or subcomponents/subassembly within the plant and delivery to large enterprises using hired transportation to enhance value of end product and in turn to ensure long-term regular purchase orders”.

SMEs are defined in the context of supply chain management by their strategic focus as well as their supply chain position (Hong & Jeong 2006).

A comparison on supply chain management is deduced by Hong and Jeong (2006) on the following grounds: Competitive strategies, key strategies, external control structure, internal control structure and goals in the supply chain management process, (Hong & Jeong 2006). The differences have been summarised in the below table.

Table 4: Comparison of supply chain management practises between large and small/medium enterprises(Hong & Jeong 2006)

Category	SCM by large enterprises	SCM by small/medium enterprises
Competitive priorities	Market dominance through sustaining large market share	Market niches through sustaining profitable market position
Key strategies	Exert influences in supply chain – both upstream and down stream; strategic alliances with suppliers and distributors	Focus on specialized market; build on unique competencies; effective customers/suppliers management
External control structure	Command and control toward their small suppliers and distributors; collaborate with more dominant suppliers and distributors	Either accept command and control by OEM or 1st tier suppliers or utilize their negotiation strengths; pursue collaboration with other SMEs
Internal control structure	Decentralized, structured and highly specialized; multiple core competencies development	Centralized, semi-structured and moderately specialized; specific core competencies development
Goals of supply chain management processes	Operational effectiveness with multiple performance outcome requirements (e.g. cost, quality, delivery, time, customer value, and disposal) bigger scopes of information flows and product flows	Operational effectiveness with focused performance outcome requirements (e.g. specific definition of order qualifiers and order winners); smaller scopes of information flows and product flows

2.7 Visibility in the Supply Chain

Due to the globalised nature of the world and complex market systems, involving competitive and comparative advantages, the use of subcontractors and outsourcing has become more prevalent (Keith (1997); Kavcic & Tavcar (2008)). The use of these mechanisms ultimately affects what is termed the pipeline time in a supply chain. The pipeline time is the time taken for material to flow from one side of the supply chain to the other, (Christopher & H. Lee 2004). With outsourcing and the like increasing the amount of pipeline time. Associated with this is 'Visibility' within the supply chain. Often members of a supply chain have no detailed knowledge of what goes on in other parts of the chain such as finished goods inventory, material inventory and work in progress, (Christopher & H. Lee (2004); Caridi et al. (2010)).

Thus, the key to improved supply chain visibility is shared information among supply chain members, (Christopher & H. Lee 2004). Visibility can also be viewed as the '*traceability*' of products in transit from manufacturer to final destination. Be it parts or components. Visibility may refer to this sharing of information as the level of transparency in the supply chain (Lamming et al. 2001).

Though there are many differentiating definitions of the term 'Supply Chain Visibility' which have caused confusion in the past, a precise definition was found to be the following. "*Supply chain visibility is the identity, location and status of entities transiting the supply chain, captured in timely messages about events, along with the actual dates\times for these events*" (Francis 2008).

The Bullwhip effect is a term utilised to explain the trend of larger and larger swings in inventory to meet the demand for a certain product, (H. L. Lee et al. 1997). It is viewed that inaccurate information or no information may exaggerate this phenomenon. I.e. The lack of visibility.

Given that visibility in a supply chain will allow more accurate demand forecasts, it will affect the variation of forecasts from actual sales. This will allow the production to be more precise and thus reduce the bull whip effect mentioned above.

According to Lamming *et al* (2001) and Bartlett *et al.* (2007) there are varying degrees of transparency that exist in business. The below table indicates these levels in a metaphorical sense.

Table 5: Levels of Transparency (Bartlett *et al.* 2007).

	Opaque	Translucent	Transparent
Business case (information shared between two organizations)	For any of a variety of reasons, no information is shared between the parties; even operational day-to-day information is obscured	Outline information only is shared – interface conditions or partial data. This can be similar to “black box” collaborative design. If used tactically, it may be akin to cheating	Information is shared on a selective and justified basis. Development of information leads to shared knowledge and collaborative abilities

In order to determine the level of Transparency, certain information would have to be conveyed,(Bartlett *et al.* 2007).

The information shared encompasses the following according to Bartlett *et al.* (2007). The descriptions were gathered from various literature sources namely; Pycraft *et al.* (2010), Gryna *et al.* (2007) and “*The Collins Dictionary*”.

Table 6: Parameters for measuring Transparency (Bartlett *et al.* 2007)

	Type of information	Description
Transparency of Quality	1. Scrap Levels	The quantity or number of goods or raw materials kept on the premises of a shop or business, (Collins 2013)
	2. Rework Levels	The amount of error correction, (Gryna <i>et al.</i> 2007)
	3. Process Repeatability	The extent in which a process does not vary, (Pycraft <i>et al.</i> 2010)
	4. Supplier Quality Issues	Issues associated with receipt and replacement of defective product received from suppliers, (Gryna <i>et al.</i> 2007)
	5. Audit of Quality system	The set of standards put in place to ensure quality such as International Organisation for Standardisation (ISO) standards and the management of it, (Gryna <i>et al.</i> 2007)
	6. Continuous Improvement	Strategies employed to relatively small, incremental, improvements in operational performance. (Pycraft <i>et al.</i> 2010)

Transparency of Costs	7. Cost of Material	The price paid or required for acquiring input material, (Collins 2013)
	8. Overheads	Business expenses, such as rent, that are not directly attributable to any department or product, (Collins 2013)
	9. Sub-Contract Costs	Costs associated with “a subordinate contract under which the supply of materials, services, or labour is let out to someone other than a party to the main contract” (Collins 2013)
	10. Factory Cost Rates	Cost of running the factory
	11. Transportation Costs	Cost of transporting sold goods to customers.
	12. Cost of Non Quality	Cost of non-conforming products, (Gryna <i>et al.</i> 2007)
Transparency of Delivery	13. Order Receipt Process	The information of the process of placing and order, following up on the order and how the incoming deliveries and dispatches are monitored and checked, (Joyce 2006)
	14. Capacity Planning	Process of determining the production capacity of an organisation to meet demand and product variability.(Russel & Taylor 2003)
	15. Material Ordering and Production Execution	Material coverage and the progression of parts through the manufacturing system, (Bartlett <i>et al.</i> 2007)
	16. Shipment Process	Method as to how the sold goods will be transported
	17. Lean Manufacturing	Short lead times, waste and the practicality around customer order service and the incorporation of lean manufacturing principles, (Gryna <i>et al.</i> 2007)
	18. Inventory Management	Management of buffer, cycle and anticipation stock levels, (Pycraft <i>et al.</i> 2010)

2.8 Collaboration in Supply Chain Management

It has been noted that in the 70's and 80's trade exchanges that took place were purely transactional and virtually no information was shared between members of the supply chain. Towards the end of the 90's a leap in trade relations had taken place with companies such as Proctor and Gamble and Walmart, (Skjoett-Larsen *et al.* 2003)

Collaboration has seen more than just a passive exchange of information between members of the supply chain but a movement towards proactive planning and synchronisation (Skjoett-Larsen *et al.* 2003). Though the complex systems utilised in systems such as VMI (Vendor Managed Inventory) and CPFR (Collaborative planning, Forecast and Replenishment) are seemingly out of reach for SMEs. CPFR was defined by VICS (1998) as *"A collection of new business practises that leverage the internet and electronic data interchange in order to radically reduce inventories and expenses while improving customer service."*

2.9 Collaboration, Visibility with SMEs

Given the capital intensity required for the systems such as VMI and CPFR due to the technology required to run such systems, they can be considered unattainable to some extent for business that are small or medium in nature. A study by the Aberdeen Group (Aberdeen Group 2010b) proclaims that *"Due to the expansion of the supply chain on both the buy side and the sell side, complexity has risen dramatically and supply chain visibility has become a critical factor,"* and *"One of the building blocks of establishing visibility across the entire demand-supply network is the ability to establish a flow of information at the interface points -- namely between trading partners. From a SME, again, the lack of adequate resources to establish a truly global infrastructure impedes their ability to manage the global business network."*

75% of respondents to the Aberdeen study have indicated that though collaboration is a strategic decision as to how their business is conducted. Back to Back (B2B) integration and collaboration initiatives with a specific emphasis trading partner recruitment and relationships, enablement, on-going maintenance, and performance measurement related activities are utilised for this purpose

2.10 Summary

In summary the research and construction of the literature review brought about a familiarisation with the following areas of study.

- To understand the larger picture that this study was facilitated in. The economic overview of South Africa and industrial sectors.
- To explain the classification system of SMEs in South Africa.
- To define critical terms such as risk and loss.
- To elaborate on the different perspectives and developments of supply chain risk.
- To show evidence of SCM in and amongst SMEs and the previous work that has been done on the topic.
- To explain risk management approaches utilised in SCM.
- To introduce the concepts of Visibility and Collaboration in the context of SCM and SCRM.
- To establish the use of collaboration and visibility by SMEs in industry.

On completion of the literature review it was found that there is a definitive lack of evidence of supply chain risk management in small medium enterprises, particularly in South Africa. The use of collaboration and visibility are seemingly un-researched in South Africa.

Certain frameworks were identified to utilise in the study. These are

- Bartlett *et al* (2007) framework for the selection of a supply chain and identification of visibility (Table 6)
- Faisal *et al* (2006) risk mitigation enablers

Chapter 3 - Research Method

This section builds on the literature review above and elaborates on the research methods constructs utilised.

In terms of the section, the nature and development of the method will be discussed before moving forward into a detailed discussion of each individual activity utilised for the collection of information.

3.1 Development of Research Method

From the preceding literature review it can be seen in Sections 2.6 and 2.9 that the literature on supply chain management and risk management regarding SMEs is not well researched and that the research that has been done is contemporary in nature. Regarding the collaboration and visibility in supply chain management and SMEs, there was only one study that could be found. As far as the utilisation and observation of visibility and collaboration as a risk mitigation technique no studies have been found.

Research is ultimately conducted in order to answer a specific question and to pursue specific objectives that have been formulated. Interpretation of the of the analysis is required as is explained Hesse-Biber & Leavy (2011) explains *‘about seeking deep understanding by interpreting the meaning of interactions, actions and objects have for people.’*

The nature of this study closely resembled that of Bartlett *et al* (2007). The approach was one of a single case study as an observer participant. This was seeking to explore a contemporary set of events taking place over time, (Yin, 2003a). According to Yin (2003b) a case study allows a study to deal with real life events with having little or no control over them.

A case study approach was utilised as *“The essence of a case study is that it tries to illuminate a set of decisions: why they were taken, how they were implemented and with what result.”* (Yin, 2009).

The Yin (2009) methodology was utilised. The methodology consists of:

- Planning
- Design
- Prepare
- Collect
- Analyse
- Share

A single case study was chosen as though the theory and logic in the collaboration among entities is well established in larger firms; it is thought of as inherent but unidentified in smaller firms. This utilises the single case study as a test of what is thought to be significant theory.

In terms of evidence sources, Yin (2009) was followed as closely as possible. The sources of evidence utilised are:

- Semi structured interviews
- Documentation
- Direct Observations
- Participant-observations.

To truly validate the study the semi structured interviews were deemed the most important aspect of evidence.

3.2 Case Company Selection

Bartlett *et al* (2007) prescribes a framework in determining the selection criteria for companies in a supply chain involved in joint initiatives. This framework was adopted and utilised to select the company and the entities involved. The framework incorporated Commercial and Operational Factors.

The Commercial Factors included the following

- Relationships -A strong relationship is desirable for the implementation of joint initiatives
- Strategic - In this research strategic suppliers would be the preferred choice whilst strategic customers will also be advantageous.
- Few Alternatives - If the SME has limited alternative supply options then the implementation of joint initiatives could be in the SME's interest
- Inter-dependencies - Joint initiatives can be seen as a positive way of further increasing visibility
- Level of business - A high level of business is required to achieve the required return on the investment or to mitigate high levels of cost avoidance
- Company Size – The central company would be an SME with upstream suppliers being small, medium or large in nature.

The Operational factors are

- Current Performance (KPI's). Owing to time constraints in completing this research, only companies that achieve medium to satisfactory performance will be considered. The indicators of performance would be a stabilising of income and orders received.
- Supply Chain Complexity – Complex referring the amount of tiers and relationships within the supply chain. Both upstream and downstream. Very complex supply chains will not be used

3.2.1 Industry Research

A sectorial review was conducted to gain insight in the South African construction and manufacturing industries. This was highlighted in the Section 2.2, Industry Overview. The evidence found was to establish the overall economic circumstances that the selected company is operating in. Furthermore what 'condition' the above mentioned industries are in given these are the industries that the organisation partakes in.

The evidence found that with the global economic crisis, the South African economy has not been left unscathed and ultimately this would need to be taken into consideration when the research was being conducted.

A specific company was required by the researched in that it had to be an established market player yet fulfil the definition of either a small company or medium company in its entirety, as provided by the *National Small Business Act 2003* of South Africa.

An industry whereby there is healthy competition and a mixture of different sized players was deemed beneficial as it would highlight the need for risk mitigation techniques as well as competitive practices.

A number of companies, namely in the manufacturing sector, were observed. This was due to the experience of the researcher. It was found that in order to truly gain an understanding of the organisation and the information flows that are inherent in it, a relationship and understanding of either senior management or shareholder was required. This was due to the information required being confidential.

A family business that the researcher has had 10 years' experience with was thus selected and deemed appropriate for the study. This organisation's supply chain fulfilled the Bartlett *et al* (2007) criteria which aided in its selection. The organisation was willing to participate on all levels of the study, be it regarding employees on the floor or high level strategic observations. This access thus ensured the information to be transparent and credible at all times.

The organisation fulfils the criteria of the SME legislation and actively partakes in a supply chain. As mentioned above it was measured against the Bartlett *et al* (2007) criteria of selection. Due to the reputation of the organisation and the experience it has accumulated in the current supply chain, accesses to players upstream of the chosen company were available. Due to the nature of business relationships, downstream customers were not researched in-depth but observed.

From here on, the companies will be referred to as Galvaniser Co. Sheet Metal Co, Steel Supplier Co among others to be discussed below.

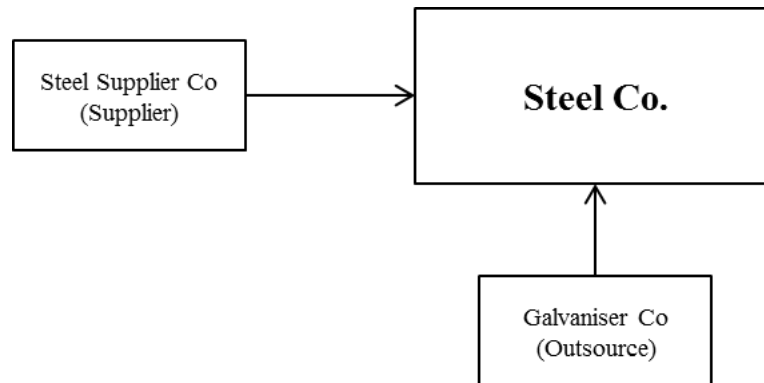


Figure 6: High Level up-stream supply chain view of participants

3.2.2 Semi Structured Interviews

The main research instrument utilised was that of a prepared semi structured questionnaire in conducting an interview. The interview questions may be found in the appendix of this report. The structure of the questions tried to gain insight into the nature of the organisation, the individual being interviewed and how business is conducted in terms of supply chain management. This including information about customers and suppliers. Information gathered assisted in the analysis of whether visibility and/or collaboration exist and at what levels according to a prescribed framework.

The interviews were exploratory thus in keeping with the nature of the report. The decision to select the format of a semi structured interview was utilised. According to Richards & Morse (2013) when enough is known about a certain subject to formulate questions about a topic in advance of the actual interview, semi structured interviewing is appropriate. Semi structured interviews afford the opportunity of the respondent the “*freedom to talk about what is of interest or of importance to them.*”(Hesse-Biber & Leavy, 2011). The desired result of this was to allow the respondent to be truthful, straightforward thus allowing more insight to the topics of discussion which possibly which could have gone unfounded.

A section of the interview 'Transparency' was conducted in a survey manner whereby Yes or No answers were deemed sufficient. A survey too was conducted with many of the floor staff. This differed to the survey from above as it was purely to analyse the penetration and utilisation of information in an organisation. This may be view in Appendix M.

The interview was initially conducted as a pilot study with the Head of Administration of Sheet Metal Co. It was deemed appropriate for respondents both internally and externally. All meetings held were fully transcribed. (See Appendices D, E, F, G). Interviews were conducted with the Managing Director of the major Steel Supplier Co, The Director of Steel Co, The Head of Powder Coating in Steel Co and the Director of Galvaniser Co.

3.2.3 Documentation

The researcher had the opportunity to gain access to all records of the company. According to Yin (2009) the forms of documentation are:

- Letters, memoranda, email correspondence and other personal documents.
- Agendas, announcements of written minutes of meetings and other written reports of events.
- Administrative documentation such as proposal and progress reports
- Formal Studies
- News Clippings

From the above, access to letters, email correspondence and administrative documentation was given. This included financial results, management accounts as well as audited figures, quotes, invoices and tender documentation.

The strengths of documentation being that it may be repeatedly reviewed and contains exacting evidence (Yin 2009).

3.2.4 Participant-Observation

Observation is the most natural way of making data and in order to be unobtrusive, a passive approach was taken, which over time began to allow all parties involved in the company to not let the presence of the researcher influence any decisions and results, (Richards & Morse 2013)

Participant-observation is a special mode of observation in which one may assume a variety of roles within a case study situation and may actually participate in the events being studied. (Yin, 2009).

The researcher was involved in the company from January 2012 to January 2013. During this time numerous observations were made pertaining to the subject at hand and specific relationships with

major suppliers were observed. The advantages of observations are that they are done in real time and taken in the context of the case study. The participant observation approach further allows insight into the behaviour and motives of those involved (Yin, 2009).

3.2.5 Data Analysis

The information was analysed with software such as Nvivo to try and solicit the most out of the information as possible. Analysis from a vertical and horizontal perspective was needed in filtering out the relevant information.

Categorisations were made and information was structured in the interviews to obtain information on specific categories. These categories included transparency, support and supply chain information.

3.2.6 Validity and Reliability

Validity refers to the issues that the researcher is believed to be studying are actually those which are being studied, (Remenyi 2008). To ensure validity a triangulation approach was taken. The approach encompassed an observation which was supported by an interview and documentation.

A diagrammatic representation below illustrates the concept.

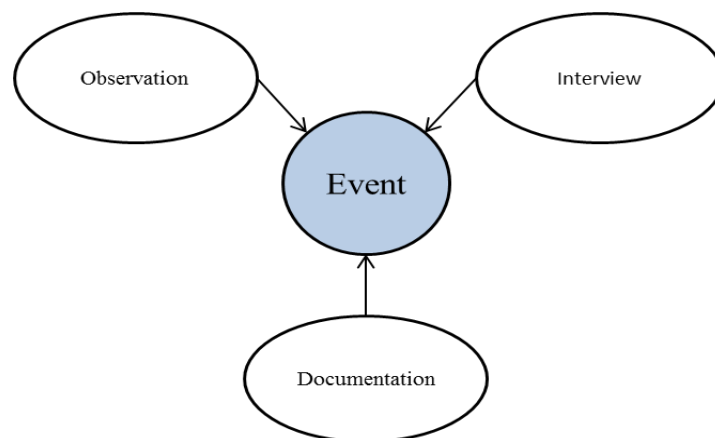


Figure 7: Triangulation Concept

Reliability refers to consistency of results if research is repeated by others. Though it is recognised that there is difficulty in reliability with qualitative research, (Remenyi 2008). Internal consistency reliability was ensured through a similar questionnaire and method of obtaining information with the triangulation method mentioned above. Internal consistency reliability assesses the reliability of information within the same test.

3.3 Ethical Considerations

Given the nature of the research and the information it represents. All names of individuals and companies remain undisclosed. Confidentiality was requested by 2 of the parties concerned. One of the parties, namely Galvaniser Co requested that the interview not be recorded and that the name of the company as well as the name of the individual not be mentioned in the study.

The strategy/plan of the study was expressed to the participants, making them fully aware of researcher's status. It was discussed that a research report would be produced from the gathered information. A formal letter of introduction was drafted by the supervisor to ensure full transparency of the project was given to the informants

Chapter 4 - Results and Discussion

Given that the researcher acted from an observer-participant point of view for 12 months, it was possible to consistently view the company and partake in some of the company activity. This enabled a detailed 'rich' picture to be formed around the company's operations and its business relationships.

A presentation on the findings will be done in the following manner.

- Firstly, the background of the case company is presented along with Galvaniser Co and Steel Supplier Co
- A narrative and analysis of the interviews will be utilised to build a vertical review or summary of the participating companies and their respective supply chains.
- A comparative or horizontal analysis will be one on the respective companies to allow the reader to understand the context that each company falls in with regards to the economy, its industry and with each other in the supply chain
- An analysis according to the framework laid out by Lamming *et al* (2001) will be analysed from the interviews to observe the levels of transparency that exist through the supply chain.
- Classification of risks, their impacts as well as the risk management practises of the companies will be analysed.
- A real world example of collaboration will then be analysed and reviewed to observe the perceived benefit and risk mitigation that occurred as a result.

