

**SUPPLY CHAIN RISKS EXPERIENCED BY STELLENBOSCH WINE PRODUCERS**

by

RODNEY TREVOR NAUDE

submitted in accordance with the requirements  
for the degree of

MASTER OF COMMERCE

in the subject

BUSINESS MANAGEMENT

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: PROF JA BADENHORST-WEISS

2018

## DECLARATION

I declare that **SUPPLY CHAIN RISKS EXPERIENCED BY STELLENBOSCH WINE PRODUCERS** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.

Rodney Trevor Naude

Student number 7692374



Signed on the 25 day of .January..... 2019

## ACKNOWLEDGEMENTS

I dedicate this research study to my wife, Micheline, who supported, and encouraged me through this whole study process. Her guidance and feedback helped keep me on track when I was going awry and her suggestions, input and advice were invaluable. Thank you for all you do for me!

I would like to thank my supervisor, Professor Hannie Badenhorst-Weiss, not only for her willingness to take this 'old dog' on as a student, but also for her commitment to me as a student. Your valuable guidance, support and feedback was most appreciated.

I would also like to thank my gatekeeper, James Browne, for his support in supplying me with wine industry information and particularly for interfacing with his colleagues in the wine industry and obtaining their approval to undertake the study at their producer estates. Thank you for taking this "risk" by supporting me and my study as you set me loose on your valuable wine industry contacts!

I am extremely grateful to the participants at each wine producing estate for giving up their valuable time to be interviewed and for their candour in supplying information regarding the challenges faced by their industry, the risks faced by their estates and the strategies to manage and overcome these risks. Your skill, knowledge and expertise were indispensable to the completion of this study and to its results. Your commitment and passion to producing such world class wines made this study interesting and exciting. This researcher will never again see a bottle of wine in the same light as he did before the study commenced!

Thanks are also extended to my editor Dr Caroline Goodier for her skilled editing and to the UNISA staff members Dr Marianne Engelbrecht and Ms Carmen Poole for their assistance in obtaining ethical clearance.

Finally, I give thanks to the triune God, the Father, the Son Jesus Christ and the Holy Spirit, for blessing me and my life so abundantly, and for the direction to undertake such a study at this late stage of life. With God all things are possible!

## **ABSTRACT**

The South African wine industry is a significant contributor to the South African economy. However the wine producers are facing financial and operational challenges as they operate and compete in a highly traded local and international wine market. These financial and operational challenges manifest as risks in their supply chain and could affect the future sustainability of their business. It against this backdrop that this study aimed to identify the supply chain risks experienced by the Stellenbosch wine producers, and how they manage and overcome these risks.

The research was conducted at five wine producers located in each of five Stellenbosch wine producing areas. The producers were selected through a non-probability purposive sample with the assistance of a gatekeeper. The study is descriptive and exploratory with qualitative data collected through semi-structured interviews with ten participants from the five wine producers. The data was analysed using thematic analysis.

The study found that the main risk factors centered around: the planning activities concerning the risks involved in matching demand and supply; agricultural activities including the drought and other external hazard risks; the wine making activities including in-process controls; financial risks including margin erosion due to inflationary costs not being matched by selling price increases; and human resource risks. This study recommends that wine producers use a formal risk appraisal process, implement a supplier development process, could make use of precision viticulture methods and improved pest control measures.

**Key Words: South African wine industry; wine supply chain; risks; supply chain risks**

## TABLE OF CONTENTS

DECLARATION	i
ACKNOWLEDGEMENTS	ii
ABSTRACT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF COMMONLY USED ACRONYMS	xii
<b>CHAPTER ONE: INTRODUCTION AND BACKGROUND TO THE STUDY</b>	1
1.1 INTRODUCTION AND BACKGROUND	1
1.2 SUPPLY CHAIN AND SUPPLY CHAIN MANAGEMENT	2
1.3 RISK	7
1.3.1 Business risk	7
1.3.2 Supply chain risk	8
1.3.3 Risk management	9
1.3.4 The importance of risk management	10
1.4 STATEMENT OF THE RESEARCH PROBLEM	11
1.5 RESEARCH QUESTIONS	12
1.6 RESEARCH OBJECTIVES	13
1.7 RESEARCH PROCESS	13
1.8 RESEARCH ELEMENTS	16
1.8.1 Research design	16
1.8.2 Research methodology	17
1.8.3 Target population	17
1.8.4 Sampling method	18
1.8.5 Sampling size	18
1.8.6 Participants	18
1.8.7 Data analysis	19
1.8.8 Data quality control: The establishment of trustworthiness	19
1.9 ETHICAL CONSIDERATIONS	20

1.10	DELIMITATIONS AND ASSUMPTIONS OF THE STUDY	20
1.11	EXPECTED CONTRIBUTION TO KNOWLEDGE	21
1.12	CONCLUSION	21
1.13	CHAPTER OUTLINE	22
	<b>CHAPTER TWO: OVERVIEW OF THE GLOBAL AND SOUTH AFRICAN WINE INDUSTRY</b>	23
2.1	INTRODUCTION	23
2.2	OVERVIEW OF THE GLOBAL WINE INDUSTRY	23
2.2.1	Global wine consumption	23
2.2.2	Global wine production	24
2.3	STRUCTURE AND STRATEGIES OF THE GLOBAL WINE INDUSTRY	27
2.3.1	The 'old world' wine producer	28
2.3.2	The 'new world' wine producer	29
2.4	CHANGES IN THE GLOBAL WINE INDUSTRY	30
2.4.1	Consolidation within the global wine industry	32
2.4.2	Future changes for the global wine industry	34
2.5	THE SOUTH AFRICAN WINE INDUSTRY	35
2.5.1	Introduction	35
2.5.2	History and origins of the South African wine industry	35
2.5.3	The South African wine supply chain	38
2.5.4	South African wine producers	41
2.5.5	The Stellenbosch wine growing region	43
2.5.6	Impact of the wine industry on the South African economy	45
2.5.7	Employment levels, employment practices and BBBEE in the South African wine industry	46
2.5.8	Consolidation in the South African wine industry	47
2.5.9	Summary of aspects of the South African wine industry	49
2.6	CONCLUSION	50

<b>CHAPTER THREE: SUPPLY CHAIN, SUPPLY CHAIN</b>	<b>52</b>
<b>MANAGEMENT, RISK AND SUPPLY CHAIN RISK</b>	
3.1 INTRODUCTION	52
3.2 CONCEPTS OF SUPPLY CHAIN AND SUPPLY CHAIN	52
MANAGEMENT	
3.2.1 The supply chain and supply chain management	52
3.2.2 The objective of supply chain management	53
3.2.3 Processes of supply chain management	54
3.2.3.1 Plan	55
3.2.3.2 Source	57
3.2.3.3 Make	57
3.2.3.4 Deliver	58
3.2.3.5 Return	59
3.2.3.6 Enable	59
3.2.3.7 Summary	61
3.2.4 Stages in the South African wine supply chain	61
3.3 RISK	65
3.4 SUPPLY CHAIN RISK	66
3.5 ELEMENTS OF SUPPLY CHAIN RISK	67
3.5.1 Financial risks	69
3.5.2 Operational risk	74
3.5.2.1 Human resource or people risk	74
3.5.2.2 Process risk	75
3.5.2.3 System risk	78
3.5.3 External downside risk	79
3.5.4 Market risk	80
3.5.5 Reputational risk	82
3.6 SUPPLY CHAIN CHALLENGES IN THE SOUTH AFRICAN WINE	82
INDUSTRY	
3.6.1 Introduction	83
3.6.2 Financial issues	83

3.6.3	Operational issues	85
3.6.4	External hazard issues	85
3.6.5	Market and reputational issues	86
3.6.6	Summary	86
3.7	CONCLUSION	86
	<b>CHAPTER FOUR: RESEARCH DESIGN AND METHODOLOGY</b>	88
4.1	INTRODUCTION	88
4.2	REVISITING THE RESEARCH QUESTIONS AND RESEARCH OBJECTIVES	88
4.2.1	Primary research question	88
4.2.2	Research objectives	89
4.3	RESEARCH PROCESS	89
4.4	RESEARCH ELEMENTS / THE RESEARCH UNION	93
4.5	RESEARCH PHILOSOPHY	94
4.6	RESEARCH APPROACH	98
4.7	RESEARCH DESIGN	98
4.8	RESEARCH METHODOLOGY	101
4.9	RESEARCH STRATEGY / TIME HORIZON	102
4.10	DATA COLLECTION	104
4.10.1	Types of data	105
4.10.2	Target population	107
4.10.3	Sampling method	107
4.10.4	Sampling size	109
4.10.5	Participants	109
4.10.6	Interview guide	109
4.10.7	Pre-testing	110
4.11	ETHICAL CONSIDERATIONS	110
4.12	DATA QUALITY CONTROL: THE ESTABLISHMENT OF TRUSTWORTHINESS	111
4.13	DATA ANALYSIS	113
4.14	SUMMARY OF THE RESEARCH DESIGN AND METHODOLOGY	117



	<b>CHAPTER FIVE: DATA FINDINGS AND ANALYSIS</b>	119
5.1	INTRODUCTION	119
5.2	PARTICIPANTS	119
5.3	OVERVIEW OF THE PARTICIPATING WINE PRODUCERS	120
5.4	FINDINGS	122
5.4.1	Risks: Theme 1 - Plan	123
5.4.1.1	Risk identification	123
5.4.1.2	Risk management	128
5.4.2	Risks: Theme 2 - Source	132
5.4.2.1	Risk identification	132
5.4.2.2	Risk management	137
5.4.3	Risks: Theme 3 - Make	139
5.4.3.1	Risk identification	139
5.4.3.2	Risk management	150
5.4.4	Risks: Theme 4 - Deliver	157
5.4.4.1	Risk identification	157
5.4.4.2	Risk management	162
5.4.5	Risks: Theme 5 - Returns	164
5.4.6	Risks: Theme 6 - Enable	164
5.4.6.1	Risk identification	164
5.4.6.2	Risk management	167
5.5	CONCLUSION	168
	<b>CHAPTER SIX: SUMMARY, RECOMMENDATIONS AND CONCLUSION</b>	169
6.1	INTRODUCTION	169
6.2	THE RESEARCH QUESTIONS, RESEARCH PURPOSE AND OBJECTIVE	169
6.2.1	The research question	169
6.2.2	Research objectives	169
6.2.3	Linking the objectives to the data findings in the study	170
6.3	DISCUSSION OF THE RESEARCH OBJECTIVE	173

6.3.1	Research objective 1	173
6.3.2	Research objective 2	179
6.3.3	Research objective 3	183
6.4	LIMITATIONS OF THIS STUDY	192
6.5	FURTHER RESEARCH AREAS	193
6.6	CONCLUSION	193
	<b>LIST OF REFERENCES</b>	194
	APPENDIX 1 Ethical clearance approval	209
	APPENDIX 2 Informed consent	211
	APPENDIX 3 Interview guide	213
	APPENDIX 4 Personal field notes	215

## LIST OF TABLES

Table 2.1: Production statistics - Top 10 producers	26
Table 2.2: Statistics on the level of wine exports	27
Table 3.1: Processes in the South African wine supply chain	62
Table 3.2: An analysis of supply chain risk elements	68
Table 4.1: Key research philosophies	97
Table 4.2: Data collection sources	105
Table 4.3: Thematic map of the interviews	116
Table 4.4: Research design and strategies elements	117
Table 5.1: Details of interviews with participants per wine producer	120
Table 5.2: Key attributes of the participating wine producers	121
Table 5.3: Thematic map of the interviews	122
Table 5.4: Theme 1: Plan	124
Table 5.5: Theme 1: Plan risks per participant	125
Table 5.6: Theme 2: Source	132
Table 5.7: Theme 2: Source risks per participant	133
Table 5.8: Theme 3: Make	139
Table 5.9: Theme 3: Make risks per participant	140
Table 5.10: Theme 4: Deliver	157
Table 5.11: Theme 4: Deliver risks per participant	158
Table 5.12: Theme 6: Enabling or management activities	164
Table 5.13: Theme 6: Enable risks per participant	165
Table 6.1: Linking the literature review of supply chain risk to the findings on risk	170
Table 6.2: Linking the objectives to the findings and relevant sections	173

## **LIST OF FIGURES**

Figure 1.1: A typical supply chain and its flows	4
Figure 1.2: A simple conversion system or process	5
Figure 1.3: The steps in a research process	14
Figure 2.1: The wine supply chain	39
Figure 2.2: Map of the main wine producing areas of the Western and Northern Cape	43
Figure 2.3: Stellenbosch wine producing region indicating the main producers	44
Figure 3.1: The SCOR model arranged around six major management processes	55
Figure 4.1: The steps in a research process	90
Figure 4.2: The research elements or research onion	94

## LIST OF COMMONLY USED ACRONYMS

APICS	:	Association for Supply Chain Management
BBBEE	:	Broad-Based Black Economic Employment
CAP	:	Common Agricultural Policy
CEMS	:	Unisa's College for Economics and Management Sciences
CEO	:	Chief Executive Officer
CFC	:	Customer Foreign Currency Account
DOP	:	Denomination of Protected Origin
EFOW	:	European Federation of Origin Wines.
EU	:	European Union
GDP	:	Gross Domestic Product
IGP	:	Indication of Protected Origin
ISM	:	The Institute of Supply Management
ISO	:	International Organisation for Standardisation
IT	:	Information Technology
KWV	:	Ko-operatiewe Wijnbouwers Vereniging van Zuid Afrika Beperkt
OIV	:	International Association of Vine and Wine
PWC	:	Price Waterhouse Coopers
SAWIS	:	SA Wine Industry Information and Systems
SCC	:	Supply Chain Council
SCOR	:	Supply Chain Operations Reference Model
SME	:	Small to Medium Enterprises
UK	:	United Kingdom
USA	:	United States of America
WIETA	:	Wine Industry Ethical Trade Initiative
WOSA	:	Wines of South Africa
WWTG	:	World Wine Trade Group

## **CHAPTER ONE: INTRODUCTION AND BACKGROUND TO THE STUDY**

### **1.1 INTRODUCTION AND BACKGROUND**

The South African wine industry is the oldest industry in the country having started in the Cape Colony in 1655 with the arrival of the colonial settlers. The settlers were granted land as part payment for their labours, and many planted vineyards on this land and commenced wine production. The industry grew rapidly from these beginnings and, by the 18th century, aided by the conflict between France and Great Britain, who could no longer get access to French wines, the industry became a major exporter of wine to the latter. The Cape vineyards were devastated by disease in the 19th century and, despite the planting of new vines and the production of new crops, the industry struggled to recover to its former levels and went into a long period of decline (Ponte & Ewart, 2007:1; WOSA, 2017).

By the beginning of 20th century, the industry was inwardly focused around co-operatives where protectionism and wine price fixing existed. Poor wine quality was a feature of the industry with wine volume being more important than quality (Ponte & Ewart, 2007:1). The industry was revitalised with the arrival of democracy in South Africa and the termination of sanctions in the mid-1990s when new local investment took place. New farms were established, new vineyards were planted, processes were upgraded, farms were modernised, and wine quality greatly improved (Ponte & Ewart, 2007:1; African Classical Encounters, 2017; WOSA, 2017).

In the 21st century, wine producers, especially the 'new world' producers of which South Africa is one, have been able significantly to grow their export markets (Bisson, Waterhouse, Ebeler, Walker, & Lapsley, 2002:1; Fleming, Mounter, Grant, Griffith, & Villano, 2014:115) due to the internationalisation of wine production and consumption and the demand for wine choices from around the world by the international consumer wants. Thus, South Africa has moved from a supplier-driven to a buyer-driven model of winemaking and marketing (Ponte & Ewart, 2007:1).

The South African wine industry is now an important and key contributor to the South African economy, employing 290 000 people across the whole wine supply chain. South Africa produces 3,9 percent of global wine (Mordor Intelligence Business Report, 2017) and in 2017, together with China, is currently the seventh largest wine producer in the world (OIV, 2018:7). In 2013,

the various activities and value add activities of the wine supply chain contributed over R36 billion or 1,2% of the GDP of South Africa (SAWIS, 2015:viii; Wesgro, 2017:7).

The South African wine industry has benefited from a major increase in export volumes and the resulting improved revenues. However, for the last two decades, this revenue increase has been more than offset by industry wide cost increases above the inflation level, particularly labour, transport and power costs and difficulty in being able to pass these cost increases on to the consumer. The industry is a price taker and is experiencing financial and operational pressures (Price Waterhouse Coopers, 2013:38; SAWIS, 2015:2; Van Eeden, Louw, Van Dyk, Goedhals-Gerber, 2012:18). A third of the wine producers are experiencing negative net farming revenues. In recent years, the industry has also faced extreme weather conditions of drought and heat, which have impacted on their grape yield (SAWIS, 2015:3).

It is, accordingly, apparent that South African wine producers face financial and operational difficulties, which manifest as risks in their supply chains. This could affect the future sustainability of their businesses. It is against this background that this study aims to determine the supply chain risks faced by the wine producers. The study will further examine how wine producers manage such risks to minimise their negative impacts. The study focuses specifically on the supply chain risks faced by wine producers in the Stellenbosch area, which is the largest wine producing area of South Africa, containing as it does 16,1% of the total of the wine producing land in South Africa, over one third of all total of wine producers in the country (SAWIS 2017:8).

## **1.2 SUPPLY CHAIN AND SUPPLY CHAIN MANAGEMENT**

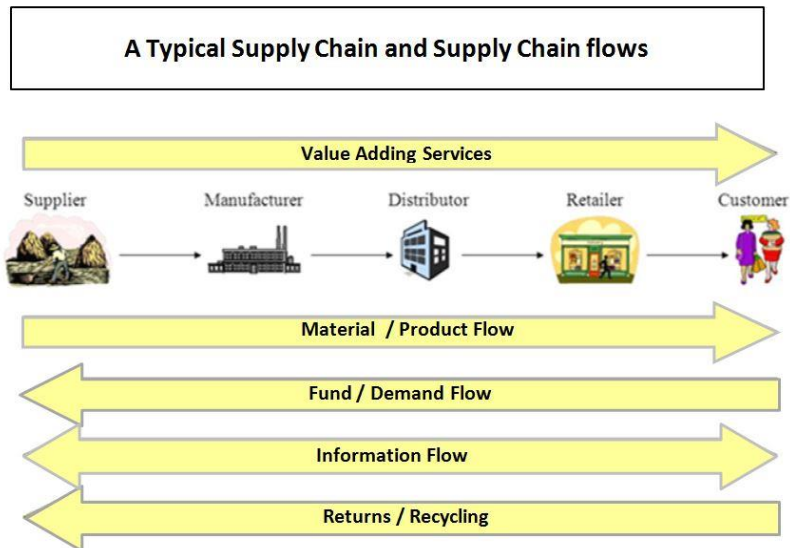
A *supply chain* is a network of all entities involved in manufacturing, supplying and delivering a finished product to an end customer. The activities included in this supply chain include the sourcing and supply of raw materials, the manufacturing of parts, the producing and assembling of products, the storage of inventory in warehouses (raw materials, WIP and finished goods), the capturing of sales orders, the tracking of the sales orders, and the distribution and delivery of products to the end customer (Sanders, 2012:3). A supply chain network also includes functions such as new product development, marketing, operations, distribution, finance and customer service (Chopra & Meindl, 2016:13).

*Supply chain management* can be defined as the design and management of seamless, value added processes across businesses or corporate borders to meet the needs of the final customer (Fawcett, Ellram & Ogden, 2014:6). The goal of every supply chain is to maximise the overall value generated (Chopra & Meindl, 2016:15). This value or surplus is arrived at by subtracting the costs that the supply chain incurs in making and supplying the customer's product requirements from the supply value of the final product charged to the customer (Chopra & Meindl, 2016:15).

Before processes can be managed up and down the supply chain, each business must properly manage its own internal processes. Within any business, a variety of business functions, namely, design, planning, operation or manufacturing, sales and marketing, finance, IT, and human resources management have the responsibility for making decisions that will impact on how much value is created. The value chain is the term used to describe the interconnected nature of these internal business functions. Better processes and more competitive products result when managers within the various business functions, understand the overall business strategy and the customers' real needs, and work efficiently and efficiently together (Fawcett *et al.*, 2014:7).

Throughout the supply chain network are value adding processes and flows. The flows through a supply chain are shown in Figure 1.1 and then described in turn:



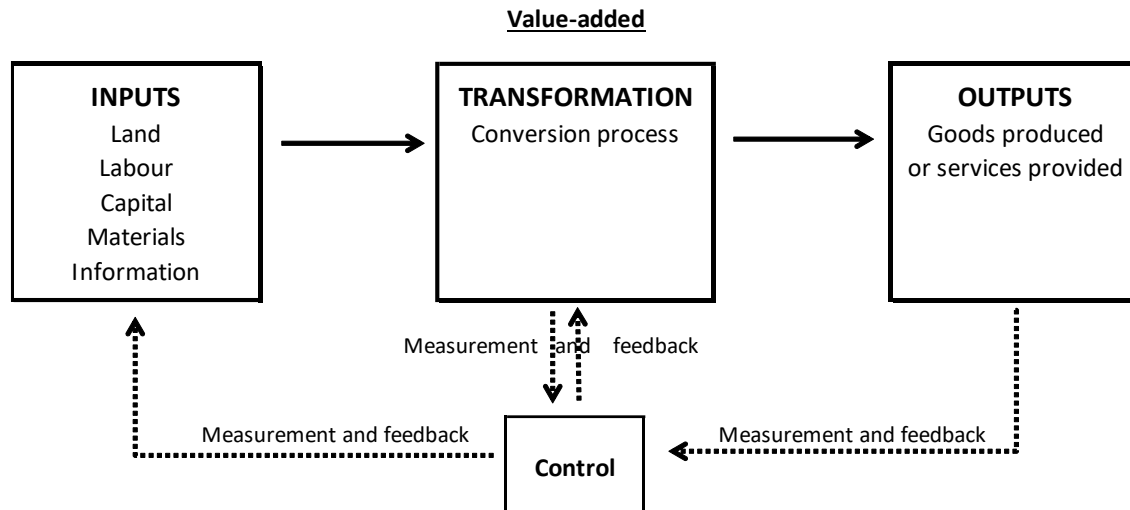


Source: University of Colorado at Boulder: Leeds School of Business, 2017

**Figure 1.1: A typical supply chain and its flows**

The first flow is that of goods or products through the supply chain, from the start of the chain as raw material, through the different stages of production and on to the final customer. In the process, various value adding or transformational steps take place, converting a raw material to a finished product. The second flow is that of information that may be shared between members within the supply chain. This is information from the producer/supplier to the customers and back from the customer to the producer/supplier. In its simplest form, this primary data may be demand for the product from the customer, from the point of sales or basic sales data. The third flow is that of funds. This financial flow is also a two-way flow. It flows down the supply chain, with the producer/supplier investing in capital equipment, inventory and other working capital, plus expenditure on operational costs (labour and various overheads). Funds also flow back up the supply chain from the customer to the producer/supplier and are vital for the sustainability of the supply chain and business. Sufficient cash flow is essential for the sustainability of the supply chain (Sanders, 2012:7). The fourth flow is a flow back through the chain in the form of product returns from customers for various reasons, often due to damage. In its simplest form, this might be the return of product that the customer does not want. It can also include the return of product back to the manufacturer for recycling purposes or return of packaging for recycling (Sanders, 2012:186).

The reason for the failure of many producers or suppliers is their inability to effectively manage their supply chain flows (Sanders, 2012:7). Figure 1.2 presents a simple system or transformation process (Stevenson, 2018:6-7).



**The operation function involves the conversion of inputs into outputs**

Source: Stevenson (2018:6)

**Figure 1.2: A simple conversion system or process**

Supply chains are external and internal to any business, with the external parts of the chain supplying raw materials, components, equipment, services and other inputs. The external parts also deliver the outputs that are the goods to the customers of the business. The internal parts of the supply chain are part of the operations function, supplying operations with raw materials and components, performing work on the products and providing services to the operation. The creation of goods or services involves converting inputs into outputs. The inputs are such as capital, labour and information used to create goods using the conversion processes. The end of the conversion processes includes the storage of the goods, as well as the transportation and distribution of the goods to the ultimate customer. The key to the operations function is to ‘add value’ to the conversion process, and this term describes the difference between the costs of the inputs and the value or price of the outputs. To ensure that the desired outputs are achieved, a business takes measurements called feedback at various points in the transformation process. The business then compares these measurements with previously established standards to decide

if corrective action to the conversion process is required. This is a control function (Stevenson, 2018:6-7).

*The wine supply chain* is complex. It starts with the farmer planting and tending the vines through to the actual wine production process and sees completion when the consumer makes a wine selection off the supermarket shelf and takes it home to consume the end product (Petti, Raggi, De Camillis, Matteucci, Sara, & Pagliuca, 2005:4).

The wine supply chain has five stages. The first stage begins with the grape producer (or grower or farmer) who produces the grapes (grape production) and encompasses all parts of the agricultural operations, including managing and caring for the land, the vines and the crop. It also includes the management of the equipment and employees (Petti, *et al.*, 2005:9; Monday & Wood-Harper, 2010:17). The second stage of the wine supply chain covers wine production and includes operations such as separating the grape from the stalks, crushing, fermentation, separating out the solids from the liquids, filtration, refrigeration and storage. It includes all process and quality controls, including sampling, testing and tasting (Petti, *et al.*, 2005:9; Monday & Wood-Harper, 2010:17).

The third stage of the supply chain covers the packing of the product into the bottle or other container and boxing, as well as storage of the finished product (Petti *et al.*, 2005:9; Monday & Wood-Harper, 2010:17). The fourth stage of the supply chain is the distribution stage, which covers the process of transporting the finished product to the distributor and retailer. It includes the correct handling of the product during transportation (temperature control and handling with care to prevent damage) (Petti *et al.*, 2005:9; Monday & Wood-Harper, 2010:17). The fifth and final stage of the supply chain is the shopper or consumer phase. Here correct handling and storage of the wine is vital and can impact on the final product quality and whether the consumer actually buys it (Petti *et al.*, 2005:9; Monday & Wood-Harper, 2010:17).

It is vital that the flow of information up and down the whole supply chain is good. This assists the wine producer to know what his customers' actual tastes and wants are and therefore to know what vines to plant and how much to wine to produce. Correct and on time supply chain information can also assist in improving supply chain performance and contributes positively towards improving the profits and cash flows of producers (Price Waterhouse Coopers, 2013:47).

This section has outlined and described the supply chain and its flows, explaining supply chain management in general as well as presenting the wine supply chain. A detailed explanation of supply chain management, including its objectives and its key components, is provided in section 3.2.

This study focuses on stages one to four of the wine supply chain. For the South African wine producer, within each of the stages of the wine supply chain, there are risks. The concept of risk, including supply chain risk and the management of the risk, as well as the importance of this management process for a business and its ongoing sustainability, is explained in the section 1.3 below.

## **1.3 RISK**

### **1.3.1 Business risk**

The Oxford dictionary defines risk as "a chance of possibility of danger, loss, injury or other adverse consequences", while the Institute of Risk Management (Hopkin, 2017:17) notes that risk is the combination of the probability of an event and its consequences. Risk is the effect of uncertainty on objectives being seen as an event, a change in circumstances, or a consequence. The consequences can range from positive to negative, and every risk has its own characteristics that require analysis and management (Hopkin, 2017:17).

After the events triggered by the 2008 economic crisis, businesses are taking a greater interest in and ensuring proactive management of risk through heightened focus on risk management. It is no longer acceptable for businesses to find themselves in a position whereby unexpected events cause financial loss, disruption to normal activities, damage to reputation and loss of market presence. Stakeholders expect businesses to take full account of all risks that might cause disruption of operations, late delivery of projects, or failure to deliver against strategy (Hopkin, 2017:24).

Business risk can include a variety of factors with potential impact on activities, processes and resources of a business. External factors can arise from the economic changes, financial market developments and dangers that arise in political, legal, technological and demographic environments. Risk can emerge over time; for example, the public can change their views on products or practices (Olson & Wu, 2015:7).

At the broadest level, risk is defined as the deviation or variability of actual results from desired or expected results (Hugo & Badenhorst-Weiss, 2011: 97). Risk applies to any management decision that could have a good or bad outcome. It follows that most management decisions carry some degree of risk (Sadgrove, 2016:4). Therefore it is important to understand the risks that can arise from making a decision, or from avoiding or delaying making decisions that are beneficial for the business. Managing and balancing the decisions and the risks that arise with the return is not only important to an investor but is also imperative for the management team of any business (Lam, 2014: 4).

The issue of risk may only be appreciated in its full context when the concept of managing this risk is understood. Supply chain risk is explained in section 1.3.2 below.

### **1.3.2 Supply chain risk**

Supply chain risk is defined as the likelihood of a disruption that would impact the ability of the business continuously to supply products and services. Supply chain disruptions are unplanned and unanticipated events that disrupt the normal flow of goods and materials within a supply chain and which expose firms within the supply chain to operational and financial risks (Jacobs & Chase, 2018:33).

Risks threaten to reduce productivity, increase costs and liabilities and reduce profits (Michalski, 2009:213). Therefore, risk management has become a necessary tool (Wu & Olson, 2009:362; Benton, 2014: 363). The field of supply chain risk management has come into being through several catastrophic events and natural disasters, globalisation, intensified competition and the onset of integrated production methods. Supply chain risk management is a developing focus area in supply chain management research (Hoffmann, Schiele, & Krabbendam, 2012:1). Tang and Musa (2011:8) posit that supply chain risk is found in each of the main supply chain flows of products, information and funds. These flows were dealt with in section 1.2.

The first important step in managing and controlling risk is to recognise what risks there are and where they are to be found in any supply chain situation (Fawcett *et al.*, 2014:105). Risk management is discussed in section 1.3.3.

### **1.3.3 Risk management**

The ISO Guide 73 BS31100 defines risk management as "the coordinating activities to direct and control an organisation with regard to risk" (Hopkin, 2017:46). Risk management is a broad

concept that involves the identification of negative events or risks, an assessment of the likelihood of the risk occurring, the potential impact of the risk and the development of strategies for addressing those risks (Monczka, Handfield, Giunipero & Patterson, 2016:259; Stevenson, 2018:654). Global supply chain risk management depends on how the supply chain members communicate and collaborate regarding sources of risk, the utilisation of supply chain management tools to mitigate and minimise risk, and any uncertainty across the supply chain. Supply chain risk management is a systems approach employing strategies or taking appropriate actions (Monczka *et al.*, 2016: 356). Key to the effective management of the risk is that the control thereof must be done in an economic and or cost effective way (Badenhorst-Weiss, Van Biljon & Ambe, 2017:373).

As already indicated above, there are a number of steps in the management of supply chain risk (Monczka *et al.*, 2016:259; Stevenson, 2018:654). Each step is described below.

#### *Risk identification*

The first step in the supply chain risk management process is the actual identification of the risk. This comprises systematically identifying the sources of any potential external and internal risk, starting with the interrogation of the supply chain to understand where risk might arise and what could trigger the risk (Zsidisin & Ritchie, 2008:4; Hallikas & Lintukangas, 2016:57). An important part of this identification process is to ensure that, once the risks have been identified, they should be recorded and then monitored (Scarborough, Wilson, & Zimmerman, 2009:730)

#### *Risk analysis and assessment*

The second step in managing risk is the evaluation of the probability of the occurrence of a possible risk and the prediction or estimation of its impact (Zsidisin & Ritchie, 2008:4). This stage therefore, has two perspectives, namely, the likelihood that a risk will occur and the extent of the impact if the risk actually occurs (Ho, Zheng, Yildiz & Talluri, 2015:132).

#### *Risk response treatment*

The third stage of supply chain risk management involves generating and considering alternate scenarios and/or solutions, assessing and judging the merits of these scenarios and solutions, arriving at appropriate solutions and following up by implementing these solutions (Zsidisin & Ritchie, 2008:4). Broadly this process leads to arriving at mitigating strategies or actions to eliminate, reduce or counteract the risks (Hoffmann, Schiele & Krabbendam, 2012:4). Possible

actions may include risk avoidance, risk assumption, risk elimination, risk reduction and risk transfer. Such actions or strategies are briefly explained below.

Risk avoidance is the taking of steps or actions to avoid the risk. For example, locating a warehouse on high, well drained ground to avoid the risk of flooding. Risk assumption occurs when the party that is exposed to the risk merely accepts it and the losses that might arise. This is a valid strategy if the cost of an action to avoid a risk is high in relation to the small cost of the actual loss. Risk elimination involves taking actions or introducing procedures to eliminate a risk. Risk reduction aims at reducing the likelihood of the occurrence of loss or reducing the severity of the loss should it occur. Risk transfer is the action of transferring the risk to another party such as, for example, through a lease agreement with a third party. Thus, leasing computer equipment allows the user of the equipment to transfer the risk of obsolescence to the owner (Hugo & Badenhorst-Weiss, 2011:103)

#### *Risk monitoring and evaluation*

The fourth and final step in risk management involves monitoring, controlling and managing solutions, and assessing their impact on the area of a business or the business itself (Zsidisin & Ritchie, 2008:4). It must be noted that risks change over time; therefore risk management is a dynamic process. The severity of the impact of a risk can equally change over time. Risk management is therefore important (Chang, Xu & Song, 2015:55)

#### **1.3.4 The importance of risk management**

Even though businesses in different industries differ widely with regard to how their supply chains operate and the efficiency of these supply chains, most businesses recognise that improvement in the supply chain is vital and continuous. There are a number of common focus areas or trends that supply chains focus upon, including greening of the supply chain, re-evaluating outsourcing, a greater integration of IT systems, a greater emphasis on lean principles and, importantly, risk management (Stevenson, 2018:657).

All businesses need to identify the risks in their supply chains before a new product or service is introduced (Fawcet *et al.*, 2014:109). Risk management strategies within operational supply chains can involve risk avoidance, risk reduction and even risk sharing with supply chain partners. With regard to suppliers, these strategies can include not dealing with certain unreliable

suppliers and risk sharing with suppliers through contractual arrangements with partners within the supply chain to spread the risk (Stevenson, 2018:657).

A bridging strategy may protect a business from risk or disruption by establishing strong linkages with supply chain partners. Businesses involved in bridging may alter the relationship with their supply chain partners by developing and relying on relationships or through vertical integration such as buying into the supply chain partners business (Mishra, Sharma, Kumar & Dubey, 2016:183).

A collaborative risk management technique for handling purchasing and supply risks includes supplier development assistance, which includes: working with the supplier to improve the systems, controls and disciplines used; requiring a supplier to have certification which provides assurance of the supplier's capabilities to a conformance standard; and quality management programmes to improve the supplier's abilities and activities (Hugo & Badenhorst-Weiss, 2011:104).

An alternative to a bridging strategy is a buffering approach. This is one of the most commonly used mitigation strategies by many businesses and involves managers protecting their supply chain from any kind of disruptions or risk by keeping sufficient inventory on hand (Mishra *et al.*, 2016:183). This could be in the form of internally holding additional inventory for contingencies, to counter the impact of non-timeous supply of materials and goods. Another buffering approach is to require suppliers to hold additional stock. Alternatively many businesses use multiple sources of supply of goods to reduce the risk of supply disruptions (Hugo & Badenhorst-Weiss, 2011:105). In addition to buffering or bridging techniques to manage risks, businesses may establish contingency plans to be activated if unexpected supplier and inventory risks are experienced (Hugo & Badenhorst-Weiss, 2011:105).