All interviews are transcribed and may be found in the Appendices E-J

4.1 Company and Supply Chain Selection Criteria

In choosing the supply chain whereby it would be deemed that visibility collaboration or joint initiatives could actively be observed, the following selection criteria was utilised. The basic conditions of the criteria are located in the Appendix B. Actual observations in relation to the criteria may be found below forming the basis of selection of the companies. The names given to the companies are Galvaniser Co, Steel Supplier Co and Steel Co.

Table 7: Fulfilment of Selection Criteria for Companies possibly involved in collaborative activities (Bartlett *et al.* 2007)

<u>Factors</u>	<u>Criteria</u>	<u>Level</u>
Commercial factors	Relationship	Relationships between participants are considered extremely good with Steel Co managing the relationships. Steel Supplier Co when asked if they had a good relationship with Steel Co replied “Yes, of course yes” Galvaniser Co confirmed that they would help Steel Co if the company was in a situation that required their help.
	Strategic	Suppliers are critical to the functioning of the company, thus, a collaborative opportunity exists. Steel Co utilised Steel Supplier for the fundamental product for manufacture and Galvanising Co as a vital outsourcing partner to finish products. This is confirmed by the income statement which shows that in some months the total expense of galvanising and steel form more than 50% of the cost of sales of the company. See Appendix L.
	Few Alternatives	There are alternatives to those in the supply chain though differentiating factors such as Cost, Quality and Service play a role. Steel Co feels that the Cost, Quality and Service of the other suppliers does not match Steel Supplier Co or Galvanising Co as seen in the interview in the Appendix E. Steel Co also has the largest proportion of Cost of Sales emanating from Steel Supplier Co and Galvanising Co as seen in Appendix L.
	Inter-dependencies	Interdependencies were shown and will be elaborated on in sections to come.
	Level of business	Levels of business were high with discussions around cost and cost avoidance taking place amongst the companies. This was confirmed in the second interview with the Managing Director of Steel Co.

	Company Size	This study refers to small and medium and large entities. Steel Co being a small company. Galvanising Co being a medium company and Steel Supplier Co being a large company.
Operational Factors	Current Performance (KPI's)	All companies involved in the study are profitable, looking to grow or have consolidated their position in the market as mentioned in the interviews.
	Supply Chain Complexity	The extended supply chain is low in complexity.

As outlined in the above table, operational and commercial factors took precedence in selecting the participants incorporating specific criteria for selection. The selection took place around Steel Co and it was found that Galvanising Co and Steel Supplier Co fulfilled the criteria and thus were the best candidates for the remainder of the study.

Other companies such as the Chemical Supplier for the powder coating plant whose questionnaire can be seen in the Appendix did not fulfil the criteria from an interdependency point of view. There are many suppliers of the chemical product and thus there are alternatives. The questionnaire forwarded to the company to support this notion may be found in Appendix K.

4.2 Steel Company

The information collected on Steel Company was through an interview process which supported observations made during the conducting of business. In terms of documentation, access to quoting material, pricing as well a company prospectus was available.

4.2.1. Steel Company History

Steel Co was founded by 3 individuals in 1966. There were 2 operational partners and a silent partner.

Steel Co began operations by manufacturing steel desks and associated office equipment for the Transvaal Provincial Administration department, and locomotive and carriage parts for the railways and Union Carriage and Wagon.

Steel Co then secured contracts with the South African Post Office and Telecommunications Provider.

The current sole shareholder joined the company in January of 1984, as a Production Manager and purchased the company outright by 1995.

The company had changed its corporate stance by concentrating more on the manufacturing of Post Office Equipment such as trolleys and post boxes. In 1997 Steel Co participated in its first construction project, this being Carnival City. See Appendix N. Since then, Steel Co has built up a reputation as being dependable and competitive with the primary construction companies in the South African market.

At present Steel Co still maintains its sundry steel section, see Appendix P which includes the manufacturing of fire cabinets and lockers for the fire and safety industry in South Africa. See Appendix O. Steel Co has recently secured work from Spain for the frames that will be utilised in a photovoltaic power project based in South Africa. Steel Co is also able to manufacture SABS approved light fittings that are tamper proof which have been used in prisons and police stations in South Africa.

Currently Steel Co employs around 43 permanent staff, up to 20 contract staff at times as well as casual labourers. The 43 employees and the turnover that the company achieves, places the company on the cusp of what is classified as a small company according to the *National Business Act*

The company organogram may be viewed in the Appendix A.

4.2.2 Company Structure

The company currently separates the construction and fabrication sides of the business. This is due to the fact that fabrication entails production runs whereby a number of identical items are produced in each run.

Construction is a projects environment where specially designed structural and decorative steel works are manufactured and erected by teams on site. Site work includes mines, shopping centres and hotel complexes.

4.2.3 Labour

The company has a largely unionised labour force with the majority of employees falling under the NUMSA (National Union of Metal Workers South Africa). This enables employees to have legal strikes on an industry wide scale.

Previous strikes have taken place in 2011 as well as 2007 and before. The strikes cause catastrophic disruptions in supply and manufacturing. Due to the use of intimidation and in order for the company

to maintain safety for all concerned, it must close down. This disrupts output and cashflow and is difficult to manage.

Employees are graded according to the regulations stipulated by government. The grading determines the employees pay and responsibilities. The grading of resources can be viewed in the Organogram in the Appendix A.

4.2.4 Machinery

The machinery utilised in the manufacturing arm of the company is old. Though the machinery is old, if the production line is utilised effectively, the old machinery allows flexibility to manufacture a wide product base. A new CNC 80 ton press break was purchased in 2007 which allows shorter set up times on a machine that is critical in sheet metal fabrication. In terms of the sheet metal fabrication process, the most capital intensive processes are the guillotine and the press brakes. This is due to their high costs (R400 000 for 1 press break). The company has 2 press breaks operating at once, though has 3 on the floor. The company has 2 guillotines. The largest guillotine has a 3 metre wide bed. Should any of these machines cease manufacturing due to a breakdown or fault, the company immediately loses up to 50% of its capacity, particularly if it is a guillotine that is at fault. It can be viewed in Figure 9 below that the guillotine is paramount for production as it is the starting point of manufacture.

Machinery such as specialised measuring equipment, drilling equipment, among others, has been purchased over the last 8 years in the company. Safety standards stipulated by the construction industry forces organisations to maintain their equipment to the highest standard and at times force new equipment to be bought to fulfil new regulations. An example of which is when Steel Co was forced to purchase fibreglass ladders due to aluminium ladders not being allowed on site as stipulated by the client's safety regulations.

4.2.4 Competition

Currently Steel Co. competes in a very competitive industry. Given that the company splits itself between manufacturing and construction, it has competitors in both industries. The competition is generally considered to be local, however; cheap imports from China are becoming a concern as well as undercutting in the market. Regarding a specific fabrication job for photovoltaic panels, the high input costs of South African companies such as Steel Co may see the company lose the work to an international company. Steel Co was informed by a senior manager who heads up the energy division of the company that no South African content will be utilised in the steel work of a Northern Cape power project which is the biggest of its kind in Africa. A response of an international company

located in Spain whom has been mandated to produce photovoltaic tracking panels for a project in the Northern Cape Province of South Africa has stipulated that South African steel prices are too high and it is cheaper to import the product into South Africa.

Contrary to the 'cheap' imports which are considered to be inferior quality, some products are exceedingly high in quality from international competition.

4.2.5 Input Costs

The basic raw material utilised in the manufacturing process of Steel Co is steel. Raw material is sourced in either pre-cut sheets or sections such as channels, I-beams, square tubing, round tubing or whatever material the specific work requires. Steel utilised for the fabrication of fire equipment is cold rolled, commercial quality steel that is de-coiled specifically for Steel Co by its supplier, Steel Supplier Co. The size is 1606mm wide by 2309mm in length by 0.8mm in thickness. Structural steel used in the construction side of the company varies. Structural I-beams such as a 350WA beam that comes in standard lengths of 6,9,11 or 13 meters is commonly used. Steel prices use to be altered twice a year however recently it is able to fluctuate at any time and, thus, is needed to be monitored consistently.

Fuel costs for delivery have seen a steady increase and thus to mitigate this cost, Steel Co has a diesel filling tank in-house. The diesel onsite is able to power a backup diesel generator which has the ability to power the entire factory. This was installed to avoid production disruption during times of no power.

The company installed its own powder coating plant to mitigate the outsourcing costs and quality costs that came with it. The costs of the outsourcing were, at times, over R100 000 depending on product demand. The powder coating plant is only utilised for the manufacture of fire equipment with the predominate colour being red. (Colour plays an integral part as to how the setup of the plant is done as multiple colours cannot be done at the same time).

In terms of other outsourced activities, galvanising, laser cutting, water jet cutting and profiling are some of the most utilised. Ultimately outsourced activities take place as the capital intensity required to purchase the machinery and the expertise make it infeasible to do in-house. Certain construction work utilises outsourced erection teams to complete the work. This is mainly done to mitigate travelling costs and to avoid needing to grow the staff compliment unnecessarily. The main outsourced activity is galvanising which is supported by its impact in the Cost of Sales calculation in the appendix. This, along with the fulfilment of the Bartlett supply chain criteria supported the analysis of the company to follow.

4.2.6 Steel Co. Supply Chain Overview

The below figure depicts the extended supply chain that Steel Co. operates in.

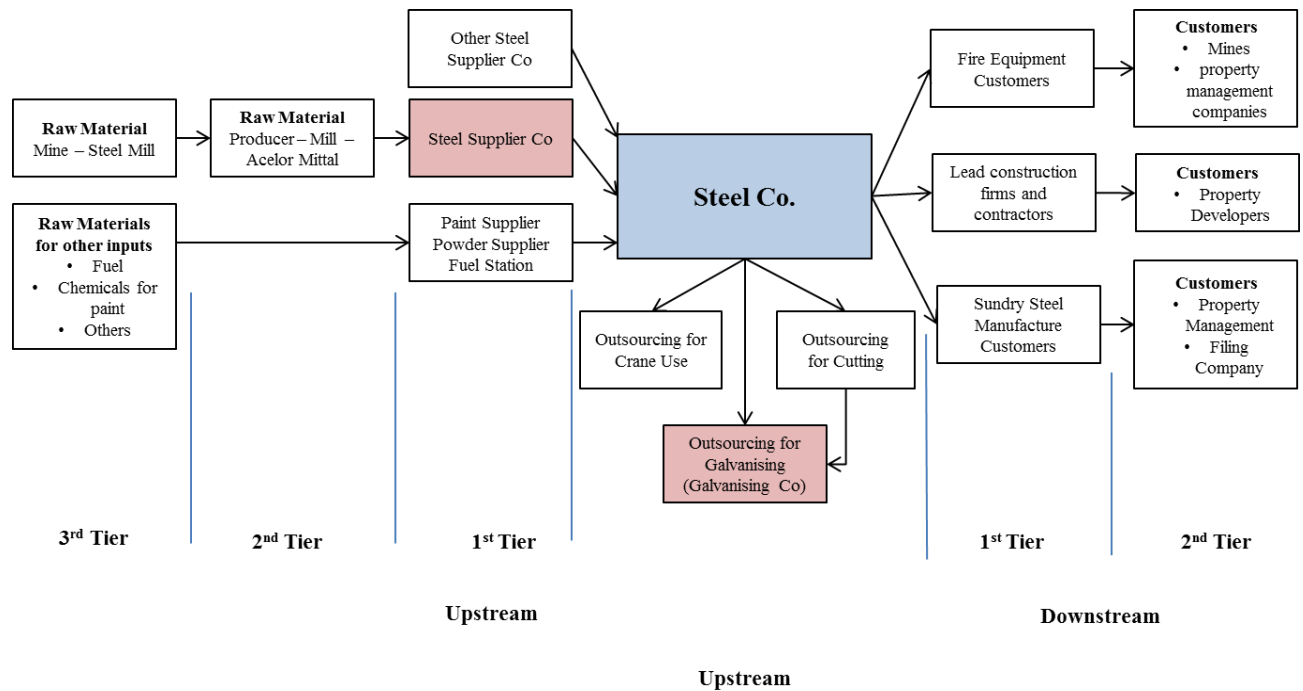


Figure 8: Extended Supply Chain of Steel Co.

The above supply chain is that which was created given the exposure and discussions with the company. As to the names of the companies involved it was requested that they remain undisclosed. This was to protect the reputations in the market.

Given the nature of the company and that it operates in 2 industries, there are 2 separate internal supply chains/manufacturing processes that are apparent in the company and depicted by the figure 9 and 10 below. The manufacturing process changes depend on the product being manufactured. Given that the Fire Equipment is a product that is involved in standard production runs, this production process was utilised

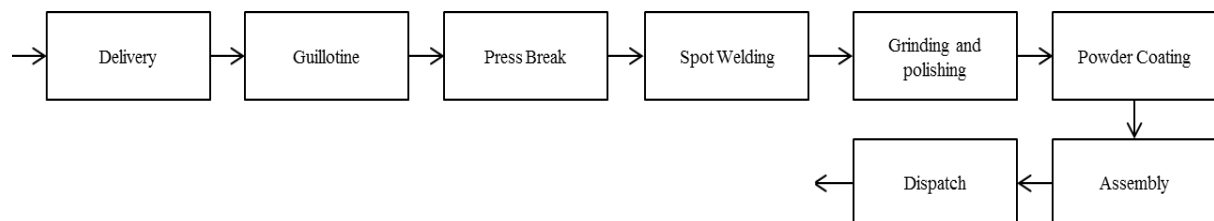


Figure 9: Production process for Sheet Metal Products and Fire Equipment on Standard Production Runs

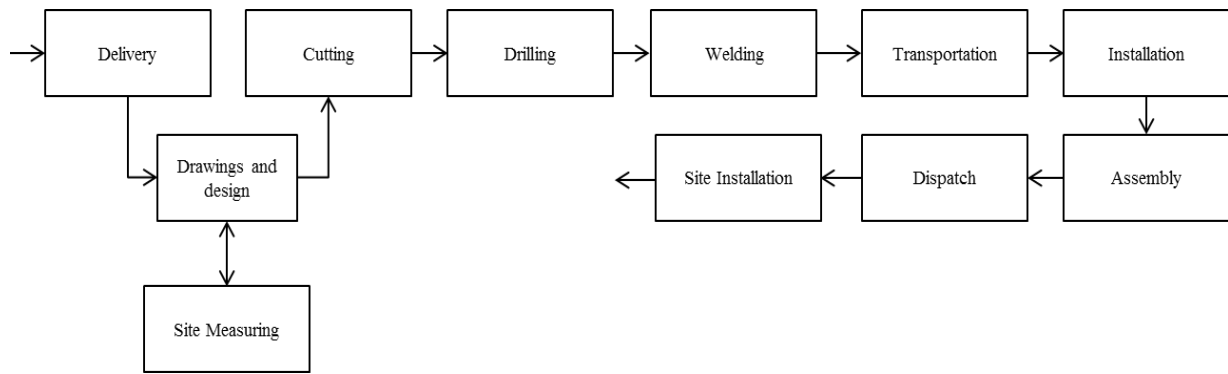


Figure 10: Internal Production Process for Site Work including Installation

4.3 Steel Supplier Company

Information was gathered on Steel Supplier Co through an interview with the Managing Director of the company. Observations of the relationships between the sales staff and the Managing Director of Steel Co were analysed and discussed in the interview with the Steel Co Managing Director. Further information was gathered off the company website.

4.3.1 Background

The Steel Supplier Company has been operating for more than 100years. It was at one time the single largest privately owned company in the world. The company operates in a number of metal sectors. It distributes steel and pipe, sheet metal and de-coils rolls, sections, roofing material, special steels as well as having a fluids and exporting division.

The company's South African office is the African component of the global group. The company operates in more than 31 countries and is the largest independent steel trading company in the world.

4.3.2 Labour

The entire company currently employs over 5000 people with the main distribution centre which is housed in the town of Germiston employing 526 people on site. The labour force is unionised with the majority falling under the same NUMSA union.

4.3.3 Machinery

The company has a vast array of machinery. The machinery most utilised for the purchases made by Steel Co are that of a de-coiling line and guillotines for the sheet metal.

4.3.4 Competition

Steel Supplier Co has a large amount of competition in South Africa and Africa. Large manufacturing companies who are able to purchase a high volume of tonnage of material have the ability to purchase material straight from the mill. Mills include Acelor Mittal, Scaw Metals and Evras Highveld Steel. This is referred to as a “mill deal”. This cuts Steel Supplier Co out of the supply chain as their service and value adding aspect to their business is not required and considered too expensive.

Many companies are involved in steel supply and the differentiating factors between the competitors are price, service and consistent quality.

4.3.5 Input Costs

The input costs of the Steel Supplier Co are largely that of electricity, labour and the purchase cost of material directly from the mills. The company provides delivery as a part of the price of the product.

4.3.6. Steel Supplier Co Supply Chain Overview

Below, depicted in figures 11, 12 and 13 are the internal and external supply chains for Steel Supplier Co. The company provides either a basic material or material with various value added components. Though the processes are relatively simple there is a large combination of products and various sizes to manufacture which makes scheduling and delivery a challenge for the company. The company prides itself on its flexibility and utilises this to its advantage in that it is willing to help customers at any time and even share costs.

The below (Figure 9) extended supply chain is summarised due to the extensive product base which serves a large network of industries and customers.

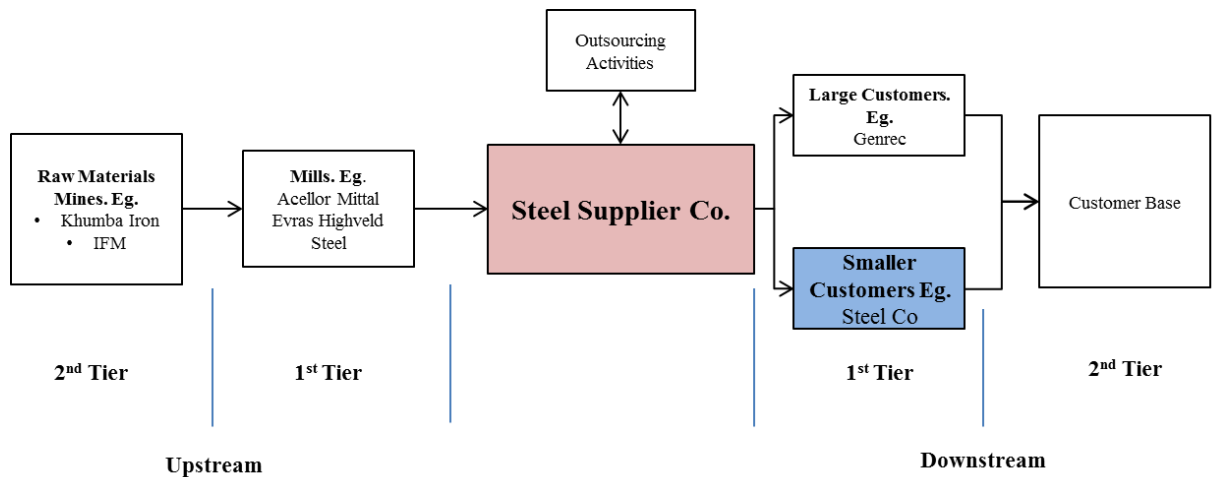


Figure 11: Extended Supply Chain for Steel Supplier Co

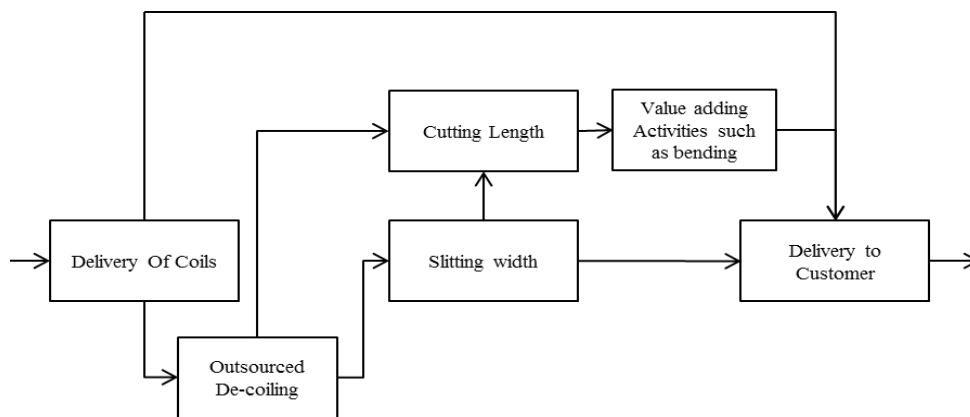


Figure 12: Internal Supply Chain for Sheet Metal production of Steel Supply Co.

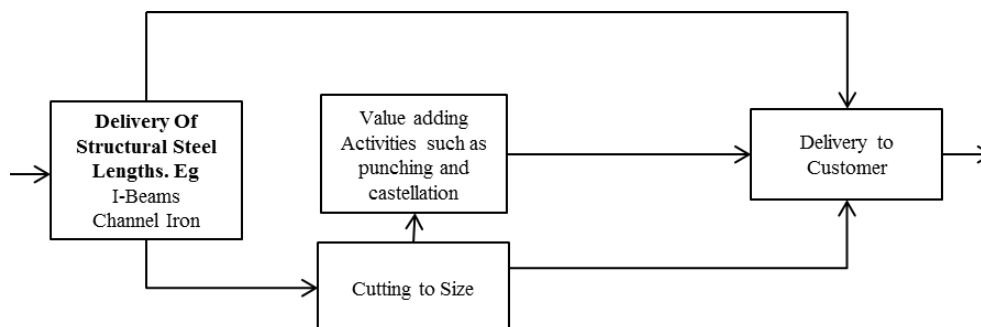


Figure 13: Internal Supply Chain for Structural Steel Material

In terms of the relationship of Steel Supplier Co, Steel Co and the mills such as Evras Highveld Steel, there lies a possibility of companies purchasing directly from the mill and with it, cutting Steel Supplier Co out of the supply chain. Steel Co is unable to do this for 2 reasons. Firstly, being that Steel Co does not purchase enough of material to warrant involving the mills. The value adding activities that Steel Supplier Co completes is critical to Steel Co as they do not have the resources to achieve this, such as de-coiling the sheet metal.

4.4 Galvaniser Company

4.4.1 Background

The Galvanising Company began as an after-hours source of income for 4 individuals in 1996. The company quickly grew and as of 1999 the company began trading full time and is now considered to be a medium sized company. The company is located in Nigel on the East Rand in Gauteng. The company provides the value adding service of galvanising steel and aluminium in order to make it resistant to rust.

4.4.2 Labour

The company employs 165 people that are unionised. The company currently has a slightly older workforce in that many of its employees are over the age of 35 years.

4.4.3 Machinery

The company considers itself very labour intensive by nature of the processes employed. This may be viewed in Figure 15 below.

In terms of machinery the company has overhead gantry cranes in order to submerge the steel in zinc baths that contains zinc. There are other baths containing Zinc Ammonium Chloride. Machines utilised for fettling and cleaning.

The company own a fleet of trucks are utilised for transportation, provided as a service to customers.

4.4.4 Competition

The company specified that most of the competition currently exists in the Gauteng area given the amount of industry in the province. The company has also specified that imports from China and India are impacting the market place.

The researcher viewed 3 other galvanising plants within 30 km of the company. All three of these were located in the town of Springs.

The company faces competition from large firms who used to have their own in house galvanising process (in-line galvanising). But, given the economic slowdown and the decrease in work available, these large companies have started outsourcing the galvanising plants to generate an income. Due to the support of the other business units that exist in these large organisations they are able to run the

galvanising process at very competitive costs for customers. This has caused a large amount of concern to specialist galvanising plants such as Galvanising Co.

4.4.5 Input Costs

The input costs of the company are high. This as the process requires a large amount of power to heat the Zinc baths. The baths are heated until the Zinc is molten.

The Zinc coils utilised to provide the Zinc for the process are extremely costly. This is not kept as stock onsite due to the risk of loss or theft.

4.4.6 Galvanising Company Supply Chain and Internal Process

The Supply Chain of the Galvaniser Co. is not too complex given that there are only 2 inputs; chemicals and Zinc. Due to the amount of industries that require galvanised products and that galvanising is a value added service for the end of a manufacturing process, the downstream customers may be demanding and the scheduling is critical to satisfy these time constraints.

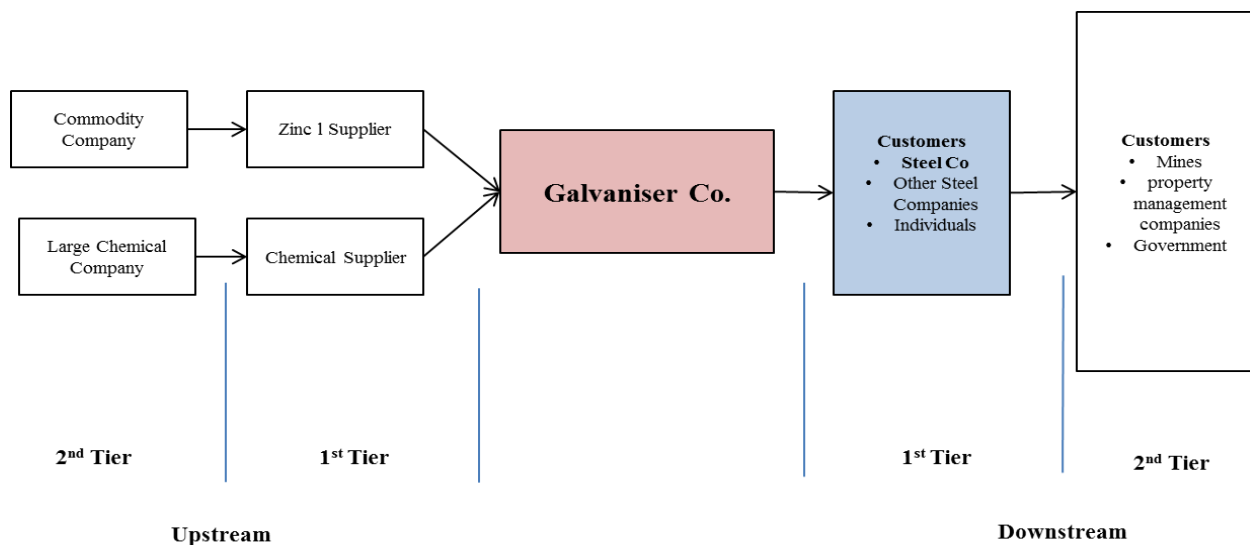


Figure 14: Extended Supply Chain of Galvaniser Co.

The Galvanising process is illustrated in the below figure:

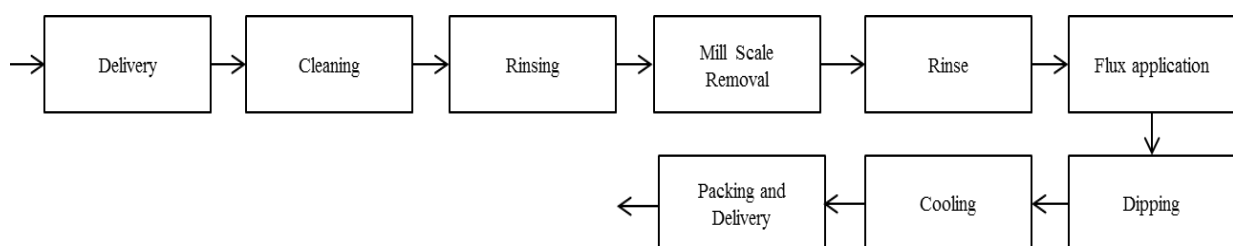


Figure 15: Zinc galvanising process

4.5 Horizontal/Comparative Analysis

In order to view the context in which the companies operate in and the positions they are in relative to one another a horizontal comparison was done on a number of factors. The comparison may be viewed in the below table

Table 8: Horizontal Comparison of Supply Chain players Revolving around Steel Co.

	<u>Steel Co</u>	<u>Steel Supplier Co</u>	<u>Galvanising Co</u>
1. Turnover	R19 million	Excess of R1 Billion	Over R50 million
2. Employees	43	More than 5000 in the group. 526 in Germiston plant	165
3. SME Classification	Small	Large	Medium
4. Type of Work	Fabrication and Construction	Steel Supply	Value added, Zinc Coating
5. Product base	Build to Spec, Standard Fire Equipment	Cut to Spec, Standard Range	Standard Galvanising
6. Experience in Product base	46 years fabrication, 16 years construction	Over 100 years	16 years
7. Raw Material	Mild and Stainless Steel	Various types of Steel	Zinc
8. Years Active	46	Over 100	16
9. Ownership	Private, Single Shareholder	Private, Management, Shareholder and BEE partner	4 Partners
10. Growth	Would like to grow	Consolidated	Consolidated
11. Competitive Factors. (Market Performance Objectives).	Price, Service, Quality	Price, Service, Quality	Price, Service, Quality
12. Interviewee	Director and Senior Manager, Factory Manager and Powder Coating Manager	Managing Director	Director
13. Interview Recorded	Yes	Yes	No

14. Duration	Average 60 min	60 min	50 min
15. Export Product	No	Yes	No
16. Imported Components	No, not directly	Yes	No
17. Level of Sophistication in Technological processes	Basic	Semi complex	Basic

It can be seen that the players in this upstream supply chain are vastly different yet as one will see in the coming sections, the way that they conduct their business and transfer information is different.

4.6 Risk Analysis on Steel Co and Upstream members.

Given that Steel Co is the focal company of the study. The first objective was to establish what risks are associated with the organisation. Risks that were observed and spoken of are mentioned in the below table. For consistency purposes, similar questions were asked to the upstream suppliers and thus a comparison could be made.

This information was drawn from the interviews with the relevant managers. The risks associated with Steel Co were bolstered through observations of the income statement in the management accounts and many discussions on the order book of the company.

Table 9: Risks in the Supply Chain

	<u>Steel Co</u>	<u>Steel Supplier Co</u>	<u>Galvanising Co</u>	<u>Number affected</u>	<u>Risk Classification</u>
1. Variation in Product	X	X	-	2	External
2. Strikes	X	X	X	3	In SC, External
3. Competition	X	X	X	3	External
4. Demand Variation	X	X	X	3	In SC
5. Raw Material Variation	X	X	-	2	In SC
6. Raw material Price Volatility	X	X	X	3	In SC, External
7. Safety Regulations	X			1	External
8. Inexperienced Labour	X	X	X	3	External
9. Theft	X		X	2	In-house
10. Defective Input Materials	X	X	X	3	In-house, In SC, External
Risk Classification		In-house 2/10	In SC 5/10	External 7/10	

Of the risks mentioned in the various interviews as well as observations that took place in the year the researcher was present the largest portion of risk was attributed to external supply chains with 70% of the risks mentioned being external in nature. 50% of the risks emanated from within the supply chain, this including the risks of demand variation caused by downstream customers. The smallest amount of risk was that of in house factors. Every risk mentioned has an effect on Steel Co, though Galvanising Co has the least amount of risks associated with it due to the standardised input material and output product that they produce.

The risks too associate themselves with theory. The below table relates the identified risks to those identified by theory. The specific theory relates to Harland *et al* (2003) types of risks. The full list and explanation of the risks may be found in Appendix C.

Table 10: Alignment of identified risks to theoretical risks

<u>Analysed risks</u>	<u>Harland (2003) Risk classification</u>	<u>Reasons why analysed risk can be classified into Harland's Risk Types.</u>
1. Variation in Product production	Customer Risk	<i>"Affects the likelihood of customers making orders"</i> . If consistency in the product is not guaranteed, it affects quality and thus has an opportunity of not meeting the customer's requirements
2. Strikes	Strategic Risk Asset Impairment Risk Operational Risk Regulatory Risk	Strikes affect all aspects of a business. It affects the firms internal ability to produce (Operational Risk), the strategy implementation of the company. It may cause the assets which require human control not to function (Asset Impairment Risk) as well as enforcing stringent regulations on employers
3. Competition	Competitive Risk	If many firms produce a similar product. It is considered competitive risk as a firm finds it difficult to differentiate itself in the form of products of service.
4. Demand Variation	Customer Risk	Demand variation comes about due to what the market demands. Thus affecting the likelihood of customers placing orders.

5. Raw Material Variation	Supply Risk	The risk of the inward flow of material causing operational problems is considered supply risk. Raw material variation causes differences in the manufacturing process. E.g. Thicker steel may need a different set up to be bent.
6. Raw material Price Volatility	Supply Risk Financial Risk	The increase in price of raw material causes a strain on product margins and thus causes an increase in financial risk. This may be deemed an input risk as the input material is causing risk to the company.
7. Safety Regulations	Asset Impairment Risk Regulatory Risk	Safety regulations may cause an asset to be considered obsolete. It also imposes regulations on an organisation which may affect the way the company conducts business. E.g. Environmental safety regulations.
8. Inexperienced Labour	Operational Risk	Inexperienced labour causes operational inefficiencies. It affects a firm's internal ability to produce a product.
9. Theft	Asset Impairment Risk Supply Risk	Depending on the type of theft it may be classed differently. Theft of an asset may refer to the inability of an asset to produce thus being asset impairment risk. Theft of material may affect the firm's internal ability to produce the product thus causing a supply risk.
10. Defective Input Materials	Supply Risk	If input material is variable it will affect a firm's internal ability to produce a product and thus can be considered a supply risk.

In the proceeding sections an attempt will be made to explain how visibility, if any, as well as collaborative efforts may be or are used to mitigate these risks

4.6 Visibility Analysis

Given the comparison above and the understanding of the differences between the 3 entities, an analysis was completed to determine the amount of visibility that is inherent in this supply chain. The level of Visibility was determined by taking all customers and suppliers of the 3 entities into account. Thereby answering the question “Do you convey the following information to your customers or suppliers?” To obtain this information a “Transparency” section may be located in the various questionnaires where yes or no answers were deemed sufficient.

Below is a comparison with the use of a slightly adjusted framework set out by Lamming *et al.*(2001) and Bartlett *et al.* (2007) to view the level of Visibility inherent in the supply chain (See section 2.7). In order to determine if the information is Opaque, Translucent or Transparent a rating was applied. If the number of No answers were greater than 66% it was deemed Opaque, between 66% and 33% it was considered Translucent and below 33% was deemed Transparent.

Table 11: Level of Transparency in the Supply Chain

	Type of information	Steel Supplier Co	Galvanising Co	Steel Co
Transparency Of Quality	1. Scrap Levels	No	No	No
	2. Rework Levels	No	No	No
	3. Process Repeatability	Yes	No	Yes
	4. Supplier Quality Issues	Yes	No	Yes
	5. Continuous Improvement	No	No	No
	Subtotal for Quality	3/5 No	5/5 No	3/5 No
Transparency of Costs	6. Cost of Material	Yes	No	Yes
	7. Overheads	No	No	No
	8. Sub-Contract Costs	No	No	Yes
	9. Factory Cost Rates	No	No	No
	10. Transportation Costs	Yes	Yes	Yes
	11. Cost of Non Quality	Yes	No	No
	Subtotal for Costs	3/6 No	5/6 No	3/6 No
Transparency Of Delivery	12. Order Receipt Process	Yes	Yes	Yes
	13. Capacity Planning	No	No	No
	14. Shipment Process	Yes	Yes	Yes
	15. Lean Manufacturing	No	No	No
	16. Inventory Management	No	No	Yes
	Subtotals for Delivery	3/5 No	3/5 No	2/5 No
	Totals	8/16 No	13/16 No	8/16 No
	Percentages	50%	81.25%	50%
	Rating	Translucent	Opaque	Translucent

It can be viewed from the above results that the organisations are harbouring a translucent to Opaque supply chain. The reasons for which surround the vulnerability of the organisations should the

information be found out. In the subtotals it was analysed that Galvanising Co does not share any information on quality and very little on cost. This is due to the amount of competition in the surrounding area and to remain competitive. The Managing Director of Steel Co referring to it is “*unethical*” (Interview 1 – (D 1)) to allow full transparency to be known. It is interesting to note that a large company such as Steel Supplier Co is open to discussing the cost of material which will allow insight into the company’s operating margins. The main information shared between parties is that of Supplier Quality Issues, Transportation Costs, Order / Receipt process, Process Repeatability and Cost of Material.

From the aforementioned risks located in Table 9, it was observed by the researcher and a construct was created which explains which risks are mitigated with the Type of information shared and with it the level of transparency. The Table below explains this.

Table 12: Risks mitigated through visibility

Type Of Information	Risk Mitigated	Why is the risk mitigate
Supplier Quality Issues	Raw Material Variation, Demand Variation, Defective Parts Competition	Supplier quality issues cause variability in manufacturing process; it increases lead times to manufacture. This effects competitive behaviour, thus being transparent about these risks, the businesses are able to mitigate them. Specifically Steel Co.
Transportation Costs	Competition	Transportation Costs may be a hidden expense over and above the material purchase, thus they need to be factored into Steel Co pricing. By knowing the costs upfront, if any, they price accordingly
Order Receipt Process	Demand Variation, Theft	How orders are received and product delivered is important for the understanding of delivery times and management thereof.
Process Repeatability	Competition Demand Variation Defective parts	The ability to repeat processes can allow consistent quality and reduce costs of quality. By knowing supply chain partners processes may reduce variation in outputs, thus Steel Co can manage their throughput which effects demand variation in that the company can understand what is needed to be achieved and not turn work away.

Cost of Material	Competition Demand Variation Raw Material Price Volatility	By knowing the cost of materials used upstream, Steel Co has the ability to negotiate on a number of levels to secure the lowest cost material. This reduces the volatility in the price and enhances competitiveness which may secure orders and decrease demand variation.
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Observations were recorded in the administration office as well on the factory floor. Observations took place during the tenor of the researcher whereby real examples of how transparency could/did have or aided risk mitigation took place. In the interviews conducted, insight was given regarding the type of information conveyed in the Section C in the interviews, “Transparency Analysis”.

Supplier Quality Issues

Regarding supplier quality issues, it was observed that during the manufacturing process of specialised filing strips for a reputable filing company the metal used was intended to be purchased already galvanised, (Interview 2 – (3.ff)). This was sourced from another steel supplier of Steel Co.’s. It was found that the steel had a defect with the galvanising process and was not to the specification required. This caused the manufactured product to not pass the in-house quality check (Defected Parts). This put the production behind schedule. This delay needed to be communicated to the customer. Though delivery time was not critical in this instance there lay a possibility of losing future orders (Demand Variation). Another coil from stock was utilised and found to be meet specifications (Raw Material Variation). As mentioned in Table 10. This may be guided by theory and refers to Supply Risk, Customer Risk, and Competitive Risk.

Transportation Costs

An observation and discussion was had with the Managing Director of Steel Co (Interview 2 – (3)), whereby a tender was quoted on regarding steel fabrication work for a construction site in the Northern Cape Province of South Africa. The quote was for one of the largest customers of Steel Co. Steel Co quoted the transportation costs as a separate cost to the fabrication quote. The order which was a substantial value of 10% of yearly turnover was initially lost due to the being classified as expensive. The Managing Director felt that the added Transportation Costs had priced Steel Co higher than its competition (Competitive Risk) which caused the order to be lost. Steel Co also knows that delivery is included in the price from Galvaniser Co and Steel Supplier Co. This enables Steel Co to quote on tenders with a calculated margin without the risk of unforeseen costs.

Order Receipt Process

The order receipt process was found to be incredibly important in the past. A discussion was had with the Managing Director and Head of Administration of Steel Co around the importance of

understanding how the products are ordered and will be received. In the past Steel Co expelled a driver due to the individual taking work in progress product to a scrap dealing company in order to be remunerated for the product, illegally. This was classified as theft and the driver duly dismissed. The individual was able to remain undetected as extra product was transported to the outsourced company. The outsource company duly did the work though the amount of product that came back to Steel Co did not correlate to the amount product that left the floor. This was not picked up for some time which allowed for this to take place on a number of occasions. If the receipt process was the same as the dispatch process and was structured and transparent at the time, it would not have allowed this to occur. The Head of Administration also mentioned that Steel Co, by following the ordering process correctly, had grounds in which to reject material supplied from a supplier in the past. It was found that the supplier made an error which could have been capitalised on by Steel Co if the company was not transparent with the acceptance of the delivery and felt that it could have taken advantage of the situation. This led to demand variation for the supplier, (Interview F - 2(i)).

Process Repeatability

Steel Co advertises its ability to produce a quality product. Steel Supplier Co advertises its ISO accreditation as mentioned in the Interview with the Managing Director of Steel Supplier Co. Steel Co was observed manufacturing pallets for a large company that manufactures clay bricks in South Africa. The steel utilised in the project was sourced from Steel Supplier Co. In the manufacturing process a routine inspection was done on work in progress inventory and it was found that variation had taken place in the manufacturing process. The variation was almost high enough to cause the product to be scrapped (Defective Parts). This would have caused a delay in delivery, thus jeopardised future orders (Demand Variation). This would have caused Steel Co to lose reputation in the market which would have an effect on competition. Due to proactive management on quality the risks were mitigated. Steel Co never assumed the variation was due to raw material variation as they are confident and aware of the stringent controls in place at Steel Supplier Co to ensure process repeatability.

Cost of Material

Steel Supplier Co is transparent with Steel Co on the cost of material. This allows Steel Co to negotiate the cost of material more accurately as will be discussed in the proceeding section's example. The will avoid unforeseen volatility in material costs. It enhances competitiveness as it affects pricing which will allow orders to be captured which will avoid demand volatility.