#### **1.4 STATEMENT OF THE RESEARCH PROBLEM**

A search on various search engines, most notably Google Scholar, has revealed that a number of studies on the South African wine industry have been published dealing with various topics. Some of these topics include: climate change, wine and conservation (Vink, Deloie, Bonnardot & Ewert 2009 ; Van Leeuwen & Darriet, 2016); governance in the value chain (Ponte, 2007); governing through quality (Ponte, 2009); factors impacting on the competitiveness of the South African wine industry (Esterhuizen & Van Rooyen, 2017); mergers and acquisitions (Kuhn,



2017); the effects of globalisation in the wine industry (Hussain, Chollete & Castaldi, 2007); and sustainable production and performance of South African grape producers (Ras & Vermuelen, 2009).

In addition, a search for case studies, articles and reports on the South African wine industry with a focus on the Stellenbosch wine growing region has revealed survey reports, conducted in 2010 and updated in 2013 by Price Waterhouse Coopers on the South African wine industry (Price Waterhouse Coopers, 2010, 2013). In the 2013 report, the CEOs were asked a question by wine producers regarding their perception of risk faced by the wine industry (Price Waterhouse Coopers, 2013:7). There seems, nevertheless, to be no actual research study focusing on supply chain risks faced by wine producers in the Stellenbosch area.

Given the apparent lack of focused research into the risks faced by the Stellenbosch area of the South African wine industry, the following problem statement was formulated for this study:

*"There is a lack of information and knowledge on supply chain risks faced by the Stellenbosch wine producers which could affect the sustainability of their businesses, unless these risks are managed."*

It should be noted that the 'sustainability' referred to above in the problem statement refers to the continuation or survival of the business on an ongoing basis in spite of adverse conditions. Sustainability is achieved by a business managing and integrating its financial, social and environmental risks, obligations and opportunities (Kuhlman and Farrington, 2010:3438). This sustainability represents resiliency over time in that a business can quickly adapt to disruptions while maintaining continuous business operations and safeguarding people, assets and overall brand equity. Embedding business resilience into the business governance processes should ensure that the management of the risks to the critical infrastructure posed by natural hazards, major accidents, disruptions and other malicious damage is considered by the board (Hopkin, 2017:108).

## **1.5 RESEARCH QUESTIONS**

Based on the problem statement, the following research question was developed:

*"What are the supply chain risks that threaten the sustainability of wine producers in the Stellenbosch area and how are these identified risks managed?"*

In order to be able to answer the primary research question, the following sub-questions need to be answered:

1. What are the supply chain risks experienced by wine producers in the Stellenbosch area?
2. How do the Stellenbosch wine producers manage the identified supply chain risks?
3. What solutions can be suggested to the Stellenbosch wine producers regarding ways to better manage or overcome their identified supply chain risks?

## **1.6 RESEARCH OBJECTIVES**

In line with the research questions, the following research objectives were derived:

1. To determine what the supply chain risks experienced by the wine producers are in the Stellenbosch area
2. To examine the methods or strategies that the Stellenbosch producers use to manage the supply chain risks that have been identified
3. To make recommendations as to how the Stellenbosch wine producers can better manage or overcome their identified risks.

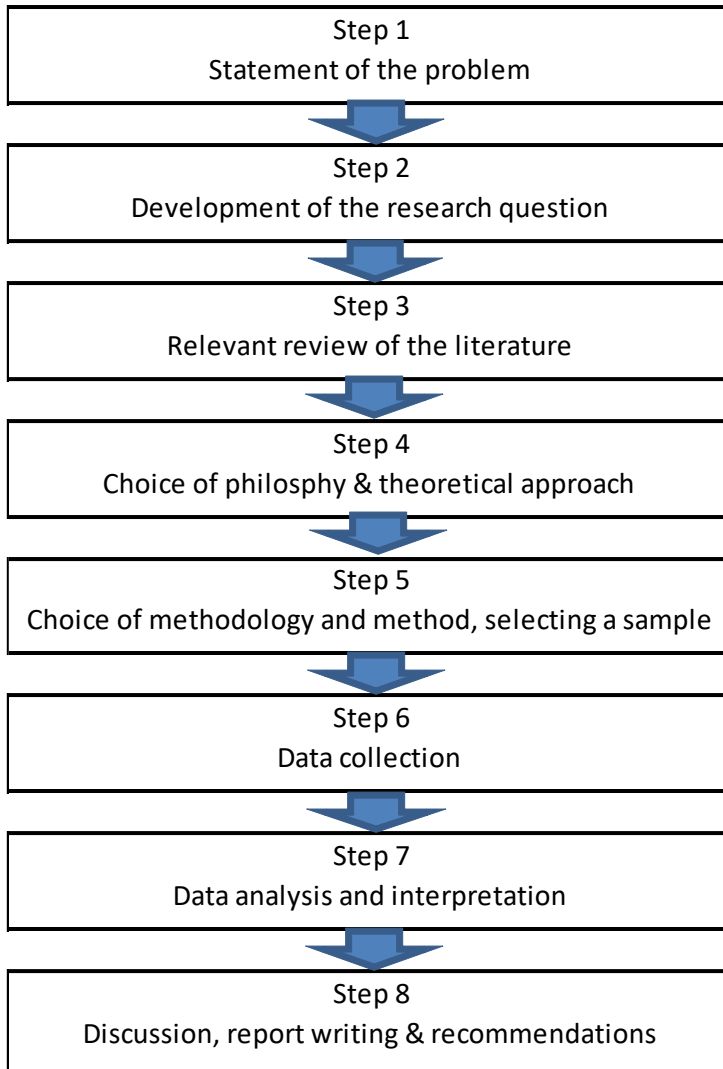
## **1.7 RESEARCH PROCESS**

Borders and Abbott (2011:2) note that the principle method of acquiring knowledge and uncovering causes of behaviour is research. According to Wagner, Kawulich and Garner (2012:36),

Research is a cyclical process of steps that typically begins with identifying a research problem or issue of a study. It then involves reviewing the literature, specifying a purpose for the study, collecting and analysing data, and forming an interpretation of the information. The process culminates in a report, disseminated to audiences that is evaluated and used in the educational community.

This study aimed to address what the supply chain risks are that threaten the sustainability of the wine producers in the Stellenbosch area and how these identified risks are managed. In order to achieve this objective, a research roadmap had been used (see Figure 1.3).

Figure 1.3 presents the steps in the research process that have been used in this study in a diagrammatic format.



Source: Adapted from Wagner, Kawulich and Garner, 2012:13

**Figure 1.3: The steps in a research process**

The first step in the roadmap is the formulation and statement of the problem. This step assists the researcher to generalise the ideas, in order to select a suitable topic for his or her research study (Wagner *et al.*, 2012:15). The topic for this study is the supply chain risks faced by the Stellenbosch wine producers and how they manage these risks. This formulation of the problem is found in this chapter, in section 1.4.

Step two is the developing of the research question. This step narrows the research down to specific details of what is to be studied and the specific aspects of the study to be focused upon which leads to the hypotheses; it also gives an indication of the methodology to be chosen,

namely, quantitative, qualitative or mixed (Wagner *et al.*, 2012:18). The development of the research question is explained in this chapter, in section 1.5.

The third step involves a critical review of the literature. This is a step by step process that involves the identification of published and unpublished work from secondary data sources on the topic of interest, the evaluation of this work in relation to the problem and the documentation of the problem (Sekaran & Bougie, 2016:51). This critical review is provided in Chapters Two and Three. Chapter Two explains the global wine industry, the South African wine industry, and discusses the Stellenbosch wine producing area, including the developments, changes and challenges in the industry. Chapter Three outlines the concepts and objectives of supply chain management, the stages, processes and activities of the wine supply chain and then explains risk, supply chain risk and elements of risk within the supply chain. The issues and challenges within the South African wine industry are also explained in this chapter, in section 3.6.

Step four of the research roadmap is the choice of philosophy or theoretical approach. For this step it is essential that a researcher thinks about and understands his or her own values and view of the world and the impact these might have on the way the research is undertaken (Saunders, Lewis & Thornhill, 2016:125). This research philosophy and approach is detailed in sections 4.5 and 4.6.

The next step, step five, is the choice of methodology, comprising an examination as to whether the research lends itself to quantitative, qualitative or a mixed approach of research, as well as a decision as to what methods would be the most suitable for collecting the data, such as interviews, observation, questionnaires and sampling methods. This design is similar to an architectural blueprint that is followed in the construction of a building (Wagner *et al.*, 2012:21). While this is summarised in this chapter, the research methodology is described in more detail in Chapter Four, in section 4.8.

Step six of the research process is the actual collection of the data and includes negotiating access to sources of empirical information and addressing ethical issues. Following ethical guidelines in empirical research is required to protect all the participants (Wagner *et al.*, 2012:62). The data collection methods for this study are explored in section 4.10, while ethical issues are addressed in section 4.11.

Step seven is the analysis and the interpretation of the data. In this step the researcher decides what analysis methods are most suited for making sense of the data. Different methods of analysis may be used for both quantitative and qualitative research (Wagner *et al.*, 2012:14). The analysis of the data is found in Chapter Five.

The final step, step 8, involves the formatting of the dissertation and the development of the structure (with headings, etc.), which takes into account the audience who will read the dissertation and ensures that the thesis has continuity and flow and that it is structured for easy reading and understanding (Wagner *et al.*, 2012:14).

The findings of the research are explained and conclusions and recommendations are made in Chapter Six.

## **1.8 RESEARCH ELEMENTS**

### **1.8.1 Research design**

The research design is a blueprint for the collection, measurement and analysis of data to fulfill the research questions and objectives (Sekaran & Bougie, 2016:95). The nature of any research project means understanding the purpose of the research design based on the research question and determines whether the research will be exploratory, explanatory, descriptive, evaluative or a combination of these (Saunders *et al.*, 2016:164).

*Exploratory research* studies are often carried out when the researcher needs to understand a specific problem or situation and where there is not much information known about the subject being studied, with a limited number of similar problems or situations having been investigated in the past (Terre Blanche, Durrheim & Painter, 2012:44; Sekaran & Bougie, 2016:102).

*Descriptive research* paints a detailed picture of events, persons or situations and is designed to collect data that describe characteristics of objects such as persons, organisations, products or brand (Saunders *et al.*, 2016:175; Sekaran & Bougie, 2016:43)

*Explanatory research* focuses on studying a situation or a problem in order to explain the relationship between variables (Saunders *et al.*, 2016:716).

*Evaluative research* sets out to understand how well something works and the research question seeking to evaluate answers often begin with 'how' or include 'what' (Saunders *et al.*, 2016:176).

This study was *descriptive and exploratory* as the research explored, investigated and described what risks the wine producers face, how the wine producers' industry manages risk and what challenges they face in managing this risk. This was appropriate as limited information exists about supply chain risk in the South African wine supply chain, and limited previous research has been carried out on this topic.

### **1.8.2 Research methodology**

The research design defines whether the research methodology for the study will be qualitative, quantitative or mixed methodology (this last being a mixture of both qualitative and quantitative). Quantitative research aims to describe social phenomena through systematic numerical means, while qualitative research focuses on interpreting or make sense of phenomena in terms of the meanings that they have for participants and involves the analysis of data and information that are descriptive in nature and are not easily quantifiable (Wagner *et al.*, 2012:273; Sekaran & Bougie, 2016:395). This study has employed a *qualitative methodology* as it is based on the input, views and opinions of the key players, namely, the wine producers, on the basis of their knowledge, skill and experience in the field of owning/managing wine farms/estates and producing wine. The main research aim was to identify the supply chain risks that threaten the sustainability of wine production in the Stellenbosch area, how the identified supply chain risks are managed. The study focused on understanding the processes, and the findings generated an output of words rather than of numbers.

### **1.8.3 Target population**

The target population is described as the population to which the researcher ideally would like to generalise his or her results (Welman, Kruger & Mitchell, 2005:126). The target population is defined in terms of elements, geographical boundaries and time (Sekaran & Bougie, 2016:240). The target population for this study consisted of wine producers in the Stellenbosch wine area. Stellenbosch is the largest wine producing area of South Africa, with 191 out of a total of 546 wine producers being located in this area (SAWIS, 207:7). According to the Wines of South Africa (WOSA) wine routes, Stellenbosch contains five main wine growing areas, namely, the Greater Simonsberg area, the Stellenbosch Berg area, the Helderberg area, the Stellenbosch Valley area and Bottelary Hills area (WOSA, 2017). For the purpose of this study, one wine producer from each wine growing area was selected.

#### **1.8.4 Sampling method**

With non-probability sampling, the elements do not have a known or predetermined chance of being selected as subjects (Sekaran & Bougie, 2016:240). One of the types of non-probability techniques is convenience sampling, which is defined as a sample design in which required information is collected from members of the population who are conveniently available to provide it. Convenience sampling is a relatively quick and efficient method of arriving at information (Sekaran & Bougie, 2016:247).

For the purpose of selecting the wine producers, a non-probability convenience sample was deemed appropriate as the owner of one of the wine producing cellars, the gatekeeper, assisted in getting access to wine producers in the area. A gatekeeper can be defined as a person who enables a researcher to gain access to a business (or other businesses/participants in the study) to conduct research (Wagner *et al.*, 2012:64). This type of sampling was also used to select the specific participants of this study.

#### **1.8.5 Sampling size**

According to Sekaran & Bougie (2016:396), "the sample size is defined as the actual number of subjects chosen as a sample to represent the population characteristics." The sample size in this study consisted of five wine producers, one from each Stellenbosch wine route areas, and ten interviews were conducted in total.

#### **1.8.6 Participants**

A total of ten participants were interviewed, with seven of the participants being male and three female. Of the five wine producers included in this study, three were represented by their owners and two by their CEOs together with other representatives. All the participants worked on a full time basis within the wine producing estates.

In the case of four of the five wine producers, at least one of the participants was the cellar master of the operation. Cellar masters have the responsibility of overseeing the making of the wine (Merriam-Webster, 2018) and therefore have knowledge of the farming and growing processes of the vineyards, as well as of the wine making processes. Eight of the participants had between 19 and 35 years' experience in wine making, and at least one participant from each

wine producer had been involved with wine making at each of the participating wine producers for more than 19 years.

### **1.8.7 Data analysis**

There are two main types of data processing methods for qualitative analysis. They are content analysis and thematic analysis. Content analysis is "an observational research method that is used to systematically evaluate the symbolic contents of all forms of recorded communications" (Kolbe & Burnett, 1991:18). This type of analysis is usually used to analyse websites, recordings, interviews and newspapers (Sekaran & Bougie, 2016:350).

Thematic analysis is a general approach to analysing the qualitative data and involves identifying themes or patterns in the data (Wagner *et al.*, 2012:231). It is a "method for identifying, analysing, and reporting patterns (themes) within data" (Braun & Clarke, 2006:79). Furthermore, it organises and describes the data set in detail, as well as interpreting various aspects of the research topic (Boyatzis, 1998:67). The tool deemed appropriate for this study was thematic analysis. The analysis of the data provided insight into the supply chain risks faced by the Stellenbosch wine producers and how they manage these risks.

### **1.8.8 Data quality control: The establishment of trustworthiness**

A good theoretical base and a sound methodological design add rigour to a research study. Rigour is defined as "the theoretical and methodological precision adhered to in conducting research" (Sekaran & Bougie, 2016:19). In addition, the validity of the research results also needs to be assured (Wagner *et al.* 2012:243).

The validity of purposive research results or data depends on the level of its merit and worth, defined as trustworthiness. Trustworthiness is the term used by Lincoln and Guba (1999:394-444) to describe the criteria involved in establishing the credibility, dependability, transferability and confirmability of the data. By applying these criteria and their attendant activities, it is possible to determine whether the methods used in the study are appropriate and the results are feasible and practical interpretations (Wagner *et al.*, 2012: 243). For the purpose of this study, the quality and merit of the data was assessed using the Guba framework. This is dealt with in more detail in Chapter Four.



## **1.9 ETHICAL CONSIDERATIONS**

Wagner *et al.* (2012:270) define ethics as "the study or discipline of moral principles in human behaviour." Ethics and ethical conduct are important in scientific research. This means that the issue of ethics and ethical behaviour must be considered throughout the research design and implementation process, and the researcher must ensure that the participants in the research study are protected at all times (Wagner *et al.*, 2012:64).

In this study the researcher complied with all ethical principles in his communication with the participants, which were assured through the formal application for ethical clearance to Unisa's College for Economics and Management Sciences (CEMS) Ethics Review Committee (see Appendix 1).

## **1.10 DELIMITATIONS AND ASSUMPTIONS OF THE STUDY**

The delimitations of a study are defined as those characteristics that limit the scope and define the boundaries of a study. Some of the delimiting factors are the choice of research objectives, the actual research questions, the theoretical perspectives that have been adopted in a study versus those that could be adopted by another researcher and the population that has been chosen to investigate in the research study (Simon, 2011:2).

The underlying limitation of this study is that it focused on only five wine producers in the Stellenbosch area. As a result the findings in the research study might not be representative of the whole wine producing region of Stellenbosch and any conclusions and recommendations made therein cannot be generalised to the whole Stellenbosch or other wine producing areas.

The study focused on the first four stages of the supply chain from the wine producer to the storage of wine prior to distribution. It did not focus on the selling and distribution side of the supply chain beyond the wine producer.

This study was based on the following assumptions:

- That through using qualitative research techniques sufficient data could be obtained to address the objectives of the study
- That there has been a lack of research on the supply chain risks faced by the Stellenbosch wine producers leading to a dearth of information relative to these risks

- That through the selected methodology, the researcher would obtain a sufficient understanding of the wine producers supply chain and the risks faced by the producer within the supply chain
- That the quality data required for this study could be collected through unstructured interviews as against other possible methods of data collection
- That by using the interview guide the researcher would be able to obtain relevant and appropriate data of sufficient quality from the participants to answer the research question
- That the participants would provide the required data for this study and that they would do so willingly.

### **1.11 EXPECTED CONTRIBUTION TO KNOWLEDGE**

This study aims to contribute to the field of supply chain management and particularly supply chain risks, focusing on the wine producers in the Stellenbosch area. It was envisaged that the findings of this study will contribute to the body of knowledge in the supply chain field.

In addition, the results of the findings could benefit South African wine producers as they may gain insight into the supply chain risks facing wine producers in the Stellenbosch area and how wine producers manage the identified risks. Recommendations are presented (in chapter six) that could be used by wine producers to better manage their supply chain risks.

### **1.12 CONCLUSION**

This chapter provides an introduction and background to this study, and explains the problem statement that leads to the research question: "*What are the supply chain risks that threaten the sustainability of wine producers in the Stellenbosch area and how are these identified risks managed?*" Arising from this, the objectives of the study are stated as a means of identifying the purpose of the thesis. A brief overview of the research methodology is given. This includes the research design and method used and describes how the participants were chosen, as well as explaining what method has been used to collect and analyse the data.

The next section outlines the chapters in this study.

### **1.13 CHAPTER OUTLINE**

Chapter One provides an introduction and background to this study, and explains the problem statement that led to the research question and the objectives of the study. It also includes a brief overview of the research methodology, the research design and method used, and how the participants were chosen.

Chapter Two provides insight into: the global wine industry from a perspective of consumption and production; details of the global wine industry and its producers; and the South African wine industry. Further, it presents the developments, changes, and challenges in the international and the South African industry and details how the industry has historically managed these issues. Thus, this chapter provides further background and justification for the study.

Chapter Three outlines the concepts of supply chain and describes the objectives, processes and activities of supply chain management. It then details the stages, processes and activities in the South African wine supply chain. The issues and challenges within the South African wine industry are also presented.

Chapter Four presents the roadmap of how the study was conducted in order to achieve the research objectives and thus to answer the research questions. It therefore presents the research design and methods used to answer the primary research question. The methods for the data analysis are also detailed. Subsequently, the research data findings are presented and analysed in Chapter Five.

Finally, Chapter Six revisits the research questions, the purpose and the objectives of this study. A summary links the study objectives to the data analysis and findings, and the study objectives are discussed and aligned to the empirical data analysis and findings. The main research question is answered. The chapter continues with recommendations and the limitations of the study. The chapter then provides suggestions for future research and a conclusion.

## **CHAPTER TWO: OVERVIEW OF THE GLOBAL AND SOUTH AFRICAN WINE INDUSTRY**

### **2.1 INTRODUCTION**

The previous chapter dealt with the background and the introduction to the study. The purpose of this chapter is to provide a context to the wine industry, an industry as old as mankind that has had to change and adapt in a fast changing globalised world, where the wine drinker of the world is now spoilt for choice and desires new tastes and experiences. Against this changed background, the industry has needed to adapt, modernise and remain financially viable in the world economy (Ponte, 2007:1). This chapter provides insight into: the global wine industry from a perspective of consumption and production; details of the global wine industry and its producers; and the South African wine industry. Furthermore, it presents the developments, changes and challenges in the international and the South African industry, detailing how the industry has historically managed these issues. Thus, this chapter provides further background and justification for the study.

### **2.2 OVERVIEW OF THE GLOBAL WINE INDUSTRY**

#### **2.2.1 Global wine consumption**

The Mordor Intelligence Business Report published in March 2017 states that the global wine market is valued at USD 304 billion and is expected to reach at USD 380 billion by 2022 (Mordor Intelligence Business Report, 2017). In spite of an increasing demand for wine in this century, the global economic crisis of 2008 impacted on wine consumption. The International Organisation of Vine and Wine (OIV) estimates that global wine consumption for 2017 will end up being between 240,5 million and 245,8 million hectolitres, which is marginally down from the peak level of 2008, before the global economic crisis, of over 250,0 million hectolitres (OIV, 2016:4, 2017:4).

The largest volume of consumers is in Europe and North America. The United States (USA) is the largest wine consumer, accounting for 13% of the global consumption, followed by France at 11%, Germany and Italy at 9% each and China at 7%. Approximately 43% of the global wine consumption is in the non-wine producing regions of the world, recognised as non-traditional

wine consumption countries. While wine consumption is declining in the 'traditional markets' of the developed countries, consumption is growing rapidly in the 'newer markets' particularly the Asian markets, where wine consumption has increased fourfold since the year 2000. The Asia-Pacific region accounts for 16% by value of global wine imports (Mordor Intelligence Business Report, 2017).

In the last century, wine was consumed in Asia only by the elite and was produced in small quantities. The factors influencing growth in demand for wine in the non-traditional markets, such as India, Asia, and China specifically, are rapid urbanisation and the changing lifestyles of consumers with higher disposable incomes (Hussain *et al.*, 2007:34; Mariani, Pomarici & Boatto, 2012:28). Wine consumption has also risen in these communities, as the ageing population has taken to consuming more wine products during social celebrations, preferring wine to 'harder drinks' such a liquor (Camillo, 2012:69).

The Chinese market consumes its own locally produced wine but is also a significant importer. The direct wine imports into China from traditional wine producing nations have been of good quality and tend to be the higher priced wines. This is evidenced by the statistics, which indicate that by 2009 Asia's average wine import price was nearly 80% higher than the world average (Balestrini & Gamble, 2006:397, Anderson & Wittwer, 2015:2). The slowdown in the Chinese economy and the government's austerity drive that started in 2015 have impacted on Chinese wine consumption. It is projected that the rate of wine consumption in China will plateau from 2018 onwards after several years of steady growth (Anderson & Wittwer, 2015:14).

In the more traditional or Western wine consuming market, wine consumption is affected by competition from other alcoholic beverages, for example, craft beer and spirits. The craft beer market has grown in value by 500% over the last ten years and, within the same timeframe, this market has quadrupled in North America (Mordor Intelligence Business Report, 2017).

### **2.2.2 Global wine production**

Currently, there are about one million small to large wine producers globally, and the world's most famous and best recognised wine brands are French and Italian (Mordor Intelligence Business Report, 2017). In the year 2000, just less than 73% of the global wine production originated from Europe, while, by 2017, this had decreased to just over 60%. These figures include Russia and Georgia in the 'Europe' region.

The OIV notes (2018) the decline in global wine production in 2017 and attributes it to a number of factors, most notably harsh weather conditions, particularly frost and drought. The year on year decline in global production volumes contrasts with the static international wine consumption levels since the global financial crisis of 2008.

From 2016 to 2017, global wine production dropped by 8,4%. A significant contributor to this drop in volumes was from the three biggest European producers of Italy, France and Spain. The volumes in these three countries were down 18,3% compared to 2016, due to severe frosts.

While the wine producing regions of the USA, Oceania (New Zealand and Australia), Africa and Asia (particularly China) all grew their volumes and increased their global share of production from 2000 to 2016, volumes between 2016 and 2017 were fairly static (Italian Wine Central, 2017).

The production volumes of the South American producers, which had shown growth over the years between 2000 and 2015, experienced a major fall in volumes of 28,3% between 2015 and 2016. This was largely due to a fall in Argentinian and Chilean production volumes caused by poor weather conditions. The decline in Chilean volumes was 21,7% and that of Argentina was 29,9%. While Argentinian volumes improved between 2016 and 2017, they still remain below the 2015 level by just under 12%. The Chilean volumes continued to decline and in 2017 they were just over 26% below the 2015 level. The Brazilian production volumes increased by just under 26% in the two year period (Italian Wine Central, 2017; OIV, 2018).

Table 2.1 indicates the global wine production volumes of the top ten producers in the ten year period between 2007 and 2016.

**Table 2.1: Production statistics - Top 10 producers**

Millions of hectoliters	2008	2009	2010	2011	2012	2013	2014	2015	Prov	F'cast
									2016	2017
Italy	47.0	47.3	48.5	42.8	45.6	54.0	44.2	50.0	50.9	42.5
France	42.7	46.3	44.4	50.8	41.5	42.1	46.5	47.0	45.2	36.7
Spain	35.9	36.1	35.4	33.4	31.1	45.3	39.5	37.7	40.0	32.1
USA	19.3	22.0	20.9	19.1	21.7	24.4	23.1	21.7	23.6	23.3
Australia	12.4	11.8	11.4	11.2	12.3	12.3	11.9	11.9	13.0	13.7
Argentina	14.7	12.1	16.3	15.5	11.8	15.0	15.2	13.4	9.4	11.8
China	12.6	12.8	13.0	13.2	13.8	11.8	11.6	11.5	11.4	10.8
South Africa	10.2	10.0	9.3	9.7	10.6	11.0	11.5	11.2	10.5	10.8
Chile	8.7	10.1	8.8	10.5	12.6	12.8	9.9	12.9	10.1	9.5
Germany	10.0	9.2	6.9	9.1	9.0	8.4	9.2	8.9	9.0	7.7

Source: Extracted from Italian Wine Central, 2017; OIV, 2018:7

European volumes as a percent of total world production have declined due to the growth in volumes of other regions. The top three Euro nations of France, Italy and Spain produce 44,5% of the world's wine. The volumes for the six top producers other than Italy and France are as follows: Spain at 32,1 million hectolitres; the USA at 23,3 million hectolitres; Australia at 13,7 million hectolitres; Argentina at 11,8 million hectolitres; and China and South Africa each at 10,8 million hectolitres (OIV, 2018:7). In spite of a significant drop in wine production of 17,8% between 2016 and 2017, Italy and France remain the largest wine producers at 42,5 million and 36,7 million hectolitres respectively, and are responsible for almost one third of the total world wine production. Over the years these two countries have frequently traded places with each other as the world's highest volume producers. In 1995, Italy was the number one producer at 55,7 million hectolitres with France at 54,4 million hectolitres. In the year 2000, France was the number one producer at 57,5 million hectolitres with Italy producing 51,6 million hectolitres. Since 2000, Italy has held the number one spot for 9 of the last 16 years (OIV, 2017:4).

Table 2.2 indicates the level of exports in 2017 from the top 10 wine producing countries. The export volumes are compared with the average production volumes of two years, 2016 and 2017. This gives an indication of the export focus of the top ten wine producing countries.

**Table 2.2: Statistics on the level of wine exports**

Country	Production Volumes 2016 Provisional	Production Volumes 2017 Forecast	Average production 2016 and 2017	Export Volumes 2017	Percentage of total 2015
	Millions of hectolitres				%
Italy	50,9	42,5	46,7	21,4	45,8%
France	45,2	36,7	40,9	15,4	37,6%
Spain	40,0	32,1	35,7	22,1	61,9%
USA	23,6	23,3	23,4	3,3	14,1%
Australia	13,0	13,7	13,3	8,0	60,2%
Argentina	9,4	11,8	10,6	2,2	20,7%
China	11,4	10,8	11,1	0,0	0,0%
South Africa	10,5	10,8	10,6	4,5	42,5%
Chile	10,1	9,5	9,8	9,2	93,9%
Germany	9,0	7,7	8,3	3,8	45,8%

Source: Extracted from OIV, 2018:12

According to OIV, global wine production in 2017, is projected to be 250 million hectolitres which is a decline compared with 2016 of over 8% and is one of the poorest years of production since the year 2000 (Italian Wine Central, 2017; OIV, 2018:7).

### 2.3 STRUCTURE AND STRATEGIES OF THE GLOBAL WINE INDUSTRY

The business structure of the wine industry is not consistent around the world. The wine producers are broadly categorised or divided into two main regions or zones, namely the 'old world' and the 'new world' wine producers. The different histories and environments in which the producers in these regions operate have impacted on the strategies and approaches of the various industry players in these regions (Roberto, 2003:13).

The 'old world' or traditional wine producing European countries are France, Italy, Spain, Germany and Portugal (Fleming *et al.*, 2014:115). While other European countries, such as Greece, Hungary, Romania, Serbia, Austria, Georgia, Moldova, Bulgaria and Russia, might produce wine their volumes are smaller and relatively less significant (OIV, 2018:7). The southern hemisphere or 'new world' wine producers are most notably Australia, Argentina, Chile, New Zealand and South Africa (Fleming *et al.*, 2014:115). Brazil, and Uruguay also



produce wine, and China has also emerged as a significant wine producer since the 1980s (OIV, 2016).

The differences and strategic approaches of these two main regions or groupings are detailed in the following two subsections.

### **2.3.1 The 'old world' wine producer**

For the 'old world' producers, wine production has historically been centred around the family farm, with the land remaining in family ownership and control for succeeding generations (Fleming *et al.*, 2014:115). Small family-owned vineyards produce much of the wine in Europe. Many European farmers see the family wine farm and its processes as the legacy handed down to succeeding generations, and their main goals do not include the optimisation of a return on investment. Furthermore, while the land might have considerable value, most do not think of the land being used for purposes other than grape and wine production. These farmers produce wine in an industry which is highly regulated by governmental and strict EU controls. These controls have gone some way to protect the industry (Roberto, 2003:4).

The EU wine industry legislation came into being in the middle of the last century and has been adapted and refined since then. This legislation is of the Common Agricultural Policy regulations (CAP) of the EU and control such things as the maximum vineyard surface allowed to individual EU member states, the allowed winemaking practices and principles for wine classification and labelling (Cockram, Ospinal & Bordas, 2016). It covers all aspects of winemaking, including planting, irrigation and wine type classification. The regulations exist to control and manage the total production in order to ensure no overproduction of wine and provide some protection to the EU wine producer (Roberto, 2003:4).

Key to the EU wine regulations are 'denominations' or 'appellations', which are legally defined and protected indicators that give the wines geographic identification and characteristics of origin, type of grape and style (Cockram *et al.*, 2016). These fall into two main classifications. The wines are either classified as 'denomination of protected origin' (DOP) or 'indication of protected origin' (IGP). The DOP designation distinguishes the product as well as the process. It denotes that every phase, from raw materials to final product, must occur within the specific geographic area. Consideration is given not only to the area's natural characteristics such as climate, topography and environment but also to human factors such as local traditions and

customs as well as local skills and techniques. This is labelled or categorised as the 'terroir' and is unique to each region. Like the DOP designation, the IGP designation also relates to typical products from a specific geographic region. However, the rules are less strict. Although the product must be produced within the declared IGP region, some ingredients may be sourced from outside (Cockram *et al.*, 2016).

The strict EU controls are effective barriers to entry to the European market by the 'new world' producers. These barriers include the labelling requirements, tariffs, duty increases and pressure on prices. The 'community preference', such as favouring EU made wine rather than imported product, has also created obstacles for 'new world' wine producers (Knaup, 2010:2). The European Federation of Origin Wines (EFOW) was created in 2010 with the aim of protecting and promoting the wines of its members. This body formalises cooperation between the French, Italian, Hungarian, Portuguese and Spanish organisations and has a mission to promote the interests of European wines (EFOW, 2017).

### **2.3.2 The 'new world' wine producer**

The wine producers in the 'new world' have a different approach from their 'old world' competitors (Fleming *et al.*, 2014:115). For these producers, the purchasing of land and the investment in process equipment is a costly activity. By them wine production is seen in terms of profitability and return on investment. The strategies of the businesses in the 'new world', particularly the two largest producers, USA and Australia, have therefore re-shaped the wine industry in these regions (Roberto, 2003:4). The market is dominated by publicly traded businesses and, more recently, since the global economic crisis of 2008, private equity investors. These businesses pursue new and additional revenue and/or cost savings, and the acquisitions have focused the industry structure in these areas to achieve cost down and increased profit. They have done so through their acquisition strategies, consumer branding and advertising strategies, capital investment plans and technology initiatives. Amongst the 'new world' producers, the level of industry regulation is low (Roberto, 2003:4).

Consumer attitudes and behaviour are also different between the countries of the 'new' and 'old world'. In Europe, amongst the smaller scale producers (most notably France, Italy and Spain), wine is often produced for the use of the producing family and sold to the surrounding community. Furthermore, in these countries, wine is consumed with the daily meal by the

average family. This is not so in the American or Australian culture, where wine appeals to a relatively small segment of society and where a small percentage of people actually consume most of the wine. In the USA, 10% of adults buy 90% of the wine purchased (Hussain *et al.*, 2007:36). These wine consumers tend to be the more highly educated individuals and the wealthier (Roberto, 2003:4).

In 2001, five 'new world' wine producing countries of the USA, Canada, Chile, New Zealand and Australia, joined forces in an effort to reduce barriers by “reducing regulatory burdens faced by winemakers”; this was in response to the difficulties, controls and restrictions for their member producers in accessing the European Market (EU) (Hussain *et al.*, 2007:34). These countries signed the Mutual Acceptance Agreement on Oenological Practices and formed the World Wine Trade Group (WWTG). The organisation has expanded with the addition of various new participants. Under some pressure, South Africa signed on in 2011 (South African Government, 2011). The WWTG is an informal group of government and industry representatives from the wine-producing countries of Argentina, Australia, Canada, Chile, Georgia, New Zealand, South Africa and the USA. The aim of the organisation is to facilitate international trade in wine through information sharing, discussion of regulatory issues in wine markets and joint actions for the removal of trade barriers. The WWTG states that it is guided by principles that facilitate trade in wine and protect consumers, to the benefit of wine exporting and importing countries. Its controls are not as onerous for its members as the EU regulations through the European Federation of Origin Wines (EFOW) and recognises the unique characteristics of the regulatory system of each member country and works towards the mutual acceptance of practices and labelling rather than imposing a single regulatory approach (WWTG, 2017).

The changes that have occurred within the global wine industry in the last 30 years are explained in the next section.

## **2.4 CHANGES IN THE GLOBAL WINE INDUSTRY**

Since 1990, 'the internationalisation' of wine production and consumption has been a key factor for the industry (Fleming *et al.*, 2014:115). This globalisation and the accompanying rapid access to information has resulted in a knowledgeable and empowered consumer who values

choice, variety and quality. The global wine consumer looked to the 'new world' producer to give them this improved choice and variety (Bisson *et al.*, 2002:1).