4.7 Collaboration and Risk Enabler Analysis

4.7.1 Risk Enablers and their ability to mitigate risk.

In the literature review in Section 2, it was contextualised that risk is determined by the significance of a loss as well as the probability of that loss occurring.

Faisal *et al* (2006), as stipulated in the literature review, explained that risk enablers had the opportunity to reduce risk, either by minimising the loss incurred or by reducing the probability of that loss occurring, thereby mitigating risk.

Table 13 outlines the enablers that are apparent as Steel Co collaborates with the other upstream members of the supply chain. The risks that the enablers reduce are in the most left column and have been characterised according to Harland's risks mentioned in the Literature Review as well as the Appendix C. It may be viewed in the table that the risk enablers allow strategic, financial and reputational risk mitigation to occur in most cases. The organisations involved in the interview process and collaboration in this research actively utilise all enablers besides continual risk analysis. At no time in the interviews or observation period did the researcher encounter continual risk analysis. The reaction to risk was found to be more reactive than proactive.

Table 13: Risks Mitigation Enablers for Steel Co (Faisal *et al.* 2006)

Mitigation Enablers	Steel Co	Steel Supplier Co	Galvanising Co	Number using	Which risks does the enabler mitigate
1) Sharing	X	X	-	2	• Strategic • Supply • Reputational • Financial
2) Agility	X	X	X	3	• Strategic • Supply • Reputational • Financial
3) Trust	X	X	X	3	• Strategic • Supply • Asset Impairment • Reputational • Financial
4) Collaboration	X	X	X	3	• Strategic • Supply • Asset Impairment • Reputational • Financial
5) Information Security	X	X	X	3	• Strategic • Supply • Asset Impairment • Reputational • Financial • Legal
6) Corporate Social Responsibility	-	-	-	0	• Strategic • Reputational • Financial

7) Aligning Incentives and revenue sharing	X	X	X	3	• Strategic • Supply • Asset Impairment • Reputational • Financial
8) Strategic Planning	X	X	-	2	• Strategic • Supply • Asset Impairment • Reputational • Financial
9) Risk Sharing	X	X	X	3	• Supply • Asset Impairment • Reputational • Financial • Fiscal
10) Knowledge	X	X	-	2	• Strategic • Supply • Asset Impairment • Reputational • Financial • Fiscal
11) Continual Risk Analysis	-	-	-	0	• Strategic • Supply • Asset Impairment • Reputational • Financial • Fiscal
Totals	9/11	8/11	5/11	23/33	

A real world example

In terms of collaboration, from the interviews, it is understood that parties, being Steel Co, Steel Supplier Co and Galvaniser Co get together and negotiate pricing in order to win tenders. This is an example of a part of a supply chain working together to increase competitiveness. The experience was witnessed by the researcher whereby a tender was released for a specific fabrication and construction job for a construction site in the Northern part of South Africa. The upstream parties were duly contacted by Steel Co to see if the companies were willing to partake in the opportunity. The companies partook in terms of reducing price and delivery lead times. These were conveyed to Steel Co which was 'built' in the quote. The tender was awarded to the Steel Co. If this did not occur Steel Co feels that it would not have won the tender. (Refer to Interview2 – (1))

In order to have this happen the risk enablers were present at the negotiation stage of the event. Thus further to just collaboration, there are a number of factors that take place in mitigating risk. This forms the basis of this collaborative effort and ultimately making the supply chain more competitive as a result. From the interviews and time spent in the organisation, the following enablers were or were not present in the relationships of this specific supply chain

4.7.2 The Enablers

4.7.2.1 Sharing

The occurrence that was witnessed as well as the discussions that took place in the interviews found that information sharing did indeed occur. The information included that of demand, in the form of what is required for the fabrication and construction tender, should the work be given to Steel Co. It also brought up a sharing of availability, thus a company's ability to deliver as well as the best price in which the 3 companies were willing to participate for. Further to this the Managing Director spoke of Steel Supplier Co booking steel for Steel Co without any expense "*they keep the stock and on my word that I will take it off their hands*" (Interview 2 – (m)). This did not include information such as margins and variable and fixed costs of manufacture but merely what the ability of the companies were. Of the 3 companies it was observed that Galvanising Co would prefer to be flexible with the customer demands but is not concerned with any further information regarding orders.

4.7.2.2 Agility

Steel Co continuously displayed agility in the incorporation of new technologies such as measuring equipment and its flexibility shown in order to complete that job at hand. The company has received the name "*Mr Fix It*" as a result of its willingness to solve problems and complete projects that were not completed to a satisfactory level by competing firms. As far the companies' ability to deliver, all

three organisations confirmed that they are willing to go over and above company norm for what is considered to be a good customer. (Interview 1;3;4;5 –(F))

4.7.2.3 Trust

Given that trust entails that one will not act in an opportunistic manner, this was displayed as the information conveyed for the job is not one of expectation but rather one of mutual benefit for all involved though it may require more work. It was indicated that previous customers of those the companies had taken '*advantage*' of either their agility or other enablers for self-gain. It was indicated by all 3 companies that this has been the case in the past and that a mature outlook and understanding that certain jobs cannot always be achieved needs to be taken. In terms of the transparency of information, this was found to be the biggest inhibitor, as all companies mentioned "*greed*" and the "*human factor*" as why businesses cannot be fully transparent. With regards to trust the managing director of Steel Supplier Co mentioned "*people who always push it and you quickly learn who they are*" (Interview 4 – (B12)). The upstream suppliers spoke highly of Steel Co in the interviews, so much so that there is a willingness to help the company should it ever find itself in trouble. "*Steel Co always pays on time. There is a very good working relationship. It is open and everyone tries to help out where possible*" (Interview 5 – (B3)). This will be done in the way of extending credit, better pricing or earlier delivery

4.7.2.4 Collaboration

Given the collaborative example described above, it has been noted that negotiations moved from open market where there is a general enquiry for a price to cooperative behaviour. (This is in-line with the theory of collaboration mentioned in the literature review). Though it is not a supply chain partnership, the most advanced type of collaboration, the understanding of risk and reward was understood and undertaken by the 3 companies. Risk will be elaborated on further in the study.

4.7.2.5 Information Security

Given the non-complex nature of the systems utilised by Steel Co, threats of information hacking from external sources are negligible. This is because the company only has a basic internet system with a website. All ordering information is done via the telephone or in person. All designs for made-to-order products are done in hard copy by the director and 2 other individuals in the company. The designs and exact specification are not shared with any external parties. With regards to the example mentioned above, no design work is necessary and thus the only sensitive information that could be viewed was price and the calculation thereof. This was mentioned to be kept "*close to your chest*" (Interview2 – (q)). Given that tenders are done in hard copy and delivered via fax no competition is assumed to know the figures. Steel Co. designed a lift for an international forklift company and furniture retailer. The furniture company requested the drawing and this was duly declined by Steel Co. Any information that is deemed to open the company up to a threat, such as copying a product, is closely guarded. As a supply chain, the only information shared with Galvanising Co and Steel

Supplier Co are that which has been discussed above, such as flexibility and price. Further to this, the transfer of information is that which forms part of the visibility study in the preceding Section 4.6. Given the relationships that exist between these companies and the inherent trust (specified above) no direct competitors are made privy to any information that may carry with it, a risk.

4.7.2.6 Corporate Social Responsibility

Steel Co does not engage in any form of corporate social responsibility program. Given the size of the company, it only extends money to certain charities on an annual basis, though this is not advertised. Steel Supplier Co has engaged in a number of CSR programmes in its history. These programmes range from life skills programs to health initiatives with staff. A search on the internet displays that this is advertised by the organisation.

4.7.2.7 Aligning of incentives and revenue sharing policies

In terms of aligning incentives and revenue sharing, Steel Co does not have any agreements in place though prefers to look at each transaction on its merits. The company has very good relationships which allow revenue sharing to take place. An example of this is the work mentioned above between Steel Co, Steel Supplier Co and Galvanising Co. The company also enjoys discounts and credit terms on its materials from upstream customers. Some of the incentives range from payment in 30 days and receives 2.5% discount, or 5% discount on cash on delivery. Again these benefits come about due to the relationships with upstream and downstream customers with no agreements in writing. This was mentioned as it “*Not being the norm*” (Interview 2 – (v)) in the market It was mentioned in the. Steel Co extends discount terms to some of the large companies that it transacts with. Steel Co, because of its size is unable to provide credit terms due to the cash flow problems that it may cause the company. The company utilises flexibility and customer satisfaction for downstream customers as an incentive.

Steel Supplier Co. openly stated in the interview that they treat each relationship on its merits irrespective of the size of the company. Steel Supplier Co which has been involved with Steel Co on an indirect revenue sharing opportunity in the example above openly stated that it will sit down with clients, if they feel it will benefit the company and will discuss pricing and terms in a round table discussion. Thus parties being 100% transparent with each other in terms of price, stock among other criteria though will not express certain overhead costs the company endures. This sharing is job specific and not tied in to any customer for an extended period of time.

Galvanising Co has indirectly shared revenue with Steel Co before as expressed in the interview and witnessed by the researcher (Interview 2 – (1))(Interview 5 – (B7)). The company prefers to be flexible for the customer rather than involve itself in revenue sharing. They have expressed they are willing to do so but it is job specific as they worry about the expectations that come with it “*We have found this to be exploited in the past*” (Interview 5 – (F2)). If the decreased cost information infiltrates their market they would have to forfeit a large portion of their margin to satisfy customers.

4.7.2.8 Strategic Risk planning

An observation took place with regards to strategic planning. This too was in the context of SCM. It was a time where Steel Co had the ability to book steel whilst still in stock of Steel Supplier Co. This was further confirmed in Interview 2, (v) with the managing director. *“I would say that is not the norm though... that’s not the norm with everybody”*. This flexibility of Steel Supplier Co allows Steel Co, to bid on tenders without needing the capital outlay required to secure the material. The booking of the steel has no charge attached to it and is an informed decision by Steel Supplier Co as Steel Co provides the supplier with as much information as possible. Regarding all other members both upstream and downstream in the Steel Co supply chain; this is the only observed case that happens regularly. This specifically mitigates financial and supply risks with Steel Co.

4.7.2.9 Risk Sharing

Of the Harland et al (2003) risks mentioned in the supply chain, the risks that were observed, by the researcher, to be shared and verbally discussed in the interviews were that of reputational risks, financial risks and supply risks. Galvanising Co. prefers to take on the risk of flexibility which aids the supply risks affecting Steel Co. Given that Steel Supplier Co will reserve material, or order material for Steel Co, it mitigates the supply risk and financial risks as mentioned above. The flexibility shown by the companies which allows Steel Co to deliver to customers ultimately mitigates the reputational element of the risk as various deliveries occurred, on time, in full, thus, satisfying the downstream customer.

4.7.2.10 Knowledge of Risks in the supply chain

From the interview with Galvanising Co. it was established that knowledge of downstream customers and potential work is not of concern to the company. The company is focused on its immediate customer and enhances the relationship with flexibility and service. The company does understand the risks of strikes, financial risks and supply risks that are inherent in conducting business, though they are ‘single tier’ focussed and not network focussed. Contrary to the preceding statement, Steel Co and Steel Supplier Co have actively shown understanding between each other in observations and the conducted interview. Steel Supplier Co will extend various financial benefits to mitigate the financial risks and understand that irrespective of the size of the company, *“We treat the people the same”* (Interview 4 – (B9)). The managing director seemingly understood that the risks are relative to small companies as they are to larger companies hence the company’s willingness to help its clients.

4.7.2.11 Continual Risk Analysis and Assessment

In terms of continual risk analysis and risk assessments that take place, the companies act in complete isolation from each other. Steel Co. only reviews its cash flow status and financial figures as continual risk assessment and recently the BEE criteria which has been laid out by South African government. In terms of understanding risks, the company conducts its core business without much market research. The company relies on its adaptability to remain competitive and afloat. The research

conducted is more by word of mouth than a thorough research of material. The company does convey its flexibility to manufacture though this is through the use and engineering of standard materials from suppliers. An example of which may be the creation of a product such as with the forklift attachments that were mentioned earlier in the study.

Risks change due to dynamic environments and ultimately the flexibility shown by the downstream suppliers in terms of quicker production times, storage of material and so forth does allow the management of the dynamic risks, however, in terms of the analysis of this and what is standard policy, this has remained unfounded and is on a special case basis.

4.8 Summary

Given that in the literature review it was conveyed that risk is the probability of loss exaggerated by the significance of loss. From the above sections risks inherent in Steel Co were discussed. In Table 9. It was further indicated by Steel Co which risks according to Harland *et al* (2003) mentioned in the Literature review, are evaded with the use of the risk enablers. Financial and strategic risk were those most commonly thought of being mitigated by the Managing Director of Steel Co

4.9 The Supply Chain and its upstream suppliers

In order to choose a supply chain that would best fit the study, Lamming's (2001) framework was utilised. Though other upstream partners were identified and an example of an interview can be found in the Appendix K, the company did not fit the criteria laid out by Lamming (2001) and thus was not utilised in the study. The researcher tried to follow up on a specific supplier though their information was not deemed appropriate for the study.

In order to gain a big picture view of the environment that Steel Co is operating in, it is important to compare the players that have been utilised in the supply chain. According to the *National Business Act of South Africa 2003* all three organisations fit into a different category. The Steel Supplier is a large company, Galvanising Co is a medium company and Steel Co, whom is the central company to this study, is a small but established company.

Turnover of the organisations was given in a broad sense though an exact number of employees were given which bolstered each classification of the businesses. Of the 3 firms, Galvanising Co is the only organisation that truly produces a value added service to standard products. Steel Supplier Co and Steel Co both involve themselves in made to order deliveries. This adds to product complexity and with it, the amount of information transferred for each product. Galvanising Co. concentrates on its process and its ability to meet customer expectation based on competitive pricing, delivery times and quality.

All 3 companies supply directly to businesses with no direct consumer involvement. From an upstream perspective, Steel Supplier Co receive their raw material in the basic "wholesale" form from mills whilst Steel Co and Galvanising Co receive their materials with an already value added component to it. I.e. already cut beams, pre mixed chemicals and shaped zinc coils.

From a downstream perspective, Galvanising Co. does work for all types of organisations, though mainly manufacturing entities. Steel Supplier Co supplies its product base to a multitude of industries, from agricultural to manufacturing to automotive. Steel Co primarily has large construction companies as customers, with other companies that on-sell Steel Co product such as the fire equipment to other companies and/or consumers.

All three organisations are well established and have been operational for more than 15 years. Steel Co has survived due to its flexibility and adaptability in the market. The skill and determination of the managing director has allowed the company to elude demise on at least 2 occasions. The first occasion was in 1997 when the company embarked on its first construction project to generate cash flow. This is now the largest portion of income on the company income statement on the management accounts. The second was in 2011 when a strike took place and the company could not operate. The

director had the foresight to manufacture stock and store in an offsite location. Deliveries could then take place irrespective that the company was forced to close down. This allowed the company to generate enough cash to cover fixed overheads and avoid major losses. Opportunity cost of income, though not quantifiable was definitely felt by the company.

The three firms at the core of this study are privately owned and the interviews were conducted with senior managers and shareholders as intended. The interviewed individuals possessed a large knowledge base of the products that their respective companies manufacture, about the markets that they operate in and the risks that are involved in the managing a going concern. Though the interviews were relatively short at around 60 – 90 minutes long, there were many conversations and discussions in the 12 months that the researcher spent with the Steel Co. As a result a sound understanding of the organisation and its upstream supply chain was achieved. The researcher was able to map out the internal and external supply chains that exist in the companies. Though Steel Co was the core subject of the study, the understanding and participation of the upstream core suppliers allowed the study to be more rounded and generalising. The respective supply chains were mapped in Figures 8, 9, 10, 11, 12, 13, 14 and 15.

It is evident from the supply chains that an SME that performs a value adding function such as Steel Co. is the connection of large industry to the a more consumer orientated base such as Steel Co customers. It was also evident that the upstream supply chains of the respective companies are similar in length. All supply chains are local with very little imports, specifically for the material that Steel Co requires. All customers are local though Steel Supplier has mentioned that it will go to any length to make sure a customer receives their purchase.

According to the horizontal/comparative analysis all three companies have direct competitors that come about due to pricing, service and lastly quality. All three companies have reiterated that pricing is the key in the South African market and therefore they are constantly looking at opportunities to decrease price with shorter lead times.

All processes of the three companies were labour intensive though there are differences in technology levels. The general sophistication is semi basic to basic. This is accurate according to the interviews as well as observations.

It can be observed in Table 8 that all interviews were recorded except the Galvanising Co. This was upon request from the company, though the interview was done in person and notes were taken. The notes and the recollection of the researcher were used to produce the transcript. Other questions such as Interview 2 and 3 of the Managing Director of Steel Co and Interview 2 of the Head of Administration were used to bolster certain observations. Questions were asked and duly noted, though not all were recorded.

4.10 Supply Chain Risk Management in the supply side of an SME

Consistent with previous studies, most of the risks mentioned in Table 9 in Section 4.6 have occurred from factors that are external to the companies as well as the supply chain. Variation in demand, competition, raw material price volatility and unskilled labour are but a few that are universally experienced by 2 or more of the members of the supply chain,.

The competition has become increasingly fierce after the global economic crisis as the construction sector has been under a large amount of pressure. This is reiterated in the literature review explanation of construction. Regarding the standard product of Steel Co, the fire equipment that the company produces has seen a large amount of Chinese imports being brought into the country, all requiring a different sized cabinet for the imported equipment. This drives input prices up as machine down time and design needs to take place. This has allowed other players to enter the market as the current processes employed in Steel Co need to change. There has also been an observation of plastic product being utilised which may or may not be cost effective at this time though Steel Co is well aware of the risk this poses from a competitive and product differentiation aspect.

Strikes have plagued the industry. This has occurred on average about once every three years with demands being placed on higher wages for union members which make up the majority of the employed. Due to the high labour input inherent in manufacturing this drives up input costs and reduces margins which are having a financial impact on the organisation as well as the other members of the supply chain. The strikes are industry wide and with the majority of the employees of the three members of the Steel Co supply chain belonging to the same union. Namely NUMSA. The strikes then affect the entire supply chain which causes material delivery problems, delays and intimidation which has forced factory closures. This requires the company to furnish their fixed overheads with no income which puts pressure on the companies' cashflow and financial positions. Steel Co has weathered the previous strikes by ramping up production pre-strike and storing finished goods in an undisclosed location. This allows pickups and deliveries to happen as no downstream customers belong to the NUMSA union. This mitigates the cashflow/financial risk to an extent though the company maintains it will not be able to survive another strike due to the thin operating margin that the company currently runs

Galvaniser Co has mentioned that specifically in Gauteng, competition is rife thus a differentiating factor is required to mitigate risk that competition brings. The company firmly believes that service at the right price is the key. The service comes about through flexibility and the ability to deliver what good customers require. This was demonstrated in the example utilised in section 4.7. As large as Steel Supplier Co is, they too believe that flexibility and customer satisfaction is paramount *“we will assist where ever” “We are willing to bend over backwards.to support the guys. Irrespective of size”*

(Interview 4 – (B12)). They see each customer in their own merits, specifically in terms of return business and payment. They do not feel that the size of the company plays a role in flexibility though the tonnage that is required plays a role in price though they try and provide the best possible price to their loyal customers. The emphasis on both suppliers being around loyalty and trust as there is a fear of exploitation, i.e. the “*human factor*.” (Interview 6 (B 14)) “*It must be done within reason as there are people who always push it and you quickly learn who they are*” (Interview 4 (B 12)).

In Section 4.6, Table 11 it was found that the information that was universally shared amongst the upstream supply partners of Steel Co, mitigated these external risks to an extent. The quantifiable effect would be difficult to obtain but leave scope for further research. Information such as supplier quality issues, cost of material, transport costs and process repeatability allow companies to advertise, to an extent, the capability of their supply chain. This sharing of information allows for planning and time for adaptability to mitigate these external risks.

In terms of collaboration, a firm, real world example was utilised whereby an exchange of information and collaborative effort from a resource, financial and strategic point of view was required to land the work. In order to effectively analyse how this would mitigate risks, the scenario was compared the risk mitigate enablers that have been previously mentioned in theory. It was found and discussed with the managing director of Steel Co, that the enablers that are present have managed to mitigate the external risks of demand variation, financial risks, strategic risks and reputational risks among others. The use of collaboration has actually enhanced the reputation of Steel Co to an extent that more work has been achieved, not only for the single company, but as a result, the supply chain partners as well. The collaboration did not only mitigate external risks but also those inherent in the supply chain such as raw material price variation, raw material variation and demand variation. What was observed with the collaborative effort was a supply chain acting as a single unit. This allowed the flexibility and adaptability required to remain competitive.