In the USA, the investments to improve viticulture and oenological techniques began in the last decade of the last century and added real value to the industry. Note: viticulture is the study of the art and science of grapes and the growing of grapes (Collins English Dictionary, 2003:1797) and oenology is the science and study of wine making (Merriam-Webster, 2018). While the USA export volumes increased, the real success came in the improvement or growth of wine export revenue. This is seen in the fact that the USA's mean unit price of exports, that is, value per litre, significantly improved between 2000 and 2010. This drive to grow revenue was led by the major Californian exporters and has significantly benefitted the USA wine producer (Fleming *et al.*, 2014:122).

For the last two decades of the last century, the Australian wine industry took the lead amongst the 'new world' producers in growing their export volume, and this success impacted on the 'old world' producers. However, from the turn of the century, the other southern hemisphere 'new world' wine producers of Argentina, Chile, New Zealand and South Africa emulated the Australian export model and focus, and achieved great success. In the period 2000 to 2009, the export growth performance of these 'new world' producers outstripped that of Australia. Australia's export performance in that period was nevertheless impressive at 248%. The fact that Australian exports lagged behind that of the other countries with this growth indicates the level of success of these 'new world' wine exporters. Of particular note is New Zealand's export volumes, which grew by 645% in the period 2000 to 2009 (Fleming *et al.*, 2014:115).

The growth and expansion of the 'new world' wine producers impacted on the 'old world' wine producers, most notably France. In response to the increased competition from the 'new world', these 'old world' producers expanded their markets to the Asian countries, most notably China and India (Hussain *et al.*, 2007:34)

Over the last two decades particularly, the wine industry has experienced a process of technological change and modernisation, brought about through the results of research by research institutes and by both researchers and the industry. Of particular note in this regard has been in the Chilean, South African and the Italian wine industries (Morrison, Pietrobelli & Rabellotti, 2010:2). Innovation and change is also key for the global industry. Screw tops for

wine bottles are being used more and more and are the predominant closure method used by Austrian, Australian and New Zealand producers.

In the face of oversupply issues, the world's largest wine producing countries have encouraged this desire for expanded choice and have focussed strongly on exportation of their wines. This access to the global market has aided the producers to achieve sustained profitability (Mariani *et al.*, 2012:1). However, this has been insufficient for the global wine producer to survive and flourish. In the rapidly changing global world environment, these producers have faced an over-supply of wine (particularly in Europe), relative weaker demand in the traditional wine drinking markets (where wine consumption is in decline), cost pressures and lesser revenue growth (impacting on the financial sustainability of the producers), the global economic downturn of 2008 and climate change (Hussain *et al.*, 2007:34; Vrontis & Thrassou, 2011:288).

As a consequence, the wine industry, including both wine producers and wine distributors, has gone through a period of consolidation since the 1990s and into the new century. This consolidation process within the industry is explored in section 2.4.1 and some of the future changes that will affect the global wine industry are detailed in section 2.4.2.

#### **2.4.1 Consolidation within the global wine industry**

A key factor in the changing wine industry environment is to ensure that the wine quality remains at a high level, especially in the face of the rising change in demand for spirits and beer versus the demand for wine. Consolidation of the wine industry through mergers and acquisitions become a way of managing this challenge to ensure cost reduction and improve financial viability (Hussain *et al.*, 2007:38; Kuhn, 2017:3). The historical and structural differences, plus differences in focus, between the 'old world' and 'new world' producers have impacted on the nature of the industry consolidation. Such consolidation has varied per country and region. The only uniformity has been the fact that consolidation has taken place (Roberto, 2003:4; Fleming *et al.*, 2014:116).

Mergers and acquisitions in the industry have taken place, in the first instance, in the wine distributor sector and then through globalisation of the wine supply and value chain (Roberto, 2003:5). This has assisted to balance global wine demand and supply. Almost half of all wine is consumed in a different country from where it was produced (Fleming *et al.*, 2014:116). Large producers have increased in size and capacity with listed companies and private equity players

entering the wine supply and distribution scene. This is particularly true in the 'new world' market. With a few exceptions, the largest alcoholic drinks producers are dominant merchandisers in the three major drinks markets of wine, beer and spirits. They have capability in that they can effectively link supply with demand and also have access to capital to fund growth and capital investment. Their biggest advantage is that they can achieve economies of scale in production and distribution and thus grow profits. Lower production costs and improved profitability per unit also mean they can spend more on sales and marketing. The smaller players in the wine industry have been forced to become more focused and specialised, trying to succeed through product differentiation. This has been especially important for the producers in the 'old world' wine producing areas (Kuhn, 2017:4). The 'new world' producers in particular have focused on wine production and export growth based particularly on the selling of premium wine (Mariani *et al.*, 2012:38).

The lack of access to capital is a major barrier for smaller wine producers and this has meant that they have been open to acquisition by the larger companies. This is equally true of 'old' and 'new world' wine producers. Larger players have also leveraged their power on the distributor side as they can offer better pricing (Kuhn, 2017:4)

The form of consolidation in the 'old world' or European producer environment has been by the larger wine producing businesses acquiring smaller producers. Between 2007 and 2010, a number of mergers and acquisitions took place in France, Spain and Italy (Vrontis & Thrassou, 2011:288; Kuhn, 2017:3). In addition, a number of foreign based companies formed joint ventures with Italian wineries (Hussain *et al.*, 2007:35).

While Europe tends to have many more privately held wine producing businesses, with consolidation between these producers, most of the largest winemakers in the USA and Australia have become publicly owned entities and private equity investors. The USA market is consolidated, with the ten largest wine producers currently accounting for 72% of total USA sales volumes (Kuhn, 2017:11). Further, 70% of USA wine distribution is controlled by the 20 largest wine wholesalers (Hussain *et al.*, 2007:39) There is now limited scope for any further large deals in the USA (Kuhn, 2017:11). Consolidation through mergers and acquisitions has also taken place in Australia, with the majority of such consolidation activity in Australia being

focused on smaller standalone wineries and wine estates. Four companies account for 75% of wine production in Australia (Roberto, 2003:5; Hussain *et al.*, 2007:37).

In some wine producing countries, the owners and producers of premium wine brands have diversified their portfolios by acquiring cheaper wine brands in addition to their premium brands. Others have consolidated their operations by selling noncore assets, in particular their lower value brands and vineyards, with a focus on higher value brands that sell at higher prices (Mariani *et al.*, 2012:38; Kuhn, 2017:5). This 'higher price' strategy has occurred in the USA market (Thach, 2016), as noted in section 2.4.

A number of international brands have taken advantage of the growth of the Chinese market by either establishing their own vineyards in China or partnering with local producers to gain access to the country's medium to high quality wine market (Balestrini & Gamble, 2006:396; Camillo, 2012:71; Kuhn, 2017:6). Chile has been seen an attractive target for foreign investment with a few larger companies exporting Chilean wine particularly to the USA and UK (Hussain *et al.*, 2007:38). In the last ten years, there have been some local and foreign acquisitions in the South Africa wine industry; however, ownership within the South African industry is far more diversified in comparison to the USA and Australian industries and has not been able to leverage cost out and efficiencies into the industry through consolidation (Kuhn, 2017:12). Details of foreign acquisitions within the South African wine industry are detailed in section 2.5.8.

#### **2.4.2 Future changes for the global wine industry**

The global wine industry has needed to change and adapt to survive and further change will be required. From a global perspective, the spirit side of the alcohol market is particularly profitable, causing the bigger alcohol merchandising groups to focus on this, as well as on their premium mixers and their own craft beer brands (Mariani *et al.*, 2012:38; Kuhn, 2017:5).

Opportunities that have been identified in the wine sector are innovative wine products with different flavours, as well as different varietals and blends. This is particularly relevant for the marketing efforts of the wine industry targeting the millennials as the new consumers. This generation values variety, innovation and flavour and they are not as brand loyal as the generation before them. The wine industry is now looking at ways to encourage this generation to consume more wine (Mordor Intelligence Business Report: 2017).

Many businesses in the global wine industry will continue to compete by remaining small and supplying and targeting particular niche markets. However, globalisation will result in continued consolidation at the levels of producer, distributor and retail. Therefore businesses wishing to compete in global markets will need to optimise their organisational structures to minimise costs, assess their strategies and maximise sources of competitive advantage in order to successfully compete against the stronger and bigger wine suppliers (Castaldi, Cholette & Frederick 2005:28). The next section provides detail on the South African wine industry.

## **2.5 THE SOUTH AFRICAN WINE INDUSTRY**

### **2.5.1 Introduction**

In 1995, South Africa was the fifth largest wine producer with its volumes ahead of both China and Australia. By the year 2000, its volumes were down to 6,9 million hectolitres and it was in ninth place behind Germany. By 2005, with a focus on red wine, an improvement in product quality and an export focus, South African production volumes began to improve and the country moved to being the eighth largest producer (Ponte & Ewart, 2007:1). South African wine volumes continued to increase to a peak production level of 11,5 million hectolitres in 2014 (OIV, 2018:7).

The top six global wine producers are currently France, Italy, Spain, USA, Australia and Argentina. The South Africa wine industry has been amongst the top nine largest wine producers since 2008 and in 2016 was in the seventh position, due to the poor volumes from the South American producers. In 2017 South Africa remained in seventh position along with China. and exported just over 40% of its annual production volume (OIV, 2018:12). Section 2.5.2 below details the history and origins of the South African wine industry.

### **2.5.2 History and origins of the South African wine industry**

The South African wine industry is the oldest industry in the country and started with the first governor of the Cape, Jan Van Riebeeck, planting the original vineyard in 1655, from which wine was produced in 1659 (WOSA, 2017). The Governor gave settlers land in and around Cape Town in part payment for their labour and also gave them vine cuttings and encouraged them to grow grapes. Although these settlers had limited direct wine making experience, they brought



with them their culture and some knowledge of vineyards and cellar practice. These people settled in the valleys outside Cape Town and set up wine farms. Within a short period, the wines from the Cape had acquired a reputation in Europe for being a quality product. During the eighteenth century, due to various conflicts in Europe, the French wine supply was cut off from England, who then looked to the Cape Colony for the supply of their wine, ports and sherry needs. This brought prosperity to the colony. This demand further helped the industry to grow, although there were comparatively many producers, most having small vineyards which produced small quantities of wine. Competition among these small scale farmers was high (Ponte & Ewart, 2007:3; African Classical Encounters, 2017).

The signing of a free-trade agreement between Britain and France in 1862 severely impacted the South African wine producers as Britain once again turned to France for its wine. While at the beginning of the 19th century, wine constituted over 90% of the exports of the Cape Colony, by the end of that century, exports collapsed. During the 1880s, the disease phylloxera devastated many of the Cape vineyards and severely impacted on Cape wine production (Ponte & Ewart, 2007:3).

From 1890 onwards and into the twentieth century, the South African wine industry struggled. The buyers of wine played one small scale producer off against another, thus keeping the wine prices down. This frequently led to an oversupply of wine, causing the farmers to pour their excess wine product into the Cape rivers. In an effort to rescue the wine industry, affected by over-production and the difficulties of war and economic difficulties, the first co-operative was established in 1918, named the Ko-operatiewe Wijnbouwers Vereniging van Zuid Afrika Beperkt (KWV). This co-operative grew in strength and importance and was eventually granted statutory powers to regulate the industry. It controlled sales, stabilised prices and managed a quota system regulating new plantings, varietal choices and vine imports. The focus was on high yields and volume over quality, with a preference for fortified wines and brandy. The co-operative system replaced the normal practices where the wine farmers competed against each other using a system of collective bargaining, joint marketing and the pooling of machinery and technical knowledge (Ponte & Ewart, 2009:10; African Classical Encounters, 2017).

During the 1980s, export volumes were very low, and all of the exports, mostly table wines, were carried out by the KWV co-operative. This pooling system in cooperatives along with

overall industry regulation gave incentives to producers on the basis of volume and quality was poor. This organisation acted as governing body for the South African wine industry for many years. In 1992, the quota system was eliminated and from then on wine prices have been determined by a free market. KWV was transformed from its co-operative status to a company, KWV Ltd., in December 2000 (Bezuidenhout, 2014:25).

With the end of apartheid in 1994, the export market opened up, and investment into the industry followed. New farms and cellars were established, cooperatives were modernised, and the general wine quality improved. Export volumes increased significantly. The upgrading of processes took place, new vineyards were planted, and the demand for various types and styles of wine grew. There was an immediate positive impact on the quality of wines produced. In the last decade of the last century, South Africa moved from a supplier-driven to a buyer-driven model of winemaking and marketing (Ponte & Ewart, 2007:1).

A large player in the South African market was the Distillers Corporation formed in 1945. This was a major wine and brandy producer and was well known for its Bergkelder concept, which was an innovation that invited wine producers to make use of the company's bottling, sales and marketing expertise. In 2001, the Distillers Corporation merged with one of the larger wine producer wholesalers, the Stellenbosch Farmers Winery Group, which was formed in 1925, to form Distell (Hussain *et al.*, 2007:2). This business is one the most prominent brandy producers in the world and, besides the production of a broad range of wines, supplies ciders and other alcoholic spirits mixers to the market. The Euromonitor's 2016 report notes that Distell has a 41% share of the South African wine market (Euromonitor International, 2017).

In the first decade of the twenty-first century, wine producers in South Africa made a change to red wine production because of an increase in global demand for this product. This increase was due to a growing awareness by consumers of red wine's health attributes and to a glut of white wine. In 1996, 18% of the South African acreage under vines was for the production of red wines. By 2008, this had risen to 44%. This led to a surplus of red wine, which affected the prices paid to producers. As the local demand for wine, and red wine in particular, did not match the increased supply, the South African industry began an aggressive export focus. This can be seen from the fact that 1999 exports as a percentage of local production was 21%, while by 2008 this had increased to 54% of total local production. (SAWIS, 2009:12). The world economic crisis of 2008 impacted on the South African wine industry. Nevertheless, the continued increase

in exports aided the industry, as did the fall in the value of the rand, thus increasing revenues. In the period 2008 to 2013, the South African wine export turnover doubled while local sales in the same period rose by only 38.4% (SAWIS, 2015:vii).

The South African wine industry has experienced a number of changes over the years and especially since the turn of this century. South Africa is now heavily reliant on the export market and, in 2017, 4,5 million litres or over 40% of the total production volume was exported (OIV, 2018:12).

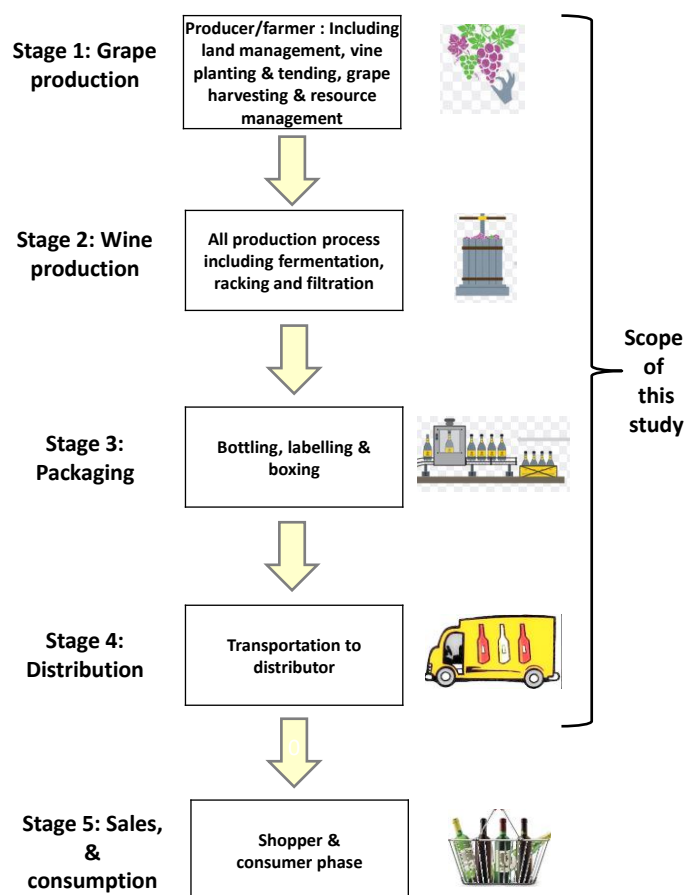
Section 2.5.3 below describes the South African wine supply chain.

### **2.5.3 The South African wine supply chain**

The wine supply chain has five broad stages, as shown figure 2.1.

It starts with the grape producers (growers or farmers) who produce the grapes (grape production) and includes all parts of the agricultural operations, including planting, tillage, pest control, irrigation (if any), as well as harvesting the crop (mechanically and or by hand). It also covers all field operations in tending to the vines/plants and its produce (quality and process control). General farm management, maintenance of farming equipment, supervision and control of the workers and transportation of the crop to the process side of the operation is also included. This stage of the wine supply chain includes the buying out of grapes, if applicable, and any involvement with the secondary growers/producers of the farms/estates where the bought out grapes are grown. The transportation of the picked grapes either from the wine producers' own vineyards or the secondary producers' vineyards are covered in this wine supply chain stage (Petti *et al.*, 2005:4; Monday & Wood-Harper, 2010:17).

Figure 2.1: An illustration of the basic wine supply chain.



Compiled by the researcher, adapted from Petti *et al.*, 2005.

### Figure 2.1: The wine supply chain

The second stage of the wine supply chain (the wine production phase) covers operations such as stemming (removing the stems), crushing (the grapes), fermentation of the juice or 'must' and storage. The production of red and white wine differs. For both, the first process is the removal of the stalks. Then for red wine production, the grapes are pulped into must, which includes the red/black grape skins. For white wine production, the grapes are crushed to extract the juice and the skins are discarded. The next step is the process of fermentation, with the adding of yeast to the juice or must. Processes included in the clarification of wine comprise: racking (siphoning the wine must from one container to the next, so as to leave any sediment behind, that is, a form of filtering of the product); fining (adding a fining agent preparation to soften or reduce its astringency and/or bitterness, to remove proteins capable of forming haze,

to prevent colour distortion by the absorption and precipitation of polymeric phenols and tannins); filtration (in order to purify the output and to produce the end product); and refrigeration. It includes all process and quality controls (including sampling, testing and tasting), and this phase ends with the storage of the wine in order for it to be aged (Petti, *et al.*, 2005:9; Monday & Wood-Harper, 2010:17).

The third stage of the supply chain covers the packing of the product (packaging) and includes all processes such as bottle washing, bottle filling, corking, capping, capsuling (attaching the foil sleeve onto the top of the wine bottle, if any), labelling, the filling and closing of boxes and placing of pallets, as well as storage of the finished product in vats, unlabelled or labelled bottles (Petti *et al.*, 2005:9; Monday & Wood-Harper, 2010:17).

The fourth stage of the supply chain is the distribution stage (distribution). This covers the process of transporting the finished product to the distributor and from here to the retailer; it includes all controls, processes and disciplines relative to the correct handling and storage of the product so that it does not experience excessive temperature fluctuations. This transportation could be to local regional, national or international destinations, depending on the distribution or supply chain strategy of the producers' business model (Petti *et al.*, 2005:9; Monday & Wood-Harper, 2010:17).

The fifth stage of the supply chain is the sales and consumption phase (shopper or consumer phase). This is a significant stage in the wine's life cycle, as the storage of the product in this phase may have a noteworthy impact, depending on whether it is necessary to keep the wine refrigerated or not, and in view of the fact that the product can deteriorate if poorly stored (Petti *et al.*, 2005:9; Monday & Wood-Harper, 2010:17).

A key element of the wine supply chain is the retailers, comprising the distributing/marketing agents and retail outlets from which consumers make purchases. In 2013, South African supermarkets traded between 35% and 39% of the value wine consumption, while discounters (such as Massmart and Metcash, which can also be referred to as 'big box' stores) handled about 41%. The remainder of wine sales are done through bottle stores, specialist and direct sales and wine cellar door sales, as well as through the 'hospitality trade' via restaurants, hotels, and bed-and-breakfasts (SAWIS, 2015: 5).

This study will focus on stages one to four of the wine supply chain as described above in this

section. The scope of the study includes the storage and handling of the wine up to the distribution of the finished product to the distributor. The next section discusses the different South African wine producers.

#### **2.5.4 South African wine producers**

In South Africa, viticulture, or grape growing and wine production, takes place mainly at a latitude of 34 degrees south in an area with a mild Mediterranean climate. The wine industry is largely based in the province of Western Cape, with some production also taking place in the Northern Cape and a very small amount in the Eastern Cape and Kwa-Zulu Natal. The Western Cape enjoys a cool climate for its latitude, particularly in the traditional wine-growing areas along the coastal zone. This area benefits from cool breezes that moderate the summer temperatures due to the impact of the cold Atlantic Ocean Benguela sea current that flows northwards from Antarctica and up and along the south western African coast. The Cape mountain ranges are ideal for grape growing, with good drainage, and the Cape vineyards lie either on the valley sides of the mountain foothills or on the flatter plains between the mountains. The diversity of topography, the great variety of soils and mesoclimatic conditions allow for the growing of a wide range of vines suitable for producing wines of varying types (South African Government, Department of Agriculture, Forestry and Fisheries, 2011:6)

Most of the wine producers in South Africa are members of the South African Wine Industry Information and Systems (SAWIS). This is a non-profit company, which furnishes information to all industry role players and provides support services to the wine industry. There are 546 wine producers engaged in crushing grapes for wine production in South Africa. The majority of the producers are called ‘cellars’ or ‘wineries’, while others are classified as producer wholesalers. Wine producers are classified into three main categories and range in size and nature. These are the private or estate cellars (of which there are 472), producer cellars (of which there are 48), and producer wholesalers (of which there are 26) (SAWIS 2017:7).

There are 3 029 primary grapes producers in South Africa. The total number of producers who are cellars and crush grapes to make wine is 546, which is down by 6,1% from 2012. The bulk of South African wine is produced in the Western Cape, where there are 507 producer cellars and private wine estates. There are also 26 producer wholesalers, the majority of whom are in the Western Cape. There are small scale wine producers in KwaZulu-Natal (two producers), the

Eastern Cape (four producers) and the Northern Cape (thirteen producers) (SAWIS 2017:7). In 2017 the number of hectares under wine grapes in the Northern and Western Cape stands at 94 545, down from 2013 with 99 687 hectares. This is a 5,1% reduction (SAWIS 2017:8). 90 422 hectares or 95,6% of the total area under wine grapes, is in the Western Cape.

The different types of producers are as follows:

- Private or estate wine cellars: These are small operations and are considered to be "boutique" winemakers. In 2013 just under half of these producers crushed less than 100 tonnes of grapes annually. The number of private wine cellars more than doubled in the period between 1996 and 2017 from 218 to 472 (SAWIS 2017:7).
- Producer cellars: These comprise co-operatives and ex-cooperatives (former co-operatives that changed their organisational structures to become companies). In 2017, there were 48 of these producers in the country, which is down from 65 in 2005. These producers are generally large operators with most being capable of crushing over 10 000 tons of grapes per annum (SAWIS 2017:7).
- Producing wholesalers: In general, these 'wholesalers' buy in grapes or wine in bulk from producers and private wine cellars. They then market, distribute or export the wine produced, either in packaged or bulk form under their own brand name. Some of these producer wholesalers own vineyards. These producers are responsible for the bulk of exports. In 2017, there were 26 of these types of producers in South Africa (SAWIS 2017:7).

Figure 2.2 indicates the main wine producing areas of the Western and Northern Cape.



Source: Adapted from the map from WOSA, 2015

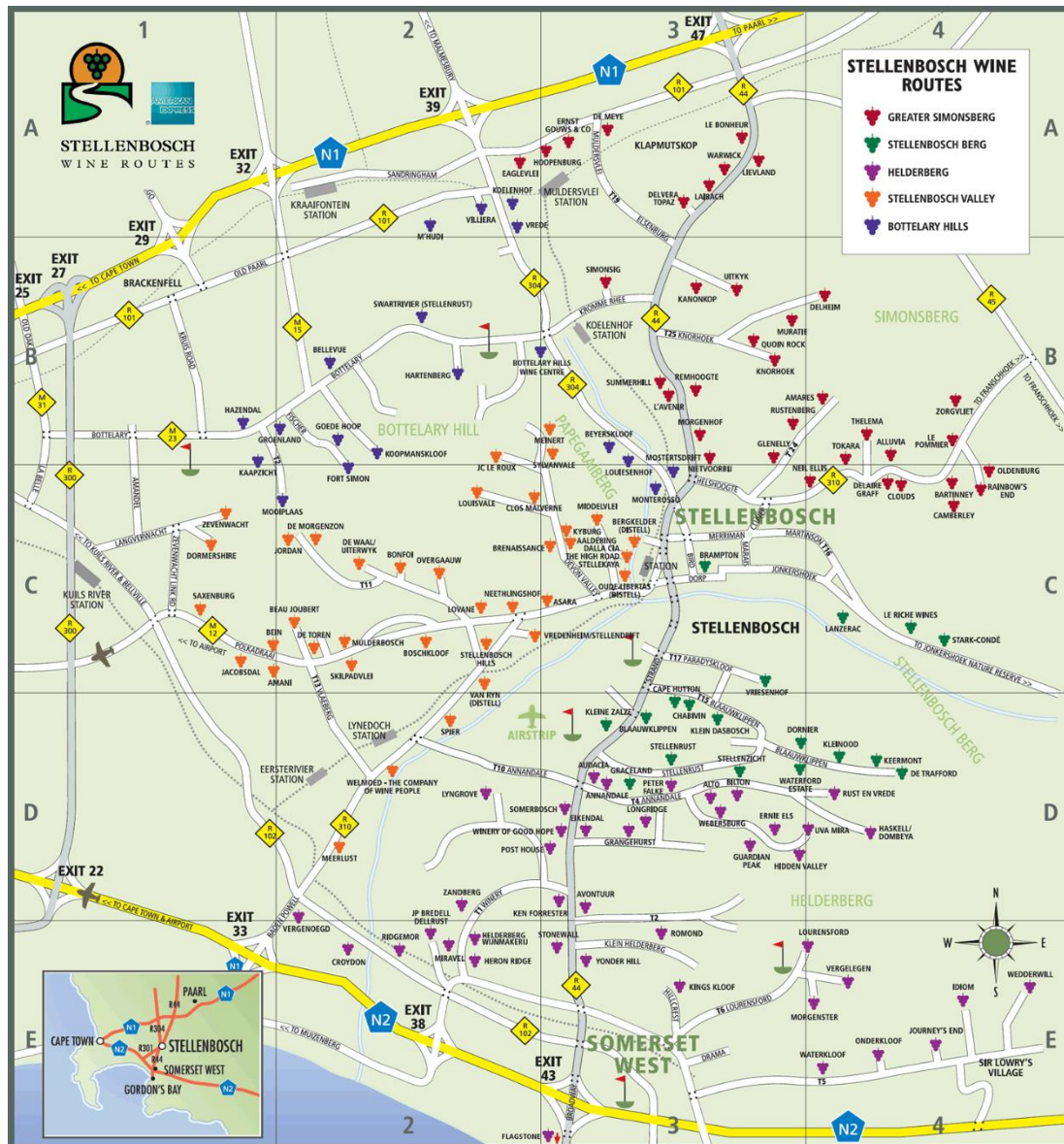
**Figure 2.2: Map of the main wine producing areas of the Western and Northern Cape**

One of the largest wine producing regions in South Africa is the Stellenbosch area, and this region dominates the South African wine producing environment. Details of this region follow in the next section.

### 2.5.5 The Stellenbosch wine growing region

In the Stellenbosch region, there are 2 producer cellars (4,2% of the national total), 168 private wine cellars (35,6% of the national total) and 21 producer wholesalers (80,8% of the national total) (SAWIS 2017:7). Thus over a third of all wine producers are in the Stellenbosch area (191 of the 546). The number of producers in this area declined between 2012 and 2017 by 5,0% (SAWIS, 2017:7). Figure 2.3 indicates the main producers in the Stellenbosch area.





Source: WOSA Stellenbosch winelands map 2015

**Figure 2.3: Stellenbosch Wine Producing Region indicating the main producers**

The Stellenbosch area contains the largest area of wine producing land at 15 252 hectares or 16,9% of the total for the province (SAWIS 2017:8). A variety of soils and varied locations are ideal for the growing of a wide variety of grape cultivars in the Stellenbosch area.

According to WOSA, a not-for-profit industry organisation which promotes the export of South African wine into key international markets, there are five key wine growing areas, as mentioned in section 1.8.3. These key areas are the Greater Simonsberg area, the Stellenbosch Berg area,

the Helderberg area, the Stellenbosch Valley area and Bottelary Hills area. The producers within each of these areas can be identified from the map in Figure 2.3, which shows the wine producers within the Stellenbosch region. The Stellenbosch wine route is popular with local and international tourists and is one of the six main tourist attractions in South Africa (Stellenbosch Wine Route, 2017).

The next section details the important impact that the wine industry has on the South African economy.

### **2.5.6 Impact of the wine industry on the South African economy**

In 2008, the industry contributed R26,2bn to GDP (South African Government, Department of Agriculture, Forestry and Fisheries, 2011:5; Van Eeden *et al.*, 2012:1). According to a survey by the South African Wine Institute, the South African wine industry contributed R36,1 billion to the GDP of the country in 2013. This increase over the five years, despite the impact of the global economic downturn, was 37.8%. This indicates that the industry performed well over that period. The initial value of the raw material income received in 2013 was R6,8 billion but, taking into account the various value adding process steps and the impact on the agricultural, manufacturing, trade and hospitality industries, the total contribution to GDP is as much as R30,1 billion. This excludes the impact of wine tourism, which adds a further R6 billion to the GDP of the country (SAWIS, 2015:viii).

In 2013, a total of 525.6 million litres of the wine produced was exported. This amount represents 57.4% of wine production. The value of these wine exports in 2013 totalled R8,5 billion. The industry is one of South Africa's leading agri-exporter, and accounted for 1,2% of the national GDP in 2013. The main export destinations for South African wines were the UK, Sweden, Germany, the Netherlands and the USA (SAWIS, 2015:vii). The 2013 turnover achieved was more than five times the R4,8bn value of the raw material inputs, resulting in a higher than average GDP to capital ratio of 0,58. In 2013, the national average of the GDP to capital ratio was 0,45. While the good wine industry GDP to capital ratio is not an indication of profitability, it indicates the good productivity of the wine industry (SAWIS, 2015:vi).

The wine farms of the Western Cape have become an important tourist attraction for South Africa. It is estimated that almost half of all overseas visitors to the Western Cape travel to and

through the Cape Winelands, generating employment for the people in the region and foreign currency for the country (SAWIS, 2015:vii).

The employment levels and employment practices in the South African wine industry are dealt with in the following section.

### **2.5.7 Employment levels, employment practices and BBBEE in the South African wine industry**

In 2013, the South African wine industry employed 290 000 people across the whole wine supply chain. Of this number, 15% are skilled, 55,6% were unskilled, and 29,3% are semi-skilled. The wine industry is relatively labour intensive due to the intensive labour production methods which are followed in this primary agriculture sector. A productivity measure of any industry versus another, or its ability to move or change from being labour intensive to capital intensive, is the labour to capital ratio. An increase to a company's capital to labour ratio indicates an attempt by the industry to remain competitive or improve margins through automation. The wine industry's labour to capital ratio was 4,64 and exceeds the agricultural average of 4,54 as well as that of the national economy at 2,94. This is a positive sign (SAWIS, 2015:viii).

The South African wine industry can trace its beginnings to a time when slavery was first brought to the Cape Colony by the first governor. The wine farmers/producers used slave labour. Slavery only came to an end in the Cape colony on 1 December 1834, a year after the Slavery Abolition Bill of 1833 was passed by the British Parliament. However, the wine industry workers experienced poor working conditions from the time that slavery was abolished through the apartheid era (Kruger, Du Toit & Ponte, 2006). The labour environment on wine farms after the end of slavery in the 1830s and up to the 1980s have been described as being harshly paternalistic, using a combination of reward and punishment: workers received benefits of housing, water, and electricity in exchange for low wages; there was no unionisation; and there was a system of part-payment of wages in alcohol (Ponte & Ewert, 2007:8; McEwan & Bek, 2009:256). The wine industry received some of the worst anti-apartheid press especially regarding the 'dop' or 'tot' system by means of which workers were in part remunerated through a supply of wine. As a result, the wine industry received direct attention and has undergone considerable restructuring. Nevertheless, change has been slow as the deeply conservative

character of the wine industry as a capital and skills intensive industry has meant that transformation has lagged behind that in other sectors (McEwan & Bek, 2009:256).

In the early part of this century, the wine industry focused on detailing plans for transformation in the industry, and the enactment of the Broad-Based Black Economic Employment Act (BBBEE) created a framework within which it could be achieved. In 2003, the first Black Economic Empowerment (BEE) corporate deal took place when Anglo American Farms (Amfarms) sold the Boschendal wine farm to a group of investors, including an empowerment group. This was followed by KWV's BEE deal in 2004, Distell's in 2005 and others after this. A number of 'black-empowered' wine labels, such as Thandi and Lindiwe, and social labelling initiatives, (such as Fairtrade Wine and WIETA, the Wine Industry Ethical Trade Initiative ) have also come into being (Ponte & Ewert, 2007:12).

Details of the consolidation in the South African wine industry are provided in the next section.

#### **2.5.8 Consolidation in the South African wine industry**

Just under 100 South African wine estates have seen foreign investment, with most being financed by companies or families from France, the UK, the USA, Belgium and the Netherlands (Wineland Media, 2017). Such foreign interest has resulted from the weakness of the rand and the relative cheapness of the wine farms. While these local and foreign acquisitions have occurred in the South Africa wine industry, ownership is far more diversified in comparison to the USA and Australian industries (Kuhn, 2017:12).

One of the most important large international acquisitions was by Constellation Brands in 2006. Constellation Brands Inc, is a Fortune 500 company and an international producer and marketer of beer, wine and spirits. Constellation, is based New York state and is one of the largest USA beer importing and marketing companies. The company came into the South African market with the purchase of the Canadian wine company Vincor International. Vincor owns the country's largest wine export brand, Kumala, and is one of the largest companies selling South African wine brands into the UK market. This was followed by the acquisition of the Flagstone winery in 2008. Flagstone is a virtual producer in that it does not own any vine growing land and buys in grapes from external farmers; it also leases and or manages a number of vineyards from which it sources and produces its own wine. Other involvement has been based on marketing and branding arrangements rather than via the development or acquisition vineyards

and cellars. This has been through the large overseas alcoholic drinks groups and brands of Pernod-Ricard, Gallo, Diago/Blossom Hill and Foster/Lindeman (Ponte & Ewert, 2009:26).

There has also been USA investment in the South African wine industry. In 2002, Preston Haskell purchased Haskell Vineyards located in the Stellenbosch area and, in 2014, Charles Banks of Terroir Capital purchased Mulderbosch in Stellenbosch and Fable Vineyards, formerly Tulbagh Mountain Vineyards, in Tulbagh. Other similar investments through direct ownership or joint ventures have taken place (WineMag South Africa, 2015).

Late in 2016, AdVini, one of the largest producers of French wine, acquired a significant share of Forrester Vineyards (Pty) Ltd, retaining the original owner as the CEO. Its aim is to double sales in the next five years. This followed AdVini's acquisition of the Stellenbosch Le Bonheur Wine Estate and L'Avenir, an estate belonging to AdVini since 2010, a well known producer of Pinotage wine. These aims of these is to position AdVini as one of the leading wine producers in South Africa. The company also owns wine producers in Chile (Wine Industry Advisor, 2016).