In order to remain competitive all 3 organisations have mentioned that price, service and quality are the differentiating factors in that specific order of importance. What was observed and discussed was by the organisations working together, they achieved a competitive price which mitigated certain external risks; they were able to be flexible which enhanced service, which mitigated supply chain risks. The quality came about due to the experience of all 3 companies in their respective products. Furthermore the openness (transparency) displayed by the companies in terms of their pricing and credit terms allowed Steel Co to manage their cash flow carefully and extrude as much value out of the transaction as possible. The researcher can only assume that the other organisations would have done the same as this would be sound business practise and in-line with the expectation that the suppliers would not have got involved if they felt that it was a detriment to their organisation or would not benefit them in the long run. This was reiterated in the Managing Director of Steel Co’s second

interview regarding the collaboration and transparency where it was mentioned “*Everybody has been happy with what we have done up until now*” (Interview 2 (1)).

It was discovered by the researcher that, though inherent in the collaboration, the risk enablers which are utilised to mitigate risks in supply chain are unidentified by the managing parties of the respective organisations. Each enabler is able to mitigate various risks to a certain extent as mentioned in Table 12. This was bolstered by a discussion with the managing director of Steel Co (Interview 2. Appendix D).

This concludes the examples of the risk mitigation that has occurred due to increased visibility and collaboration in this specific supply chain.

Though firms have the ability to address internal risks more directly than their external counterparts, it was extrapolated that collaboration and visibility have the opportunity of mitigating, to a certain extent, these external risks. Thus according to the theory mentioned in the literature review supply chains can use collaboration and visibility as a risk mitigation technique and this was duly proved and discussed. A fundamental point mentioned by participants in the study was the element of greed that exists in business today.

For the categorisation of risks that were mitigated by the collaboration see Table 12. For the identified risks that were mitigated by the degree of visibility in the supply chain please refer to Table 11.

Ultimately what may be observed from the findings is that SMEs do actively employ risk mitigation techniques. Further to this it has been found that Collaboration and Visibility is achievable with much larger companies on the supply side of the supply chain. An identifying factor was the age of Steel Co and the reputation that it has in the market place. All organisations believe that they believe that Steel Co is a good customer and are willing to help them if they were to find themselves in some sort of difficulty. Ultimately this compliments trust and the ability to share, both of which are poignant risk enablers mentioned in theory.

As detailed in the literature review Sections 2.5 and 2.6 there is very little documented work on supply chain risk management and supply chain management in SMEs. This specifically pertains to South Africa. There were no findings to compare the above work to. All the frameworks utilised were previously utilised on larger supply chains and organisations though were adapted in terms of complexity to suit the study of SMEs. The researchers findings confirm that SMEs do employ risk mitigation techniques and though not always identified are inherent in how the business is conducted.

Ultimately in closing, the best words to describe the SME encountered in this study would be adaptability and flexibility in the way that business is conducted on a regular basis.

4.11 Summary of Research

It was vital for this study to follow a selection framework when choosing the supply chain to study. The supply chain was further scrutinised by the researcher in that it was to be a manufacturing supply chain as the researcher felt this would have the highest possibility of visibility and collaboration findings. This was due to experience of the researcher in the field.

Due to the vulnerable nature of SMEs and the importance of each customer to the survival of the company, it was decided by the researcher not to investigate downstream customers but only the major suppliers with whom there are open channels of communication with. They were observed and interviewed.

Risk mitigation approaches such as the enablers should be evaluated on their effectiveness which may leave scope for a qualitative and quantitative study in this regard. This study followed a purely qualitative approach and thus impacts of the risks and the quantifiable advantages of the collaboration were not investigated.

Given the single case study approach adopted for this study, a multiple case study approach could be done to enable a comparison to be made. This too could be found to be industry specific and thus leaves grounds for further research to take place.

Given the exploratory nature of the work, the case study methodology was utilised and followed carefully in terms of design, preparation, collection of information and sharing.

Narrowing the scope of the study to that of a single case study was to observe the intricacies that lie within the way business is conducted with SMEs in an established supply chain. Though this limited the research somewhat, it is believed that this information may add value in further studies in South African SMEs, Supply Chain Risk Management in South African SMEs as well as in the social aspect of conducting business in a country that due to its past and diversified nature, is difficult to comprehend.

The transcripts of the interviews are evidence that organisations of all sizes are interested in the analysis of business. The amount of time spent in the SME further reiterated that much of what perceived in theory is not the case in practise.

Chapter 5 - Conclusion

Given the diversity of South Africa and the economic and political swings that the country faces in both the short and the long term time horizon, it can be said that South Africa is a difficult business environment to conduct business in. It is thus imperative that risk mitigation techniques are deployed to ensure survival. These techniques may encompass internal strategies or those across the supply chain or a part thereof.

The major finding of this paper illustrates that an SME in the manufacturing sector of South Africa does indeed execute risk mitigation techniques and planning. Furthermore the study uncovered that collaboration and visibility are inherent in the supply chain though are not particularly identified as it is considered the 'norm'. It was further proven that these two strategies are indeed risk mitigation techniques and mitigate 10 risks that were identified by the researcher and interview participants.

Though a reaction such as the planning required to store off site finished goods in case of a strike are reactive to an extent, the collaboration and visibility case is one that is calculated and thought through. Further to collaboration it was identified that collaboration encompasses a number of risk enablers that allow and aid risk mitigation. These enablers house themselves largely in the social aspect of how business is conducted.

The research question of whether low levels of collaboration and visibility exist in an SME and how it conducts its business was explored and discovered. The second question whether these approaches were able to mitigate certain risks was also researched and found to be positive.

Ultimately an incredible amount of insight was gained into a very under researched topic in the South African context.

Recommendations

Future work

In order to validate findings further investigations would need to take place. This would encompass a prolonged study of the business and the monitoring of collaboration that seemingly takes place.

A single case study investigation into the use of collaboration and visibility could be pursued in a different company in a different industry and results compared.

A deeper investigation as to the possible quantitative benefits that risk mitigation techniques have on SMEs could be completed.

A similar study whereby the downstream customers could be involved in a similar study could be completed.

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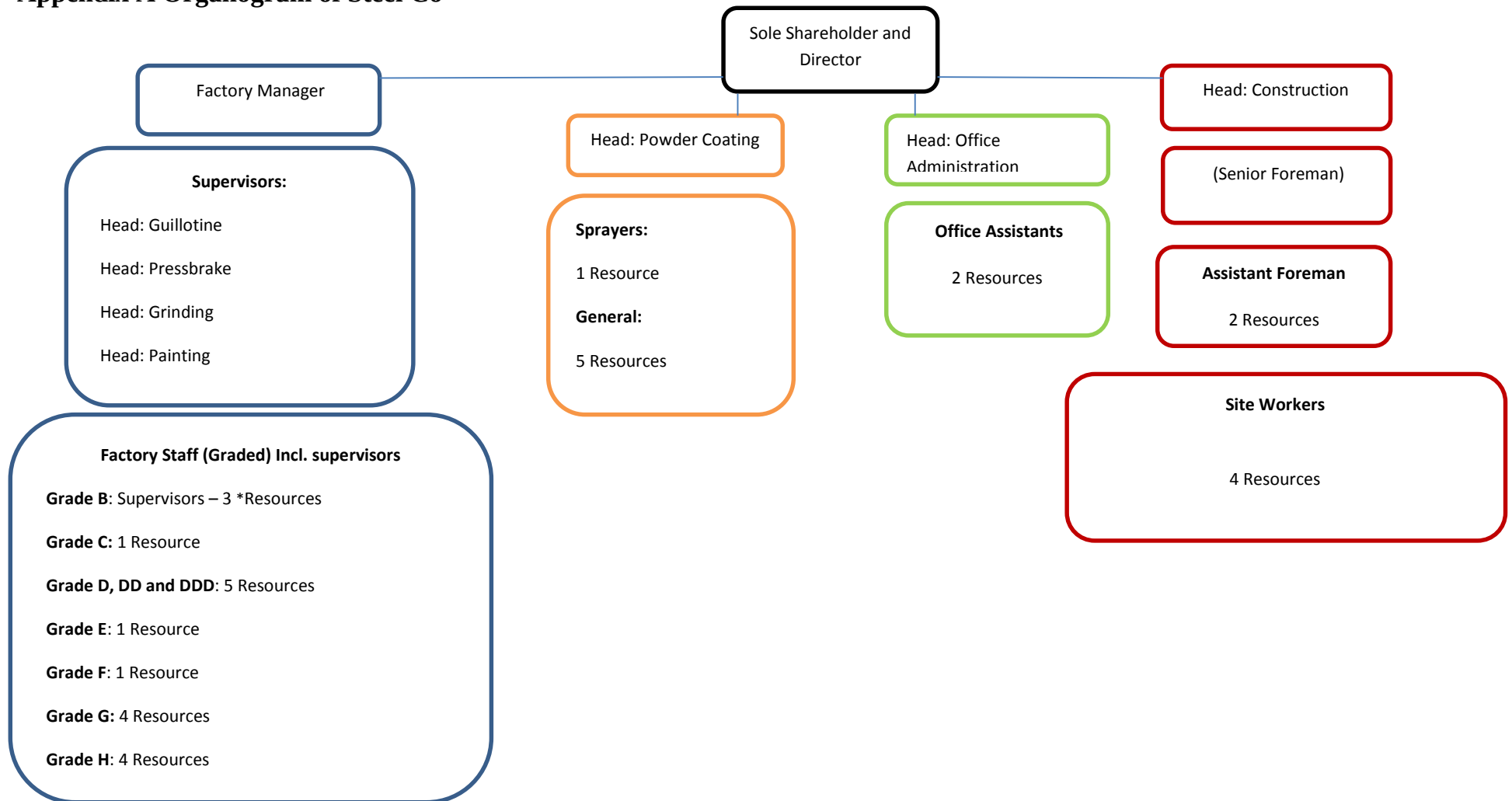
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Appendices

Appendix A Organogram of Steel Co



Appendix B Supply Chain Selection Criteria

<u>Factors</u>	<u>Criteria</u>	<u>Desired Level</u>
Commercial factors	Relationship	A strong relationship is desirable for the implementation of joint initiatives
	Strategic	In this research strategic suppliers would be the preferred choice whilst strategic customers will also be critical.
	Few Alternatives	If the SME has limited alternative supply options then the implementation of joint initiatives could be in the SME's interest
	Inter-dependencies	Joint initiatives can be seen as a positive way of further increasing visibility
	Level of business	A high level of business is required to achieve the required return on the investment or to mitigate high levels of cost avoidance
	Company Size	Larger companies would be preferred because of the level of investment required
Operational Factors	Current Performance (KPI's)	Owing to time constraints in completing this research, only companies that achieve medium to satisfactory performance will be considered. The indicators of performance would be a stabilising of income and orders received.
	Supply Chain Complexity	Very complex supply chains will not be used

Appendix C Types of Risks

Types of risk, sources and descriptions

Type of risk	Source	Description
Strategic risk	Simons (1999)	Affects business strategy implementation
Operations risk	Meulbrook (2000) Simons (1999)	Affects a firm's internal ability to produce and supply goods/services "...results from the consequences of a breakdown in a core operating, manufacturing or processing capability"
Supply risk	Meulbrook (2000)	Adversely affects inward flow of any type of resource to enable operations to take place; also termed 'input risk'
Customer risk	Smallman (1996) Meulbrook (2000)	Categorized by Smallman with human technological and organisational risks as 'direct risks' Affects likelihood of customers placing orders; grouped with factors such as product obsolescence in 'product/market risk'
Asset impairment risk	Simons (1999)	Reduces utilisation of an asset and can arise when the ability of the asset to generate income is reduced
Competitive risk	Simons (1999)	Affects a firm's ability to differentiate its products/services from its competitors
Reputation risk	Schwartz and Gibb (1999)	Erodes value of whole business due to loss of confidence. Examples are Nestlé's baby milk issue and Shell's Brent Spar oil platform disposal issue
Financial risk	Meulbrook (2000)	Exposes a firm to potential loss through changes in financial markets; can also occur when specific debtors default
Fiscal risk	Meulbrook (2000)	Arises through changes in taxation
Regulatory risk	Meulbrook (2000)	Exposes the firm with changes in regulations affecting the firm's business, such as environmental regulation. Categorized by Smallman as 'indirect risks'
Legal risk	Bowen et al. (1998) Smallman (1996) Meulbrook (2000)	Exposes the firm to litigation with action arising from customers, suppliers, shareholders or employees

Appendix D Questionnaire

Section A: Company background

1. How long has your company been in existence?
2. What industry do you specifically consider yourself apart of?
3. How long has your company been trading your current product range
4. How many people does Steel Co/ Galvaniser C/Steel Supplier Co employ.
5. Where do you fit according to the South African business act's definition of a business. I.e. Small medium or large.
6. Are they putting you in the manufacturing or construction sector of the act
7. Do you want to grow your company further?
8. Are the constraints in house or outside factors?
9. Further to the above, would you prefer to increase net profit over market share and turnover. I.e. keep the company the same size yet increase its returns? Would you prefer margins to be better?
10. Is there a lot of competition in your line of work?
11. Do you think that this competition has come about due to a gap that has come about and been created either through lack of service lack of quality or for instance such as the inclusion of these standards. As these standards can be over looked and I am sure cost money to enforce. I.e The standards affect margin. Etc.
12. Does the market prefer price over quality?

Is the competition brought about through pricing, quality, service? Or anything else that may come to mind

What are the main risks that your company endures? Strike action, financial, competition, service, expertise, information etc.

Section B: Level of Transparency – Dissemination

1. How long have you been working with Steel Co/ Galvaniser Co/ Steel Supplier Co
2. Would you feel that Steel Co is a good customer to have?
3. If so, why? Payment, reputation,
4. Does Steel Co convey who its customers are for a specific job?
5. Are you aware of other products and services that Steel Co trades or constructs?
6. Would this be information, both the customers and type of work that you would like to know?

7. If large contracts to reputable companies were available, would a company such as your self be open to creating a fully transparent working relationship. I suppose the fabrication side would be a better example than the construction. Would you put Chubb Fire in touch with MacSteel or the company that manufactures the locks for the cabinets?

What was the reason for the closing?

8. If there were no large contracts, would it benefit you to have a more transparent level of communication with Steel Co?
9. What information do you convey to Steel Co/Galvaniser Co/ Steel Supplier Co? Price, supplier, level of stock, discounts, terms of discounts/.
10. If Steel Co had a crisis of some sort would you try and help the company in any way possible, be it payment terms, discount etc.
11. If it was proven that such an act would help sustain a supply chain and actually benefit the market as a whole would you change your mind?
12. Would you describe your relationship with Steel Co as opaque, translucent or transparent

Section C. Transparency decision criteria

1. Does Steel Co/Galvaniser Co. Steel Supplier Co convey the following information:
2. Scrap Levels:
3. Rework Levels
4. Process repeatability
5. Supplier Quality issues
6. Continuous Improvement
7. Cost of Material
8. Overheads
9. Sub Contract Costs
10. Factory Cost Rates
11. Transportation Costs
12. Cost of Non Quality
13. Order Receipt Process
14. Capacity Planning
15. Shipment Process
16. Lean Manufacturing

17. Inventory Management

Section D. Convey Delivery information

- 1. Would you like to know who your customer's customer is? I.e. would you like to know that your customer has received the order?**
- 2. And if the amounts were specified do you think it would possibly free up cash flow as it would decrease stock holding and increase your lead time to manufacture**

Section E. Reward

- 1. Does Steel Co receive beneficial pricing and credit terms or is pricing based on a history and credit application?**
- 2. Would you foresee the visibility as discussed as a possibility to earn a return in the form of higher turnover, or by decreasing stock levels and thus increasing working capital?**

Section F. Support

- 1. If Steel Co finds itself needing urgent attention or help in the form of faster delivery would provisions be made for this based on the relationship that exists or based on reputation and possible future work?**
- 2. Does this happen with other customers. Are they SMEs?**
- 3. Does this put any sort of strain on your organisation through loss of gross margin through increased overheads and overtime?**

Section G. Visibility and the Bullwhip Effect

- 1. Do you have fluctuations in demand on your production? Or do you make standard production runs?**
- 2. Do you feel that knowing customer's customer will help aid smoothing demand?**
- 3. Are you transparent with your suppliers ability to supply you with your clients and in this case republic metal works**
- 4. Do you understand the concept of visibility? (Explain Concept)**
- 5. Once understood, do you think that the transparency and collaborative working relationship would be beneficial if managed correctly? Or do you think that the risks involved in creating this relationship are too large**
- 6. Would there be benefit in a quantitative study**
- 7. Do you perhaps think that given the above, it currently already exists?**

Appendix E Managing Director of Steel Co Transcript

Interviewee: Managing Director

Interview 1:

Questions:

Section A. Company background

1. How long has your company been in existence?

1966

2. What industry do you specifically consider yourself apart of?

Basically in 2 sides of the steel industry. The structural side and sheet metal. Structural being construction. A third business is powder coating.

3. How long has your company been trading your current product range?

Construction is since 1998. Fire equipment was before this though regular trading was after 2000.

4. How many people do you employ?

Round 38

5. Where do you fit according to the South African business act's definition of a business. I.e. Small medium or large.

Small to medium. Though not big enough to be medium. Given the criteria includes turnover and amount of employees. This can be manipulated.

6. Are they putting you in the manufacturing or construction sector of the act?

Not sure. Ask Lilian

7. Are you wanting to grow your company further?

Not at this stage of the game though it can be. I would like to see the company grow though .

8. Are the constraints in house or outside factors.?

Both. Outside factor would be sourcing a more stable order book.

- 9. Further to the above, would you prefer to increase net profit over market share and turnover. I.e. keep the company the same size yet increase its returns? Would you prefer margins to be better?**

I would like to increase the whole company as the margins will come by themselves. If you take on big orders, it is difficult to streamline if it is new work so labour is generally overstated initially, this would cost you money and once it is up and running this would come down. And thus margins would start going up. But initially it is not the case. So in order to grow the business I would rather have 10% of 100 million than 10% of 5 million

- 10. Is there a lot of competition in your line of work.**

Yes

- 11. Do you think that this competition has come about due to a gap that has come about and been created either through lack of service lack of quality or for instance such as the inclusion of these standards. As these standards can be over looked and I am sure cost money to enforce. I.e The standards affect margin. Etc.**

At the end of the day, we would not be chosen upfront as we would not abide by the points structure. This is because the major contractors have to supply information to the end customer on the subcontractors that are utilised. Though once the initial tender is won, then this does not matter anymore. This is where Steel Co comes in. The standards will eventually be overlooked and then

- 12. Is the market preferring price over quality?**

Initially Price.

- 13. Is the competition brought about through pricing, quality, service? Or anything else that may come to mind.**

Price has always been the first number 1 factor then when can you do it, so it becomes a service factor and then the quality. So the guys would rather get something , cheap quick rather than quality.

- 14. What are the main risks that your company endures? Strike action, financial, competition, service, expertise, information etc...**

Information, expertise. Strike action has been a problem in the past. Have to take financial decisions.

One has to take chances every now and then. Skills is a problem nationwide.

What type of information is a risk. Any information you may be required to perform against. I.e. Drawings if they are the wrong sizes therefore information is the forefront of manufacturing.

Section B. Level of Transparency – Dissemination

1. How long have you been working with Steel Co.

29 years

2. Would you feel that Steel Co is a good customer to have?

Absolutely, we are open and honest with any business we have transacted with. I.e. suppliers

3. If so, why? Payment, reputation

I should hope so,

4. Does Steel Co convey who its customers are for a specific job?

Only if they ask and feel that they are being open up to risk, they would. No I don't lever my customers onto my suppliers. But up until now they rely on my honesty or my order. The suppliers have come to the party. It is not levered on the client. 30 years ago it used to be.

5. Are you aware of other products and services that Steel Co. trades or constructs?

Repeat business, even on the construction side we are getting so used to it, it is like repeat. Large quantities would be nice, though this does not happen anymore due to cheap exports.

6. If large contracts to reputable companies were available, would a company such as your self be open to creating a fully transparent working relationship. I suppose the fabrication side would be a better example than the construction. Would you put Chubb Fire in touch with MacSteel or the company that manufactures the locks for the cabinets?

Absolutely. To be open and honest with each other would be beneficial to both parties. It has been proved in our own business where customers and suppliers have become personal household friends over time. The breaking down of the barrier allows honest relationships that are effective. There is so much greed around today, as when a customer needs a fitting they specify it must be made at a specific price and then then to find out they sell it at double the margin. They make R50 and we make R5. Forced constraints onto RMW as he would like to make more money yet as the manufacturer has more risks involved. I.e. if margins are so tight that a loss product could be made.

Time constraints. Those kind of guys are always like that. I'm not interest anymore. Would rather turn the work away

7. If there were no large contracts, would it benefit you to have a more transparent level of communication with Steel Co?

Absolutely. Somewhere along the line there is an end user and if anyone of us in between that can work together so that we all can make money at the end of the day and not :

One guy make money, two guys lose money and the end user pays a fortune. I would rather it be an even playing field. If we all made our little bit, the world would be a happier place.

This is how I run my organisation. If we see a gap and we can take it on we will try and make extra. But more than likely done on a transparent basis.

We have a deal with the pallets which is getting out of hand as they are pushing margins tight.