Chairman of Max India Ltd. Analjit Singh has seen business opportunities in the South African wine industry, particularly those in Franschhoek and the Swartland. He has bought three small vineyard holdings in Franschhoek, which are collectively called Leeu Estates. In 2013, he also bought a 50% share in Mullineux Wines (now called Mullineux and Leeu Family Wines) and, in 2015, bought Roundstone wine farm in Riebeek Kasteel to gain access to a supply of grapes (Wine Industry Advisor, 2016). In 2014 the British investor Richard Branson bought Mont Rochelle, and the Californian based company Jackson Family Wines bought Fijnbosch Farm near Stellenbosch. This is owned as a joint venture with Graham Beck Wines. The Jackson Family Wines has vineyard holdings in Italy, France and Australia (Wineland Media, 2017).

In 2015, wine exports to China increased by 40% and it is predicted that significant portions of the Cape winelands will be Chinese and Indian owned within the next 15 years (Wineland Media, 2017). The Val de Vie wine estate was bought through Perfect China's 51% shareholding in Perfect Wines of South Africa. This is a joint venture with Leopard's Leap Wines and La Motte wine estate (Wineland Media, 2017).

### 2.5.9 Summary of aspects of the South African wine industry

The history of the South African wine industry has been varied, with a number of highs and lows. The industry is a significant one to the South African economy. Key facts that have a bearing on the success or otherwise of the wine industry are summarised below:

- Post democracy, the industry was revitalised. The South Africa wine industry along with other 'new world' wine producers has experienced a process of technological change and modernisation in the twenty-first century (Morrison *et al.*, 2010:2).
- In the first decade of the twenty-first century, the wine producers in South Africa made a change from producing mostly white wines to more red wine production (SAWIS, 2009:12).
- South Africa is a 'new world' wine producer along with other major producers, including Argentina, Australia, Canada, Chile, Georgia, New Zealand and the USA (WWTG, 2017).
- In the twenty-first century, South Africa copied the Australian wine industry model (along with the other 'new world' wine producers) and focused on export volumes (Fleming, *et al.*, 2014:115). The industry achieved significant export growth. The main export destinations for South African wines are the UK, Sweden, Germany, the Netherlands and the USA (SAWIS, 2015:vii)
- There have been some local and foreign acquisitions in the South Africa wine industry in the last decade due the weaker Rand and the comparative cheapness of South African farms (Kuhn, 2017:12). Acquisitions have been made by investors from the UK, the USA, Belgium, the Netherlands, and India (Wineland Media, 2017).
- Ownership within the South African industry shows greater diversity in comparison to the USA and Australian industries where big groups have bought and consolidated individual producers. The South African industry has therefore not been able to leverage cost out and efficiencies into the industry through consolidation as with the USA, and Australian industry (Kuhn, 2017:12).

- In 1995, South Africa was the fifth largest wine producer with volumes ahead of both China and Australia (Ponte & Ewart, 2007:1; OIV, 2016). Currently, South Africa is the seventh largest producer of wine (OIV, 2018:7).
- In 2017, the number of hectares under wine grapes in the Northern and Western Cape stood at 94 545, down from 2013 with 99 687 hectares. This was a 5,1% reduction (SAWIS 2017:8). Of the total area under wine grapes, or 90 422 hectares, is in the Western Cape.
- The number of South African wine producers has decreased from 582 in 2012 to 546 in 2017, that is, by 6,1%, while the number of Stellenbosch producers has declined in the same period from 201 to 191, a reduction of 5,0% (SAWIS, 2017:7).
- The South African wine industry contributed R36,1 billion to the GDP of the country in 2013 with significant volume growth being recorded between 2008 and 2013. The industry is one of South Africa's leading agricultural exporters, and accounted for 1,2% of the national GDP in 2013 (SAWIS, 2015:vii).
- The wine farms of the Western Cape are an important tourist attraction for South Africa; it is estimated that just under half of all overseas visitors to the Western Cape visit the Cape Winelands (SAWIS, 2015:vii).
- The South African wine industry in 2013 employed 290 000 people across the wine supply chain. The industry is labour intensive (almost 56% unskilled) due to the production methods (SAWIS, 2015:viii).
- The industry is conservative and transformation (towards BBBEE) has lagged behind other sectors (McEwan & Bek, 2009:256).

## **2.6 CONCLUSION**

The global wine industry has its roots in the history and development of mankind. However, in the last forty years the world environment has changed dramatically. Globalisation of all industry in general and of the wine industry in particular has allowed the international wine consumer to become more discerning and, in fact, more demanding, valuing choice and variety in their wine selections, at the right price. Global wine producers have needed to weather this

change and to meet these challenges: they have faced an over-supply of wine; a relative weaker demand for wine; the growth in demand for alternative alcoholic beverages, such as craft beer; cost pressures; a reduced revenue growth; and climate change.

Both the 'old world' and 'new world' wine producers have found it challenging to grow and flourish in this rapidly changing and difficult environment. In order to grow their businesses, they pursued a growth in export volumes. A positive issue has been the growth in wine consumption since the 1990s by the Asian countries, most notably China, although this demand is expected to reach an upper limit by 2018. To reduce costs, a number of mergers and acquisitions have taken place in the wine industry.

The export volume growth has given the 'new world' producers, in particular, opportunity to expand, modernise and grow. Players in the South African wine industry have faced similar difficulties and challenges as their wine producing competitors. They have also needed to face unique challenges. The challenges faced by the global wine industry and the South African wine producers in particular that present, in part, as risk will be explored in the Chapter Three.

This concludes the overview of the global and South African wine industry. The next chapter, deals with risk, supply chain risk, the supply chain risks faced by the South African wine industry and how supply chain risk may be managed.



## **CHAPTER THREE: SUPPLY CHAIN, SUPPLY CHAIN MANAGEMENT, RISK AND SUPPLY CHAIN RISK**

### **3.1 INTRODUCTION**

The previous chapter dealt with the global wine industry with particular emphasis on the South African wine industry. The chapter outlined the history, features, structure, developments, changes, and challenges in both the international and the South African wine industry. In this exploration, some of the possible challenges in wine producing became clear.

This chapter outlines the concepts of supply chain and describes the objectives, processes and activities of supply chain management. It then details the stages, processes and activities in the South African wine supply chain. The issues and challenges within the South African wine industry that may manifest as risk are also presented. This provides a context to the South African wine industry supply chain which was briefly described in section 1.2 and then in detail in section 2.5.3.

Finally, in this chapter, risk and supply chain risk are explained, and details of the various risk elements of the supply chain are discussed.

### **3.2 CONCEPTS OF SUPPLY CHAIN AND SUPPLY CHAIN MANAGEMENT**

In this section the concepts, objectives and activities or processes of the supply chain are described as these issues provide the necessary structure and context for a grasp of supply chain risk and why an understanding of supply chain risk and its management is so vital for the efficient functioning of the supply chain and for the sustainability of a business.

#### **3.2.1 The supply chain and supply chain management**

A supply chain is a grouping of three or more businesses linked by flows of products, services, finances and information from an original raw material source to a customer (Monczka *et al.*, 2016:13). In simple terms, it is a grouping of businesses, including their facilities, functions and activities, involved in producing and delivering a product (Stevenson, 2018:4). Its focus is on fulfilling a customer request or requirement (Chopra & Meindl, 2016:13).

Supply chain management involves effectively managing the two-way movement and co-ordination of goods, services, funds and information (these being the various flows) within and across the supply chain (Monczka *et al.*, 2016:13). The supply chain flows are of product, funds and information, with efforts being made to minimise the quantum of the fourth flow of product returns from the customer. These flows were explained in section 1.2. Supply chain is dynamic and involves the continuous flow of information, funds, and product and funds with all these flows operating at different level of efficiency, at various stages (Chopra & Meindl, 2016:14).

The Institute of Supply Management (ISM) in (Wisner, Tan & Leong, 2016:7) describes supply chain management as "the design and management of seamless, value added processes across organisational boundaries to meet the real needs of the end customer". Anything that negatively detracts from the seamlessness of these processes needs to be dealt with by the supply chain practitioner (Wisner *et al.*, 2016:7).

### **3.2.2 The objectives of supply chain management**

There are number of key objectives of supply chain management. The main objective of the supply function is that it obtains the 'right' materials, in the 'right' quantity for delivery at the 'right' time and the 'right' place from the 'right' sources with the 'right' service and at the 'right' price in the short and long term. The management of the flows and resources of the supply chain to achieve all of these 'rights' is the challenge and end goal of supply chain management and defines the efficiency of the supply chain (Johnson & Flynn, 2015:46).

The overall success of the supply chain is seen as the maximisation of the overall value generated in supplying the good or service. This is the value, or the supply chain surplus, and is the difference between the value of the finished product to the end customer less the costs incurred in the whole supply chain in meeting the customer's requests. This simple formula is as follows:

$$\text{Supply Chain Surplus} = \text{Customer (sales) Value} - \text{Supply Chain Cost.}$$

The higher the supply chain surplus or profitability, the more successful the supply chain (Chopra & Meindl, 2016:14). Any supply chain inefficiencies and disruptions can have large financial and strategic consequences. However, correctly designed, implemented and managed operational strategies and plans can effectively mitigate the financial and strategic risk

associated with supply chain disruptions. Such a strategy is supply chain risk management (Tomlin & Wang, 2011:2)

The next section examines the components or parts of the supply chain and the various activities that ensure that the supply chain functions effectively.

### **3.2.3 Processes of supply chain management**

To create and supply goods and services all businesses need to plan, organise and manage functional areas that are integral for the operating and survival of the business. These functional areas include marketing/sales, operations/production and finance/administration. Through these functional areas of marketing, operations and finance, value for the customer is created, but the business cannot create this value for themselves. They require the procurement from a variety of suppliers of goods and services (the source activity), and this procurement function, taken together with the three functions of marketing, operations and finance, may be thought of as the supply chain (Heizer, Render & Munson 2017:44).

While functional areas or departments might exist within a business, the effective and efficient functioning of the supply chain cannot be tied to the organisational 'boundaries' but instead operates across primary management processes of planning the operation and its activities, sourcing goods and services, making products, delivering product to customers and the return of some product from the customer, through the enabling or management of the components and activities to ensure an efficient operation of the supply chain (APICS, 2017:2). A Supply Chain Operations Reference (SCOR model), containing the supply chain processes of plan, source, make, deliver, return and enable was created as a tool for management to use to address, improve, and communicate supply chain decisions within a business and with the customers and key suppliers of a business. The model is used widely to understand the key activities within the supply chain (Hugos, 2018:42).

The broad processes of the model provide a set of descriptions for activities most businesses follow to effectively operate their supply chains (APICS, 2017:2). Every operation or business within the overall supply chain involved in supplying a product or a service is engaged in some, if not all, of these processes (Hugos, 2018:42; Jacobs & Chase, 2018:7).

These different process components may be seen in Figure 3.1 and are further described:



Source: Supply Chain Council, 2012:6

**Figure 3.1: The SCOR model arranged around six major management processes**

### 3.2.3.1 Plan

This plan process of the SCOR model consists of the processes needed to operate a supply chain strategically (Wisner *et al.*, 2016:514; Hugos, 2018:42; Jacobs & Chase, 2018:7).

At the corporate level, the overall business strategy is developed in the boardroom through planning the allocation of resources and formulating and implementing the strategies, tactics and goals. This is the strategic plan (Swink, Melnyk, Hartley & Cooper, 2017:26; Jacobs & Chase, 2018:26; Stevenson, 2018:44).

Operations and supply chain strategies evolve out of the strategic plan and guide the business in the use of resources to implement the corporate strategy and to plan and coordinate the operational strategies and goals with those of the overall business. The overall supply chain strategy is the determination of how anticipated demand will be met with available resources, and this is done through the plan process. The plan process refers to all the operations needed to plan and organise the operations in the other components of source, make, deliver, return and enable (Wisner *et al.*, 2016:514; Hugos, 2018:42; Jacobs & Chase, 2018:7).

The plan process at operational level includes the following activities (Wisner *et al.*, 2016:514):

- Demand and supply planning: ensuring that demand from the customer (sales through the deliver process) can met by manufacturing operation (the make process)

- Balancing resources with requirements: these resources include manpower, materials, machinery and methods (or processes)
- Establishing and communicating plans for the supply chain
- Planning of business rules: rules, policies and procedures
- Supply chain performance: operational metrics and financial results (detailed below)
- Data collection: IT systems/databases
- Inventory: raw materials, work in progress and finished product
- Capital assets: all assets used within the supply chain
- Transportation requirements: storage and carriers
- Regulatory requirements: laws and regulations.

A key aspect of the plan process is the measurement of supply chain performance through the use of metrics. Metrics are used to monitor supply chain performance, that is, whether the supply chain is efficient and delivers both a high quality product or service and also, importantly, value to customers (Jacobs & Chase, 2018:273; Stevenson 2018:680). The strategic goals of the business are translated into financial terms through the planning and creation of an annual budget, which is the financial 'plan' or measure against which the business's progress can be assessed during a year. The budget includes expenditure targets for the business and the overall business's profitability (Johnson & Flynn, 2015:48; Jacobs & Chase, 2018:495; Stevenson, 2018:10). A significant variation of actual performance versus the budgeted/planned target can highlight shortcomings. It is vital for a business to monitor operational metrics in order to highlight shortcoming and/or risk areas (Wisner *et al.*, 2016:514; APICS, 2017:4; Jacobs & Chase, 2018:273). Actual performance attributes can also be measured against competitors in the industry through the process of benchmarking (Stevenson, 2018:405). The planning activity incorporates metrics, with targets set and monitored in the following areas: financial, suppliers, operations, order fulfilment, inventory, customers, sales and marketing, and employees (Jacobs & Chase, 2014:274; Swink *et al.*, 2017:43; Stevenson, 2018:681).

As noted in this section, the plan process over-arches and is vital to the success of the other supply chain processes of source, make, deliver, return and enable. This will be explained in the following sections.

### **3.2.3.2 Source**

The source process consists of the selection of suppliers that deliver the services or goods needed to make the business's products. This requires a set of pricing, delivery and payment processes and again requires metrics or measures for monitoring and improving the relationship between the business and its suppliers. These sourcing processes are broad, covering the ordering and receiving of supplies, their transfer to the business's manufacturing sites and the paying of the supplier for the goods sourced (Wisner *et al.*, 2016:514; Hugos, 2018:42; Jacobs & Chase, 2018:7).

The detailed source process activities include the following (Wisner *et al.*, 2016:514):

- Sourcing goods and services
- Managing incoming goods (inventory)
- Sourcing of human resources
- Scheduling deliveries of purchased products
- Receiving, verifying and transferring bought out products
- Authorising supplier payments
- Identifying and selecting suppliers
- Managing supplier agreements
- Oversight of the delivery performance of the suppliers's supplier
- Assessing supplier performance and supply metrics.

Planning is key to ensuring the success of the source process in obtaining the right product, of the right quality, at the right time and at the right cost in order to enable the company to produce the required goods for its customers. In addition, correct planning is key in ensuring that that the right services are obtained for the business. Planning is also required to ensure the sound management of the supply chain functions and of the supply chain resources (Jacobs & Chase, 2018:7)

### **3.2.3.3 Make**

The make process comprises the making or producing of the goods or the provision of a service. This step includes the scheduling of processes for the workers and the coordination of the

materials and other resources such as plant and equipment to support the producing of the product or the providing of the service. This process includes the scheduling of the activities that are needed for the on time production of the goods and all preparation for delivery (Wisner *et al.*, 2016:514; Hugos, 2018:42; Jacobs & Chase, 2018:7). Metrics used here are to measure speed, quality and worker productivity, and this is probably the most metric-intensive portion of the supply chain (Jacobs & Chase, 2018:7).

Make process activities include the following (Wisner *et al.*, 2016:514):

- Execution of production
- Scheduling production activities
- Producing, testing, preparation, packaging, short term storage, and releasing product for delivery
- Engineering for engineered products
- Managing work in progress
- Engineering for equipment, facilities and the production operation
- Employee health and safety practices
- Production metrics.

Planning activities are key to ensuring the success of the make process so as to enable manufacturing of the right quality product (in accordance with design specifications and to meet customer requirements) at the right time and at the right cost price (in line with target costs) (Jacobs & Chase, 2018:7)

#### **3.2.3.4 Deliver**

The deliver process is often referred to as the logistics side of the supply chain. Transporters are selected to move the ‘made’ (finished) products to storage warehouses and to customers, to coordinate and schedule the movement of information and products through the supply network, to develop and operate a network of warehouses and to run the information systems that manage the receipt of orders from customers (Hugos, 2018:42; Jacobs & Chase, 2018:7;) The sales department is also held accountable for achieving sales volumes and turnover (Johnson & Flynn, 2015:10).

Activities within this deliver process are as follows (Wisner *et al.*, 2016:514):

- Warehousing
- Transportation/installation management - of all 'made' products
- All order management steps, from order enquiries and quotes to the planning and expediting of shipments
- Selecting transporters / carriers
- Warehouse management from receiving and picking to loading and shipping product
- Invoicing customers
- The collection of payments from customers
- Managing finished products inventories
- Managing export requirements
- Customer relationship management.

Planning is key to ensuring the success of the deliver process to ensure that the customer obtains the right quantities of the right product at the right time and at the right price to satisfy the customer real needs (Jacobs & Chase, 2018:7).

#### **3.2.3.5 Return**

This return process involves the receiving of defective products or excess products from customers. This process includes support for customers who have problems with delivered products (Hugos, 2018:42; Jacobs & Chase, 2018:7).

Activities within the return process are as follows (Wisner *et al.*, 2016:515):

- The receipt and handling of finished goods returns from customers
- Authorisation and scheduling of returns
- Receiving, verifying, and placement of defective or excess products
- Managing returned inventories.

#### **3.2.3.6 Enable**

The enable process involves supporting the design and management of the planning and execution processes of the supply chain. These processes are associated with managing activities



(establishing/planning, maintaining and monitoring) and include the following (Wisner, 2016:515; APICS, 2017:4):

- Supply chain business rules: this includes the maintenance, changing and improving of appropriate business rules.
- Supply chain performance; this includes initiating reporting requirements and then analysing the reports to find root causes of problems, the development of corrective actions to deal with the problems and implementation of the corrective actions.
- Supply chain data/information: this includes making or receiving requests for new/improved information/data regarding the supply chain, as well as ensuring that the information/data is produced on a continuous basis, and is verified for accuracy and published accordingly.
- Supply chain human resources: this includes identifying skills/resource requirements, identifying available skills/resources and matching the need to the requirements. It also involves determining hiring/redeployment of human resources, determining required training/education and prioritising, approving and facilitating training.
- Supply chain assets: this includes scheduling asset management activities such as the installation and configuration of new assets and the cleaning, maintaining and repairing of existing assets. The decommissioning and disposal of obsolete assets is also included.
- Supply chain contracts: this includes entering and reviewing contracts, as well as reviewing contractual performance to identify performance issues and opportunities for improvements in the contracts.
- The supply chain network: this includes gathering data on potential projects and developing possible project scenarios through the modelling/simulating of these scenarios to identify the impacts of them. Subsequently, appropriate value adding projects are selected, approved and launched, and changes to these projects are developed.
- Supply chain regulatory compliance: this includes monitoring and assessing the regulatory entities that affect the supply chain through the assessment of publications to identify deficiencies, and correcting the deficiencies to ensure compliance.
- Supply chain risk: this involves identifying risk issues/events relating to the supply chain in order to evaluate the risks, quantify their impacts and manage/mitigate the risks.

- Supply chain procurement: this includes developing a supply chain procurement strategy/plan, developing necessary procurement documentation and undertaking supplier selection.
- Supply chain technology: this includes defining the supply chain technology requirements (IT hardware and software), identifying alternative solutions and defining and/or updating the technology roadmap.

This enable process of management activities (organising and controlling), like the planning component, covers the whole supply chain and the other activities of source, make, deliver and return (APICS, 2017:4)

### **3.2.3.7 Summary**

The orchestration of all of the six processes and their various detailed activities is critical to provide a quality product/service at a reasonable price (Jacobs & Chase, 2018:7). While these processes describe the total business process and activities required to satisfy a customer's demand, they also provides a basis for how to manage and improve the processes within the supply chain (Hugos, 2018:42). Risk materialises in each of these components and their underlying activities. These plan, source, make, deliver, return and enable processes were used as the framework to examine the risk within the wine industry supply chain.

The next section deals with the stages within the South African wine supply chain.

### **3.2.4 Stages in the South African wine supply chain**

The stages in the South African wine supply chain were dealt with in section 2.5.3 and illustrated in Figure 2.1. For ease of reference, this figure is presented again as Table 3.1 but in a different format. In this table, the supply chain stages are cross-linked to the six key SCOR processes as presented in section 3.2.3 of plan, source, make, deliver, return and enable together with their underlying activities. Column one lists the process, column two the wine supply chain stage that correlates to the SCOR process, column three a brief description of the SCOR process and, finally, in column four the detailed activities within each supply stage process are listed. The activities set out in this last column are those that are generic to all supply chains as outlined in sections 3.2.3.1 to 3.2.3.7, as well as those specifically applicable to the wine supply chain stages as detailed in section 2.5.3.

**Table 3.1: Processes in the South African wine supply chain**

Supply chain process	Supply chain stage	Description of the wine supply chain process	Supply chain activities within the wine supply chain processes
Plan	<p>This incorporates all the plan activities of the supply chain stages:</p> <p>Stage 1: Grape production            Stage 2: Wine Production            Stage 3: Packaging            Stage 4: Distribution            Stage 5: Sales and consumption</p>	<p>The plan process includes <b>all</b> aspects of <i>planning</i> of the business and its operating activities. This component covers: planning for the business and its operation; farm and crop management; procurement; bottling &amp; packaging; and sales/distribution of the wine.</p>	<p>The plan process includes the following activities:</p> <p><i>Demand and supply planning/matching:</i></p> <ul style="list-style-type: none"> <li>• Land and vine availability/suitability</li> <li>• Current and future crop capacity (demand planning)</li> <li>• Current/future wine manufacturing capacity</li> </ul> <p><i>Balancing resources with requirements:</i></p> <ul style="list-style-type: none"> <li>• Manpower, materials, and methods (procedures/policies/business rules)</li> </ul> <p><i>Establishing and communication plans for the supply chain</i></p> <p><i>Planning the business rules, policies and procedures</i></p> <p><i>Planning supply chain performance</i></p> <ul style="list-style-type: none"> <li>• Financial metrics</li> <li>• Operational metrics</li> </ul> <p><i>Planning inventory levels</i></p> <ul style="list-style-type: none"> <li>• Dry stocks (bottles, labels, boxes, capsules, corks, barrels)</li> <li>• Work in progress (wine in barrels and bottles),</li> <li>• Finished goods (bottled, labelled and boxed)</li> </ul> <p><i>Planning of IT systems and databases</i></p> <p><i>Planning of capital assets</i></p> <ul style="list-style-type: none"> <li>• Utilisation</li> <li>• Replacement</li> </ul> <p><i>Planning transportation requirements</i></p> <ul style="list-style-type: none"> <li>• Storage</li> <li>• Carriers</li> </ul>
Source	<p>This incorporates all the source (procurement)</p>	<p>The source process includes <b>all</b> aspects of <i>sourcing</i> for the business. This covers the ‘procurement’ of</p>	<p>The source process includes the following activities:</p> <ul style="list-style-type: none"> <li>• Identifying/selecting suppliers</li> </ul>

	<p>activities of the wine supply chain stages:</p> <p>Stage 1: Grape production</p> <p>Stage 2: Wine Production</p> <p>Stage 3: Packaging</p> <p>Stage 4: Distribution</p>	<p>materials, manpower, machinery and the services to enable the supply chain to operate</p>	<ul style="list-style-type: none"> <li>• Sourcing all materials/goods including receiving of incoming products and managing inventory: <ul style="list-style-type: none"> <li>- Vines/grapes (if required)</li> <li>- Wine barrels/corks/capsules</li> <li>- Other goods: chemicals, etc.</li> <li>- Bottles, labels &amp; boxes</li> </ul> </li> <li>• Oversight of supplier's supplier</li> <li>• Sourcing external services</li> <li>• Sourcing human resources</li> <li>• Sourcing plant and equipment</li> <li>• Assessing supplier performance (metrics)</li> <li>• Authorising supplier payments</li> <li>• Managing supplier agreements</li> </ul>
Make	<p>This incorporates the make activities of the wine supply chain stages:</p> <p>Stage 1: Grape production</p> <p>Stage 2: Wine production</p> <p>Stage 3: Packaging</p>	<p>The make process includes <b>all</b> aspects of wine <i>production</i>. This component covers: land management; vine management; crop management; harvesting; and all steps of the wine production processes. It also includes bottling and packaging activities</p>	<p>The make process includes the following activities:</p> <p><i>Scheduling the farm operation, resources and processes:</i></p> <ul style="list-style-type: none"> <li>• General farm management</li> <li>• Production planning/scheduling</li> <li>• Engineering for equipment/facilities/production network</li> <li>• Employee health and safety</li> <li>• Work in progress</li> <li>• Production metrics</li> </ul> <p><i>Land/crop/product management:</i></p> <ul style="list-style-type: none"> <li>• Managing of farm/resources</li> <li>• Planting, tilling, fertilising, tending, pest control, irrigation</li> <li>• Harvesting / transportation of crop to process facility</li> <li>• Stemming / crushing of grapes</li> <li>• Fermentation / clarification</li> <li>• Racking of the wine</li> <li>• Fining/filtration</li> <li>• Refrigeration</li> <li>• Process and quality control procedures (sampling, testing and tasting)</li> <li>• Wine storage/ageing</li> <li>• Bottling filling, corking and capsuling, labelling</li> <li>• Box filling, box closing and palletising</li> </ul>
Deliver	<p>This incorporates the deliver activities of the wine supply chain:</p>	<p>The deliver process includes all aspects of sales: customer invoicing; warehousing, sales transportation of the wine</p>	<p>The deliver process includes the following sales and distribution activities:</p>

	Stage 4: Distribution Stage 5: Sales & consumption <sup>1</sup> .	to the distributor; and after sales service.	<ul style="list-style-type: none"> <li>• Customer pricing/setting the customer base</li> <li>• Warehouse management,</li> <li>• Transportation of wine</li> <li>• Order enquiries/quotes</li> <li>• Routing of shipments</li> <li>• Selecting transporters</li> <li>• Warehouse management</li> <li>• Invoicing customers</li> <li>• Collection of payments</li> <li>• Managing wine stocks</li> <li>• Managing exports</li> <li>• Customer relationship management</li> <li>• Sales/marketing metrics</li> </ul> <p>Note - other aspects of the shopper/consumer phase do not fall within the scope of this study</p>
Return	This incorporates the return (of product) process activities of the wine supply chain: Stage 5: Sales & consumption	The return process includes <i>product return</i> for any reason, such as quality problems, excess stock not required by the customer and account non payment	The return activities includes the returning of product: <ul style="list-style-type: none"> <li>• Receipt/handling of wine returned from customers</li> <li>• Authorisation/scheduling of returns</li> <li>• Receiving, verifying, and disposition of defective wine</li> <li>• Managing returned wine inventory</li> </ul>
Enable	This incorporates the enable activities of the supply chain: Stage 1: Grape production Stage 2: Wine production Stage 3: Packaging Stage 4: Distribution Stage 5: Sales and consumption	The enable process includes the support, design and management of the <i>planning and execution processes</i> of the supply chain	The enable activities includes the management activities of the following: <ul style="list-style-type: none"> <li>• Business rules</li> <li>• Supply chain performance</li> <li>• Data/information</li> <li>• Human resources/training</li> <li>• Assets</li> <li>• Contracts</li> <li>• Projects</li> <li>• Regulatory compliance</li> <li>• Risk</li> <li>• Procurement and IT</li> </ul>

Source: Compiled by the researcher

<sup>1</sup> This study does not include sales further down the supply chain to the end consumer.

### 3.3 RISK

The International Organisation for Standardisation (ISO), an independent, non-governmental body which creates various relevant international standards for organisations and businesses, created an international standard for understanding and managing risk, namely, ISO 31000:2009 (ISO, 2017). Risk is the effect of uncertainty on objectives, being seen as an event, a change in circumstances or a consequence. The consequences can range from positive to negative and every risk has its own characteristics that require analysis and management (Hopkin, 2017:17).

The definitions of 'business risk' are broad and have different meanings, measurements and interpretations depending on the field of research (Wagner & Bode, 2008:308; Hopkin, 2017:3). Business risk includes a range of factors with possible impact on a business's processes, activities, assets and resources. External factors can arise from economic change, financial market developments and dangers arising in political, legal, technological and demographic environments. Risks can arise and change over time; for example, the public can change their views on products or practices (Olson & Wu, 2015:7).

Risk applies to any management decision that could have a good or bad outcome (Johnson & Flynn, 2015:29). It follows that most management decisions carry some degree of risk (Sadgrove, 2016:4). Therefore it is important to understand the risks that can arise from making a decision or from avoiding or delaying making decisions that are beneficial for the business. Managing and balancing the decisions and the risks that arise is not only important to an investor, it is also vital for the management team of any business (Lam, 2014: 4). Core business risks are those that arise as a result of the business decisions taken by the management of the business (Hugo & Badenhorst-Weiss, 2011:97; Institute and Faculty of Actuaries, 2017). In its broadest sense, business risk includes the tangible value investors lose if a business fails (Kim & Vonortas, 2014:456).

The King Report on good corporate governance notes in the section titled 'Strategy, Performance and Reporting' under principle four, that the board/management "should take cognisance of the organisation's core purpose, *its risk* and opportunities, strategy, business model, performance and sustainable development and that these elements are all inseparable elements of the value creation process." Key is that, under the section entitled risk governance, principle eleven, the report notes that the board/management should govern *risk* in a way that

supports the organisation in setting and achieving its strategic objectives (King Report IV, 2016).

After the events triggered by the 2008 economic crisis and a number of serious supply chain disruptions arising from extreme weather, businesses are taking a greater interest in risks and undertaking their identification and proactive management. The stakeholders expect businesses to take full account of all risks that might cause disruption with operations, late delivery of projects or failure to deliver against strategy (Heckmann, Comes & Nickel, 2014:120; Hopkin, 2017:24; Jacobs & Chase, 2018:32). Risk management was explained in Chapter One.

The next section examines the issue of supply chain risk.

### **3.4 SUPPLY CHAIN RISK**

The ISO Guide 73: 2009 on Risk Management notes that risk may be positive or negative or a deviation from the expected (Hopkin, 2017:15). Wagner and Bode concur and posit that there is a persistent two sided argument with risk being viewed purely as a 'danger' or as both 'danger' and 'opportunity'. In view of the history of disruptions on supply chains, the notion of supply chain risk as a negative issue is the one most commonly used by many academic authors and researchers. Most appear to view risk as being the 'negative' deviation from the expected value of a supply chain performance measures which generally results in negative consequences for most businesses. Therefore, risk is usually equated with the damage or loss resulting from a supply chain disruption (Wagner & Bode, 2008:308).

Many academics have studied supply chain management risk and have defined what it is from different perspectives. Tummala and Schoenherr (2011:474) define supply chain risk as "an event that adversely affects supply chain operations and hence its desired performance measures, such as chain-wide service levels and responsiveness, as well as cost." Heckmann *et al.*, (2014:122) provide a very simple definition of supply chain risk as "the possibility and effect of mismatch between supply and demand" (Heckmann *et al.*, 2014:122).

The need to study, understand and manage supply chain risk is significant as supply chains have become more complex and of a global nature. Modern global supply chains are subject to more risk factors than localised supply chains of the past (Chopra & Meindl 2016:159; Heizer *et al.*,

2017:487). Some examples of well-known international supply chain disruptions that have impacted on the results and performance of various businesses include:

- The earthquake, tsunami and resultant nuclear power station crisis that occurred in Japan in 2011, which resulted in a 40 000 vehicle drop off of sales and production by Toyota, costing the vehicle manufacturer \$72 million in lost profits each day (Ho, Zheng, Yildiz & Talluri, 2015:5031)
- The flooding in Thailand in 2011, which affected the supply chains of computer manufacturers dependent on hard discs and which also disrupted the supply chains of Japanese automotive businesses with plants in Thailand (Ho *et al.*, 2015:5031).

Consequently risk management has become a necessary tool for businesses (Benton, 2014: 363; Olson & Wu, 2015:362), with supply chain risk management becoming a developing focus area in supply chain research (Hoffmann *et al.*, 2012:1). Risk management was explained in Chapter One.

### **3.5 ELEMENTS OF SUPPLY CHAIN RISK**

All businesses operate in an environment of constant change. This environment of change gives rise to uncertainty, especially about future events and the impact that these events may have on the business. The uncertainty about future events manifests as risk that the businesses will not operate as planned and that the financial results will deviate from what is anticipated. The degree of uncertainty surrounding an event determines the level of risk (Hugo & Badenhorst-Weiss, 2011:97). Tang and Musa (2011:2) posit that supply chain risk is found in each of the main supply chain flows of products, funds and information. These flows were dealt with in section 1.2.

As explained in section 3.4, different academic authors and researchers have their own views or lenses for defining supply chain risk. Likewise, there are different views on how to classify and identify supply chain risks elements. There is, however, a strong correlation between the elements or classification presented by the authors. This research focuses on the five main supply chain sources of risk as defined by various academic authors and researchers, namely, financial, operational, external downside, market and reputational. These are summarised in Table 3.2 below and then explained.