8. What information do you convey . Price, supplier, level of stock, discounts, terms of discounts/.

Level of stock yes, not my suppliers discounts. Unless we all sitting around the table and costing the job as a joint venture. Then you have to be working with people you can trust.

9. If suppliers had a crisis of some sort would you try and help the company in any way possible, be it payment terms, discount etc.

Absolutely. Macteel, Cutmaster Steel, Steelworld. On numerous occasions I have been helped just as I have helped other people.

Hopefully those I help have the same ethics I have. It is actually due to that, that we are still around today.

It is just inherent in the way the business is conducted. It is just the way it is. Hopefully it is how people know Ken.

Given the amount of people you mentioned it seems it does happens?

Yes, you have to have trust and belief in people.

A huge organisation with set procedures has gone out its way. This could be through a collaborative partnership that has developed over the year. If I need extra terms on payment, I doubt if any one of them would turn me down.

10. If it was proven that such an act would help sustain a supply chain and actually benefit the market as a whole would you change your mind? N/A

Section C. Transparency Analysis

Does Steel Co or yourself convey the following information:

Scrap Levels:

No

Rework Levels

No

Process repeatability

Yes

Supplier Quality issues

Yes, If we are under tight schedules and we have bad steel delivered. If I cannot fulfil my duties because of my supply, than obviously they must take the wrap for it.

I'll certainly let my customer know the reason for it. Therefore Macsteel must either take it and bring their side to the party or tell me honestly that they cannot improve on that situation. If they are open and honest about it, it will allow me to look for material somewhere else. It would not jeopardise any future business with Macsteel what so ever. As they are being honest with me.

They understand that we have to explain this to our customer.

Continuous Improvement

No

Cost of Material

Only list prices, but not our discounts. That is for our benefit.

Overheads

In some instances we have to. In certain contract they would like our total overheads, cost of material, manufacturing costs, profit etc.

It's not ethical to do that. It's similar to me asking Macsteel what is the price they get their steel for.

Sub Contract Costs

If the guys want me to put it in black and white I will.

Factory Cost Rates

No

Transportation Costs

Yes. The long distance hauls are explained..

Cost of Non Quality

No. It's a sore point but 99% of the time it was from storage or due to client negligence.

Order Receipt Process

Yes

Capacity Planning

No

Shipment Process

Yes

Inventory Management

Yes, I think most of the people know that we maintain stock levels to service the industry.

Section D. Convey Delivery information

- 1. Would you like to know who your customers' customer is? I.e. would you like to know that your customer has received the order.**

In some instances as I would like to know if my product is being exploited. If I found it to be true. Then I would go around them.

It would be nice to have this transparency but there are too many unethical people today. As everyone is too scared that they will be cut out of the loop.

To be a manufacturer and to retail doesn't work.

2. **And if the amounts were specified do you think it would possibly free up cashflow as it would decrease stock holding and increase your lead time to manufacture.**

Yes, Customer base is unknown on certain product lines.

Section E. Reward

1. **Does Steel Co receive beneficial pricing and credit terms or is pricing based on a history and credit application?**

Yes. Of course.

2. **Would you foresee the visibility as discussed as a possibility to earn a return in the form of higher turnover, or by decreasing stock levels and thus increasing working capital.**

Section F. Support

1. **If Steel Co finds itself needing urgent attention or help in the form of faster delivery would provisions be made for this based on the relationship that exists or based on reputation and possible future work?**

I have offered consignment stock to customers to free up their cash flow but to help service. This is based on reputation in the market.

2. **Does this happen with other customers. Are they SMEs?**

Only special customers. They are SME's. There is a customer who takes unpaid stock over the December period. This does not put strain on my organisation.

3. **Does this put any sort of strain on your organisation through loss of gross margin through increased overheads and overtime?**

It would. But not over December.

Section G. Visibility and the bullwhip effect

- 1. Do you have fluctuations in demand on your production? Or do you make standard production runs?**

Yes, Absolutely. Yes we have standard production runs as well.

.

- 2. Do you feel that knowing customer's customer will help aid smoothing demand?**

Not always. At times the customer does not even know what he really wants.

It may lengthen lead times.

It is not really through new business. Its replacement purchases.

The fluctuations force stock carrying.

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- 3. Do you understand the concept of visibility?**

Yes.

- 4. Once understood, do you think that the transparency and collaborative working relationship would be beneficial if managed correctly? Or do you think that the risks involved in creating this relationship are too large?**

Yes. The risks are too large for those backward suppliers. But going forwards it won't be a problem.

The suppliers would have a problem as they are not able to fix their prices. Thus may suffer a loss.

- 5. Would there be benefit in a quantitative study.**

Yes.

- 6. Do you perhaps think that given the above, it currently already exists?**

Possibly. Specifically with a central holding company. When the whole supply chain is owned.

I don't believe it is working anywhere.

Theme: Collaboration and Risk

1. **The reason for this interview is to bolster the observation made. It is a recent thing that has occurred in the company. It has occurred on a regular basis. It specifically pertains to a job, Tojando, which is a construction site. It is a taxi rank.**

I heard certain things take place and saw things occur take place whereby you secured steel or got discounts for steel from your steel supplier as well as decent rates and ability to deliver from your galvanizer. Can you elaborate on that?

We were asked to tender on the job which we did. We were then informed that it is reasonably competitive and that they would like to do work with us but we would have to look at our pricing. So from that point of view we were given the opportunity to go back and look at our price and not just thrown out. With that point taken, I couldn't take it all on ourselves and thus I went back to our suppliers and explained that they need the work as much as I need the work. I asked can we sit around the table and discuss the pricing structure from the price of steel and talk to the galvanisers and see what they could come to the party with as this is a large portion of the cost. After explaining to them what sort of volumes were involved and as we speak now the volumes have gotten a lot larger so the right decisions taken back then, with the parties coming together on price the job has grown and grown. We got the job and were awarded the contract.

Everybody has been happy with what we have done up until now. Unfortunately we have forced price increases in steel material but there is nothing we can do about that. The initial pricing that the supplier came to us to get the job, they came to party on the price of steel and the galvanisers have maintained their price right up until now. We had to forfeit some discount structures.

2. **Now along with that collaborative effort, there are inherent risks involved in operating a company. I would just like to go through the risks.**
 - a. **Is there anything that hampers your strategic implementation? For instance if you are wanting to expand or enter a new market, is there a risk in going that route?**

Obviously there is risk in strategy and wanting to grow or take on new work or products. You are looking at new skills point of view, a whole new line of raw materials supply chain that would pertain to that line of product. This would mean new suppliers that we haven't been dealing with. That would put us under pressure as new accounts; pricing structures are not going to be what they should be. In the past when we have been dealing with people for years, you get the best possible price out of the guys. When you looking at news products that you are going to manufacture, its new items and its new suppliers, it's a chance you take when dealing with these guys and hope that you getting the best possible price so you can price yourself correctly in the market. You can shoot your mouth off and say you can do this, that and the next thing, but...if your supply chain doesn't work with you, it's not going to work.

b. From an operations perspective, your internal ability to produce and supply goods.

There are always risks when you take on any work. If you think you are going to do it the risks are, do you have the expertise? The machinery and all of that? You think you have it all until you take on the job and when you get to the nitty gritty, you find you battling to do it. The risks are all there. In the past we have bitten off more than we could chew. But you get through it, somehow you get through it. You either farm the work out to get the job done, just to save your name. Every job you take on, every single order that you take there is a certain risk involved because can you supply or can't you supply. This is more the jobbing side of the shop, not the stock items. That is on-going and we know what we can do. When it comes to the construction side of things when every job is different, there the risks are huge.

c. Have you ever had suppliers let you down?

Of course, on a regular basis and in a lot of instances this could not be through any fault of theirs. It could be as what has just happened recently when we have just had a blow up of one of steel mills and we can't get steel. Now what do I tell my customers. Already it comes into the market place where shortages are occurring and prices are being pushed because of supply and demand.

d. Another thing I have seen happening is that Steel Co lost an order, potential order due to everything being brought in from overseas. Comment?

That is par for the course at the moment in this country because, in fact there is a lot of work that the Chinese are taking up and they are buying up industry in this country and bringing in their technology over here. On this specific job that you are talking about, that is true, we manufactured some of the stuff in the beginning and now we are sitting knowing for a fact that 90% of the work that is being carried out by this particular company, they are importing it as we are not cost effective in this country.

- e. **Does this directly affect your competitiveness in the market as in the end of the day you cannot help the cost of your input price.**

Correct, but again we had an instance today we had a discussion today where we were saying that we were waiting for some of the new sites to wait and get going and see if we were going to get the business. Then we get told that in some instances we were told that we were 10-15%, 17% more expensive than some of the other suppliers. But then after chatting to another guy and telling him this story, he is running a site, he said he is running these guys and though he would prefer to use us he had to use the cheapest price and later to let down by that supplier, only to have them supply for a month or two only to realise they have gone out of business. Gone. Closed. Then they have to come back with their tail between their legs and come back to me and say “Ken can we...”

- f. **So through internal policies, they have to tender, choose the lowest price and because then lowest price there is (possibly) no service and no quality, because there is no deliverable and they have to come back to you the trusted supplier?**

Correct!

- g. **Obviously every single job that you take on there is a certain amount of reputational risk attached to it given that your client base, specifically on the construction site, is so small. So you must perform, you cannot let it down.**

Yes you also rely on your own people. To be able to perform it efficiently and do it as I cannot be everywhere. It has just come to the fore now on a Standard Bank job. Some of the items there I have a contract director walking around and saying, phoning and saying “Ken, why is this not like this, why is this not touched up, why is that not painted and it’s a reflection on us and its purely from, in other words relying on my staff and the guys are not doing their jobs properly, so what do I do.

- h. **From a regulatory point of view, I see there have been complaints on the safety rules and regulations on these sites and that they actually cost a lot of money to implement and to get your staff up to scratch with regards to safety. I heard a story whereby you had to purchase a fibreglass ladder as opposed to an aluminium ladder because the new rules were written in the mine. Do you feel these safety regulations are a hindrance?**

Absolutely. They cost enough money to make a problem, you have to cost them into your job now as the time and effort to create the files, the meetings that the staff attend which are non-productive, I pay their salary. Who pays them to adhere to the policies. The rules differ from contractor to contractor. It is not standard.

You work on the mines that's standard, you work with construction companies, they have their own standard. To me it's a load of hog wash. To me its got to be there, you have to have it. Be conscience of your health and safety but they have taken it 10 steps too far.

i. In terms of customers not paying and the like?

I think it's being very selective as to who you are dealing with. We don't just open our doors to every one as a customer we pick and choose. We are fully aware of who we deal with.

j. Should a customer not pay, it's obviously going to put the company under pressure?

Yes, absolutely it would.

k. Would it be an immediate pressure from a cash flow point of view?

Yes it would

l. Now that we have spoken of this collaborative effort and the inherent risks that are in the business, there are certain enablers that are present in this collaborative effort that can be used to mitigate a certain amount of those risks. One of them would be sharing. So do you think that by sharing in the broad sense, information and revenues, do you think it mitigates those risks?

I think if we could and sit around a table and everyone make the exact same amount of money, at the end of the day I'm sure. At the end of the day I'm sure. You know you still don't know how honest these people are that you dealing with that you can actually sit around the table and put everything openly on the table and say right, this is my cost, that is your cost, be 100% transparent, which I doubt you will ever achieve in this country.

m. In terms of this flexibility that the galvaniser's delivery and the booking of steel on the floor, that's obviously helped you a hell of a lot.

It does as they are carrying the stock. It's just a gentleman's agreement that we have and that they keep the stock and on my word that I will take it off their hands. There again are they doing it at their best possible price? I don't know. They say they are and I believe I am getting a fair deal but when other guys come in and start under cutting you with ridiculous margins, then you start to wonder.

n. In the same breath, besides the financial reasons. This trust that they can book it and deliver immediately, surely this helps your flexibility and ability to deliver?

Yes it does.

o. If it can help you deliver, it can help your reputation?

Yes. That is something that has been built up over time. It is a relationship that has been built up.

- p. We have spoken about collaboration such as with Tojando, as this mitigates a whole range of risks. From financial, reputation, and almost all of them.**

Yes.

- q. Information Security. I suppose when you are speaking about the prices that the galvanisers give you and the discounts that your suppliers give you and the terms, you obviously keep that quite close to your chest.**

Yes you have to. That's something that you keep very close. Nobody discusses with each other with who gets what and nor does the merchants. You keep it very close to your chest. But I do believe that as a small business we are getting a pretty fair deal as far as our buying power as such. As little as it might be in their eyes but its all relative.

- r. Does Steel Co do any corporate responsibility things?**

No.

- s. You have aligned the incentives for this Tojando job. The incentive was that this job could be a big job and its now turned out to be bigger than initially thought. That alignment that happened. It had to happen at some point, when you sat around a table and said to the guys are you going to do this? They agreed?**

It came with the service that we offer them and the co-operation and our input into providing information and helping them to solve their problems on their site that we actually made life easier for them and hence the work has just kept on coming our way. We keep on pricing it and they keep guiding us and we just keep getting the work, all the time.

- t. In terms of them taking a cut on their price, to enable you to have some sort of margin on your price. If they didn't do that do you think it would have been priced too high?**

I think they have taken a knock. For example beams that were in on the job. The original tender price was R23 a kilo and now they are paying us R25 a kilo. But what they lose on the swings they gain on the roundabouts. In a lot of the instances, it is not a fixed billed quantity. Not a fixed billed item. So what they do is take it to the end client and the client gives the approval. So they just ask me for a price and they just pass it on to their QS's. They either say they happy, if they say they not happy they come back and we may be negotiate around what would be an amicable price. If they are looking for ridiculous pricing, I turn around and walk away. My door is always open.

- u. **Do you go back to your suppliers such as your galvanisers and ask them to drop their price as you are unable to lower it any further.**

Yes. We will do that.

- v. **We have spoken about the companies leaving steel on the floor which lends itself into strategic planning, you know you don't want to take the steel on now but they keep it for you while you are planning a job.**

I would say that is not the norm though Darren, that's not the norm with everybody

- w. **Yes I'm saying that it happens for you, in this supply chain it happens?**

Yes it happens for me because of our ethics in the industry

By them doing this it is complete risk sharing. They are taking on 'no sale', they are keeping the stock and cash strapping themselves in the hope that you land the work.

- x. **There is always knowledge that comes with the relationship.**

Yes it works both ways. I buy steel from them and they come back to me and say "Listen there is this job like this and this... We have been approached, can you quote, infact heres the job, heres the guy, talk to those guys and take it" (**going backwards from a supplier to you?** Yes)

- y. **I haven't observed any continual risk analysis at all. You don't really look at the market all the time. You do the work every day slogging it out. You said in the last meeting that you would like to business to grow but not underneath you, you would like someone else to come in.**

Yes there is space for it to grow. But what we were talking about in the Steel Suppliers helping me. In turn as little as we are, I help the really little guys by carrying stock for them. If they phone me and say I need 20 of these and 20 of those, I say come and get it as I have it in stock.

- z. **So again it's all relative, and you have passed "the buck" but ultimately from a continual risk analysis there is nothing that I have seen happen. This seems to follow a trend in the supply chain. The galvaniser told me they are concerned with their work.**

Theme: Ordering and Supplier Quality

aa. Around the receipt and order process – how goods are received and how they are ordered. Do you think that is important information to know?

Yes I think so. Firstly, you would like to know who is buying what and where, what for and at what possible prices. Are they the best prices, are they chasing the best prices so that's why all the bulk items I buy myself and do the negotiating. On the receiving we are starting to tighten up on our goods received. Making sure that the stuff is counted properly before they sign for anything and it gets documented into the stores.

bb. In terms of your on-selling and how orders are made to you and the way that deliveries take place. Is this important?

Yes. A job sheet is made out according to an order number. Are we making standard stuff or non-standard stuff? This so Francious knows what is on order. An in-house job sheet is only generated from an official order.

cc. Do people know exactly how to place an order?

Yes.

dd. From a risk mitigation point of view. Do you think that if a client is well aware of how and when a delivery is going to take place and the fact that you know when the product is going to leave the floor and be delivered and it will stop the opportunity for theft as I noted an observation whereby a driver was scrapping goods and taking the money.

We had goods leaving the factory with orders but never being checked though it was half finished goods. We had goods leaving the factory with orders though weren't being checked. Due to being a stock item we never picked it up. The dispatch was the problem.

ee. In terms of supplier quality issues, have you had problems with suppliers in the past?

Yes it is on-going. You must check all incoming goods. From pens and papers to steel.

ff. An observation that took place, steel came from a company for a filing product for a customer. The line worker came into the office with oil on his hands. The material was supposed to be galvanised, what I saw happening was the line worker had to stop the machine, explain the problem. You and Francious had to go onto the floor for an inspection. People from the company still came over to inspect the material themselves. A lady and gentleman. They assured you that it was galvanised.

Due to the specification ordered not being given to the supplier, they supplied inferior product.

gg. This incorrect supply and inferior quality led to the line being down and if Steel Co was under a tight deadline there would have been a problem.

We were in big trouble.

hh. Is there alternatives?

Yes though price is important.

ii. Another recent observation is that you and I were having a discussion around a large job that was being tendered on. The discussion was around that you lost the job due to transport costs. They were an added cost to the job. You said this was the reason for losing the job.

Yes we lost the job due to transportation costs though we have won it.

jj. Has it happened before that you have lost a tender due to transport costs.

Well if it has been included or shown separately. If it was shown separately. Not really. Though when it is included in the price it becomes a major factor depending on where you are located, delivery circumference and if your competition is closer than you.

kk. Do you have a preference as to how you advertise your transport costs.

Our transport costs are free, gratis and for nothing. Though if it is taken advantage of we quote accordingly

Appendix F Head of Administration of Steel Co Transcript

Interviewee: – Head of Office Administration and bookkeeping

Interview 3:

Section A: Company background

1. How long has your company been in existence?

1966

2. What industry do you specifically consider yourself apart of?

Anything steel related. Mainly manufacturing and construction

3. How long has your company been trading your current product range?

Construction ventured in 1998 and on the manufacturing side since inception in 1966. I would say that the Fire-stuff has been manufactured for around 10 years. Let's say since 2002. (Would manufacture anything that you deem appropriate? – Yes

4. How many people does Steel Co employ.

43 Permanent Staff earn wages. On Salaries including myself and the director. There are 5.

5. Where do you fit according to the South African business act's definition of a business. I.e. Small medium or large.

I would actually classify us as small. According to the BEE requirements we are a QSE which is a qualifying small enterprise. We fall just short of a medium enterprise.

6. Are they putting you in the manufacturing or construction sector of the act? Manufacturing sector as that is what we were originally registered as.

7. Are you wanting to grow your company further?

I would like to see it grow. I feel that the current capacity is there but there are certain constraints which do not make it viable at the moment.

8. Are the constraints in house or outside factors?

They are in-house – for instance our premises are too small.

- 9. Further to the above, would you prefer to increase net profit over market share and turnover. I.e. keep the company the same size yet increase its returns? Would you prefer margins to be better?**

I would like to see both.

- 10. Is there a lot of competition in your line of work?**

Yes there is. Our customers are more local. For instance on the manufacturing side of things, there is quite a bit of competition in this regard. One must compare apples with apples and not apples with oranges. This with regards to quality. At the moment its price versus quality versus market share.

On construction there is a lot of local competition. It is cut throat. There are standards we have to comply with. These standards are overlooked when smaller BEE competitors apply.

- 11. Do you think that this competition has come about due to a gap that has come about and been created either through lack of service lack of quality or for instance such as the inclusion of these standards. As these standards can be over looked and I am sure cost money to enforce. I.e The standards affect margin. Etc.**

On the manufacturing side, At the end of the day it comes down to the end user. Their expectation, if they are only price driven then they will be prepared to accept what will be supplied to them by other manufactures. We had our first instance last year whereby goods were given back to the competition and the customer was “forced” to by from us as they could not handle the ‘garbage’ they were given.

We need to work smarter and harder to be competitive. We are the recognised supplier to the major role players in the fire industry.

In construction it depends on the QS and the surveyors. We lost a R500 000 contract for the sake of a R500 price difference. The smaller competitor is not fulfilling the duty and thus we will in all likelihood be called in to correct the situation.

- 12. Is the market preferring price over quality?**

Yes. The market is preferring better prices to quality on the manufacturing side.

- 13. Is the competition brought about through pricing, quality, service? Or anything else that may come to mind.**

- 14. What are the main risks that your company endures? Strike action, financial, competition, service, expertise, information etc...**

One at a time. Strike action – we have a fully unionised shop, whenever the wage agreements are up for renewal and in renegotiation we encounter strike action. It is nationwide. The violence and intimidation of action in 2011. The way I see the strikes going throughout the country. Can't see ourselves continue working should the strikes continue.

Cashflow – on the manufacturing side a lot of it is on COD basis. We are expected to carry stock so this does constrain cashflow. On the construction side we have to literally write off 12,5% on inception of contract due to retention money though this varies from company to company and have learnt not to rely on this income. Retention money can put strain on the system as you can show a profit yet do not have the money in the bank.

Expertise and information – we have always prided ourselves on our ability to do anything. This is all encompassing. I think our level of expertise is all encompassing as we are able to manufacture around the constraints we are faced with. Specifically in the construction industry. We have developed the name of Mr 'fix it' we are open to information from our customers and are open and willing to work around that.

Information- In construction we are open to specification and do not keep anything to ourselves.

Section B: Level of Transparency – Dissemination

1. How long have you been working with Steel Co.

Since 1988

2. Would you feel that Steel Co. is a good customer to have?

I would like to think so

3. If so, why? Payment, reputation,

I think both, every company has its ups and downs and when we have had difficult times and not been able to pay 30 days we have notified our suppliers and will pay any interest that is due. We have never run away from a bad situation.

We will pay on 30 days and sometimes earlier. We will take our discount. Some of our suppliers have approached us for early payment because they have a cashflow problem and we have always attempted to help them.

4. Does Steel Co. convey who its customers are for a specific job?

Yes and No. Its common knowledge that a major customer is WBHO. The steel merchants know that. We also require a major supplier of steel, Macsteel, if there is a large job that we are tendering on or that WBHO is tendering on, WBHO will request us to try and reserve material on their behalf. Macsteel is normally quite willing to do so.

The other customer we deal with are very varied and for instance many customers know that we are a major supplier to Chubb Fire. So this is not hidden in any way.

5. **If large contracts to reputable companies were available, would a company such as your self be open to creating a fully transparent working relationship. I suppose the fabrication side would be a better example than the construction. Would you put Chubb Fire in touch with Steel Supplier Co or the company that manufactures the locks for the cabinets?**

Yes I think we would. As I know that Chubb Fire has ceased all manufacturing in South Africa. Everything is imported. They buy local in the way of cabinets but as far as fire extinguishers they used to manufacture is all imported. Their manufacturing operation was closed down.

What was the reason for the closing?

If I can deviate. There was also a company called Blue Crane that also only imports.

This was due to price. We are faced with Chinese imports that nothing is standardised with everything being different shapes and sizes. To try and manufacture any standard item to suit all products is becoming a nightmare.

6. **What information do you convey to Customers. Price, supplier, level of stock, discounts, terms of discounts/.**

We have standards terms and condition which is normally less 2,5% 30 days or less 5% for COD.

Offer quantity discounts depending on quantity involved.

If we are selling to Chubb, the pricing of Chubb has nothing to do with the smaller guy. As Chubb only orders 50 or more units at a time and the bulk discount applies.

Section C. Transparency decision criteria

Does Steel Co. or yourself convey the following information:

Scrap Levels:

No

Rework Levels

No

Process repeatability

Yes, I would like to think we do though there is no advertising of that fact

Supplier Quality issues

We only share it when absolutely necessary. We do not make it known as we just feel that we have had the attitude that we don't expect anyone to make their problems mine but when it does become mine we deal with it as best we can. This goes down to for instance for our main supplier of locks and keys whom also shut their manufacturing section down in this country, if they have any problems with their imports from China, I have increased my stock levels to accommodate for this.

If there is something unforeseen that is beyond our control, we try put contingencies in place so as to not disrupt supplies to our customers. So in this case there would be communication. So it depends on what the situation is.

Continuous Improvement

We do, but our customers are only interested if it results in a drop in price.

Cost of Material

No as there are many other extraneous costs that come into the price. And we are wanting to avoid a false representation as steel is far removed from the price it costs to manufacture the goods.

The price may be given in percentage terms if there is an increase in steel.

If customers were aware of the production processes and the profit margins built into it. Would you then provide this information?

No

Overheads

No

Factory Cost Rates

No

Transportation Costs

There are certain instances where we charge for deliveries but 99% of the time the cost of transport is included in the cost of the product.

Cost of Non Quality

Not sure

Order Receipt Process

Yes

Capacity Planning

Not Sure

Shipment Process

Yes

Inventory Management

In an indirect way we do for instance if we have an enquiry for a particular cabinet and the quantity is high and only need the order at the end of the month we would ask that the order gets placed so that the stock may be reserved for them.

Section D

1. Convey Delivery information

No, they only order upon having their order in hand.

2. Would you like to know who is your customer's customer is. I.e. would you like to know that your customer has received the order?

We keep amount of stock and are able to manufacture quickly. But would like to know the customer's customer so that we could know that what the customer is about to order is the correct item for its intended use.

3. And if the amounts were specified do you think it would possibly free up cashflow as it would decrease stock holding and increase your lead time to manufacture.

Yes it would. If we could have call off orders and they were placed for 3 or 6 months at a time, it would go a long way to easing cashflow and easing production backlogs. We have tried repeatedly to arrange call off orders but they are not willing.

We have a week to supply and if cannot do so we must notify them.

Section E: Reward

1. **Does Steel Co receive beneficial pricing and credit terms or is pricing based on a history and credit application?**

We have the standard terms. Any credit application is based on credit check and history.

2. **Would you foresee the visibility as discussed as a possibility to earn a return in the form of higher turnover, or by decreasing stock levels and thus increasing working capital?**

Yes

Section F: Support

1. **If Steel Co finds itself needing urgent attention or help in the form of faster delivery would provisions be made for this based on the relationship that exists or based on reputation and possible future work?**

We always do try and accommodate the customer and I think it would be based on all of that.

2. **Does this happen with other customers. Are they SMEs?**

We do it for new and old customers irrespective of size.

3. **Does this put any sort of strain on your organisation through loss of gross margin through increased overheads and overtime?**

We would always weigh up for instance if it is not worth our while that the customer contribute to these costs. The commitment cannot only come from Steel Co.

Section G: Visibility and the bullwhip effect

1. **Do you have fluctuations in demand on your production? Or do you make standard production runs?**

Yes we do. There are standard production runs for stock. Though this is not always enough.

2. **Do you feel that knowing customer's customer will help aid smoothing demand?**

In certain instances. This is more specifically for manufacturing. In certain instances the customer might be involved in installations in a building if they had to let us know that we had the work it would go a long way in enabling us to plan better.

3. Are you transparent with your supplier's ability to supply you, with your clients

Yes we are. For instance a steel mill in Newcastle closed, and there would be short certain sections. We immediately got hold of the customer so that contingencies could be put in place.

4. Do you understand the concept of visibility?

No.

5. Once understood, do you think that the transparency and collaborative working relationship would be beneficial if managed correctly. Or do you think that the risks involved in creating this relationship are too large?

Each case would have to be handled on its merits. I can only think now about the new tenders issued where we were involved for the 2 pilot projects. Shortages of material could be encountered if communication was not given to the major steel merchants.

6. Would there be benefit in a quantitative study?

Yes there would be, but Non-Disclosure agreements would be needed to isolate each supply chain.

7. Do you perhaps think that given the above, it currently already exists?

We have put certain things in place that facilitate information. But I am sure that oversees that these agreements already exist.

Theme: Order Receipt Process and Supplier Quality Process

- a. **Do you think it's important to know, at all times and have transparent information with regards to the ordering and receipt of goods coming into the factory and leaving the factory.**

Yes I do, in the past we have experienced problems with imports from China. If it weren't for our stock holding on specific items we would have come to a standstill. It was due to our stock holding and transparency by our supplier that we were able to avoid a major catastrophe in production

- b. **Was the transparency from the supplier the information regarding their ability to deliver or was it through them not holding stock or a problem with the shipment.**

There was a delay in the shipment from China and the delay was in excess in 2 months. They had to resort to flying stock in to tide us over.

- c. **So was that after you had placed the order that they come back and told you.**

We normally give them a call off order which covers a six month period and it was in the middle of our call off order. We also experience transparency in the supply of steel. As soon as one of the mills go down, our steel suppliers notify us. I put it down to our working relationship that we have with them. It has also allowed us, where they have accommodated to holding and reserving stock for us.

- d. **Do you think it is important for everyone to know how they product will be delivered and how the product is ordered. You had a driver that was loading more product in the vehicle and offloading product as scrap and taking money for himself and thereby steeling from the company. Therefore if the delivery and order was known by both parties, there would have been a chance of mitigating that theft.**

The problem was that, that was work in progress. It was being stolen

- e. **There was still an order being placed with an outsourced activity.**

Yes this would have prevented it. The MD brought up that it was more about dispatch. The problem was that nobody was checking what he was loading.

We had an instance about a week ago where one of our customers came to collect and tried to bribe one of our staff to load extra stock. Our member of staff was honest enough to come and tell us

.

- f. You would agree that if that process is vague, it leaves a lot to be desired?**

Yes.

We have also experienced it from our suppliers where we ordered steel and the wrong delivery took place. We are honest enough to have them invoice us correctly or return it.

- g. Did the mistake come about through supplier error?**

Yes it was a supplier's error.

- h. So your order was correct?**

Yes but they delivered the wrong length of item.

- i. So again, because you understood the process and understood the process of the order and you placed the order correctly you had grounds to reject the delivery?**

Yes, in essence we could have stolen the extra lengths.

Appendix G Managing Director of Steel Supplier Co Transcript

Interviewee – Managing Director

Interview 4

Section A Company background

1. **How long has your company been in existence?** Over 100 years. It was Mechanicate and Fence beforehand.
2. **What industry do you specifically consider yourself apart of?** We are a part of the metal and steel industry. We supply all sectors. Motorcar, construction, white goods industry. We supply the yellow goods industry. We supply the plate industry.
3. **How long has your company been trading your current product range?** No, the only thing that has changed is the grade of the material. The tensile strengths are so much better. A lot of development over the years as well as the application thereof. A lot of changes but not in the basic product. It is still made in the same process but the chemical compistions are better
4. **How many people do you employ?** Group wise we are over 5000. But in the local branch. 536
5. **Where do you fit according to the South African business act's definition of a business. I.e. Small medium or large.** It is a large business. Bear in mind it is a private company so none of our results are published. We apart of siefsa and thus in steel and manufacture.
6. **What sector are you apart of in the act?** Steel and manufacturing
7. **Do you want to grow your company further?** We have consolidated through the period but we always try and grow.
8. **Are the constraints in house or outside factors?** There are constraints to the country at the moment. There is difficulty getting material from the producer mills. The international pricing fluctuates quite a bit. There are no in-house constraints at all.
9. **Further to the above, would you prefer to increase net profit over market share and turnover. I.e. keep the company the same size yet increase its returns? Would you prefer margins to be better?** We would like both.
10. **Is there a lot of competition in your line of work?** There is plenty. There are a lot of new players in the market. There are now people without the same experience as we have and it is increasingly difficult.

11. **Do you think that this competition has come about due to a gap that has come about and been created either through lack of service lack of quality or for instance such as the inclusion of these standards. As these standards can be over looked and I am sure cost money to enforce. I.e The standards affect margin. Etc.** There are a lot more players in the market and people are under the perception that there are such large volumes to be made in the steel industry. If you look at it, margins are declining at a rapid rate. You also have the competitiveness from overseas, competing in all sectors of the business not only in supply but also in fabrication as well.
12. **Does the market prefer price over quality?** When you look across the board. It is always a price driven however, quality plays a big factor. We have always prided ourselves, being an ISO listed company, being able to supply what is requested. We cannot say the same about the rest of competitors.
13. **Is the competition brought about through pricing, quality, service? Or anything else that may come to mind?**
14. **What are the main risks that your company endures? Strike action, financial, competition, service, expertise, information etc.** .The failure of the mills. The supply chain failure. I think you also have to worry about the instability of the country.

Section B: Level of Transparency – Dissemination

1. **How long have you been working at this present organisation.** 32 years.
2. **Would you feel that Steel Co is a good customer to have?** Yes, of course yes. We value all customers, irrespective of size.
3. **If so, why? Payment, reputation.** .We take all customers accordingly and we treat them all the same. I think that has made our success.
4. **Does Steel Co convey who its customers are for a specific job?** .Not really. Though we have once or twice. It is not relevant to us. We do not fabricate. A lot of customers do mention who the end customer is and who the contract is for. We supply to the sector where fabrication gets done. We do a specific deal. I.e if RMW is doing a contract for Consol glass for instance. Then we know where the contract is and we do a specific deal according to the contract and we keep and monitor how the pricing structure might be or what the requirements might be. That we always speak about. We always
5. **So even though you guys are not involved in the fabrication you are always monitoring.** Yes we know where and what it is for. It is beneficial.
6. **Are you aware of other products and services that Steel Co trades or constructs?**

7. **Would this be information, both the customers and type of work that you would like to know?**
Yes. If I can elaborate further on that. What is also important: If you understand that a contract is done like that. In discussions, though RMW might be involved in the structural and might not be doing the roofing. We may pick up all the sectors where the group may want to be involved in. So we pick up group-wise where the requirements lie and where the group may want to be involved in and try benefit
8. **If large contracts to reputable companies were available, would a company such as your self be open to creating a fully transparent working relationship?** .Yes, 100%.
9. **If there were no large contracts, would it benefit you to have a more transparent level of communication with Steel Co?** .We treat the people the same in all regards so yes we would be.
10. **What information do you convey to Steel Co? Price, supplier, level of stock, discounts, terms of discounts?** .What we do is do a discount structure per customer. Categorised as a buy and ban period as to what tonnages we can buy on a monthly basis. We don't disclose the other customers' discounts with each other. It is relationship and customer driven.
11. **If Steel Co. had a crisis of some sort would you try and help the company in any way possible, be it payment terms, discount etc.** Yes we would assist wherever possible. Irrespective of size.
12. **If it was proven that such an act would help sustain a supply chain and actually benefit the market as a whole would you change your mind?** That is why we are as successful as we are. We are willing to bend over backwards.to support the guys. Irrespective of size. It must be done within reason as there are people who always push it and you quickly learn who they are.

Section C. Transparency decision criteria

Does your company convey the following information:

Scrap Levels: No

Rework Levels. No

Process repeatability. Yes, we advertise this fact

Supplier Quality issues. Yes. You must generate and NCR. Convey to customers and back to mill.

Continuous Improvement

Cost of Material. Yes. But only on certain contracts. Evergreen and confidentiality agreements are in place. Anyone can go to the mill and buy directly. He thus knows the price. So we secure the business.

Overheads. No

Sub Contract Costs. No

Factory Cost Rates. No

Transportation Costs. Yes. It is in the price.

Cost of Non Quality. Gets NCRed and returned to the mill. The customer might find out and all the information flows. We credit the customer with the full amount of charged.

Order Receipt Process. Our buying is a trade secret. Yes.

Capacity Planning. No

Shipment Process. Yes, road rail sea air and whatever is necessary

Lean Manufacturing. No

Inventory Management. No, we control it in our own group of companies.

Section D. Convey Delivery information.

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1. **Would you like to know who your customers' customer is? I.e. would you like to know that your customer has received the order?** .We know most of the time anyway. We find it beneficial as we can always try and add value. What we have done through period of time is try to give a better product to do the job where there might be a cost saving there.
2. **And if the amounts were specified do you think it would possibly free up cash flow as it would decrease stock holding and increase your lead time to manufacture.** Yes .

Section E: Reward

1. **Do you receive or give beneficial pricing and credit terms or is pricing based on a history and credit application?**
All of our business is done on credit.

- 2. Would you foresee the visibility as discussed as a possibility to earn a return in the form of higher turnover, or by decreasing stock levels and thus increasing working capital?**

It does help turnover as with those customers, you secure your forward orders and cover the overheads for a period of time. It also increases and decreases depending on the instance. As if you sign into some contract you have to hold more on the floor.

Yes and No. It would do both as if you hold more on the floor. But the more you hold on your floor theoretically the more you should sell. When you doing a special deal with pricing like that and you are doing a 'mill' deal as that is what we consider a mill deal is ultimately it enable you to buy at better bends cos when you buy at the mills the more you buy the cheaper the price until a certain level. So it does tie up cash but also releases the cash for you and enable you to buy more.

Section F: Support

- 1. If your customer finds itself needing urgent attention or help in the form of faster delivery would provisions be made for this based on the relationship that exists or based on reputation and possible future work?**

Yes, it is just a case of communicating and we will assist where ever. It is based on a relationship and each customer is treated on its own merits.

- 2. Does this happen with other customers. Are they SMEs?**

No, not at all. There is no discrepancy

- 3. Does this put any sort of strain on your organisation through loss of gross margin through increased overheads and overtime?**

It will always do so. It always affects you though ultimately it is beneficial for you to do that.

Section G: Visibility and the Bullwhip Effect

- 1. Do you have fluctuations in demand on your production? Or do you make standard production runs?**

Yes whilst you never pre plan emergencies you always entertain it. If there is a cost value you specify the added cost though not extra cost on the negotiated price of the product

Never have standard runs as we can't predict volumes .

- 2. Do you feel that knowing customer's customer will help aid smoothing demand? .**

Not really as few people can forecast their usage upfront. Only if parties are involved in contract negotiations.

3. Are you transparent with your suppliers ability to supply you with your clients and in this case Steel Co?

Yes

4. Do you understand the concept of visibility?

Yes

5. Once understood, do you think that the transparency and collaborative working relationship would be beneficial if managed correctly? Or do you think that the risks involved in creating this relationship are too large.

Yes of course, to both parties. To customer and supplier. There are many a time where we walk away from the deal. It is generally due to payment terms and credit availability.

6. Would there be benefit in a quantitative study. .

It is difficult to say that as we have analysed our business through and through. But given the international price parities we cannot judge. We analyse this very carefully and being aware of our market prices.

7. Do you perhaps think that given the above, it currently already exists?

100%

Appendix H Director of Galvanising Co Transcript

Interviewee - Director

Interview 5

Section A Company background

1. How long has your company been in existence?

Since 1999

2. What industry do you specifically consider yourself apart of?

The Metal Industry, specifically manufacturing

3. How long has your company been trading your current product range?

Since 1999

4. How many people do you employ?

165

5. Where do you fit according to the South African business act's definition of a business. I.e. Small medium or large.

Medium company according to turnover and employees

6. What sector are you apart of in the act?

Manufacturing

7. Do you want to grow your company further?

No, we have consolidated

8. Are the constraints in house or outside factors?

In-house constraints are always going to be labour as well as cost. External constraints are that there are many galvanisers in the market, specifically in Gauteng. There is also competition from India and China

- 9. Further to the above, would you prefer to increase net profit over market share and turnover. I.e. keep the company the same size yet increase its returns? Would you prefer margins to be better?**

Given that we have consolidated we are always looking at our current process and trying to get the most out of it as possible. So we are continuously trying to achieve better margins.

- 10. Is there a lot of competition in your line of work?**

As mentioned before, yes. Specifically in Gauteng and now with imports.

- 11. Do you think that this competition has come about due to a gap that has come about and been created either through lack of service lack of quality or for instance such as the inclusion of these standards. As these standards can be over looked and I am sure cost money to enforce. I.e The standards affect margin. Etc.**

There is always competition from a quality and service perspective. In 2009 many large companies with their own galvanising plants did not have enough work to keep the plants busy so they began outsourcing the plants. It created a lot of competition almost overnight.

- 12. Does the market prefer price over quality?**

Though one can pride themselves on service though customers are always trying to squeeze a better price out of you for their own benefit.

- 13. Is the competition brought about through pricing, quality, service? Or anything else that may come to mind?**

As mentioned earlier, price. Though we like to think our service has given us a competitive edge.

- 14. What are the main risks that your company endures? Strike action, financial, competition, service, expertise, information etc.**

In 16 years we have had 2 strikes, they were industry wide. Naturally in business there is always financial risks. Regarding information, we only supply one product, so from an information perspective only timing is critical.

Section B Level of Transparency – Dissemination

- 1. How long have you been working at this present organisation.**

1999

2. Would you feel that Steel Co is a good customer to have?

Yes

3. If so, why? Payment, reputation.

RMW always pays on time. There is a very good working relationship. It is open and everyone tries to help out where possible.

4. Does Steel Co convey who its customers are for a specific job?

At times it is mentioned in passing but we consider it a job for RMW and thus the end customer is not of too much importance.

5. Are you aware of other products and services that Steel Co trades or constructs?

No only those that we deal with and I know that they are in construction.

6. Would this be information, both the customers and type of work that you would like to know?

No, we only focus on what our core business entails.

7. If large contracts to reputable companies were available, would a company such as your self be open to creating a fully transparent working relationship?

We have done it before on a specific construction site, where RMW approached us and together we got our pricing down to such a rate that it was competitive. RMW duly received the work and so did we. This was done in an open environment.

8. If there were no large contracts, would it benefit you to have a more transparent level of communication with RMW?

I think an open relationship is the way to go in business.

9. What information do you convey to Steel Co? Price, supplier, level of stock, discounts, terms of discounts?

We have a price per ton, which is known, we have a standard discount policy with the terms. As for our stock, we don't really keep stock and what we do have on site is expensive and thus we would prefer to keep it undisclosed.

10. If Steel Co had a crisis of some sort would you try and help the company in any way possible, be it payment terms, discount etc.

Always, if a customer is a good customer, we will always try and help. Though people always try their luck.