**Table 3.2: An analysis of supply chain risk elements**

Risk element	Risk description	Academic authors
1. Financial (including legal issues)	<p>Risks that have financial implications and can cause fluctuations in the operating profit and in the return that the shareholder receives. This element also includes legal issues, which invariably have a financial implication for a business.</p> <p>These risks can negatively impact on the supply chain surplus by decreasing the customer value and/or increasing the supply chain costs.</p>	<p>Van Wyk, Dahmer, &amp; Custy 2004  Wagner &amp; Bode, 2008  Hugo &amp; Badenhorst-Weiss, 2011  Tang &amp; Musa, 2011  Tummala &amp; Schoenherr, 2011  Mohammed &amp; Sykes, 2012  Kim &amp; Vonortas, 2014  Johnson &amp; Flynn, 2015  Chopra &amp; Meindl, 2016  Monczka <i>et al.</i>, 2016  Rahman, Yap, Ramli, Dullah &amp; Shamsuddin, 2017  Heizer, <i>et al.</i>, 2017  Jacobs &amp; Chase, 2018</p>
2. Operational	<p>These are broad based risks that capture the business dangers and challenges arising from the people, systems, and processes that the business utilises in its processes</p> <p>These risks can negatively impact on the supply chain surplus by increasing the supply chain costs</p>	<p>Wagner &amp; Bode, 2008  Hugo &amp; Badenhorst-Weiss, 2011  Tang &amp; Musa, 2011  Tummala &amp; Schoenherr, 2011  Mohammed &amp; Sykes, 2012  Kim &amp; Vonortas, 2014  Jacobs &amp; Chase, 2018  Fawcett <i>et al.</i>, 2014  Heckmann <i>et al.</i>, 2014  Johnson &amp; Flynn, 2015  Chopra &amp; Meindl, 2016  Pakhchanyan, 2016  Heizer, <i>et al.</i>, 2017  Hopkin, 2017Stevenson, 2018</p>
3. External downside	<p>This is a broad category of risk that is labelled differently by various academic writers but includes all external factors that could affect the supply chain such as natural disasters, security, crime, corruption and external industrial action.</p> <p>These risks can negatively impact on the supply chain surplus by increasing the supply chain costs</p>	<p>Van Wyk <i>et al.</i>, 2004  Wagner &amp; Bode, 2008  Hugo &amp; Badenhorst-Weiss, 2011  Tang &amp; Musa, 2011  Tummala &amp; Schoenherr, 2011  Mohammed &amp; Sykes, 2012  Johnson &amp; Flynn, 2015  Chopra &amp; Meindl, 2016  Monczka <i>et al.</i>, 2016  Hopkin, 2017:2  Manners-Bell, 2017:22  Heizer, <i>et al.</i>, 2017  Jacobs &amp; Chase, 2018</p>

4. Market	This refers to product market acceptance, the potential action of competitors and the general market conditions and the evolution of that market. It also relates to the changes in the competitive market. These risks can negatively impact on the supply chain surplus by reducing (or threatening) the customer value and/or increasing the supply chain costs	Wagner & Bode, 2008 Tummala & Schoenherr, 2011 Mohammed & Sykes, 2012 Kim & Vonortas, 2014 Johnson & Flynn, 2015 Chopra & Meindl, 2016 Monczka <i>et al.</i> , 2016
5. Reputational	This also relates to the changes in the competitive market environment and can include anything that negatively impacts on business's sales and its reputation.  These risks can negatively impact on the supply chain surplus by reducing (or threatening) the customer value and/or increasing the supply chain costs	Johnson & Flynn, 2015 Chopra & Meindl, 2016 Heizer <i>et al.</i> , 2017

Source: Compiled by the author

### 3.5.1 Financial risks

The first area of supply chain risk as outlined in Table 3.2 is financial risk. This risk refers to the tangible value an investor could lose if the business fails and all financial aspects of a business (Kim & Vonortas, 2014:454), including anything that can cause fluctuations in the operating profit through a reduction in sales revenue (decreasing or reducing the customer value) or an increase in supply chain costs (Hugo & Badenhorst-Weiss, 2011:99; Kim & Vonortas, 2014:454; Chopra & Meindl, 2016:14). In this category the following are included:

- (1) *The risk of cost overruns and or poor financial performance* – The results of this risk are an increase in supply chain costs and ultimately in the customer value as revenues decrease. This can have financial implications for the business's financial sustainability. A key to ensuring operational performance is through the use of measures to monitor costs and overall financial performance (Jacobs & Chase, 2018:273). On the production side, the risk is significant as cost overruns can result in higher product costs, causing an

increase in selling price to increase the margin, which can in turn impact on sales (Tummala & Schoenherr, 2011:475; Mohammed & Sykes, 2012:15).

- (2) *The risk of a negative impact on sales revenue through pricing strategies* – This includes sales promotions, sales incentive schemes, price reductions or 'specials', or incentives that may be aimed at increasing sales volumes; however, if these are poorly managed they can negatively impact on overall sales revenue and inventory holding (Wagner & Bode, 2008:310; Tang & Musa, 2011:4; Tummala & Schoenherr, 2011:475).
- (3) *The risk of a shortage of a key material* – A shortage of a raw material or ingredients can be harmful to a business. This could be of a material used to manufacture a product or even of packing materials. Such a shortage presents as risk to a business. (Lysons & Farrington, 2016:58; Jacobs & Chase, 2018:520).
- (4) *Liquidity risk and the risk of poor financial management* – This includes:
  - The business poorly managing its financial resources/assets and not being capable of achieving its anticipated return on investment. The category also includes the risk of the business not safeguarding its fixed assets and property (Kim & Vornortas, 2014:454; Hugo & Badenhorst-Weiss, 2011:97; Tummala & Schoenherr, 2011:475; Mohammed & Sykes, 2012:15; Johnson & Flynn, 2015:220; Chopra & Meindl, 2016:160).
  - The business poorly managing its operating cash flow through its management of capital investment and working capital. This cash investment in working capital includes the holding of adequate inventories and managing the credit allowed to its customers and the credit received from its suppliers (Kim & Vornortas, 2014:454; Hugo & Badenhorst-Weiss, 2011:97; Tummala & Schoenherr, 2011:475; Mohammed & Sykes, 2012:15; Johnson & Flynn, 2015:220; Chopra & Meindl, 2016:160).
- (5) *The risk of fluctuating or high interest rates* – This is relative to the goods purchased with borrowed capital or short term financing from the bank via a bank overdraft with the risk manifesting through having to pay more than anticipated for purchases or other services if the market interest rate increases (Van Wyk *et al.*, 2004:264; Hugo & Badenhorst-Weiss, 2011:99).

- (6) *Foreign exchange risk* – This concerns the impact that fluctuations in the exchange rate can have on:
- The value of sales revenue on selling finished product to export customers (Hugo & Badenhorst-Weiss, 2011:97; Tummala & Schoenherr, 2011:475; Kim & Vornortas, 2014:454; Chopra & Meindl, 2016:159).
  - The cost of imported materials and freight and shipping costs on either imported materials or on exported sales (Hugo & Badenhorst-Weiss, 2011:97; Tummala & Schoenherr, 2011:475; Kim & Vornortas, 2014:454; Chopra & Meindl, 2016:159). Exchange rate risk can severely impact on the profitability of the business within the supply chain; therefore the appropriate sourcing of raw materials and the location of foreign supplier needs to be carefully considered to reduce the impact of this risk (Tang & Musa, 2011:5; Chopra & Meindl, 2016:123).
- (7) *Price and cost risk* – Changes in the price of goods or services purchased or basic cost increases over which an operation does not have control. This can be when the business is operating in an inflationary environment. It can also refer to changes or fluctuations in the cost of basic raw material prices of key commodities. Examples are seen in the commodity market, a key example being a change in the oil price, which affects costs of fuels, energy and those products that require oil as a key ingredient or raw material, for example, chemicals, and plastics (Van Wyk *et al.*, 2004:264; Hugo & Badenhorst-Weiss, 2011:97; Tang & Musa, 2011:5; Mohammed & Sykes, 2012:15; Johnson and Flynn, 2015:30; Jacobs & Chase, 2018:33; Chopra & Meindl, 2016:160; Monczka *et al.*, 2016:352).
- (8) *The risk of unexpected changes in taxes, tolls, duties and tariffs* – This can have an impact on the business costs (Johnson & Flynn, 2015:30; Jacobs & Chase, 2018:33).
- (9) *The risk of high or fluctuating freight and transportation costs on raw materials or on goods sold to the customer* - Causes for this risk regarding raw materials could include non-availability of materials, poor estimation of materials quantity required, poor workmanship of supplier, poor quality of the material, inconsistent demand on a supplier causing a supply crisis as the supplier cannot meet the demand, and a delay in material supply (Monczka *et al.*, 2016:352; Rahman *et al.*, 2017:2).
- (10) *The risk of the non-sustainability of key suppliers and customers* - The financial strength, reliability, flexibility, and capability of the businesses supply chain partners are vital:

this includes all suppliers *and* customers. The financial failure of a key supplier can impact severely on the purchaser and can easily affect the entire supply chain network - this is supplier management and poor or non-management of the suppliers can severely impact on the business and its profits. Equally, the failure of a key customer can have a significant impact on a businesses' liquidity as the customer will not be in a position to pay for their purchases (Tang & Musa, 2011:4; Kim & Vonortas, 2014:256; Chopra & Meindl, 2016:160; Monczka *et al.*, 2016:352).

- (11) *The risk of supply problems by a supplier of goods and services (supplier fulfilment problems and or shortages)* – This could manifest itself through having a single source of supply for a particular good or service, leaving the business vulnerable to supply/service problems. Any supply delays or interruptions have the impact on increasing cost, especially if last minute substitutions are required. Idle labour and machinery and equipment and missed customer delivery promises all bring with them cost increases (Wagner & Bode, 2008:310; Tang & Musa, 2011:4; Tummala & Schoenherr, 2011:475; Johnson & Flynn, 2015:30; Chopra & Meindl, 2016:160; Heizer *et al.*, 2017:488; Jacobs & Chase, 2018:33;). In its simplest form this includes inflexibility of the supply source to meet short term volume changes (Tummala & Schoenherr, 2011:475; Chopra & Meindl, 2016:160).
- (12) *Risk of poor quality of goods or materials supplied* – Poor materials supplied can impact on a business's ability to meet its own production demand, as production cannot take place until product of correct quality is supplied. This can ultimately affect supply to the customer (Johnson & Flynn, 2015:30; Chopra & Meindl, 2016:160; Heizer *et al.*, 2017:488).
- (13) *The risk presented by the supplier's supplier* – This could be through the financial collapse of the supplier's supplier, the non-supply of materials to the supplier by their supplier or the suppliers supplier giving substandard product to its customer. This indirect or secondary risk covers the financial sustainability *and* capability of the supplier's supplier. Businesses need to ensure that their suppliers are capable of meeting all requirements by evaluating whether they manage their own business well and have the requisite knowledge, skill and ability to be a reliable supplier. To mitigate against supply interruptions, this must be handled through careful supplier evaluation *before*

selecting the businesses supplier (Tang & Musa, 2011:4; Johnson & Flynn 2015:30; Monczka *et al.*, 2016:352;).

- (14) *The risk of the physical management of inventory* – This includes the following:
- Poor storage of all categories of inventory can lead to the damage of stock. Inventories included are raw material, work in progress and finished product as well as consumables. This may arise from poor storage methods and can result in loss or damage of the inventory (Monczka *et al.*, 2016: 352).
  - Excess inventory holding may also lead to an increase in stock obsolescence and stock write offs (Wagner & Bode, 2008:310; Chopra & Meindl, 2016:160; Monczka *et al.*, 2016: 352).
- (15) *The risk of transportation of inventory (logistics delays/damage)* – This is the risk associated with the shipment and transportation of any raw material purchases from suppliers, *and* sales of finished product to customers. As the supply chain gets longer the inventory carrying costs also increase (Wagner & Bode, 2008:310; Tang & Musa, 2011:4; Monczka *et al.*, 2016, 352; Heizer *et al.*, 2017:488; Jacobs & Chase, 2018:33).
- (16) *Legal risk relative to the business activities and to the product it supplies* – This risk may manifest in various ways, most of which have a negative financial implication for businesses within the supply chain:
- There may be personal liability damages against a business. Examples of personal injury damages include damages for its employees acting in an unethical way or for injury to others through the negligence of the business (for example, for injury sustained by a visitor to a business premises) (Van Wyk *et al.*, 2004:264; Monczka *et al.*, 2016:576).
  - Contractual violations relative to the supply of goods and services may occur. Examples of such violations include the supply of substandard goods, non-payment for goods or services supplied and other breaches of contract (Monczka *et al.*, 2016:577).
  - Warranty enforcement issues, whether express or implied may constitute risk (Tummala & Schoenherr, 2011:475; Monczka *et al.*, 2016:590).

This ends the explanation of financial risk as the first category of supply chain risk.

### 3.5.2 Operational risk

The second risk category is operational risk. This is defined by the Basel II Committee as "as the risk of loss resulting from the inadequate or failed internal processes, people and systems" (Hugo & Badenhorst-Weiss, 2011:99; Heckmann *et al.*, 2014:122; Kim & Vonortas, 2014:456). Included in this supply chain risk category are all management issues that fall within the *direct* control of the business and its management.

Therefore this operational risk can be categorised across the three dimensions of (i) people (human resources), (ii) processes and (iii) systems (Hugo & Badenhorst-Weiss, 2011:99; Kim & Vonortas, 2014:456;).

#### 3.5.2.1 Human resource or people risk

The first and a key factor to operations is the "human impact" or the 'people' dimension. Core to the business is the knowledge, skill, experience, capability, honesty and reliability of the personnel within the supply chain and its processes. People risks, such as the loss of key employees with unique skills, errors by employees, whether intentional or accidental, and finally the dishonest actions of employees who commit fraud or who steal from a business are all factors that could impact on the quality of the products or services that a business provides and thus present as risk.

Examples of the human resource risks are:

- (1) *The risk of human error* or even negligence of the businesses employees (Hugo & Badenhorst-Weiss, 2011:99).
- (2) *The risk of inadequate training* – This can lead to unintentional error and can affect operational performance (Hugo & Badenhorst-Weiss, 2011:99; Fawcett *et al.*, 2014:453; Stevenson, 2018:194;)
- (3) *The risks presented by a poor working culture*, leading to low morale, which in turn can lead to low levels of motivation and low productivity and ultimately to high staff turnover (Hugo & Badenhorst-Weiss, 2011:99; Fawcett *et al.*, 2014:450; Stevenson, 2018:194;)
- (4) *The risk of industrial action* – This can lead to delays in production and supply issues and ultimately reduced profitability (Wagner & Bode, 2008:311; Tummala & Schoenherr, 2011:475; Johnson & Flynn, 2015:30; Chopra & Meindl, 2016:160; Manners-Bell, 2017:25; Jacobs & Chase, 2018:33).

- (5) *The risk of loss of personnel and replacement of these employees with inexperienced staff* – The inadequate training of the replacement staff members can impact on the business. It is vital that new staff is given guidance and training as well as autonomy and recognition. Mistakes made by employees can be costly; therefore, adequate training of such new employees is vital to ensure that this risk is militated against (Pakhchanyan, 2016:13).
- (6) *The risk of incompetent staff and/or staff that act recklessly or irresponsibly* (Hugo & Badenhorst-Weiss, 2011:99)
- (7) *The risk of unethical conduct and theft by employees* – The risk of fraud, bribery and corruption are all issues included within this operational risk area (Wagner & Bode, 2008:311; Mohammed & Sykes, 2012:15; Hopkin, 2017:25).
- (8) *The risk of ill-informed and unauthorised decision making* throughout the business – Key to management of this risk is by means of adhering to operational and process controls and through management oversight and diligence (Hugo & Badenhorst-Weiss, 2011:99; Fawcett *et al.*, 2014:451).
- (9) *The risk of not being able to find, attract and retain employees with appropriate experience, skill and abilities* – such requisite skills include problem solving ability based on prior experience or knowledge (Tang & Musa, 2011:4; Kim & Vonortas, 2014:455; Stevenson, 2018:469).

### **3.5.2.2 Process risk**

A second factor in operational risk is the risk of the inadequacy of internal processes, resulting in inefficiency and unexpected losses. This includes errors in execution due to process inadequacies and process flaws (Hugo & Badenhorst-Weiss, 2011:99). Process risk refers to risk around the businesses own operations teams for development (design), production, supply and distribution (Kim & Vonortas, 2014:456).

The risks within internal operations process are listed and explained below:

- (1) *The risk of poor process controls* – Such risk may result in the manufacture of a substandard product. A quality product is one that meets the customer's needs or requirements (Heizer *et al.*, 2017:256). Poor control of the process, through the lack of or inadequate process controls, allowing for a substandard product to be produced that does not meet design requirements and therefore does not meet the customer requirements is a



risk to a business. It is vital that production process controls exist and are adhered to at all times within the process to ensure products conform to requirements and meet the customers' needs and wants (Wagner & Bode, 2008:310; Tang & Musa, 2011:4; Tummala & Schoenherr, 2011:475; Jacobs & Chase, 2018:33).

(2) *The risk of operational failure* – Causes of operation failure are broad and include the following (Tang & Musa, 2011:4; Stevenson, 2018:43):

- A lack of focus on operational strategy, which means that the business does not meet its objectives and strategy. Examples of such strategies could be low-cost manufacture, responsiveness, differentiation of products or services, lean manufacturing processes.
- A failure to work at identifying and overcoming operational weaknesses and identifying operational strengths and on capitalising on these strengths
- A focus or emphasis on short term financial performance at the expense of operational excellence or expenditure on research and development
- A lack of investment in capital and human resources
- A failure to establish and maintain good internal communications and cooperation among different functional areas
- A lack of emphasis on process design and improvement
- A failure to meet the customers' 'real' needs: this occurs when a business supplying good or services erroneously believes it is giving its customers what it requires. This can arise through a break-down in communication between supplier and customer.

(3) *A failure of the operation to be agile and flexible* – This risk can arise when an operation does not have the capability to adapt systems and processes to meet changing requirements. Therefore, flexible and agile supply chains are those that are able to quickly respond to unpredictable changes or circumstances. Such a business should be able to rapidly increase or decrease volume, adjust product mix or even change process timeframes. This could be necessary if the operation encounters variability such as supplier production or quality issues, changes in demand, weather disruptions and transport fluctuations. Broadly and simply, what is at issue here is the operational capability to recognise change and adjust accordingly. There are various dimensions to this issue which include the following (Jacobs & Chase, 2018:113; Stevenson 2018:657):

- Capacity flexibility, meaning that the operation needs to have some ability to rapidly increase or decrease production levels if the demand from the customer requires it
  - Flexibility within processes so that the operation and the production environment can move from producing one product to another, rapidly and with minimal cost outlay
  - Flexibility of the work force, meaning that the workers within the operation are multi-skilled and able to switch from one task to another with relative ease.
- (4) *The risk of poor operational performance* – This risk can result in process inefficiency, such as poor productivity, cost over-runs and even non-delivery of product to customer. Key to ensuring operational performance is through the use of measures or metrics to monitor, manage and control operations. This process can highlight process problems and inefficiencies (Johnson & Flynn, 2015:511).
- (5) *Risk of equipment and machinery failures* – Such failures can prevent timely handling, manufacture or processing of goods and cause delays or non-supply of the product to customers. Effective planned and preventative maintenance processes need to be in place to prevent such occurrences (Tang & Musa, 2011:4; Heizer *et al.*, 2017:705; Jacobs & Chase, 2018:358; Stevenson, 2018:645).
- (6) *Disruption to the supply of water and electricity* – While this can affect all aspects of the operation, it can have a significant impact on the manufacturing operations (affecting manufacturing processes) or the sales and distribution operations (affecting computer systems) (Wagner & Bode, 2008:310).
- (7) *The risk of damage to the environment through a lack of focus on sustainable management* – Such risk refers to the business’s impact on the environment through excessive usage of electricity and water and through the incorrect handling of waste water and materials (Jacobs & Chase, 2018:25; Stevenson, 2018:27). Progressively, product design managers need to consider what happens to a product or its materials after the product reaches its end-of-life stage (Heizer *et al.*, 2017:241).
- (8) *The risk to the occupational health and safety of employees* – Worker safety is one of the key issues in managing a business. Accidents are undesirable as they are expensive (involving insurance and compensations claims) and they often involve damage to equipment or products. From the workers perspective, accidents and injuries involve

worker pain and suffering, possible loss of earnings, work flow disruption and mental anguish (Heizer *et al.*, 2017:241; Stevenson, 2018:303).

### **3.5.2.3 Systems risk**

Broadly, systems risks are those that arise from the failure of systems and can therefore be traced back to a dependence of the business processes on technology. Most business records are held in electronic data bases on computer systems, with all reporting and accounting systems as well as order placement and order takings (sales) being handled electronically (Hugo & Badenhorst-Weiss, 2011:99; Kim & Vonortas, 2014:456). Information technology generally results in reduced costs, improved processes, increased productivity, increased speed and accuracy of transactions and accelerated communication within the supply chain (Heizer *et al.*, 2017:48; Stevenson, 2018:250).

Accuracy of data information is dependent on information accessibility, information efficiency and core data accuracy. Inaccurate data can severely impact on the supply chain (Tang & Musa, 2011:5). Systems risks include the following:

- (1) *The risk of disruption of the efficient functioning of information systems (system breakdowns)* through system (software) and hardware failures. This can severely impact on the businesses ability to supply product to their customers (Wagner & Bode, 2008:311; Tang & Musa, 2010:5; Hugo & Badenhorst-Weiss, 2011:99; Tummala & Schoenherr, 2011:475; Chopra & Meindl, 2016:160).
- (2) *The risk of system obsolescence* is also a key factor as computer program upgrades and enhancements are being made all the time. A business needs to ensure that it keeps up to date with these system upgrades as older versions of systems are often not supported by the IT service providers after a number of years (Hugo & Badenhorst-Weiss, 2011:99).
- (3) *The risk commensurate with the introduction of new technologies or with implementation failures* – New technologies bring complexity and uncertainty to the environment. The newer the system the greater the risk as new and less mature systems often need changes, improvement and modification to function as planned or required by the business (Tang & Musa, 2010:5; Hugo & Badenhorst-Weiss, 2011:99). There is also the added risk of integrating the new systems/processes into an operation and its other systems (Stevenson, 2018:251).

- (4) *The risk of security or system access breaches by unauthorised individuals* with malevolent intent gaining access to data/records by ‘hacking’ the system – This can lead to data theft or data corruption (Tang & Musa, 2010:5; Heizer *et al.*, 2017:488).
- (5) *The risk of poor data integrity or corruption of data through hardware or software failures* – The key to this is to have system backups so as to be able to restore lost or damaged data and backup hardware facilities (Tang & Musa, 2010:5).
- (6) *The risk of insufficient computer system capacity* – This can slow down the systems for the users or prevent users from storing much needed data (Tang & Musa, 2010:5).
- (7) *The risk of damage or loss to computer systems due to physical damage* – Such damage could be suffered through the factors of heat, fire, water, and smoke (Hugo & Badenhorst-Weiss, 2011:99; Tang & Musa, 2011:5).

This ends the operational risk section in which the risks of people, processes and systems were explained. The next category of risk to be discussed is external downside risk.

### **3.5.3 External downside risk**

The third category of risk includes all external factors that could affect the supply chain such as natural disasters (including the impact and effect of climate change) and environmental issues. These risks affect or disrupt a business's ability to meet customer requirements in the short medium or long term. External factors are beyond the business’s control, and these can include severe weather, storms, flooding and wind damage, all of which can disrupt the transportation and supply of materials and services from suppliers, as well as the supply of the businesses goods to their customers (Monczka *et al.*, 2016:352).

Risk issues under this category are as follows:

- (1) *Security risks*, including geo-political issues that can disrupt the supply chain – This can include terrorism or war (Mohammed & Sykes, 2012:15; Chopra & Meindl, 2015:160; Heizer *et al.*, 2017:488; Manners-Bell, 2017:26)
- (2) *External hazard risks* – Such natural disasters can delay or even prevent the delivery of purchased goods or the supply of a business's products and services to its customers (Van Wyk *et al.*, 2004:259; Hugo & Badenhorst-Weiss, 2011:98; Tummala & Schoenherr, 2011:475; Mohammed & Sykes, 2012:15; Chopra & Meindl, 2016:160; Heizer *et al.*, 2017:488; Manners-Bell, 2017:22; Jacobs & Chase, 2018:32;). Supply interruptions have

the effect of increasing cost, especially if last minute substitutions are required. Idle labour and machinery and equipment as well as missed customer delivery promises all bring with them cost increases (Johnson & Flynn, 2015:30). The category of external hazard risks includes climate change (Manners-Bell, 2017:22).

- (3) *Risk of crime*, including theft by external criminals (as distinct as that by internal sources, that is, employees), cargo crime, hijacking and piracy. An example of such risk has been the issue of pirating off the Somali coast (Heizer *et al.*, 2017:488; Manners-Bell, 2017:27; Jacobs & Chase, 2018:33).
- (4) *Risk of external industrial action* – Labour action or strikes can delay the supply of goods from external suppliers (Johnson & Flynn, 2015:30). Industrial action may also occur in other places in the supply chain beyond an actual supplier, such as the ports of entry; for example, customs officials or at transporters can delay the supply of materials (Johnson & Flynn, 2015:30; Monczka *et al.*, 2016:353).
- (5) *The risk of delivery problems* – This may be related to weather, accidents on key roads and anything that prevents a business that buys *and* sells goods being able to supply the end products to their customers (Johnson & Flynn, 2015:29; Jacobs & Chase, 2018:32).
- (6) *Physical security risks* – This may be a risk at external warehouses where goods are stored (Monczka *et al.*, 2016:353).
- (7) *Risk faced by the business through legislation and regulation* - This could be through rigidity, controls or regulations in the labour market or from law and regulations that affect the trading environment. An example of this risk is when laws and regulations come into force that prevent a business from downsizing their employee complement in times of an economic hardship. Another example could be the promulgation of wage levels that are above what the business is able to pay (Van Wyk *et al.*, 2004:2694; Wagner & Bode, 2008:310; Mohammed & Sykes, 2012:15).

This ends the section on external downside risks.

#### **3.5.4 Market risk**

The fourth category of supply chain risk is market risk. This refers to market acceptance of product, the general market conditions, the potential action of competitors, and the evolutionary changes within the market. This category of risk also relates to the changes in the competitive

market environment. Relevant questions for a business to ask in order to understand this type of risk are: who are the competitors? what products do they offer? what competitive advantages do they have? who are the potential new competitors and what are their strategies and tactics? (Kim & Vonortas, 2014:456).

Risks under this category are as follows:

- (1) *The demand side/planning risks* (demand and supply mismatches) - This risk can manifest itself as a result of poor sales forecasts or the uncertainty caused by customers' unforeseeable demands. Disruption can occur from a mismatch between a business's sales volume projections and actual demand. The results of such issues could be costly, with the implications being product shortages and inefficient capacity utilisation. Key to this is the business's ability to accurately plan production levels so as to ensure that supply matches demand. If supply lags demand, potential sales may be lost, and customers can turn to competitors to meet their demand and might not return (Wagner & Bode, 2008:310; Tummala & Schoenherr, 2011:475; Mohammed & Sykes, 2012:15; Chopra & Meindl, 2016:160; Monczka *et al.*, 2016:632).
- (2) *Capacity planning risks* – Such risks may arise from a lack of understanding of future demand for a business's product, resulting in a lack of production and process capability to meet the required demand. Key to managing this risk is to know the market and the customers in order to arrive at forecast production volumes for the years ahead. It is also important to know the market and the customer base to understand what the customer's future volume and product needs will be. A business may be hampered in the future through not understanding future demand and not correctly planning for future process improvement and capacity enhancement (Wagner & Bode, 2008:310; Tummala & Schoenherr, 2011:475; Chopra & Meindl, 2016:160).
- (3) *The risk of loss of customers* – This type of risk could occur through the financial failure of the customer or as a result of a customer sourcing from another supplier due to factors such as better prices, on-time delivery or better quality. It is important for a business to understand the market dynamics, particularly with regard to the number and strength of the competitors and their products. The risk is obviously greater in a highly traded market, with many opportunities for supplier substitution. Customer relationship management is

a key issue in customer retention and customer satisfaction (Tummala & Schoenherr, 2011:475; Mohammed & Sykes, 2012:15; Chopra & Meindl, 2016:160).

- (4) *The risk of delays of supply to customer and or delivery problems (service delivery)* – This type of risk can have a negative impact on the relationship between a business and its customer and, if the problem is a protracted or continuous one, the customer could be lost (see point 3 above) (Tummala & Schoenherr, 2011:47).
- (5) *The risk of a distortion of demand due to sales promotions and or incentives* – While this was covered under financial risk in that such promotions can distort sales revenue and profitability, it should be noted that they can also impact on the supply chain as they can distort demand information (Wagner & Bode, 2008:310; Tang & Musa, 2011:4; Tummala & Schoenherr, 2011:475).

This concludes the discussion of market risks. The final supply chain risk element, reputational risk, will be discussed below.

### **3.5.5 Reputational risk**

Another type of supply chain risk which can affect a business or an enterprise is reputational risk. Reputational risk is a factor which can have serious implications for a business, as the loss of a reputation can be disastrous. There are two dimensions to this risk, namely, legal and ethical. The reputation of the business itself is key, as is that of the supply chain partners. Adverse publicity to do with poor product quality, improper disposal and environmental practices or relationships and dealings with unethical suppliers, including bribery and kickbacks, can impact on the business and its brands (Johnson & Flynn, 2015:30; Chopra & Meindl, 2016:453; Heizer *et al.*, 2017:255).

This ends the section on the five key dimensions of supply chain risk. The next section examines the challenges faced by the South African wine industry.

## **3.6 SUPPLY CHAIN CHALLENGES IN THE SOUTH AFRICAN WINE INDUSTRY**

As mentioned in section 1.4, it would appear that there has been a lack of focused academic research on risk in the South African wine industry. However, some research has been conducted in the South African wine industry for the following purposes:

- Investigating and understanding industry benchmarking measures and statistics (Kassier, Vink, Cherry, Van Wyk, Hobson, Sefoko & Van Rooyen, 2008)
- Understanding various overall operational, supply chain and financial issues, in relation to which some of the challenges that the industry faces have been detailed (Price Waterhouse Coopers, 2010; Van Eeden *et al.*, 2012; Price Waterhouse Coopers, 2013).

In the next six sections (that is, 3.6.1 to 3.6.6), the findings of the research referred to above are described. The research findings have been classified and analysed into a number of key areas, namely, financial, operational, external or hazard, market and reputational issues. Most of the research data highlights issues and challenges experienced by the South African wine industry. These give further context to the exploration of the industry and should be read in conjunction with Chapter Two and the supply chain risk in section 3.5.

### **3.6.1 Introduction**

A University of Pretoria study (Kassier *et al.*, 2008:9) found that in the period from 1990 onwards the volume of international wine trading has grown, which has opened up international opportunities for South African wines. As a result the South African wine industry has faced an increase in opportunities in global markets. This includes access to scientific research, technical information and higher regulatory standards. However, with the opportunities have come challenges relating to trade with international markets. Challenges include, for example, the fluctuating value of the rand and exchange rate instability, which has impacted on revenues and the costs of imported inputs to the production process of wine. The fluctuating value of the currency and the increase in import costs makes financial planning difficult for wine producers in the export of their wines (Kassier *et al.*, 2008:9).

### **3.6.2 Financial issues**

A South African Wine Industry Statistics Report indicates the financial pressure being experienced by the South African wine industry. This arose due to the relatively stagnant wine consumption over the long-term with cost escalations in excess of the overall inflation rate, particularly with regard to production and packaging costs (SAWIS, 2015:2). Between 2008 and 2013, average wine production costs increased by 52%, while the increase in income per ton of grapes produced was only 38,2% in the same period. The SAWIS 2015 report noted studies by VinPro, a non-profit company representing 3 500 South African wine producers, cellars and



industry stakeholders, which stated that approximately a third of wine producers experienced negative net farming incomes (NFIs). This is not sustainable over the longer-term (SAWIS, 2015:2).

A 2010 Price Waterhouse Coopers survey undertaken within the South African wine industry reported that South Africa wine producers are experiencing a ‘price squeeze’ because of increasing costs and an inability to pass these cost increases to the consumer. The consumers tend to be ‘price takers’, meaning that they look for the best wine according to taste and quality expectations and decide how much they are willing to pay for such a bottle of wine. Of particular concern to the wine producers concerning this ‘price expectation’ is that the retailers who purchase the wine from the producers and sell the wine do not want to pass any increases in taxes on to the consumer. An example of such a tax is the increase in the ‘sin tax’ on alcohol sales raised by the South African government in a number of the annual budgets. The wine retailers place the pressure back on the wine producer to effectively absorb such tax increases into their prices, thus reducing the margin of the wine producer. This means that revenues have been relatively static for the wine producer over a number of years (Price Waterhouse Coopers, 2010:18).

Van Eeden *et al.* (2012:4) used the findings of the Price Waterhouse Coopers (PWC) wine survey report of 2010 as a base to do further research in the South African wine industry. Their study focused on wine producers in three wine districts, namely, the Robertson, Bredekloof, and Worcester wine producing areas. As in the Price Waterhouse Coopers report of 2010, it was found that the South African wine producers are under extreme financial pressure. The report noted that a reduction of costs and an increase in the efficiency within the supply chains, through supply chain management, could help the producers survive and stay competitive.

Price Waterhouse Coopers undertook a follow up to their 2010 survey in 2013. This survey confirmed their earlier research findings and those by Van Eeden *et al.* (2012:4), namely, that increasing efficiencies and the reducing in costs in the producer supply chains could help the producers to become more sustainable (Price Waterhouse Coopers, 2013:38). A key finding was that the overall financial pressures presented a significant threat to wine producers’ sustainability (Price Waterhouse Coopers, 2013:38).

The report noted interviews with the CEOs of the wine producers and revealed that their major

concerns included high and increasing energy costs, labour-related challenges and increasing regulations and taxes. They noted that the most significant risks faced in their businesses included increasing labour costs, ageing infrastructure and the replacement cost of this equipment, plus cash flow management (Price Waterhouse Coopers, 2013:7).

### **3.6.3 Operational issues**

The Price Waterhouse Coopers survey of 2010 recommended that the broader supply chain management approach to managing wine producing might lead to better effectiveness and efficiency. However, while some producers started to follow supply chain principles to assist in managing their businesses, such methods are in an early stage of adoption. This is clearly reflected in the findings of this Price Waterhouse Cooper study, indicating that on average 66% of the cellars *do not* use any supply chain cost performance metrics. Approximately the same percentage of producers do not use any form of demand forecasting accuracy measures. The exception is export focused producers, who tend to use best practice supply chain performance management metrics to monitor the health of their supply chains (Price Waterhouse Coopers, 2010:30).

The report noted that key to the competitiveness of the SA wine industry was the timely flow information that moves back through the supply chain from the customer to the producer. Being able to access the correct information will assist in decision making, and effective coordination and execution of plans. It noted that this will become more and more important to supply chain performance that meets customer requirements (Price Waterhouse Coopers, 2010:21).

Further, the Van Eeden *et al.* (2012:4) research study confirmed that few wine producers actively managed their businesses according to the supply chain management approach or philosophy (Van Eeden *et al.*, 2012:1). This was again confirmed in the follow up Price Waterhouse Coopers survey of 2013, which noted that there was a lack of understanding of the potential and benefits of managing and measuring supply chains. In fact, many of the participating producers in this survey viewed supply chain management merely as a cost element (Price Waterhouse Coopers, 2013:47).

### **3.6.4 External hazard issues**

In addition to the financial squeeze and the supply chain management issues discussed above, wine producers in the Western Cape area experienced serious wild fires and drought over a

period between 2015 and 2017. WOSA remarked that the drought impacted on the volume of wine production in the country in 2016 (Booyesen, 2017). According to AgriSA (2016), the wine industry lost approximately 82 hectares of vineyards in the year ending February 2016 due to the fires and the drought conditions, with total damages of around R20 million. Of further note is the statement by OIV that a major contributor to the overall global decline in wine production in 2016 and 2017, including in South Africa, was climatic events (OIV, 2016; OIV, 2018).

### **3.6.5 Market and reputational issues**

Another unexpected event aggravated the conditions for wine producers. During 2016, negative publicity was received through a documentary entitled “Bitter grapes – Slavery in the vineyards” by the Danish investigative journalist, Tom Heinemann, which was shown on Swedish television. This documentary placed several South African wine producers, as well as the wine industry at large, in a very bad light in terms of farm worker conditions (Loots, 2016). These reputational challenges place the South African wine industry and the wine produced in a difficult situation and could have market implications, in that the overseas wine consumer could avoid buying South African wine and instead buy the product of the other 'new world' producers or even the more traditional 'old world' wine producers.

### **3.6.6 Summary**

While the research detailed in this section makes limited reference to the actual risks faced by the South African wine industry it does define key issues and challenges. From this it is evident that the South African wine producers are finding themselves under extreme financial and operational pressure which could affect the future sustainability of their businesses.

## **3.7 CONCLUSION**

In this chapter, supply chain, supply chain management and related concepts, objectives and processes have been explained. The South African wine supply chain, previously described in Chapter Two, has been delineated and linked to the SCOR model through the key activities within the wine supply chain.

In line with the primary research objective of this study, which was to determine the supply chain risks that threaten the sustainability of the Stellenbosch wine producers risk, supply chain

risk and the elements of supply chain risk have been explained in this chapter and linked to the wine supply chain processes and their activities. Some findings from previous research papers regarding actual supply chain issues and the challenges faced by the South African industry have been provided. While this research only briefly notes some actual risks, it does explain some of the issues and challenges faced by the industry.

This adds to the data in Chapter Two, which provided background information relating to the wine industry generally and the South African wine industry in particular in the context of its global competitors and as a key industry in South Africa.

The next chapter details the research methodology and research design, explaining how the research in this study has been undertaken in order to answer the research questions set up in the introduction to this study.

## CHAPTER FOUR: RESEARCH DESIGN AND METHODOLOGY

### 4.1 INTRODUCTION

The previous chapters dealt with the circumstances of the global and South African wine industry and with concepts relating to risk, supply chain risk and risk management as the fundamental topics of this study. The purpose of this chapter is to present a roadmap of how the study was conducted in order to achieve the research objectives and thus answer the research questions. Therefore, it presents the research design and methods used to answer the primary research question.

### 4.2 REVISITING THE RESEARCH QUESTIONS AND RESEARCH OBJECTIVES

A research question is defined as the key question that any research process will address (Saunders *et al.*, 2016:726), with the research question being the driving force for empirical studies. The purpose of the research question is to express the problem in a way that directs the researcher to appropriate objectives and methods of data collection (Yin, 2014:31).

The research questions and objectives were outlined in Chapter 1, sections 1.5 and 1.6 respectively, but to achieve clarity they are repeated in the next section.

#### 4.2.1 Research questions

The primary research question was:

*"What are the supply chain risks that threaten the sustainability of wine producers in the Stellenbosch area and how are these identified risks managed?"*

In order to be able to answer the primary research question, the following sub-questions needed to be answered:

1. What are the supply chain risks experienced by wine producers in the Stellenbosch area?
2. How do the Stellenbosch wine producers manage the identified supply chain risks?
3. What solutions can be suggested to the Stellenbosch wine producers regarding ways to better manage or overcome their identified supply chain risks?

#### **4.2.2 Research objectives**

In line with the research questions, the following the research objectives were derived:

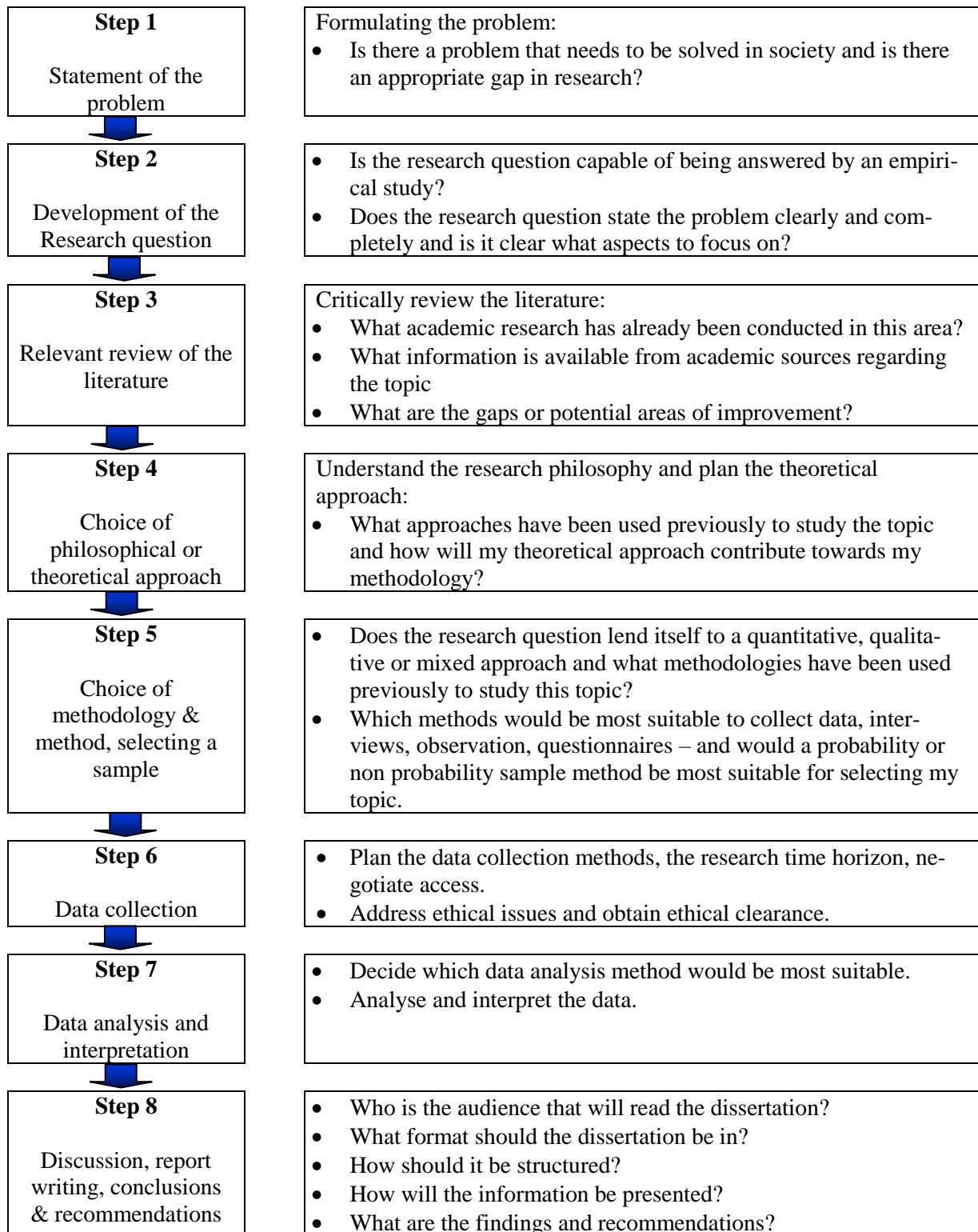
1. To determine what the supply chain risks experienced by the wine producers are in the Stellenbosch area.
2. To examine the methods or strategies that the Stellenbosch producers use to manage the supply chain risks that have been identified.
3. To make recommendations as to how the Stellenbosch wine producers can better manage or overcome their identified risks.

#### **4.3 RESEARCH PROCESS**

Saunders *et al.* (2016:726) note that research is the process of the systematic collection, collation and interpretation of data or information with the purpose being to find things out or to discover things.

Wagner *et al.* (2012:36) observe that "research is a cyclical process of steps that typically begins with identifying a research problem or issue of a study. It then involves reviewing the literature, specifying a purpose for the study, collecting and analysing data, and forming an interpretation of the information. The process culminates in a report, disseminated to audiences that is evaluated and used in the educational community".

The research process followed in this study is depicted in Figure 4.1.



**Figure 4.1: The steps in a research process**

Source: Adapted from Wagner *et al.* (2012:13); Saunders *et al.* (2016:124)

This study aimed to address what the supply chain risks were that threaten the sustainability of the wine producers in the Stellenbosch area and how these identified risks were managed. In order to achieve this objective, the research roadmap (Figure 4.1) was used. As the roadmap was followed, each point examined led the researcher back to the previous one for the interrogation of validity of that step and to ensure that the researcher was on the correct path (Wagner *et al.*, 2012:15)

The first step of the roadmap is the formulation and statement of the problem, an important step, according to Wagner *et al.* (2012:15) This step assisted the researcher to generalise the ideas in order to select a suitable topic for this research study. The review process identified that there was a problem that needed solving and that there was a gap in research. Key to this was a specific definition of the problem. The research problem was dealt with in Chapter One, in section 1.4. The topic for this study was the supply chain risks faced by the Stellenbosch wine producers and how they manage these risks.

The developing of the research question is step two. This step narrows the research down to specific details of what is to be studied, criteria that must be met and the specific aspects that the study is to focus upon. This step provides direction for the methodology to be chosen, that is, quantitative, qualitative or mixed. Key characteristics to defining a good research question are: (1) to ensure that it is capable of being answered by an empirical study; (2) that it states the problem clearly, concisely but completely; (3) that it does not presuppose the outcomes of the study; and, finally, (4) that the question has not been satisfactorily answered before (Wagner *et al.*, 2012:18). This step is explained in Chapter One and also in section 4.2.1 of this chapter.

The third step involves a critical review of the literature. A literature review is a process that involves the identification of work, both published and unpublished, from secondary data sources on the topic of interest. This work is then evaluated in relation to the problem and the documentation of the problem (Sekaran & Bougie, 2016:51). Conducting the literature review is a very important step of the research process in all studies as it is the optimal way of becoming aware of previous findings and the research methodology used by researchers in relation to any topic (Onwuegbuzie & Frels, 2011:5). The literature has been surveyed in Chapters Two and Three of this study. In Chapter Two the background to the global and South African wine industries was provided along with information on the wine supply chain and the developments and changes within these industries. Chapter Three of this study then described supply chain



risk, the elements of this risk and challenges within the South African industry that may present as risk to the industry. These two chapters have provided a context to this study.

The literature review ensures that the research effort builds on existing knowledge, and does not ‘reinvent the wheel’. A literature review according to Sekaran and Bougie (2016:51):

- assists the researcher to look at a problem in a way that helps to raise useful insights to the topic under research;
- assists the researcher to get a clear idea of what variables will be important to consider, why they are considered important and how they should be investigated to solve the problem;
- provides guiding definitions of the concepts in the theoretical framework;
- enhances the testability and replicability of the findings of the current research and how the current research findings are related to the findings of others.

Step four of the research roadmap is the choice of philosophy or theoretical approach. Every researcher has a perspective on what is truth and knowledge, and these perspectives guide his or her thinking, assumptions and beliefs about society and his or her overall views of society. The views that define how researchers sees the world obviously impact on the researchers’ approaches or attitudes to the research and can and will impact upon the research findings (Wagner *et al.*, 2012:51). This is explained in more detail in sections 4.5 and 4.6.

The next step, step five, is the research design and choice of methodology. This design is similar to an architectural blueprint that is followed in the erection of a building. Such a blueprint designates what material are needed, how much of it should be procured and the actual layout of the building (Wagner *et al.*, 2012:21). This is explained in section 4.7. The research methodology examines whether the research lends itself to quantitative, qualitative or a mixed approach of research, as well as examining what methodologies have previously been used to study the topic. Insight into the research methodology used in this study is provided in section 4.8.

Step six of the research process deals with planning the research strategy, that is, what data collection methods that will be used. This step involves deciding on what methods would be the most suitable for collecting the data, such as interviews, observation and questionnaires, and the sampling methods suitable for the research. This is described in section 4.9, with the data section

criteria for this study being explored in section 4.10. Finally, the ethical issues of the study need to be addressed. The purpose of following ethical guidelines in empirical research is to protect all the participants (Wagner *et al.*, 2012:62). A discussion of ethical issues in this study is found in section 4.11.

Step seven is the analysis and the interpretation of the data. In this step, the researcher decides what analysis methods are most suited for the data. It could be using descriptive and/or inferential statistics (quantitative) or document, content, thematic, phenomenological, and narrative or discourse analysis (qualitative) methods. Key to this is understanding how the theoretical approach explains the result or findings of the research (Wagner *et al.*, 2012:14). This is explained in section 4.12 and in Chapter Five.

Step 8 involves the format of the dissertation and the structure (headings, etc.), and this will be decided in relation to the audience who will read the dissertation report, to ensure that it has continuity and flow and, most importantly, that it is structured for easy reading and understanding.

Finally and essentially, the findings of the research will be explained, conclusions drawn and recommendations made in the concluding chapter, Chapter Six.

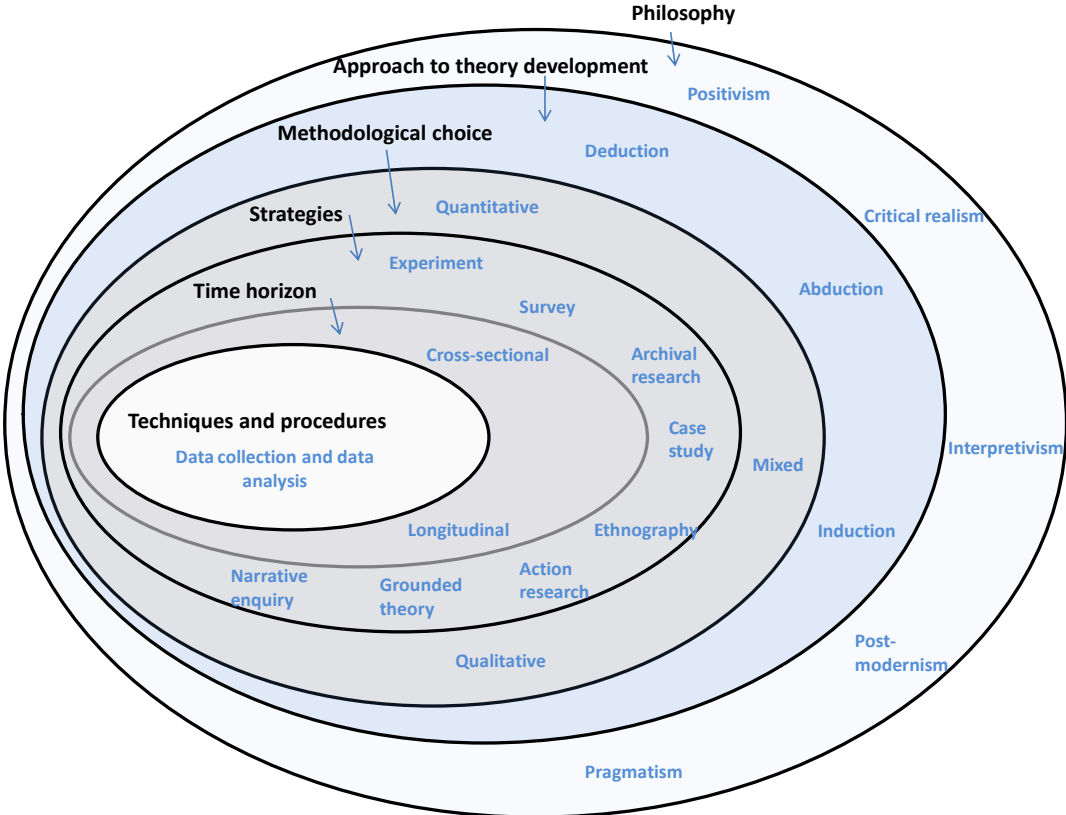
The research roadmap outlined above was used throughout this study. As per step four of the research roadmap, the next section identifies and explains the philosophical dimension of the study and the approach to theory development.

#### **4.4 RESEARCH ELEMENTS / THE RESEARCH ONION**

Research is defined as the process of finding solutions to a problem thorough a systematic study and analysis of the situational factors, thereby increasing the knowledge base of the problem studied (Saunders *et al.*, 2016:5; Sekeran & Bougie, 2016:1).

The research process was explained in the previous section (4.3) as the roadmap for the study, with eight steps, commencing with the formulation of the research problem and ending with the final end product of the project, the written dissertation. On the other hand, the research onion in Figure 4.2 below depicts the philosophy and the actual methodology and design of the research project. Thus, it explains the process followed for the collection, collation and analysis

of the data to enable the research question to be answered. This onion overlays the research process map and gives context and detail to steps four, five, and six of that roadmap. Each layer of the onion will be 'removed' and explained in the following sections.



Source: Saunders *et al.* (2016:124)

**Figure 4.2: The research elements or research onion**

The next section, 4.5, explains the first layer of the onion, being the philosophical framework of this study.

**4.5 RESEARCH PHILOSOPHY**

The term ‘research philosophy’ relates to “a system of beliefs and assumptions about the development of knowledge and the nature of this knowledge in relation to research” (Saunders *et al.*, 2016:726). At every stage of the research study, the researcher is making assumptions about human knowledge, about the realities that are uncovered by the research and about the

extent and ways in which the researcher's own values influence the research process (Saunders *et al.*, 216:124; City University of Hong Kong, 2017:1).

In simple terms, the research philosophy of a study is a blueprint for answering the research questions and fulfilling the objectives. It involves a series of decisions and choices relating to the purpose of the study, the type of research techniques that will be used in the study and the extent of interference and manner in which the data will be collected, analysed and used (Cooper & Schindler, 2008:89).

All research projects follow conventions of the worldview upon which the research is based, with these varying worldviews being called philosophies or paradigms. These represent particular ways of thinking in problem solving and also the commitments, beliefs, values, methods and outlook of the researcher and thus the research. Of the various philosophies used in business and management research some key ones are: positivism, critical realism, interpretivism, post modernism and pragmatism. The researcher needs to understand the assumptions upon which each philosophy stands. The differing assumptions are ontology, epistemology, and axiology (Wagner *et al.*, 2012:51). These are briefly explained as follows:

- Ontology refers to assumptions about the nature of reality; it answers the question 'what do we believe about the nature of reality?' Ontological assumptions define the way the researcher sees and studies the research issue. In business, these objects include management, the working lives of people and organisational events. The ontological view of the researcher determines the choice of the research project (Saunders *et al.*, 2016:127).
- Epistemology inquires into the nature of knowledge and truth, how we know what we know. Epistemology asks questions such as: What are the sources of knowledge? How reliable are those sources? What can one know? How does one know if something is true? It asks whether believing in something is true knowledge, or whether knowledge is something that can only be proved by means of concrete data (Wagner *et al.*, 2012:51).
- Axiology refers to the role of values and ethics within the research process. It includes questions about how researchers deal with their own values and the values of the participants in the study. For the research results to be credible, the researchers' and participants' own values need to be understood and questioned (Saunders, 2016:128).

Table 4.1 outlines the features of the five key research philosophies of positivism, critical realism, interpretivism, post modernism and pragmatism from the perspective of each of the above assumptions of ontology, epistemology, and axiology. *This research study follows the philosophy of interpretivism.* This philosophy and its key constituents appear in shaded sections in Table 4.1.

Interpretivism research originated out of hermeneutics, which is the process of interpretation and understanding as part of the research process. The nature of the reality or ontology of such research recognises that the environment is socially constructed and subject to being changed, as human behaviour influences knowledge and thus behaviour is constantly changing. Accordingly, the research is not just about the empirical data gained from the study but is also affected by language practices and accepts the possibility that the data may be interpreted differently (Eriksson & Kovalainen, 2015:21). Key to this type of research is the creation of a new, deeper understanding of the wine producer's environment and the 'world' in which such producers operate. This study depends on the input of the participants. It relies on the knowledge, experience, skills and views of the different employees at the wine producers, in order to understand their motivations and even their differing perspectives and to find commonality and variation in their narratives.

While such studies focus on complexity, richness, and multiple interpretations, they are subjective. Such a research philosophy also means that the researcher adopts an empathetic stand point to the research and the participants, and this coupled to its subjectivity can be seen as a negative aspect of such a research approach. With such research the researcher is part of what is being studied and the understanding and interpretations of the researcher make a contribution to the study (Saunders *et al.*, 2016:141).

**Table 4.1: Key research philosophies**

<b>Philosophy</b>	<b>Ontology</b> The nature of reality or being	<b>Epistemology</b> What constitutes acceptable knowledge	<b>Axiology</b> Role of values	<b>Typical methods</b>
Positivism	Real, external and independent of the social players. There is one true reality	Scientific method. Only observable and measurable facts. Focuses on causality and generalisations	Value-free research. Researcher is detached, neutral and independent of the research topic and is objective.	Typically deductive, highly structured, large samples, measurement and typical quantitative methods of analysis
Critical realism	Stratified/layered (the empirical, the actual and the real). External, independent. Objective structures.	Knowledge historically situated and transient. Facts are social constructions.	Value-laden research Researcher acknowledges bias by world views, cultural experience and upbringing. The researcher tries to minimise bias and errors. Researcher is as objective as possible.	In-depth historically situated analysis of pre-existing structures. Range of methods and data types to fit subject matter.
Interpretivism	Complex, rich. Socially constructed through culture and language. Multiple meanings, interpretations, realities.	Theories and concepts too simplistic. Focus on narratives, stories, perceptions and interpretations. New understandings and world-views as contributions.	Value-bound research. Researchers are part of what is being researched, subjective. Researchers interpretations are key to the contribution	Typically inductive. Small samples, in-depth and investigations, qualitative methods of analysis but a range of data can be interpreted.
Post-modernism	Nominal Complex, rich Socially constructed through power relations. Some meanings, interoperations, realities are dominated and silenced by others.	What counts is truth and knowledge is decided by dominant ideologies. Focus on absences, silences and oppresses/repressed meanings, interpretations and voices.	Value-constituted research Researcher and research is embedded in power relations Some research narratives are repressed and silenced at the expense of others.	Typically deconstructive - reading texts and realities against themselves. In-depth investigations of anomalies, silences and absences. Range of data types - typically qualitative.
Pragmatism	Complex, rich, external Reality is the practical consequence of ideas.	Practical meaning of knowledge in specific contexts True theories and knowledge are those that enable successful action Focus on problems, practices and relevance. Problem solving.	Value-drive research Research initiated and sustained by researchers doubts and beliefs. Researcher reflective.	Following research problem and research question. Range of methods: mixed, qualitative, quantitative, action research. Emphasis on practical solutions and outcomes.

Source: Collis & Hussey (2013:43); Saunders *et al.* (2016:136)

## 4.6 RESEARCH APPROACH

This is the second layer of research onion as shown in Figure 4.2. There are differing research approaches, and these are explained below:

- *Deductive reasoning* – Much of scientific research has been arrived at from the process or approach of deductive reasoning. This approach enables a researcher to deduce one or more hypotheses from what is known about a phenomenon and these hypotheses are then subjected to empirical study (Eriksson & Kovalainen, 2015:23). This means that the development of a theory is subjected to thorough testing to prove or disprove a hypothesis (Saunders *et al.*, 2016:146). Such an approach is not normally considered appropriate for most business research (Eriksson & Kovalainen, 2015:23).
- *Inductive reasoning* – This deals with observed cases, general statements or general claims about most cases of the same kind (Eriksson & Kovalainen, 2015:23). Inductive reasoning begins with collecting data to explore a phenomenon with a researcher generating or building a theory from this (Saunders *et al.*, 2016:145).
- *Abductive reasoning* – A third theory development process exists, which is called the abductive approach. This lies somewhere between the inductive and deductive approach. Usually this develops from observing a 'surprising fact' and from this working out of a possible theory of how this could have occurred. This working out of a possible theory involves subsequent testing through additional data collection. Often this method is followed to modify an existing theory (Saunders *et al.*, 2016:145).

*The research approach chosen for this study is that of inductive reasoning* as there appears to be limited data on risk experienced by South African wine producers, and research data has been obtained to arrive at conclusions. This concludes step four of the research process as set out in Figure 4.1.

## 4.7 RESEARCH DESIGN

The research design "is a plan that logically links the research question with the evidence to be collected and analysed in a study, ultimately circumscribing the types of findings that can emerge" (Yin, 2014:240). A simpler definition states that the research design is a blueprint for

the gathering, measurement, collation and analysis of data. It is based on the research question/s of the study (Sekaran & Bougie, 2016:95).

Therefore the research design is the 'general plan' of how the researcher will answer the research question. Key to the success of the research design is that the research question is clearly defined. The research design should also contain the following information: clear objectives compiled from the research question; the sources from where the researcher intends to get the research data; how the researcher proposes to collect and analyse the data; and discussion on the ethical issues and potential constraints that will be encountered (Saunders *et al.*, 2016:163). There must be a logical flow linking the topic, the research question and the methodology and methods to ensure that all these aspects fit within the research framework set out in section 4.3. (Wagner *et al.*, 2012:27). The methodological choices and related strategies will also impact on the decisions regarding the appropriate time horizon for the study (Saunders *et al.*, 2016:164).

The design also defines how the research will be conducted, using, for example, interviews or questionnaires. It also defines the techniques for analysing the data (Wagner *et al.*, 2012:21; Saunders *et al.*, 2016:163). The research design is step five of the research process roadmap. The research design covers the third, fourth and fifth layers of the research onion in Figure 4.2.

The nature of any research project means understanding the purpose of the research design based on the research question and this understanding leads to the need for the research to be exploratory, descriptive, explanatory, evaluative or a combination of these (Saunders *et al.*, 2016:164). These different research design types are explained below:

- *Exploratory research* studies are often carried out in instances when the researcher needs to understand a specific problem or situation (Terre Blanche, *et al.*, 2012:44). Such studies are conducted when there is not much information known about the subject being studied, with a limited number of similar problems or situations having been investigated in the past by other researchers (Sekaran & Bougie, 2016:102). In an exploratory study, questions that are asked during the data collection phase aim to explore, clarify and gain understanding on issues, problems or phenomenon and usually start with 'what?' or 'how?'. There are various ways of conducting exploratory research. These include a search of literature; interviewing 'experts' in a field; conducting detailed interviews with individuals; or conducting group interviews. As they are exploratory, the interviews are



usually unstructured and rely on the quality of the contributions from the participants to help guide any subsequent stage of the research (Saunders *et al.*, 2016:174). Exploratory research is a valuable way to gain depth of knowledge about an issue and to discover what is actually happening in a particular situation. The study can be flexible in nature, with the questions asked often leading to the opening up of other issues (Saunders *et al.*, 2016:174). A simple example of such research is the work undertaken by police investigations and seen in various TV series (Sekaran & Bougie, 2016:43).

- *Descriptive research* paints a detailed picture of events, persons or situations (Saunders *et al.*, 2016:175). Such studies are designed to collect data that describe characteristics of objects such as persons, organisations, products or brand and may be quantitative or qualitative in nature (Sekaran & Bougie, 2016:43). Likely research questions typically begin with or include, 'what?', 'who?', 'when?' 'where?', or 'how?'. During the data collection process, in order to obtain details of events, situations or even people, the questions asked are likely to start with these same words (Saunders *et al.*, 2016:175). An example of descriptive research could be a blind taste test with various participants to understand their preference for Coca-Cola or Pepsi.
- *Explanatory research* studies a situation or perhaps a problem in order to explain any connections between variables (Saunders *et al.*, 2016:716). An example of this sort of study could be an analysis of quantitative data on scrap rates in a manufacturing environment. This may show a correlation between the age of machinery used in the production process and the resultant scrap rates (Sekaran & Bougie, 2016:43).
- *Evaluative research* aims to understand how well something may work. The research questions in such a study usually begin with 'how?', or include 'what?' in the form of 'to what extent?'. An example of such research is research undertaken within a business to understand the effectiveness of a business programme or initiative (Saunders *et al.*, 2016:176)

This study was *descriptive and exploratory* as the research explored, investigated and described the wine supply chain, what the producers understood about risk, what risks the wine producers faced and how they managed the risk. This was deemed appropriate as limited information

exists about supply chain risk in the South African wine supply chain, and limited previous research has been carried out on this topic.

#### **4.8 RESEARCH METHODOLOGY**

The research design defines whether the research methodology for the study will be qualitative, quantitative or mixed methodology (this last type being a mixture of the two, qualitative and quantitative). This is step five of the research process roadmap as set out in Figure 4.1. Step five of this roadmap covers the choice of methodology, the research strategies and time study of a research project. The research methodology is the third layer of the research onion.

Qualitative research involves non-numeric data (images, words, video clips and similar material) while quantitative research involves numeric data (numbers) (Wagner *et al.*, 2012:273). Whether the study is qualitative or quantitative or mixed methodology defines the mix of elements so as to achieve coherence through a research study (Saunders *et al.*, 2016:164). This is the third layer of the research onion in Figure 4.2. Each type of study is described below:

- *Quantitative research* describes social phenomena through systematic numerical means, such as the application of statistical or mathematical processes (Wagner *et al.*, 2012:273).
- *Qualitative research* sets out to understand and make sense of phenomena in terms of the meanings they have for the participants (Wagner *et al.*, 2012:273). Such research examines and tries to understand the processes and the social/cultural contexts which shape the way people/s behaviour. Such research creates a story as seen through the eyes those who are participants in the story (Wagner *et al.*, 2012:273) and involves analysis of information and data that is descriptive in nature and cannot be easily quantified (Sekaran & Bougie, 2016:395). A qualitative approach examines the meanings, definitions, concepts, symbols, characteristics, and the "description" of things. It therefore generates an output of words rather than of numbers (Berg, 2007:86). This research study followed a qualitative methodology as it is based on the input, views and opinions of the key players of the wine producers, on the basis of their skill, knowledge, and experience in the field of owning/managing wine farms/estates and producing wine.
- *Mixed methods research* includes data, within a single study, that is qualitative and quantitative (Creswell, 2003:212).

*This was a qualitative study* as the main research aim was to identify and explored the supply chain risks that threaten the sustainability of wine producers in the Stellenbosch area and how the identified supply chain risks are managed. The study focused on understanding the processes and the findings generate an output of words rather than of numbers.

#### **4.9 RESEARCH STRATEGY / TIME HORIZON**

A strategy is a plan of action to achieve a goal. To answer a research question, a researcher needs such a research strategy or plan to be followed. This research strategy forms a link between the philosophy and the methods to collect, collate and analyse data. This must follow a particular time horizon (Sekeran & Bougie, 2016:96)

**Research strategy:** The research strategy aims to answer the research question and to meet the research objectives. There is a link between the philosophy, research approach and purpose. This strategy must take cognisance of the existing knowledge on a topic and the available amount of resources, data, and time that are available to undertake the research (Saunders *et al.*, 2016:177).

Research strategy is the fourth layer of the research onion in Figure 4.2. There are a number of strategies that can be followed. Some examples are: surveys, experiments, case study material, archival and documentary research, action research, ethnography, and narrative enquiry. Quantitative research design is mainly used with or tied to experiments and surveys. Qualitative research design is often linked to ethnography, narrative enquiry and action research (Saunders *et al.*, 2016:178). A number of key strategies are explained below:

- *Experiments* – Research linked to the natural sciences such as in the fields of social science and psychological. The purpose of any experiment "is to study the probability of a change in an independent variable causing a change in another dependent variable" (Sekeran & Bougie, 2016:97).
- *Survey* – Survey research is a common way of obtaining quantitative research data. Such research is used for exploratory and descriptive research. With this type of research, a sample of participants from within a population is selected and a questionnaire is administered to them. This questionnaire may be a written document that is completed by the participant, a telephone or face to face interview, or via an online questionnaire

(Wagner *et al.*, 2012:100). A deductive research approach often uses this strategy, such as in business and or management research, with questions such as 'who', 'where', 'what?', 'how much?' and 'how many?'. The survey strategy allows for the collection of quantitative data which may be analysed using descriptive statistics (Saunders *et al.*, 2016:181).

- *Archival and documentary research* – This strategy has become easier with the broader use of digitised records and the internet, but it does have its limitations. For example, while a documentary might quote certain facts it usually does not explain why certain facts were used versus other facts and what was omitted (Saunders *et al.*, 2016:184).
- *Case studies* – This strategy focuses on collecting information from an event or activity, such as in a particular business unit or business. In case studies, the focus may be the business, a group or individuals, an event, or even a situation. The goal behind using this strategy is to obtain a picture of a real life situation, studied from various angles and perspectives, using many means of data collection (Saunders *et al.*, 2016:184; Sekeran & Bougie, 2016:98).
- *Ethnography* – This strategy is used to study the culture or the social world of a group. Ethnography literature is a written account of a people or ethnic group and had its origins in the 1700s when colonial powers used the research to study peoples and their culture under their rule (Saunders *et al.*, 2016:187; Sekeran & Bougie, 2016:97).
- *Action research* – This is a process that starts at a point and keeps adding to itself through change and improvement. As an improvement process it aims to identify solutions to organisational problems through approaches that are collaborative and or participative. Different forms of knowledge are used which have implications for the participants and the business beyond the research process. The objective of the research strategy is to promote learning with outcomes that are practical. Through it issues are identified, actions are planned, actions are taken and these actions are evaluated (Saunders *et al.*, 2016:189; Sekeran & Bougie, 2016:99).
- *Grounded theory* – This a systematic data collection process for generating theory whereby the analyst jointly collects, codes and analyses the data, deciding what data to collect next and where to find it. After a theory has emerged from this process, the researcher compares the data with the theory, the goal being to find a fit between the data

and the theory. Then the categories and theories need to be modified until the categories and the theories all fit (Saunders *et al.*, 2016:193; Sekeran & Bougie, 2016:98).

- *Narrative enquiry* –A story or a personal account of an event or a sequence of events, is a narrative. A narrative inquiry is deeper than this and has a distinct purpose, which is getting the participants to give complete stories. The process follows a chronology, through a sequence of events as told by the participants. This deepens understanding and assists in the analysis. A narrative inquiry is usually used with a small number of participants who are selected on the basis of being typical of a population. If the method is used with larger groups, the goal might be to compare how accounts of an event or series of events differ or agree across this group (Saunders *et al.*, 2016:197).

This research project has *followed the case study approach* as the wine producers' supply chain risks require the study to focus on current events and it would not have not been feasible to use any other designs (Yin, 2014:5). The aim of the research was to study and gain insight into a particular phenomenon. Thus, interviews were conducted using an interview guide. This process is explored in more detail in the discussion of the data collection method, in section 4.10.

**Time horizon:** This is the fifth layer of the research onion (see Figure 4.2). The research process can follow two basic time horizons. It may be research done as a 'snap-shot', taken at a particular time, with data gathered just once usually over a number of days. Other research can be conducted over a longer more protracted period, perhaps even months or years, in the form of a 'diary'. Research with a 'snap-shot' time horizon is called a cross-sectional study, while research with a 'diary' horizon is called a longitudinal study. A cross-sectional study explores a particular phenomenon at a particular time. Such studies often employ the questionnaire or survey strategy to collect data (Saunders 2016:200; Sekeran & Bougie, 2016:104). This is a *cross-sectional study*, following *the snap-shot time horizon*. The gathering of the research data at each of the participating estates took place over a number of hours, on an agreed date during the second week of June, 2018.

#### **4.10 DATA COLLECTION**

Data collection is the act of gathering or collecting information or data to assist the researcher to answer the research question (Wagner *et al.*, 2012:269). This data collection and the ethical

considerations in section 4.11 comprise the sixth step of the research roadmap (see also the six layer of the research onion, in Figure 4.2).

#### 4.10.1 Types of data

Primary data is 'first hand' information gathered by a researcher using tools such as interviews, surveys or observations (Saunders *et al.*, 2016:724; Sekaran & Bougie, 2016:395). Data that already exists and does not need to be collected by a researcher is called secondary data. It includes such things such as statistical bulletins, government publications, library records, company websites, the websites of industry wide associations and the general internet. In any study it is often beneficial to gather both primary and secondary data, with the secondary data helping the researcher to focus interviews meaningfully on relevant aspects that have been found to be important in existing literature (Sekaran & Bougie, 2016:37). Case study richness is achieved when empirical evidence is obtained from many sources. Yin (2014:106) lists the available case study data collection techniques or sources and these include direct observations, participant observation, interviews, archival records, documentation and physical artefacts. In this study, both primary sources and secondary sources of information were used, as outlined in Table 4.2.

**Table 4.2: Data collection sources**

Primary sources	Secondary sources
Face-to-face interviews: open-ended questions	Academic literature: textbooks, journal articles, theses and dissertations. This included data on viticulture, pests, diseases and wine making processes as detailed in the interviews
Personal notes and personal observations (field notes)	Professional industry bodies: WOSA and SAWIS documentation
	The participating wine producer's websites

There are various types or categories of *interviews*, namely, structured, semi-structured in-depth and unstructured interviews. Structured interviews are those that are conducted by a researcher using a predetermined list of questions that are asked of the interviewee (Sekaran & Bougie,

2016:397). The pre-determined questions should be asked in the same order of each interviewee and should be open-ended with a limited number of ranking questions.