11. If it was proven that such an act would help sustain a supply chain and actually benefit the market as a whole would you change your mind? N/A

Section C Transparency decision criteria

Does your company convey the following information:

Scrap Levels:

Don't have scrap, no

Rework Levels.

Never

Process repeatability.

No

Supplier Quality issues.

No, we sort this out

Continuous Improvement,

No

Cost of Material.

No

Overheads.

No

Sub Contract Costs.

No

Factory Cost Rates.

No

Transportation Costs.

Yes It is built into our quoted price

Cost of Non Quality.

No

Order Receipt Process.

Yes

Capacity Planning.

No

Shipment Process.

Yes

Lean Manufacturing.

No

Inventory Management.

No

Section D. Convey Delivery information.

Yes. We prefer the goods to go back to HQ as we found it cost us money if we delivered to some sites. It cost us time too.

- 1. Would you like to know who your customers' customer is? I.e. would you like to know that your customer has received the order?**

It does not matter, as we are mainly concerned with our direct customer and their requirements. It does happen on occasion whereby we get phoned and told that an order may be place with our customer and in turn with us. It is difficult to reserve that capacity based on this. But if in constant contact which all good relationships have, this should be fine.

- 2. And if the amounts were specified do you think it would possibly free up cash flow as it would decrease stock holding and increase your lead time to manufacture.**

Yes most certainly. Though definitive contracts would already have to be in place and the work guaranteed.

Section E. Reward

- 1. Do you receive or give beneficial pricing and credit terms or is pricing based on a history and credit application?**

Yes, we receive and give standard discounts and credit terms.

- 2. Would you foresee the visibility as discussed as a possibility to earn a return in the form of higher turnover, or by decreasing stock levels and thus increasing working capital?**

Perhaps efficiency, so free up cash.

Section F. Support

- 1. If your customer finds itself needing urgent attention or help in the form of faster delivery would provisions be made for this based on the relationship that exists or based on reputation and possible future work?**

We are open to it, though it must be a good customer and the relationship works both ways. We have found this to be exploited in the past.

- 2. Does this happen with other customers. Are they SMEs?**

Good loyal customers, irrespective of size are taken into account. We have huge organisations on a COD basis.

- 3. Does this put any sort of strain on your organisation through loss of gross margin through increased overheads and overtime?**

If it goes past 45 days it puts a lot of strain on the company as it ties up the cashflow.

Section G. Visibility and the Bullwhip Effect

- 1. Do you have fluctuations in demand on your production? Or do you make standard production runs?**

Yes, though we do have standard production runs.

- 1. Do you feel that knowing customer's customer will help aid smoothing demand? No.**
- 2. Are you transparent with your suppliers ability to supply you with your clients and in this case Steel Co?**

We have very good supplier relationships and they are very punctual and trust worthy so there is no need to. We pride ourselves on our service.

3. Do you understand the concept of visibility?

Yes

4. Once understood, do you think that the transparency and collaborative working relationship would be beneficial if managed correctly? Or do you think that the risks involved in creating this relationship are too large.

Yes I think it would be beneficial. It would allow planning.

5. Would there be benefit in a quantitative study.

I don't think so.

6. Do you perhaps think that given the above, it currently already exists?

No

Appendix I Head of Powder Coating - Steel Co.

Interviewee – Head of Powder Coating – Steel Co

Interview 6

Section A Level of Transparency – Dissemination

1. How long have you been working at Steel Co?

2.5 years as head of powder coating.

2. Would you feel that Steel Co is a good customer to have?

Yes

3. If so, why? Payment, reputation,

They are efficient and a very good reputation in the market place

4. Does RMW convey who its customers are for a specific job?

It does influence what we need to produce, they order 10, 40m, that type of thing.

5. Are you aware of other products and services that Steel Co. trades or constructs?

Well the construction site outside which I am slightly involved in as when the plant is not running, my guys go outside and help prepare the product outside.

6. Would this be information, both the customers and type of work that you would like to know?

Not really

7. If large contracts to reputable companies were available, would a company such as your self be open to creating a fully transparent working relationship. I suppose the fabrication side would be a better example than the construction. Would you put Chubb Fire in touch with MacSteel or the company that manufactures the locks for the cabinets?

Yes I think we should; there is always a human risk or corruption and giving business secrets away. Though if this wasn't the case and it would jeopardise the factory in any way. The more guys we have working, discussing it with more people then everyone helps.

8. If there were no large contracts, would it benefit you to have a more transparent level of communication with Steel Co?

I don't think it would make a difference with large companies that simply supply. A company like Ferro, who supplies the powder for the cabinets only supply powder and thus wouldn't care. I don't think it would be beneficial due to the size of the company and due to Ferro not being involved in production.

What is your lead time on the Ferro Powder? 2 days, when I order. It is normally 2 days as they keep stock for us. We normally order 500kg a month. They always have stock for us. I never order 500 kg any more as it is too expensive for us. When I look at the calendar and work out how many days I have (in stock), I order accordingly. So in other words I order 6 boxes or 4 boxes, so I am not sitting at the end of the month with a hell of a whack that Ken has to pay. I try and work it out. The same applies to the gas.

Would it help if Reatile who supplies the gas knew Ferro? No, they don't actually, all Reatile does is take orders. The load up a tanker, the Tanker goes to Secunda. It loads up the gas at Secunda, the liquid gas, comes here and drops off a 1000 litres and then moves to the next shop. They have nothing to do with the customer. All they do is deliver whatever you order. The delivery time is 3 days.

I keep a record every day of the percentage of the tanks. So I know exactly. If Francious came to me and asked when do I need gas? I can say Wednesday etc. The same goes for the diesel.

9. If a supplier had a crisis of some sort would you try and help the company in any way possible, be it payment terms, discount etc.

If that was the case I think we would as Ken has a soft heart. It would have to be really serious.

10. If it was proven that such an act would help sustain a supply chain and actually benefit the market as a whole would you change your mind?

It would have to be a huge situation before we get involved.

Section B Transparency decision criteria

Does Steel Co or yourself convey the following information:

Scrap Levels:

I record them though we don't share it. If I have a reject, I can fix it. If the problem reoccurs then we will only scrap it. I prefer to put the defects aside and when we have time I attend to them.

Rework Levels.

We do our best to rework things. Whether by sanding it. It is just between Ken and myself. Other times not even Ken knows about it if it is a small object

Process repeatability.

No, has nothing to do with anyone. I must maintain a 60 micron coat.

Supplier Quality issues.

We changed from Ferro, to Powder Lak, to JTL. We went back to Ferro and then got a better price. This information is not shared.

Continuous Improvement.

We always try improve the process. It is all in house. I am very lucky in the respect that it is just one colour. The hassle comes in when you changing colours. There is where the loss comes in. Changing colours, throwing the powder away, get sweepings, getting contamination. Here you don't have it, it is an extremely streamline process.

Cost of Material.

You are well aware of the cost of material, cost of the powder used. It is not conveyed. It has nothing to do with anybody.

Overheads.

No. The only one to discuss that kind of thing is Ken.

Inventory Management.

It gets recorded three times a week. I record the raw stock on the floor. It is all in house. I go to Francious and let him know what is needed.

Section C. Convey Delivery Information

1. **Would you like to know who your customer's customer is? I.e. would you like to know that your customer has received the order?**

No it doesn't make any difference to me.

2. **Do you think that it could make a difference when, Do you think there is a possibility of a delay if a big company places and order with Chubb. They sit on the order for 4 or 5 days but when they tell Steel Co they require it in 2 days.**

That is exactly what happens.

3. **Don't you think it is then in your best interest to know the end customer as you know that they have placed the order, so you can already get things ready. Thus irrespective if Chubb delay in the delivery information you can already have the goods awaiting them. So if end company knew they wanted Steel Co product would this not benefit.**

This would not work and I will tell you why. Chubb for arguments sake may feel that you are undermining him by going direct to his customer,

4. **This comes to my discussion that if everyone understood their role to play. Chubb is a provider and servicer of fire equipment, we are the manufacturers of fire equipment and the end user is the user of fire equipment. If everyone understood their role and was 100% transparent and there were agreements put in place that protected each entity. Then do you think it would be a nice to have.**

It would be yes, but... like I say to you, if, which is the case in republic. If the quality that Republic is putting out is good, the end user, the end user is only going to ask for republics product. Then you have to get the customer to realise where the quality is coming from. Which will give him the quality he is looking for.

5. **So do you not think that you would really like to know who the end customer is as you would really like them to know who you are. As at the moment they do not know that the product is a Steel Co cabinet. So do you think this would create a perfect working environment?**

It would yes, but you remember, that is where you get the human factor. They will be suspicious. You have the human side. That is the failing thing. In all scenarios if we could all get together and work like that it would be perfect. We would never have a backlog or would never have a bottle neck.

6. **And if the amounts were specified do you think it would possibly free up cash flow as it would decrease stock holding and increase your lead time to manufacture**

Yes it would help a "hell" of a lot, Yes. We have so much tied up in idle stock. We are sitting here with at least 300 brackets that haven't been sold as we have to do the production run.

Section D. Support

1. **If Steel Co. finds itself needing urgent attention or help in the form of faster delivery would provisions be made for this based on the relationship that exists or based on reputation and possible future work?**

With Steel Co's reputation being so good. Macsteel would probably assist in credit terms and Chubb for that same matter knows the quality and they would assist.

Section E. Visibility and the Bullwhip Effect

1. Do you have fluctuations in demand on your production? Or do you make standard production runs?

Yes very much so. It is actually calendar wise. There are slack periods then busy periods. It also depends on the building industry. You might get a person who puts up a simplex. It might be another 10-15 years before you get another one. That is exactly what happens in this factory. Chubb order 50 and Joe Soap orders 50 and somebody else's order is 30. Now you don't have any stock. They might order it on the same day for delivery in 2 days.

2. What has happened now is that it has forced republic to hold stock, giving no lead time to the manufacturer.

Then you have dead money standing on the shelf.

3. Do you feel that knowing customer's customer will help aid smoothing demand?

Definitely

4. Are you transparent with your suppliers' ability to supply you with your clients?

No other than to Lilian. I don't have many problems. The only problem I had was dirty benzene. I complained to Lilian. We ended up insisting on a brand new drum as they were putting new benzene in a dirty drum.

5. Do you understand the concept of visibility?

Yes.

6. Once understood, do you think that the transparency and collaborative working relationship would be beneficial if managed correctly? Or do you think that the risks involved in creating this relationship are too large

I think the risk is too great. I think a closed shop is the way to go. This as we cannot foresee what orders are coming.

7. Would there be benefit in a quantitative study?

I don't feel the effort done in powder coating would warrant such an exercise. We manufacture on demand. When Lindy gets an order she comes straight to me. On the chart it has the date of order and the delivery date required.

So what happens is that it comes in. Your order gets placed at that specific date and she must arrange with me when she can tell the customer they can have delivery.

If we come across a large order we know whether we can do it. Other times we have to ask if the order can be split.

8. Do you perhaps think that given the above, it currently already exists?

I am sure it does. Especially if you have a small customer base.

Appendix J Factory Manager- Steel Co

Interviewee – Factory Manager

Section A Level of Transparency – Dissemination

1. How long have you been working with Steel Co

Plus minus 11 years

2. Would you feel that Steel Co is a good customer to have?

I think so, in terms of the product that we deliver and the lines that we work on. The stuff is good quality. The stuff goes out nicely,

3. If so, why? Payment, reputation,

The credit we have we always pay and I have never had any complaints with regards to this.

4. Does Steel Co convey who its customers are for a specific job?

Due to being in the same line of business. Everyone generally knows everyone and thus knows who has the work. Sometimes it goes so far as in the construction that the supplier knows where the job is occurring.

5. Are you aware of other products and services that Steel Co trades or constructs?

There could be a few. Could go to market with a wide variety of products that RMW has the capability of producing though has never considered. If this were conveyed, something could come from it.

6. Would this be information, both the customers and type of work that you would like to know?

Definitely as there is always a space for a new service to be delivered to the clients. So if this were conveyed something could come from it. The SA Block case is a revolving client. They were looking for someone to do the work for them and we found out about it and tried to actively get involved.

7. If large contracts to reputable companies were available, would a company such as your self be open to creating a fully transparent working relationship. I suppose the fabrication side would be a better example than the construction. Would you put Chubb Fire in touch with MacSteel or the company that manufactures the locks for the cabinets?

I'm sure we could do that. One must keep the lines open for communication for the delivery of the product.

- 8. If there were no large contracts, would it benefit you to have a more transparent level of communication with Steel Co? Would you be hesitant?**

If it is your own design and makes the product better then you limit the information. Open upto a point. Open to stock levels and capability but when it comes to design you do not want to just convey this.

- 9. What information do you convey to Steel Co? Price, supplier, level of stock, discounts, terms of discounts/.**

- 10. If Steel Co had a crisis of some sort would you try and help the company in any way possible, be it payment terms, discount etc.**

I'm sure they would. It is not a new company and every company has its ups and downs. There has been times were things were tight and everyone tries to help one another.

We have helped a number of clients. They are very good clients. At times can only pay in 60 days. If it is a good customer, then sure, why not.

- 11. If it was proven that such an act would help sustain a supply chain and actually benefit the market as a whole would you change your mind? N/A**

Section B Visibility and the Bullwhip Effect

- 1. Do you have fluctuations in demand on your production? Or do you make standard production runs?**

On the Fire Stuff we have standard runs. Obviously there is some demands that come in where some months there is only 100 cabinets sold and other months could be 5.

The same applies to the construction side. One month we might do 20 tons and other months we might do 5.

- 2. Do you feel that knowing customer's customer will help aid smoothing demand?**

Look, that is difficult. Guys do not want to give out who they do the work for. It is very difficult to know. On the construction side we always generally know as we know which site we are working on though were would never be able to work with those guys directly.

If the world was a perfect place, everything would run smooth but this is not the case.

3. **Are you transparent with your suppliers ability to supply you, with your clients and in this case**

Yes

4. **Do you understand the concept of visibility?**

Yes

5. **Once understood, do you think that the transparency and collaborative working relationship would be beneficial if managed correctly? Or do you think that the risks involved in creating this relationship are too large**

If you have an open plan like that and there is communication amongst each other, then you will know what is wanted at the end of the day so you will be able to sharpen up your product.

There is a problem in that I would not like my customers to go to my preferred suppliers due to the bond I have created with these guys.

6. **Would there be benefit in a quantitative study**

Not sure

7. **Do you perhaps think that given the above, it currently already exists?**

Yes, I'm sure if one person does it, there must be more than one. We cannot be the only ones open with the suppliers.

Theme: Supplier Quality Issues

a. In the factory is there material that has defects?

Not really no, There are specs that they work to when they manufacture I-Beams and that. Take an example for a 60*60*5 angle iron. Some times that is not square when it comes out of the mill. They have a spec they work on. It can affect the work, depending what you needed for It doesn't happen often.

b. It was observed that steel used in the manufacture of strips used for the filing products was faulty. A line worker came in from the floor. There was a problem with the galvanising?

What the problem was there was they gave us a material with an oil base. It was not the cleaner type, though it was galvanised. They had to take the product back to their floor and exchange it.

c. Did you have to wait for this to arrive?

Yes we had to wait 1 day. Luckily, on their side they were quite quick.

Appendix K Chemical Supplier Questionnaire Answers

Questions forwarded to Chemical Supplier Company

Section A Company background

1. **How long has your company been in existence?** 12 years
2. **What industry do you specifically consider yourself apart of?** PAINT – Chemical Industry
3. **How long has your company been trading your current product range** 12 Years
4. **How many people do you employ.** Over 200
5. **Where do you fit according to the South African business act's definition of a business. I.e. Small medium or large.** Medium Business
6. **What sector are you a part of in the act** Chemical
7. **Do you want to grow your company further?** Yes
8. **Are the constraints in house or outside factors?** Outside
9. **Further to the above, would you prefer to increase net profit over market share and turnover. I.e. keep the company the same size yet increase its returns? Would you prefer margins to be better?** Yes
10. **Is there a lot of competition in your line of work?** Yes
11. **Do you think that this competition has come about due to a gap that has come about and been created either through lack of service lack of quality or for instance such as the inclusion of these standards. As these standards can be over looked and I am sure cost money to enforce. I.e The standards affect margin. Etc.** Yes
12. **Does the market prefer price over quality?** Yes
13. **Is the competition brought about through pricing, quality, service? Or anything else that may come to mind – Mainly pricing**
14. **What are the main risks that your company endures?** Strike action, financial, competition, service, expertise, information etc. Competition

Section B Level of Transparency – Dissemination

1. **How long have you been working at this present organisation** 8 Years

2. **Would you feel that RMW is a good customer to have?** Excellent customer
3. **If so, why?** Payment, reputation, Yes
4. **Does RMW convey who its customers are for a specific job?** No
5. **Are you aware of other products and services that RMW trades or constructs?** No
6. **Would this be information, both the customers and type of work that you would like to know?**
Not necessary
7. **If large contracts to reputable companies were available, would a company such as your self be open to creating a fully transparent working relationship. I suppose the fabrication side would be a better example than the construction. Would you put Chubb Fire in touch with MacSteel or the company that manufactures the locks for the cabinets?** Yes
8. **If there were no large contracts, would it benefit you to have a more transparent level of communication with RMW?** Not necessary
9. **What information do you convey to RMW? Price, supplier, level of stock, discounts, terms of discounts/.** All the above
10. **If RMW had a crisis of some sort would you try and help the company in any way possible, be it payment terms, discount etc.** Yes – definitely.
11. **If it was proven that such an act would help sustain a supply chain and actually benefit the market as a whole would you change your mind?** No

Section C Transparency decision criteria

Does your company convey the following information:

Scrap Levels: N/a

Rework Levels N/a

Process repeatability N/a

Supplier Quality issues Yes – if questioned

Continuous Improvement - Yes

Cost of Material No

Overheads No

Sub Contract Costs No

Factory Cost Rates No

Transportation Costs No

Cost of Non Quality No

Order Receipt Process No

Capacity Planning No

Shipment Process Yes

Lean Manufacturing N/a

Inventory Management N/a

Section D Convey Delivery information

1. **Would you like to know who your customer customer is? I.e. would you like to know that your customer has received the order?** Yes
2. **And if the amounts were specified do you think it would possibly free up cash flow as it would decrease stock holding and increase your lead time to manufacture** Yes

Section E Reward

1. **Do you receive or give beneficial pricing and credit terms or is pricing based on a history and credit application?** History on Credit Application
2. **Would you foresee the visibility as discussed as a possibility to earn a return in the form of higher turnover, or by decreasing stock levels and thus increasing working capital?** Yes

Section F Support

1. **If your customer finds itself needing urgent attention or help in the form of faster delivery would provisions be made for this based on the relationship that exists or based on reputation and possible future work?** Yes most certainly
2. **Does this happen with other customers. Are they SMEs?** All Customers receive special service
3. **Does this put any sort of strain on your organisation through loss of gross margin through increased overheads and overtime?** Yes – but service counts

Visibility and the Bullwhip Effect

1. **Do you have fluctuations in demand on your production? Or do you make standard production runs?** Production runs are pre-planned
2. **Do you feel that knowing customer's customer will help aid smoothing demand?** Yes
3. **Are you transparent with your suppliers ability to supply you with your clients and in this case republic metal works?**
4. **Do you understand the concept of visibility? – Explain concept -** be open with your Customers
5. **Once understood, do you think that the transparency and collaborative working relationship would be beneficial if managed correctly? Or do you think that the risks involved in creating this relationship are too large?**
6. **Would there be benefit in a quantitative study?**
7. **Do you perhaps think that given the above, it currently already exists?**

Appendix L Section of Steel Co Income Statement

Below is a section of the major part of the cost of sales of Steel Co from the Steel Co Income Statement from August 2012

2000/001	Enamels and Paints	7 441
2000/002	General	149 409
2000/003	Steel	760 544
2000/004	Powder Coating	53 910
2000/005	Galvanising	148 529
2005/000	Wages	457 599
Total		1 577 432
Steel as a percentage of Total		48.21%
Galvanising as a percentage of Total		9.42%

Appendix M Line Worker Questionnaire

Questions	Yes	No
<u>General</u>		
How long have you been working at RMW?		
What is your main job that you fulfil at RMW?		
Can you name some customers that RMW currently has?		
Do you know which products go to which customer?		
<u>Work</u>		
Do you know how many parts you can make in 1 hour		
Do you know who the supplier of the steel is		
Do you know who any of the other suppliers are		
Do you think other people in the factory know who the customers are		
Do you think other people in the factory know who the suppliers are		
Do you keep track as to what you do each day?		

Appendix N Examples of Completed Steel Co Construction Work



Decorative sheet metal work –
Carnival City



Decorative balustrading work –
Emperors Palace Casino



Structural steel work – Standard
Bank

Appendix O Steel Co Standard Fire Equipment Products



Hose Reel Cabinet



Fire Extinguisher Cabinets



Vehicle Brackets

Appendix P Sundry Made to Order products of Steel Co



SABS Approved tamper proof prison
light fittings



Electrical Distribution Boxes