A semi-structured interview is a process whereby the interviewer makes use of an interview guide or schedule, that is, a list of questions that defines the line of enquiry. This approach is commonly used to enable the researcher to probe and explore deeper into issues and to corroborate data obtained from other sources (Wagner, 2012:135).

Unstructured interviews consist of a process where the interviewee and the participants are engaged in a formal interview and where they sit and speak to each other over a predetermined time frame, where the interviewer has clear plan in mind regarding the focus and the outcomes from the process. Building rapport is an important part of the process, as the interviewer will want the other party to feel comfortable and to be open to express their views freely (Wagner *et al.* 2012:136).

For the purpose of this study, *face-to-face semi-structured in-depth interviews* were deemed appropriate as this enabled the researcher to probe and expand on particular answers given by the participants, of whom there was at least one at each wine producer. This included the CEOs or owners of the operation, who have considerable in-depth knowledge of operational activities, challenges and risks at their wine producing estates. Each interview was conducted in the participant's office, an appropriate meeting room or a boardroom'; it was recorded, with the permission of the participants, using Listen 'n Write Freeware which had been downloaded onto the researchers computer. The interviews were transcribed verbatim.

*Personal notes and observation by the researcher* can serve as another source of evidence in doing case study research. Personal field notes taken during an interview can assist in the data collection process in that they add richness and context to the interview (Sekeran & Bougie, 2016:124) Direct observation by the researcher allows for the structured observation of the activities and the participants being studied as a form of corroboration of the data obtained from the participant (Yin, 2014:113). Such field notes can be jotted notes (also called scratch notes) or full field notes (Bryman & Bell, 2015:348). In this study the researcher asked the participants for permission to take personal field notes during the interviews. Such permission was granted and field notes were taken. These field notes are attached in Appendix 4.

*Documentation and archival records* include amongst others, letters, minutes, administrative documents, formal studies, news clippings and articles appearing in media, public files, company records, service records and survey data compiled by others (Yin, 2014:108-109). The type of documentation to be used will differ from study to study depending on what type of study it is. Documentation and archival records offer a broad range of topics and can be reviewed as often as needed. For example, documents are useful in confirming the correct spellings of the names of people and organisations that might have been mentioned in an interview or may provide specific details to corroborate information given during the interviews (Yin 2014:107). Post the interview, the researcher in the present study has used data from other studies and other articles to verify, confirm and expand on the detail provided by the participants, particularly regarding disease, pests, vine irrigation and some technical process issues relative to viticulture and wine making. This assisted in giving context to the data supplied by the participants in the interviews.

In this study, documentation and archival records were found on the websites of the participating wine farms and professional industry bodies such as WOSA and SAWIS. Relevant data was extracted and combined with the results from observations and the interviews.

#### **4.10.2 Target population**

The target population is described as the population to which the researcher would like to generalise his or her results (Welman *et al.*, 2007:126). The target population is defined in terms of elements, geographical boundaries and time (Sekaran & Bougie, 2016:240).

As indicated in Chapter One the target population for this study consisted of wine producers in the Stellenbosch wine area. Stellenbosch is the largest wine producing area of South Africa, with 191 out of the total 546 South African wine producers being located there. According to WOSA wine routes, the Stellenbosch wine producing area comprises five main wine growing areas, namely the Greater Simonsberg area, the Stellenbosch Berg area, the Helderberg area, the Stellenbosch Valley area and Bottelary Hills area. For the purpose of this study, one wine producer from each of these areas was selected.

#### **4.10.3 Sampling method**

There are two main types of sampling techniques, namely, non-probability and probability and (Saunders *et al.*, 2016:276). Probability sampling is usually used in quantitative research and



involves selecting a random sample through a random procedure to ensure objectivity. With this sampling method, the elements of the population have some known chance or probability of being selected as sample subjects (Sekaran & Bougie, 2016:395). Non-probability sampling, on the other hand is usually used in qualitative studies as the elements in the population do not have a known chance of being selected as sample subjects. This means that the findings of the study cannot be generalised to the population (Saunders *et al.*, 2016:247).

Some of the *probability* techniques include simple random sampling, systematic random sampling, stratified random sampling, cluster sampling and multi-stage sampling (Saunders *et al.*, 2016:286; Sekaran & Bougie, 2016:245). With simple random sampling the inclusion of a unit of the population occurs entirely by chance (Bryman & Bell, 2015:537). Systematic random sampling requires some mathematical calculation in that the design involves choosing every *n*th element in the population for the sample (Sekaran & Bougie, 2016:397). The stratified random sampling method occurs where units are randomly sampled from a population that has been divided into categories or strata (Bryman & Bell, 2015:539). Cluster sampling is a sampling design in which the sample comprises groups or in which chunks of elements are diverse in character or content (heterogeneous) or they are all the same or all of the same kind (homogeneous) (Wagner *et al.*, 2012:91); by contrast, multi-stage sampling is a development of cluster sampling which involves taking a series of cluster samples, each of which uses random sampling processes (Saunders *et al.*, 2016:721).

There are a number of non-probability techniques used in qualitative research such as quota sampling, volunteer sampling, convenience sampling and purposive sampling (Saunders, 2016:298; Sekaran & Bougie, 2016:198). Quota sampling is a type of sample in which the selection of cases with strata is non-random. Volunteer sampling is simply where participants volunteered to be part of the study rather than being chosen. Convenience sampling is where the sample cases are selected because they are readily and easily available or most convenient to provide the information required. Purposive sampling, sometimes known as judgment sampling, is often used when working with samples such as in case study research where the subjects are in the best position to provide the information required. (Wagner *et al.*, 2012:93; Saunders, 2016:298; Sekaran & Bougie, 2016:247).

For the purpose of selecting the wine producers, *a non-probability purposive sample* was deemed appropriate as the owner of one of the wine producing cellars, the gatekeeper, assisted

in getting access to wine producers in the area. A gatekeeper can be defined as a person who enables a researcher to gain access to a business to conduct research (Wagner *et al.*, 2012:64). This type of sampling has also been used to select the specific participants of this study.

#### **4.10.4 Sampling size**

A sample size can be defined as “the actual number of subjects chosen as a sample to represent the population characteristics” (Sekaran & Bougie, 2016:396). The sample size for this study is five wine producers, one from each Stellenbosch area, with ten interviews conducted in total.

#### **4.10.5 Participants**

At each participating wine producer, the CEO and/or owner and the wine maker were approached to participate in this study. At wine producer W3, only the owner/cellar master was available to be interviewed due to work pressures at the operation. However, this individual, participant P6, has run the operation for over 21 years and has considerable knowledge of the wine supply chain on the producing estate. At wine producer W2, the owner, the viticulturist and the wine maker were interviewed. A total of 10 interviews were conducted. This detail is dealt with in detail in section 5.2.

#### **4.10.6 Interview guide**

The interview guide is sometime referred to as the schedule of protocol and is the list of questions and their sequence that controls an interview. The guide has the purpose of directing the interviewer as to what to ask and the sequence in which the questions are arranged (Wagner *et al.*, 2012:271). The questions in the guide must be designed so as to ensure that the objectives of the study are attained (Saunders *et al.*, 2016:394). It is important that the interview guide consists mainly of open-ended questions. Open-ended questions are those that the participant can answer in a free-flowing way, without any restriction regarding the range of choices to a set of designated alternatives suggested by the researcher (Sekaran & Bougie, 2016:394).

The interview guide in the current study was used as a checklist to ensure that all the relevant subjects, addressing all the research objectives, were dealt with during the interviews. The interview guide can be found in Appendix 3. The interview guide consisted of open-ended questions and, under the 'probe' section of the guide, the main framework of the supply chain activities of plan, source, make, return, deliver and enable. The main aim of the interviews was to extract qualitative data from the participants in order to determine the supply chain risks faced

by the wine producers and how these identified risks were managed. This was achieved, with researcher also taking personal field notes during the interview (See Appendix 4).

#### **4.10.7 Pre-testing**

The interview guide was checked for content validity by a number of academics during the UNISA ethical clearance process, pre-tested by the gatekeeper, serving as a 'test run' of the interview guide. The purpose of this review was to refine the questions in order to confirm that the participants would be able to answer them without any difficulties as well as allowing for assessment of the validity of the questions in order to give greater reliability to the data collected (Saunders *et al.*, 2016:723).

### **4.11 ETHICAL CONSIDERATIONS**

Wagner *et al.* (2012:270) define ethics "as the study or discipline of moral principles in human behaviour". This means that the issue of ethics and ethical behaviour must be considered throughout the research design and implementation process, and the researcher should ensure that the participants in the research study are protected at all times. This is particularly relevant in a qualitative research study, with the researchers engaging in personal interaction and discussion with the participants. The protection takes the form of physical, emotional, and intellectual protection and therefore the study should not impact on the dignity and the rights of others, particularly the participants (Wagner *et al.*, 2012:64).

Terre Blanche *et al.* (2012:67) suggest that there are four widely accepted ways or principles to determine whether the research is ethical:

- The first principle is autonomy and respect for the dignity of person. This principle is achieved through obtaining voluntary informed consent from all the research participants and involves the protection of the individuals and institutional confidentiality as well as protecting their privacy.
- This second principle is to ensure that there is no ill intent. This principle requires the researcher to ensure that there is no harm to the participants, as a direct or indirect result of the research. The researcher must also be careful of deception, either direct or implicit.
- Beneficence is a third principle which Terre Blanche *et al.* (2012: 67) noted. While on one hand, the research must not harm the participants and the business they represent,

and confidentiality must be protected at all times, equally the research must not overly benefit or advantage the persons and their business.

- A fourth principle for ensuring that the research is conducted in an ethical way is justice. While this, in general terms, speaks to the people receiving what is due to them, it is a complex philosophical principle and requires that researchers treat participants with fairness and equity during all stage of the research process.

As noted previously, obtaining the voluntary informed consent from all the participants (See Appendix 2) was vital to the issue of research ethics. A key stage of a research study where ethical problems could arise is when seeking initial access from the participants, and no pressure should be applied in order to get these persons to participate in the study (Saunders *et al.*, 2003:132). No pressure was applied on the participants of the present study to be part of that study. The participants were all willing volunteers, and they were assured that they had the right to withdraw from the research project at any time.

In this study, the researcher complied with all ethical measures in his communication with the participants, in line with the formal application for ethical clearance through Unisa's CEMS process.

#### **4.12 DATA QUALITY CONTROL: THE ESTABLISHMENT OF TRUSTWORTHINESS**

A sound theoretical base and a good methodological design add rigour to a research study. Rigour is defined as "the theoretical and methodological precision adhered to in conducting research" (Sekaran & Bougie, 2016:19). However, the validity of the research results also needs to be assured (Wagner *et al.*, 2012:243).

The validity of purposive research results or data depends on the level of its merit and worth, defined as trustworthiness. Trustworthiness is the term used by Lincoln and Guba (1999:394-444) to describe the criteria involved in establishing the credibility, dependability, transferability and confirmability of the data. By applying these criteria, and their relevant activities, it is possible to determine whether the methods used in the study were appropriate and whether the results are viable interpretations (Wagner *et al.*, 2012: 243). For the purpose of this study, the

quality and merit (trustworthiness and authenticity) of the data was assessed by using the Guba framework as outlined below:

*Credibility* – The first Guba element or criterion is creditability, or internal validity, which is defined as "the extent to which the evidence can be accepted or trusted, as it is undistorted and sincere, free from error and evasion" (Wagner *et al.*, 2012:269). Further, it describes the extent to which the research observations accurately record the behaviour under investigation (Sekaran & Bougie, 2016:137). The chain of evidence was ensured by using quotes from the participants to validate the findings. Credibility was further improved by the use of the researcher's personal field notes, which contained a brief review checklist of observations. In this study, an audit trail is available in the form of recordings, documents and field notes of the empirical data collection.

*Transferability* – Another criterion to test the merit of the research data is transferability, which is defined as the extent to which methods and results of a research study are understood in relation to a reader of the study. It focuses on the exchange of information and engagement with each unique reader rather than with context across a generalised set of rules. Thus transferability refers to the extent to which research findings may be generalised or may be transferred to other contexts with other participants (Wagner *et al.*, 2012:275).

*Dependability (consistency)* – The third element of Guba's framework is dependability. This is a reliability measure which attests to the accuracy of translation of the information from various sources and provides the means for ensuring the confirmability of the findings (Wagner *et al.*, 2012:243). It is the extent to which the research findings may be replicated with similar subjects in a similar context (Babbie, 2016:146). Thus reliability of the research data depends on the consistency of the observations and questions whether two or more observers on separate occasions, observing the same event or activities, would arrive at the same results or conclusions (Sekaran & Bougie, 2016:137). The questions in the interview guide were phrased in simple language to make sure that there was no ambiguity. The participants were given a copy of the interview guide before the interview took place. They were then given the opportunity to ask questions and seek clarity, if needed, before responding to questions. Therefore, consistency was maintained during the interviews, which contributed to the trustworthiness of the results of the study.

*Confirmability* – The final criterion or element of trustworthiness of the research and its data is confirmability or objectivity. Any conclusions arrived at by the interpretation of the results of the data analysis should be objective or confirmable (Sekaran & Bougie, 2016:21). This involves ensuring that the findings are in fact accurately grounded in the data and checking and gauging the degree of bias. The goal is to demonstrate that the data and the findings of the data were derived from events and did not arise solely from the researcher's construction or from his or her views (Wagner *et al.*, 2012:243). Shenton (2004:72) notes that steps should be taken to ensure that the findings are the result of actual experiences and ideas of the researcher rather than from characteristics and preferences of the researcher. In order to ensure conformability of the data, interviews were recorded using Listen 'n Write Freeware that was saved onto the researcher's laptop computer. The recordings were transcribed into Word documents, using this same software on playback mode. For this study, the transcribing process was carried out personally by the researcher.

*Authenticity* – This refers to whether the evidence in the research data is genuine and of unquestionable origin (Wagner *et al.*, 2012:268). The fairness and unquestionability of this study has been assured by ensuring that: firstly, all the participants replies/answers were accurately recorded and transcribed and that all voices were included, no matter how disparate they were found to be; and secondly, the participant's accounts were fairly and accurately reported by verification of the voice recordings of the interviews to the typed transcript. To ensure accuracy of the transcription, the researcher listened to the audio interviews and compared them with the transcription. This was done to identify and correct errors. This 'data cleaning' is an important process in ensuring research data accuracy (Saunders *et al.*, 2016:572). The data cleaning process was carried out twice by the researcher to ensure accuracy of the transcribed interviews (Braun & Clarke, 2013:3). Field notes were made at the time of the interviews of the participants.

#### **4.13 DATA ANALYSIS**

Data analysis is step seven in the research roadmap outlined in Figure 4.1.

There are two main types of data methods/processes for qualitative analysis. They are content analysis and thematic analysis.

Content analysis is "an observational research method that is used to systematically evaluate the symbolic contents of all forms of recorded communications" (Kolbe & Burnett, 1991:18). This method is usually used to analyse websites, recordings, interviews and newspapers (Sekaran & Bougie, 2016:350). Thematic analysis is a particular approach to analysing qualitative data and involving the identification of themes or patterns within the data (Wagner, 2012:231 & Braun & Clarke, 2006:79). Furthermore, it organises and describes the data set in detail as well as interpreting various aspects of the research topic (Boyatzis, 1998:67). Thus thematic analysis "allows the researcher to see and make sense of collective or shared meanings and experiences" (Braun & Clarke, 2012:2).

The purpose of qualitative data analysis is to transform data into findings. *The appropriate analysis tool for this qualitative study is thematic analysis* as the researcher has identified common themes and patterns in the risk data provided by the wine producers. This was achieved by reducing the raw data by searching through it for patterns and trends to bring order and structure to it. Thematic analysis consists of six consecutive sequential steps followed to transform the data into findings as follows (Braun & Clarke, 2012:5-12):

1. Comprehending the data and becoming familiar with it – This first step requires the researcher to be fully involved and actively engaged in the data through the process of listening to recordings, transcribing interactions and then reading and re-reading the transcripts to ensure accuracy and in-depth understanding (Braun & Clarke, 2013:3; Saunders *et al.*, 2016:572).
2. Generating initial codes – The second step of thematic analysis is the generation of codes. Preliminary codes are identified from the data transcriptions in step one above. These are the features of the data that appear interesting and meaningful. These codes are more numerous and specific than themes, describing the content of the data and providing a label for a feature of the data relative to research question (Braun & Clarke, 2013:3).
3. Searching for themes – The third step in the process is the start of the interpretive analysis of the collated codes. The analysis starts to take shape, shifting from codes to themes. A theme “captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set” (Braun & Clarke, 2006:82). The codes are sorted and collated; in some cases, they are combined with

others and, in other cases, they are divided according to their overarching themes (Braun & Clarke, 2013:3).

4. Reviewing themes – In stage four, the researcher questions whether to refine, combine, separate, or to dispense with initial themes. In this step, the data within the themes are reviewed and examined, with certain data themes being combined where appropriate in order to arrive at clear and identifiable distinctions between the themes. A thematic ‘map’ is then generated (Braun & Clarke, 2013:3).
5. Defining and naming themes – This fifth step involves defining and refining the themes and potential subthemes within the data. At this step, the researcher provides theme names and clear but key definitions that capture the essence of each theme in a concise and punchy manner (Braun & Clarke, 2013:3).
6. Producing the report – Finally, the researcher transforms the analysis into an interpretable summary of words, using clear extract examples that relate to the themes, the research question and the literature. The report must impart the results of the analysis in such a way as to convince a reader of the accuracy, value and validity of the analysis. It must go beyond a mere description of the themes and should portray an analysis supported with empirical evidence that addresses the research question (Braun & Clarke, 2013:3).

The six steps described above explain how the researcher transforms data into findings.

The interviews in the present study were recorded using Listen 'n Write software. Again, using Listen 'n Write software, the researcher transcribed each recorded interview into a unique Word document. The transcripts of the original audio recordings of the interviews were checked twice by the researcher to ensure accuracy of the transcribed interviews (Braun & Clarke, 2013:3). Field notes were made at the time of the interviews with the participants. These notes added further context to the participants' answers in the transcription documents and were used to confirm comments made by the participants.

The data was reduced through the following process:

- The transcript from each participant interview was reviewed, and sentences referring to risk issues were highlighted with a highlighter pen. The key words that clearly denoted the specific risk issue were underlined as a "pithy label" of a few words that described the risk issue (Braun & Clarke, 2013:3). Using a unique tab per participant, P1 to P10, the labels were



then captured into an Excel spreadsheet document as a list. The spreadsheet list, per participant, contained three fields: the *participant number* was captured in one field, P1 for participant one, and so forth; the *risk label* was captured in a second field; and in the third field, the *supply chain activity* where the risk occurred, namely, plan, source, make, deliver, return or enable, was captured. Each list was then reviewed for accuracy of capture back to the interview transcript.

- The list from each participants tab, P1 to P10, were combined into a one new Excel tab of all risk code phrases for all participants. This list of codes was reviewed, analysed and collated or grouped. This was done through a data sort. The collated data was reviewed and analysed a number of time to ensure accuracy of the analysis and collation process. A final sort was undertaken to sort the codes into groups based on broad risk groups. The list of risks were then sorted by theme of plan, source, make, deliver, return and enable, and each of these themes were separated out into a new Excel tab per theme. The themes were again reviewed, examined and re-sorted to ensure that the codes were aligned within the appropriate themes. Each theme tab contains sub-themes and codes. A thematic ‘map’ was then generated from this, with a theme table indicating the sub-theme and risk.

Table 4.3 reflects the thematic map that was established from the transcribed interviews and the field notes. This is a summary of all themes.

**Table 4.3: Thematic map of the interviews**

Theme	Sub-themes	Code
<b>Theme 1: Plan (section 5.4.1)</b>	5.4.1.1.a. Demand versus supply	Forecasting, planning
	5.4.1.1.b. Investment	New vineyards
<b>Theme 2: Source (section 5.4.2.)</b>	5.4.2.1.a. Bought out grapes	Drought
	5.4.2.1.b. Dry goods	Costs, supply, quality
<b>Theme 3: Make (section 5.4.3)</b>	5.4.3.1.a. Costs	Costs
	5.4.3.1.b. Nature	Drought, picking, disease, wind/hail/frost, pests, fire, baboons
	5.4.3.1.c. Infrastructure	Irrigation, electricity, land
	5.4.3.1.d. In-process	Controls

	5.4.3.1.e. Human resources	Industrial-relations, skills, safety, theft/damage
<b>Theme 4: Deliver (section 5.4.4)</b>	5.4.4.1.a. Revenue	Sales-revenue, costs
	5.4.4.1.b. Market	Bad-debts, demand
	5.4.4.1.c. Inventory	Damage, delays
<b>Theme 5: Enable (section 5.4.5)</b>	Nil	Nil
<b>Theme 6: Enable (section 5.4.6)</b>	5.4.6. Financial	Profitability, cash-flow

#### 4.14 SUMMARY OF THE RESEARCH DESIGN AND METHODOLOGY

A summary of the elements of research design and strategies of this study is presented in Table 4.4.

**Table 4.4: Research design and strategies elements**

Key research element	Description of key research element
Main objective of the study	The main research objective was to explore the supply chain risks experienced by the Stellenbosch wine producers that threaten their sustainability and how these risks are managed
Research philosophy	Interpretivism: The study was based on the knowledge, experience, skills, and views of the different employees at the wine producers, and it sought to understand their motivations and even their differing perspectives, to find commonality and variation in their narratives.
Research approach	Inductive
Research design	Descriptive and exploratory
Methodological choice	A qualitative study
Research strategy	In-depth semi-structured interviews
Time horizon	Cross-sectional, with a snap-shot time horizon: financial and time constraints dictated this
Population	Five Stellenbosch wine producers

Sampling	Non probability (purposive) sampling with the assistance of the gatekeeper
Sources of data	Primary research data
Data collection method	Face to face interviews using an interview guide (see Appendix 3) Personal field notes (see Appendix 4)
Data analysis	Data was analysed using thematic analysis. The thematic map of the research data appears in table 4.3.
Quality of the research data	Achieved through credibility and trustworthy measures
Ethical considerations	Ethical clearance from Unisa's College for Economics and Management Sciences (CEMS) Ethics Review Committee

Source: Compiled by the researcher

This completes Chapter Four. The next chapter presents the findings of this study.

## **CHAPTER FIVE: DATA FINDINGS AND ANALYSIS**

### **5.1 INTRODUCTION**

The objective of this study was to determine the supply chain risks that threaten the sustainability of the wine producers in the Stellenbosch area and how they manage these risks. Chapters One, Two and Three covered the research question and study objectives and reviewed the literature, in order to explore the South African wine industry within the context of the global wine industry and to explore risk and supply chain risk within the wine industry. Chapter Four described the methodology that was followed in conducting the research, choosing the sample population and analysing the data. In this chapter, the empirical findings of the study are presented, analysed and discussed.

Semi-structured interviews were conducted with the participants within the wine producers. A total of ten participants were interviewed, with seven of the participants being male and three female. Of the five wine producers included in this study, three were represented by their owners and two by their CEOs together with other representatives. All the participants worked on a full-time basis within the wine producing estates.

The data was collected by means of the semi-structured interviews. A total time of 597 minutes (nine hours and fifty seven minutes) was spent conducting the interviews, with each interview per participant taking an average of one hour. All of the participants contributed and willingly shared their knowledge with pride and enthusiasm.

### **5.2 PARTICIPANTS**

The participants have significant knowledge of the wine supply chain and of their own wine producing estates. In the case of four of the five wine producers, namely, W1, W3, W4 and W5, at least one of the participants had skills and expertise in oenology, which is the science and study of wine making (Merriam-Webster, 2018), and was the cellar master of the operation. Cellar masters have the responsibility for overseeing the making of the wine (Merriam-Webster, 2018) and therefore have knowledge of the farming and growing processes of the vineyards, as well as of the wine making processes. In the case of the wine producer estate W2, the viticulturist

and the owner of the operation had 22 and 19 years wine-making experience respectively. A viticulturist is an individual who has studied the art and science of grapes and the growing of grapes (Collins English Dictionary, 2003:1797). Overall, eight of the participants had between 19 and 35 years' experience in viticulture/oenology, and at least one participant from each wine producer had been involved with wine making at each of the participating wine producers for more than 19 years. Besides skill/experience in viticulture/oenology, the owner/CEO in each of the participating operations, had financial/business management skills. This means that the participants had considerable in depth knowledge of operational activities, challenges and risks at each of the wine producing estates. The details of the participants and the interviews are set out below in Table 5.1.

**Table 5.1: Details of interviews with participants per wine producer**

Participant pseudonym	Job title	Gen-der: M/F	Wine industry experience	Producer pseudonym	Interview duration
P1	Logistics Officer	F	<5 years	W1	42 minutes
P2	CEO/Cellar Master	M	19 years	W1	1 hour 13 minutes
P3	Owner/Sales & marketing	F	19 years	W2	} 2 hours 10minutes
P4	Winemaker	F	<5 years	W2	
P5	Viticulturist	M	22 years	W2	
P6	Owner/Cellar Master	M	21 years	W3	1 hour 18 minutes
P7	Owner/Cellar Master	M	35 years	W4	1 hour 26 minutes
P8	Wine Maker	M	22 years	W4	50 minutes
P9	CEO/Financial Executive	M	5 years	W5	56 minutes
P10	Cellar Master	M	24 years	W5	1 hour 22 minutes
10	10 positions			5 producers	9 hours 57 minutes

The next section presents an overview of the participating wine producers

### 5.3 OVERVIEW OF THE PARTICIPATING WINE PRODUCERS

Table 5.2 below presents an overview of the key attributes of the five wine producers who participated in this study.

**Table 5.2: Key attributes of the participating wine producers**

<b>Producer facts</b>	<b>Producer W1</b>	<b>Producer W2</b>	<b>Producer W3</b>	<b>Producer W4</b>	<b>Producer W5</b>
<b>Grape crop:</b> Locally grown grapes Bought out grapes <sup>2</sup>	50% 50%	Buy out a small portion for specific wine types	95% 5% Buyout for specific wine types	100% Nil bought out	90% 10% Buyout for specific wine types
<b>2018 yield versus prior year</b>	Down between 10% and 30%	About the same as the previous year	Down 20%	About the same as the previous year	Down 13% - 15% versus previous year
<b>Reason for lower yield</b>	Drought	N/A	Drought	N/A	Drought
<b>Producer water resources:</b>	Dam plus underground supply  Use irrigation	Dam on farm not adequate - use Theewaters water supply Use irrigation	Dam / water self sufficient  Use irrigation	Dam / stream Water self sufficient  Use irrigation	Dam/ boreholes   Use irrigation
<b>Labour relations:</b>	High focus on labour relations	Good employee relations	High focus on labour relations	High focus on labour relations	Good worker relationships
<b>Market:</b> Local Export		20% 80%	35% 65%	65% 35%	70% 30%
Export sales terms	Mostly 60 days / FOB	90 days / FOB	Mostly 60 days / FOB	Mostly 90 days / FOB	Mostly 90 days / FOB
<b>Export destinations</b>	UK, Europe, USA and Canada	USA (98%) and Europe	USA and Japan	UK, Europe	UK, Europe and USA
<b>Producer focus - as described by a participant</b>	"Natural wine maker"	"Boutique wine maker"	"Natural wine maker - focus on professionalism"	"Precision viticulture"	"Sustainable viticulture"

<sup>2</sup> Many wine producers 'buy out' quantities of grapes which are used together with their own grown grapes to produce their wines

## 5.4 FINDINGS

This section presents the findings according to the thematic analysis of the interviews. Table 5.3 summarises the thematic analysis of the interviews in the form of a thematic map comprised of themes, sub-themes and codes. The key risk themes are plan, source, make, deliver, return and enable, with the identified risks detailed in sub-themes and codes (see Figure 5.3).

The themes, sub-themes, and codes are discussed in more detail in the sections that follow.

**Table 5.3: Thematic map of the interviews**

Theme	Sub-themes	Code
<b>Theme 1</b> <b>Plan (section 5.4.1.)</b>	Demand versus supply	Forecasting, planning
	Investment	New vineyards
<b>Theme 2</b> <b>Source (section 5.4.2.)</b>	Bought out grapes	Drought
	Dry goods	Costs, supply, quality
<b>Theme 3</b> <b>Make (section 5.4.3.)</b>	Costs	Costs
	Nature	Drought, picking, disease, wind/hail/frost, pests, fire, baboons
	Infrastructure	Irrigation, electricity, land
	In-process	Controls
	Human resources	Industrial-relations, skills, safety, theft/damage
<b>Theme 4</b> <b>Deliver (section 5.4.4.)</b>	Revenue	Sales-revenue, costs
	Customers	Bad-debts, demand
	Inventory	Damage, delays
<b>Theme 5</b> <b>Return (section 5.4.5.)</b>	Nil	Nil
<b>Theme 6</b> <b>Enable (section 5.4.6.)</b>	Financial	Profitability, cash-flow

The findings are presented against the risk themes of plan, source, make, deliver, return and enable. The findings were interpreted within the context of the primary and secondary research questions:

1. What are the supply chain risks experienced by wine producers in the Stellenbosch area?
2. How do the Stellenbosch wine producers manage the identified supply chain risks?
3. What solutions can be suggested to the Stellenbosch wine producers regarding ways to better manage or overcome their identified supply chain risks?

The interpretation of the findings in terms of the objectives of the study is presented in Chapter Six under recommendations. The sections that follow present the key risks and how these are managed by the participants. Each theme is dealt with in a separate section.

A participant was of the opinion that the wine industry is a high risk business from the perspective that it is an agricultural enterprise producing food products: *"But the wine business is an inherently risky business. One, obviously its agriculture so it's subject to weather, so we have ups and downs, so we, if we look we look at the average yield that we want to achieve in a given year, and you know that they can fluctuate by .... well you know, 20% is not uncommon. Like in 2018 we were down but 20% so you have to have some .... you know ... you have to have some fat on the bones in order to absorb something like that. The other thing is that the wine itself, because you're making a food product, it is subject to a higher degree of risk that you might have on another manufactured product"* (Participant 6).

#### **5.4.1 Risks: Theme 1 – Plan**

In this section the risks identified by the participants in the planning area are explored together with the management techniques and activities that the wine producers followed to minimise the impact of the risks. There are two main sub-sections, being risk identification and risk management.

##### **5.4.1.1 Risk identification**

This theme includes all risks raised by the participants associated with the *planning* of the business and all its operations, including: the farm and crop management; the making, bottling and packaging of the wine; and sales/distribution of the wine to the customers. Table 5.4 below indicates the sub-themes and the codes.



**Table 5.4: Theme 1 - Plan**

Theme	Sub-themes	Code
Theme 1: Plan	Demand versus supply	Forecasting, planning
	Investment	New vineyards

The plan risk has two main sub-themes, which featured predominantly in the research results. They are demand versus supply and investment. The first sub-theme of demand and supply examined the risk faced by the producers in managing and balancing product supply to customer demand, to avoid excess inventory arising through selling less product than planned, or to avoid over-stocking due to lower customer demand.

The second sub-theme of investment indicates the risk experienced by the producers in investing in new vineyards. This arose from the uncertainty as to whether the wine consumer will buy the wine that comes from the investment in view of the wine consumers' current and future tastes and desires. This is obviously key to the wine producer gaining adequate future financial returns on such a new investment. The uncertainty is relative to the cultivars that should be planted. "A cultivar is a variety of a plant that was produced from a natural species and is maintained by cultivation" (Collins English Dictionary, 2003:407). In wine terms, this denotes the vine type, being for red or white wine production *and* the type of wine that results from the cultivar, for example, Shiraz/Syrah or Chardonnay.

Participant 6 noted that the winemaking process takes considerable planning and management, with flexibility and adaptability being key to the success of the endeavour: "*But we kind of look at what we want and we plan according to that and then you know then your plans evolve all the time. I often say it like.....wine making is a lot like being a general of an army. Because you plan as best as you can for battle, but once you start going then your plans have to evolve.*"

Table 5.5 presents the risks identified by each participant

**Table 5.5: Theme 1 - Plan risks per participant**

THEME 1: PLANNING	W1		W2		W3		W4		W5	
Sub-theme and code	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
<b>(a) Demand versus supply</b>										
Forecasting			✓			✓	✓		✓	
Planning			✓	✓		✓				✓
<b>(b) Investment</b>										
Vineyards						✓	✓			

**(a) Demand versus supply**

- **Forecasting** - Sales forecasting is the projection of customer demand (Stevenson 2015:76) for the various wine cultivars in a planning period. The findings revealed the risk experienced by the wine producers in matching demand and supply based on the following:
  - **Variable demand** – The customer demand is variable and in many cases does not follow a well-established pattern (sales variability) *"And that's because if you look at it a lot of the customers they will order now, but that will be stock for six months or might be stock for a year or might be stock for 18 months, so it's very difficult to get into a pattern and that a big challenge"* (Participant 6).
  - **The small customers purchasing patterns** – The wine producers did not have a clear picture of the requirements of their customers, who might buy small quantities of wine at any one time but whose overall purchasing patterns are important to the wine producer. *"Customers themselves are not very good at helping you plan. You know when they want it they want it, give it to me. And when they think they want it, they will ask you to hold it and then when it comes to taking it, they forget that they actually asked you to hold it. That's another thing ..... that you need, to manage the customer's expectations. It's a tough one. We only have a couple of markets where the customers does that really well. But that tends to be the bigger guys that are more established"* (Participant 6).

- **Competition for wine is strong.** *“The South African and overseas customers are ‘spoilt for choice’ for wines and can move their purchases from producer to producer”* (Participant 3).
- **Competition from the larger (corporate) producers** – The larger wine producing groups had an advantage in selling to the wine distributors, as they have the resources to "create demand" by promoting their wines, which has an impact in distorting the demand and supply picture. *"And so the problem we have is that the Distell's and the big distributors buy their spaces. Not based on the quality of the wine, they buy their space because they have marketing expenditure to do so"* (Participant 3).
- **Lack of market information** – Due to the lack of clarity regarding the short term demand from the customers, the producers had to vary their promotion strategies due to the shifting sales. This added complexity and cost to the operations. *"The painful thing is there is not quick way to change it once you produced it that is what is available. So if you got more volume available you promote a bit more, you push it a bit harder and if you got a shortage obviously you cut back on some customers and you don't promote at all"* (Participant 9).
- **Drought** – The drought resulted in lower yields which had exacerbated the difficulty in the matching of demand and supply, as wine availability was affected. *"Look in 2018 we were down you know ..... about 20% and that was certainly because of the drought year"* (Participant 6).
- **Over/under stocking** – The short term demand and supply mismatches also affected the longer term planning strategy. *"Ja, you could overproduce or under produce. We have had a few cases of underproduction as well that's quite tricky. What we do as we call it runs outs, so for every wine we will say what's the current vintage and do your projections for the next four or five years. But it's not that easy"* (Participant 9).

Four participants, representing four of the five participating producers, noted that the matching of demand and supply is difficult and presents as risk. The answer to a question regarding the ease or difficulty in matching demand and supply was: *"it's a big risk, I mean it's very easy to make wine, it's not so easy to sell it, and to get paid for it"* (Participant 7).

- **Planning** – While the matching of supply and demand presents as risk, the planning of the facility and its processes was identified as a risk by four participants. The wine supply chain is long, beginning with the vine planting and growing and moving through the harvesting and the wine making processes, to the maturation and storage stage of the finished wine. This is particularly true of the making and maturation of red wine which takes a number of years to convert from a berry to a saleable wine. As explained by participants: "*The reds, they start in a year, then three years, four years and five years. So our [premium wine brand and vintage] I bottle this year will only go to market in five years*" (Participant 10).

*"Let me tell you the risk is your strategy and planning in terms of how you again manage the fruit at the beginning, your longevity in the barrel, your management in your barrel and I am talking about all the components and things that happen in the barrel and there are lots, ask the winemaker. Those components .....that planning .....if you are not acutely on plan for that, you end up going backwards"* (Participant 3).

*"No. on the other hand, the planning of that is important because we have to take it in here. We have to insure that we have got fermentation space in here. Maybe its 100% ripe but we haven't got space over here so then we have to start doing a few things to try and sort that out"* (Participant 5)

*"The use of your cellar is an important part of managing your production process so effectively. So you know what I mean. So firstly you have tanks, and your tanks are used for multiple purposes. There are tanks for fermenting and then there tanks for a storage you know. So you have to balance that out and then you the same way you have the cellar as well. So you have to do your planning for your bottling so that you can empty that tank so that can be used for production, right. You need to have that cycle worked out and then you need to have your sell cycle so that it can facilitate that also. So you see, you always trying to balance that"* (Participant 6).

It is noted that planning and managing a wine vintage comes with risk but any changes to the plan and the plan timeframes may impact on a producer and adds additional risk.

*"You can plan what a vintage will give you. But now you have got two behind you, that's how we work. So I have two in barrel. I have 2018 and 2017 behind me. I am going to*

*now 2019. When I am in 2019 I am going to bottle 2017. But if 2017 isn't right it might have to stay in barrel for another 6 months. Now it pushes me" (Participant 3).*

**(b) Investment**

- **New vineyards** – As stated by Participant 7, the cost of a new vineyard is significant: *"You are planting over 3000 vines in a hectare. So this little block here (pointing to a map) is a hectare..... It adds up. To plant a vineyard it probably sets you back R250 000."* The investment in planting a new vineyard, which will last many years, is a risk, in view of the changing market and anticipated future customers tastes and demands. This is identified by two participants:

*"We are planning another vineyard now. While this vineyard is going to last 25 years and what is the demand going to be like in 25 years and the style what will the style be? How can I know that? Actually I've waited a couple of years as I did not have a good idea; I've kind of been stuck, not seeing. Sometime I have seen the market very clearly, sometimes I have not. And now is the period ..... and maybe because of global warming and because of the talk of global warming the talk of style has changed a little bit. People are looking at different things ..... yeah so we are also questioning what we do" (Participant 6).*

This ends the section on the risks identified under the planning theme. The next section examines how the producers managed these risks to minimise the impact of the risk on their operations.

**5.4.1.2 Risk management**

The planning risks are detailed in the previous section. This section examines how the participating wine producers managed the risk identified in section 5.4.1.1. This will be examined under the headings of the forecasting and planning activities, risks under the demand and supply sub-theme and the risk of investing in a new vineyard.

**(a) Demand versus supply**

- **Forecasting**

As noted under the risk identification section 5.4.1.1, the majority of the producers noted risk in matching the customer demand with supply. The producers noted that key to continued success of their operations and future trading was to manage this risk as best as possible. Different participants noted varying ways of managing this risk such as:

**To create customer loyalty** – This enables customer retention, and improves communication and aids in knowing what the customer wants and in meeting these wants through product supply: *"I need to create loyalty in my customers"* (Participant 2).

**To manage the customers' expectations** – This is through relationship management. *"So I would say that's one of the most important aspects of a wine producers job is to manage the difficult vintage and to manage the highs and lows because consumers want consistent product. They can say whatever they want, but really they want consistency. So that's what we are doing mostly managing. You need to manage the customers' expectations"* (Participant 6).

**To effectively manage stock supply to customers as best as possible** – *"So the shifts, so the handling of stocks on the part of your customer is a big fundamental challenge for the industry. So we find that in my other business, because it's a larger volume business, we have customers that are ordering every month. Sometime they are ordering 3 or 4 times a month, so when I look at it our projections are very even. I can project month to month; they will be up and down. If I look at it over a quarter we are very much like where our projections were made"* (Participant 6).

**To have ready access to customer sales information in order to make the best decisions** – *"I made a great hire very early on, a woman, who has amazing computer skills. She can programme and do all sorts of stuff. She has systems within our company that big companies do not have. For example, we can pull up sales of any client and that it's up to date. And we can pull it out and break it down into three years and five years, and one month and two month patterns." "It's a very big advantage. The sales information, which is very important..... so we look at it. We go over sales. We are always looking at that ..... constantly actually. Formally every month but often even more than that. Looking at what a client is doing and what a client might want. Adjusting up and down and moving allocations up and down. Yeah, .....we look at that a lot"* (Participant 6).

**To employ the correct and experienced sales and marketing staff** to build and maintain the customer relationships and to stay close to the customers – *"I mean, you know my wife and I, we have now about 15 people doing the work that we used to do between the two of us. Because you have got a marketing manager, you have a sales manager and these reps and all this sort of stuff."* (Participant 7).

This ends the explanation of the management activities that the producers employed in an effort to balance customer demand and supply

- **Planning**

The planning of the facility and its processes was identified as a risk by four participants. This was in view of the length and complexity of the supply chain. The participants noted the following ways of managing this risk:

**Forward planning** – To plan as far ahead as possible and understand supplier lead times and to manage requirements against these lead times to prevent delays in the receipt of dry goods<sup>3</sup> which may impact on the wine making process. *"You need to plan ahead and you need to understand that if you don't put your order for dry goods in on time you can't really get angry at anybody"* (Participant 2). *"Your planning needs to be up to date on that side"* (Participant 7).

**Having a knowledge and understanding of history** – To know and understand past history; to be able to recognise the need for changes as early as possible; to anticipate the impacts of any changes make; and to manage the operation accordingly. This is seen in the answer to a question about the aspects of planning and the effects of the drought on planning: *"It affects us all, we will plan for a dry season this year"* (Participant 7). *"We will watch what happens this month because June and July are critical months. They have always been critical months – we have 75 years of rainfall history. In the Cape, the most important months for rainfall are June, July and August. We will keep a close eye on what happens this month, in May we were below the 75 year average"* (Participant 2).

**Flexibility and adaptability** – To be flexible, to adapt and adjust plans and to manage accordingly to ensure the production of a consistent product. *"I think it's just the way you need to be flexible, so that you can manage. So I think change is a constant. I think certainly a challenge is that from a wine perspective we want consistency, so our style are consistent"* (Participant 3). *"But we kind of look at what we want and we plan according to that and then you know then your plans evolve all the time"* (Participant 6).

---

<sup>3</sup> Bought out items used in the making of wine and the bottling and packing of the wine.

**Precision viticulture** – To follow the strategy of using ‘precision viticulture’. This management process was used by one participant and aims to take as much complexity, judgment and subjectivity out of managing the agricultural activities and to add disciplines (science), controls and more objectivity. Participant 7 noted that he has been following this strategy for a number of years in order to put more ‘science’ into the vineyard growing / grape growing and harvesting processes and to reduce the complexity and the risk within the planning and managing of the operation. This precision viticulture is explained in Chapter Six under recommendations for managing variability and reducing the incidence of planning risk in the Stellenbosch wine producing area: *"We try to work on a principle called 'precision viticulture'"* (Participant 7).

The participant noted that the highest degree of complexity was in the area of viticulture due to the fact that a number of issues affect vine and grape growing and, as a consequence, the planning timeframes. Such things as the drought, heat and other naturally occurring events that the farmer does not have full control over but lives with the impacts. *"..... the thing is, it is much more complicated .....the viticulture is. You don't um, you know with wine making you can do something and you get an almost an immediate effect. With viticulture it can take years. And then you don't always know that you are on the right track. In wine, if it suddenly tastes bad then you know you are on the wrong track"* (Participant 7).

This participant noted the process was a long term one. *"Well it's a long process, getting to know the vineyard"* (Participant 7).

- (b) **New investment (new vineyard)** – While two participants noted that there was risk in this area of not knowing what cultivars to plant, none of the participants noted ways to manage and or mitigate this risk.

This ends the section explaining the management steps that the producers took to manage the planning risks. The next section examines the risks identified by the producers in the sourcing theme and its activities.



## 5.4.2 Risks: Theme 2 – Source

This section examines the risks identified by the participants in the *source* risk theme and its activities. This theme includes all risks raised by the participants associated with sourcing for the business of materials, manpower, machinery and services. Following this in section 5.4.2.2, the producers risk management activities are explained

### 5.4.2.1 Risk identification

The participants noted two risk sub-themes relative to the sourcing activities. These relate to the sourcing of ‘bought out’ grapes and ‘dry goods’ which are other goods used in the making of wine, the bottling process and packing of the wine. The source risk theme, with sub-risks and codes’, is set out in Table 5.6 below.

**Table 5.6: Theme 2 - Source**

Theme	Sub-themes	Code
Theme 2: Source	Bought out grapes	Drought
	Dry goods	Costs, supply, quality

Many wine producers buy out quantities of grapes for wine production. Dry goods cover all the inventory items for bottling and packing of the wine, and other items used in the wine making process. Such items include additives such as yeast, as well as oak wine barrels used for wine maturation. The packing items covered by this sub-category are bottles, labels, boxes, capsuling, corks, and pallets. The wine producers buy out oak wine barrels for use in the wine making process. Oak is used in the winemaking process to vary the flavour, tannin profile, colour and texture of wine with oak wine barrels being used in the fermentation or aging process (Creationwines, 2014). "*Yeast is used in the wine fermentation process and converts the sugars of wine grapes into alcohol and carbon dioxide through the process of fermentation*" (Participant 6).

The participants who noted risk under a particularly theme and code are indicated in Table 5.7 with a tick.

**Table 5.7: Theme 2 - Source risks per participant**

THEME 2: SOURCE	W1		W2		W3		W4		W5	
Sub-theme and code	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
<b>(a) Bought out grapes</b>										
Drought		✓	✓		✓					✓
<b>(b) Dry goods</b>										
Costs		✓	✓			✓	✓	✓	✓	✓
Supply	✓		✓			✓	✓	✓		
Quality	✓		✓		✓	✓	✓	✓		✓

**(a) Bought out grapes**

- **Drought** – The drought risk is found in both the sourcing and making aspects of the wine supply chain. On the source side, the drought had created a shortage of grapes that need to be bought in from third parties and this had raised the prices. This had been further exacerbated by overseas customers buying out South African bulk wine due to the lower South African prices versus those paid overseas for such bulk wine. This has brought risk to South African wine makers who buy out a significant portion of their grapes. Four participants noted this risk regarding these bought out grapes.

*"I mean, the prices of grapes have gone up substantially and obviously people have got very, very scared. It is now 2018 and everybody said that 2018 would be 25% down. Everybody was going ..... I need to buy grapes because I am not going to get the quantity. And the prices went up because suddenly they could sell them for more. So that variable does change, and it depends on the farmer that you are working with but I mean grape prices have gone up" (Participant 3).*

*We could buy a year or two ago, five, six, seven thousand rand a tonne, we bought very good rates. Now we pay R14 000 to R15 000 to R18 000 per tonne" (Participant 5).*

*"I have seen the prices double already in the last six months" (Participant 10).*

**(b) Dry goods**

There are three aspects of risk groups identified relative to these dry goods: the cost of the products; ordering and timely supply of these goods including, excess stock-holding; and the poor quality of these items.

- **Costs** - This identified risk covers the increasing and high cost of these items from local suppliers and the increasing costs of the imported items, due to Rand devaluation. Each year, the local dry goods suppliers tend to put through inflationary linked price increases through to their customers. Further, all of the participated wine producers used imported oak barrels in their wine making process. These barrels were imported from France, with the cost of a barrel being high at *"between R13 000 to R18 000 per barrel"* (Participant 3). The cost of the barrels was increasing due to the depreciating Rand versus the Euro exchange rate. Usage of barrels depends on various issues, such as the wine style/cultivar being made (red or white wine) and the production volumes. Participant 8 noted that his estate imports 160 per year, while Participant 10 noted that his estate imports between 200 to 300 barrels a year. The outlay cost for 150 barrels at an average of R15 000 (at June 2018 exchange rates) is R2,25 million. The cost of these items and the continually increasing cost due to the devaluing Rand presented as a significant risk, as identified by seven participants. For example:

*"Yeah on the sourcing side, bottles, boxes, capsules, barrels and all of those things. We tend to pay higher prices"* (Participant 6).

*And: "Yeah they tend to work on high margins in general because it's a small industry. So if they have a business ..... to give you an example, where we don't have a big glass industry so the glass prices are high. They are higher on average than what the European prices would be for glass. I was just overseas, on a trip and talking to a lot of producers at a wine show and I say on average we are paying 40% more for our glass than than they are paying in Europe. And when you look at the costs of labour, the cost of raw material, it doesn't even make sense"* (Participant 6).

- **Supply** - This risk covers issues relative to the on time receipt of dry goods from local and foreign suppliers. This risk leads, in many cases, to the wine producers holding excess or

buffer stocks of the dry goods as a way to mitigate against supply delays. Such risks arise from various issues:

- The long lead-time between ordering and receiving dry good inventory from South African suppliers (quoted by participants as between six and eight weeks). This can include inefficiencies at the local suppliers with promises not being met. Participant 6 noted that from his previous experience in other industries that the order lead time from dry good suppliers (bottles/boxes) to customers in the USA/Japan was as low as two weeks versus the South African norm of 6 to 8 weeks;
- Lead-time delays in obtaining supplies from overseas due to distance and or delays brought on by bad weather (for example at sea);
- Delays in the obtaining supplies from local suppliers. Reasons for the delays include poor weather conditions, strikes and transport delays caused by roads being blocked due to service delivery demonstrations.

This presented as risk as the supply chain can be long, especially on the imported items, and the need for higher inventory holding places a cost and space burden on the producers. There was the added risk of inventory obsolescence and damage while the goods are stored. For example, Participant 8 noted an experience where the delay in the receipt in wine barrels due to the *"South Easter prevented a lot of boats from docking and all our barrels went to Durban and then they come back and they finally offload them in PE and they bring them down via truck from PE."* This delay created severe process delay issues.

Five participants identified the dry good supply issues as a risk:

*"I think our biggest problem with dry goods is not to make sure we get the dry goods on time but to make sure we plan ahead and get our orders in on time because there is a much bigger window for them to get the order ready. Six weeks or even eight weeks. Time to make sure we get in on time, to make sure that we get the stock when the wine is ready"* (Participant 1).

*"Well if you look at capsules, they're basically all imported. That's always a tricky thing because you're dealing with the middleman"* (Participant 6).

*"The problem is convenience because if we are doing ..... bottling, we need 700 000 bottles per year. It's a lot of pallets. Where do you put them? If you want to order 50 000 bottles you can do it from Consol and it can come in dribs and drabs. Sometimes..... they have a furnace that isn't working so you have to plan it quite well in advance"* (Participant 7).

*"I don't know why but, you are always waiting for labels especially and capsules it's a problem"* (Participant 7).

- **Quality** - This risk covers the poor quality of dry goods stocks, most notably bottles, boxes, labels and corks. The poor quality of the dry goods was a significant risk, as identified by seven participants. Issues included weak and floored bottles that break and crack, labels that do not stick to bottles, colour variation on boxes, boxes that collapse, and contaminated cork.

*"But the biggest difference is the colour differences because our boxes ..... I don't know if you have seen them..... our boxes, we have brightly coloured boxes and beautiful labels and so that's sometimes .... if they do a big run on that ..... the colour difference ... you can pick it up after a while"* (Participant 1).

And: *"Bottles are a major problem because the main supplier is Consol and they are not really interested in the small guys. Beer is what keeps them ticking along and they are dreadful to work with."* The answer to a question about the quality of the bottles from the local supplier was: *"Very poor!"* and *"We've also had labels that don't stick on the bottles"* (Participant 7).

Participant 10 explained about his move from cork to 'technical cork' ('cork' stoppers which consist of small pieces or granules of clean, natural cork bound together with resin or a chemical binder) due to quality issues with imported cork being contaminated: *"Before with ordinary cork I had lots of problems. It's why I went to technical cork. We had tricholoroanisolé (TCA) problems, I can write a book about it"*.

This ends the section which explains the risks identified by the participants relative to the sourcing of items used to produce and pack wine. The next section (section 5.4.2.2) explains the risk management activities or processes followed by the participants to reduce or mitigate against the negative impacts of the identified risks.

### 5.4.2.2 Risk management

The sourcing risks are detailed in the previous section. This section explains how the participating wine producers managed the risk identified in section 5.4.2.1. This will be outlined under the same headings of the risks identified by the participants. These are the risks presented by the drought, affecting the purchasing of bought out grapes, and the risks affecting the buying out of dry goods. The risk of the dry goods had three aspects which are the rising costs, timeous delivery/supply of the dry goods and issues relating to poor quality.

#### (a) Bought out grapes

The drought has created a shortage of supply of grapes and raised the price of these grapes. This presented as risk and was noted by four participants. While the producers stated that they were paying higher prices for their grapes, they had the following risk management strategy in place in try to mitigate the impact of this risk:

Negotiating and entering in contracts in advance to obtain a better price for the grapes:

*"You need to order, you need to sign a contract at least six to eight months in advance. Because the work on the 2019 crops starts now in July." "I have already locked in contracts, some longer term contracts and I need to cut two growers where we are not going to have ..... the budget process that we are busy with now ..... shows that we .....because of the drop in sales where we have to off load some grapes"* (Participant 10).

*And: "So grapes are harvested in February or March and we would normally have contracts finalised by the end of September. That's what we aim for. So I will start doing my budget now in the next month or two and we will do a budgeted crop forecast for next year for our own property based on our own budgeted production here. I would then base my requirements for bought in fruit and then would obviously look at my current suppliers and whether I should add in or drop any suppliers to that mix, which is a function of price and quality. And how important they are in our various blends and wine that we make"* (Participant 2).

#### (b) Dry goods

The risks were rising costs, timeous supply and poor quality. The wine producers' ways of managing these risks were as follows:

- **Rising costs** – All five participating producers noted that they *do not* use forward exchange contracts to manage the risk exposure relative to the costs of the imported goods. Participants 3 and 9 noted that their wine producing estates sell their wine in foreign currency value, and they bank the foreign proceeds in a customer foreign currency account (CFC), with the monies being retained in the particular foreign currency. They then use this account to pay for their imported items. This includes the wine barrels. While this did not eliminate the foreign currency (forex) risk, the strategic aim is that if the Rand depreciates, the value in Rands of the export earnings increases, which would go some way to offset the increase in the cost of the imported items. *"There are two customers which we sell in Rands .....the rest we sell in Euros and Dollars. And then we take the Euros to a CFC account and we use those Euros to buy barrels again"* (Participant 9).

All five of the participating producers noted that the risk presented by the high costs and annual increases of other dry goods was managed through ‘tough’ negotiation with the South African and foreign suppliers in an attempt to keep the base cost increases down. *"Ja, I have a very strict policy on that, when we purchase dry good product where there is a great incentive on volume ordered, we will negotiate an agreement with the supplier"* (Participant 10).

- **Supply delays** – Participant 9 noted that the one way to mitigate the impact of supply delays of dry goods was to hold additional inventory of the item, but this had cost and space implications. Participant 1 noted that the best way of managing the issue to ensure that there was stock availability when required was to order well in advance and have a safety inventory margin in the order lead time (usually a week.)
- **Poor quality** – Participants 7 and 10 explained that their way of managing the risk of poor quality dry goods was through import substitution or by replacing the local supplied product with a better quality (and cheaper) imported one. This was the case with imported bottles from China, which were better quality products. This did have some cost impact due to the need to hold additional stock but overall it was a better solution than using an inferior local product.

One participant from each producer noted that the checking of incoming dry goods to ensure that the supplied product met required quality standards was a key control in their operation.

This ends the sections explaining the risks and the management steps taken by the participants to manage the risks relative to the sourcing activity. The next section examines the risks under the make process.

### 5.4.3 Risks: Theme 3 – Make

The section examines the risks identified by the participants in the *make* theme and its activities under section 5.4.3.1. This is followed by the processes undertaken by the participants to manage these risks.

#### 5.4.3.1 Risk identification

This theme includes all risks raised by the participants associated with land management, vine management, crop management, harvesting and all steps of the wine production processes. It also includes the risks associated with the bottling and packaging activities. The *make* risk sub-themes and codes are shown in Table 5.8 below.

**Table 5.8: Theme 3 - Make**

Theme	Sub-themes	Code
<b>Theme 3: Make</b>	Costs	Costs
	Nature	Drought, picking, disease, wind/hail/frost, pests, fire, baboons
	Infrastructure	Irrigation, electricity, land
	In-process	Controls
	Human resources	Industrial-relations, skills, safety, theft/damage

The identified risk issues are: increasing costs; the risk associated with external factors through acts of nature; risks associated with the infrastructure needed to run the operation and to make the wine; the in-process or control risks within the wine making process; and the risks relative to human resources.



Table 5.9 details the participants who raised the issues under this risk theme of make. The participants who noted risk under various sub-themes and codes are indicated in the table with a tick.

**Table 5.9: Theme 3 - Make risks per participant**

<b>THEME 3: MAKE</b>	<b>W1</b>		<b>W2</b>			<b>W3</b>	<b>W4</b>		<b>W5</b>	
<b>Sub-theme and code</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>	<b>P5</b>	<b>P6</b>	<b>P7</b>	<b>P8</b>	<b>P9</b>	<b>P10</b>
<b>(a) Costs</b>			✓			✓	✓		✓	
<b>(b) Nature</b>										
Drought		✓	✓		✓	✓			✓	✓
Picking		✓	✓		✓		✓	✓		✓
Disease		✓			✓	✓	✓			✓
Wind, hail & frost			✓			✓	✓			✓
Pests		✓			✓		✓			✓
Fire			✓				✓			
Baboons			✓			✓				
<b>(c) Infrastructure</b>										
Irrigation			✓		✓		✓		✓	✓
Electricity			✓			✓	✓	✓		
Land						✓			✓	
<b>(d) In-process</b>										
Controls		✓	✓	✓		✓		✓		✓
<b>(e) Human resources</b>										
Industrial relations		✓			✓	✓	✓			✓
Skills		✓	✓			✓				✓
Safety				✓		✓		✓		
Theft/damage			✓					✓		

The sub-themes of this risk issue are costs, nature, infrastructure, in-process and human resources:

**(a) Costs**

The first risk sub-theme of costs was raised by four participants in relation to the high and increasing input costs of the farming activities (land tending, planting, growing, vine tending and picking) and the wine making process in the winery. This included the cost of labour and other inputs, such as water, electricity and waste water treatment.

Explaining the impact of costs increases, participants commented: *"Yeah it's created pressure on the business. I mean we can't, obviously you can't keep paying more than inflation. Well it becomes the major inflation in your business. And it becomes a big component in the business. It's like 40% of our costs. The labour related component flows all the way down the chain."*

And: *"So yeah our labour costs, if you look at it over the past 20 years it has way outpaced the inflation level. It has been a major risk going forward"* (Participant 6).

The yield or volume declines also had an impact on units costs: *".....if your vintage is down 15, 20, or even 40%, your fixed costs stay the same ..... I mean ultimately you need certain volumes to run a business, it's as simple as that"* (Participant 9).

**(b) Nature**

This risk sub-theme covers all external risks of the environment which the wine producer needed to contend with for the growing of vines and grapes.

- **Drought** – While a representative from all five of the participating producers noted that the drought had impacted on the operations in some way, three of the five wine producers noted yield reductions due to the drought. This was a key risk issue.

Participant 6 explained about the impact of the drought: *"Look in 2018 we were down ..... you know about 20% and that was certainly because of the drought yeah."*

- **Picking** – This refers to the importance of picking the berries when they are ripe (and not, for example, over-ripe) and in the best conditions with regard to temperature. This was a key issue with six participants, all of whom deal with viticultural activities, identifying this as a risk.

Ripe wine grapes are very perishable and are at their best for a few days. When to pick the grapes is such an important decision that most winemakers start sampling grapes several weeks before picking time and continue sampling with increasing frequency as harvest time approaches. There is risk if the berries are not appropriately ripe and picked when the ambient temperature is the coolest (ChanticleerWines, 2018). The importance of ripeness was explained: *"It affects the whole style of the wine potentially"* (Participant 8). *"Over ripe and we have a window where we to pick it today and it's the middle of summer at 32 to 35 degrees and we get delayed by a week, then your sugar jumps and your alcohol will end up a lot higher than intended it to be. That can happen, also you use quality, you going beyond the point of ripening of where you want to be."* and *"You can lose market. Woolworths for example, over 14% alcohol levels is a problem. Supermarkets won't stock it, won't shelve it if you have more than 14% alcohol level"* (Participant 8).

While ripeness is key, the ambient temperature also plays a role:

*"Well temperature is important for the whites, but for the reds it's not so important. The coldest part of a Cape day is at dawn. The moment the sun sticks its head out is always the coolest part of the day. So at 5:30 we will pick, we don't pick to a time, we pick to a temperature, we pick to 20 degrees Celsius".* Then: *"we stop. It could be 8, it could be 9, ja then we go back the next day. The first part of the harvest that's the way we do it. We pick for an hour or two or three. If it's cool and cloudy we may pick the whole morning, but it depends on the temperature. We bring it in because again you have one opportunity in 12 months to get it right"* (Participant 10).

- **Disease** – This risk category includes two types of mildew called powdery and downy mildew. Powdery mildew, also known to vine and grape growers as oidium, is caused by the fungus *Uncinula necator*. Without necessarily causing obvious disease symptoms, the fungus may have a harmful effect on all facets of the vine and its products. Downy mildew is a highly destructive disease of grapevines and grapes where parts of the young fruit bunches turn brown, wither and die rapidly (Wineland Media, 2001). Five participants noted disease as risk:

*"And then diseases it's basically oidium which is a powdery mildew and downy mildew, so the two mildews are the two main diseases that we would be concerned about"* (Participant 2).

- **Wind, hail and frost** – Wind can do damage to flowers and to the vine shoots. Hail and frost, while not a common occurrence in the Stellenbosch area, also present risk factors for the vines and the fruit (Participant 7). Five participants identified wind as risk, while only one of these participants noted hail and frost as a risk:

*"So the wind is a problem now and again when the wind speeds get to a point where they break the shoots off at a very sensitive stage, when the shoots are 30 to 40 cms then the shoots are not well cemented to the main frame and they can be blown off quite easily"* (Participant 10).

- **Pests** – This risk category covers all pests but most particularly the mealybug, which damages the vines by passing on a virus to the vines. Participant 1 also noted the risk of the stem borer and the snout beetle. Stem-borer normally damage vine trunks over a year old and can eventually affect the vigour of the vine and eventually impact on bud burst (Wineland Media, 2013). Snout beetle causes serious damage to emerging buds, sprouts and young shoot tips on the vines (Wineland Media, 2013). Four participants identified pests as a risk:

*"You get a variety of pests, the most dangerous ones are the thing called mealybug which is the carrier of the leaf-roll, the females carry the virus in their intestinal system and every time she bites a plant she injects through her saliva .....is injecting the virus. So she crawls from one vine to the next along a wire. The typical spread patterns are along the rows. You see it quite clearly at autumn because the leaves go that red colour. That's an unnatural colour, that a virus that does that. It's robbing the leaf of the ability to photosynthesize"* (Participant 10).

- **Fire** – This risk factor affects the wine producers by burning the vines and also through the smoke damage to the fruit. This is called smoke taint, which is the permeation of smoke into the grape berries, resulting in the eventual production of unpalatable juice or wine (Participant 3). Two participants identified fire as a risk.

*"I mean we live on a mountain side. A risk on our location is fire"* (Participant 3).

- **Baboons** – Baboons do damage in two ways. Firstly, they steal grapes off the vine and they also damage the vine when they rip the fruit from the vine (Participant 2). Two participants noted this as a risk:

*"Yeah they tend to just grab a bunch and just pull the whole shoot off so its ruins your architecture of the vine that you have done. They pull the berries off then they pull the irrigation stuff down. They are very destructive" (Participant 6).*

(c) **Infrastructure**

This risk sub-theme covers all risks relating to the infrastructure required for vine and grape growing and the wine making operation. This includes such items as irrigation, electricity, and the use of land.

- **Irrigation** – A representative from each of the five participating wine producers noted that they use irrigation to water their vines. Issues that impact on effective irrigation, such as low water levels in the dams, affected the producer's ability to supply water to the vines. This risk therefore refers to problems associated with not being able to irrigate due to a water shortage or other negative factors.

*"The best time to irrigate, well the problem is that you do have those daily issues if you have wind and use drip irrigation. It's null and void, the reason being that the wind comes and washes the water away. And it's such a miniscule amount water, it's not a lot. The huge risk also with the drought and Theewaters scheme is that the dam got lower and lower there was more and more silt. There was more and more waste from the fish. This got into the pipes. We are on the scheme, we pump up to our reservoir. Our reservoir filters a portion into our home that we pump directly into the drip irrigation. The silt and that blocks it. Your plan of action .... the risk you are taking is that you are using unfiltered water. The risk that you are taking is that there is a drought and how do you counteract without spending millions. So you have to watch, you have to walk the line because you don't know. Is the line dripping or is it just a pressure zone at the end" (Participant 3).*

- **Electricity supply** – Electricity is needed in the winery to run the equipment and particularly to run the cooling machinery. Cooling of the wine juice is vital throughout the wine-making process. Four participants noted that an interruption of electricity supply is a risk for the operation:

*"Throughout the whole process. You need it ..... you have to have good cooling. If you ..... well power is major risk" (Participant 7).*

- **Land** – This relates to the threat of the ownership of the land through possible land claims. The findings also revealed that more and more land in the Stellenbosch area is being used for other purposes than vineyards. Vineyards are being converted for property development. This risk is noted by two participants:

Regarding the use of land for other purposes than growing vineyards a participant noted: *"It's already a factor in Stellenbosch now. Frankly you can't buy a property in Stellenbosch and make wine profitability from it now. There is going to be more and more pressure in agriculture you are going to be far better off putting in homes. I see it all over. We have just bought a farm from another business in Stellenbosch and I spent two years looking at farms in Stellenbosch and there are many farms that are not being maintained because they can't make a profit. In twenty years it will change. The government will not let it continue because they will rather build homes because at least they get tax on the built homes"* (Participant 6).

**(d) In-process<sup>4</sup>**

This risk category is relatively broad and refers to the risks within the in-process activities during the actual wine making process. The science of wine making is relative to the various controls and disciplines within the wine making process. These involve checking, testing and managing the must (juice) to ensure that the correct chemical processes are taking place and that the wine develops correctly. The science in wine making guides the winemaker to use practices which lead to better wine quality and the elimination of wine faults.

Issues included under this risk category are relative to the management of the processes and the impacts that occur if the process is not well managed or gets out of control. This can lead to a wine that is spoiled. Process control issues include the need to measure, control and adjust (if necessary) temperature, acid, PH, sugar, sulphur dioxide, and malolactic

---

<sup>4</sup> The main risks relative to the vine and grape growing were covered under the nature risk code.

acid (Participants 4, 8 and 10). Process control examples and risks include (not an exhaustive list):

- Temperature control within the whole wine making process to ensure the best development of the wine
- PH and acid control to ensure an optimum taste of the wine
- Sulphur dioxide (SO<sub>2</sub>) testing to protect the wine from oxidation and spoilage organisms
- Managing the secondary (malolactic) fermentation and maturation phases – It is vital to ensure the completion of the malolactic fermentation as a residual malic acid leads to an unstable wine with the risk of fermentation of the wine in bottle and its spoilage.

*"The thing is though that they constantly are testing. So in every aspect they are testing and even when it goes from juice to barrel, the second malolactic happens in the barrel, I mean they constantly are monitoring the wine. It's not like, its monitored all the time, and then there are periods where (our winemaker) will take specific draws, send them to the laboratory, see that everything is happening according to what is supposed to happen from a chemical, the chemistry development of a wine, should I say. So you are monitoring it all the time"* (Participant 3).

*And: "We will plot mainly sugar drop and temperature. Obviously the lower the temperature the slower the sugar drop but I am more worried about my temperatures actually, it's almost if you have done a proper inoculation and the juice is safe and good then it's often not a problem. There is one or two small chemical things you have to look out for in certain vintages, you have more fructose than glucose and then some yeast can't utilise the fructose and then you get stuck fermentation. So you end up with a wine with 11% alcohol and a hell of a lot of sugar and you can't get it to budge"* (Participant 8).

There are other decisions that have an impact on the wine quality and taste and therefore need to be controlled and managed to produce a wine that is consistent in flavour and style with past vintages. Not controlling and managing these issues or not following previous historic practices regarding these issues presented as significant risk (Participants 3, 6, 8 and 10). Examples include (not an exhaustive list):

- Quality/consistency - Managing the overall taste/quality of the wine that is produced to ensure that the product matches that of previous vintages from the perspective of flavour/style.
- Yeasts – Besides the right time and best conditions for picking the grapes which impacts on the quality (and taste) of the grapes, wine making decisions include what types and the quantities of yeast to introduce to the process. In the absence of oxygen, yeast converts the sugars of wine grapes into alcohol and carbon dioxide through the process of fermentation. For example, in making some white wines some yeast strains bring out more citrus characters in the wine, while others produce more fruity, tropical flavours (Winemaker's Academy, 2013). Problems here can lead to fermentation issues that need correction. Rushing or altering the maturing process in the barrel may affect the style and flavour of the wine. See the comment from Participant 8 with regard to 'stuck fermentation'.
- Maceration process – In making red varietals, decisions are made regarding the length of the maceration process. Maceration is the process of soaking crushed grapes, seeds and stems in a wine juice (must) to extract colour and aroma compounds as well as tannins. For example, the goal of extended maceration is to increase colour, flavour and tannin structure in the wine (Winemaker's Academy, 2013). Tannin is an element that makes wine taste dry. Tannin is a naturally occurring organic chemical found in plants, seeds, bark, wood, leaves and fruit skins. As a characteristic of wine, tannin adds bitterness and astringency, as well as complexity to the wine (Wine Folly, 2013). Astringency is defined as the dryness, tightening and puckering sensations perceived in the oral cavity (Science Direct, 2017). Adjusting or adapting the maceration process and time frames may impact on the ultimate colour and taste of the wine and may lead to a vintage out of line with requirements or previous ones.
- Barrel usage– Other decisions that affect the taste of the wine are those relative to keeping the must (juice) in oak barrels. Decisions include how long the must remains in a barrel, whether the barrel has been used before and how many times the barrel has been used before. This may present as risk as changes may affect the flavour or the wine and lead to a vintage that is not aligned with previous ones (Wine Folly, 2013).



*"Your longevity in the barrel, your management in your barrel and I am talking about all the components and things that happen in the barrel and there are lots, ask the winemaker". The life of a barrel, ".....it depends, new wood brings new components to the structure of your wine or tannins your flavour. Somebody .....you can put for example ..... we do put juice into new wood and will keep it in that new wood for 36 months. But that means not all the juice of that cultivar will be in new wood. So we will use new wood for a second or a third or maybe even fourth fill. And when we blend it as a component we get that magnificent balance" (Participant 3). "That's the artisanal creation. Some people will only go into new wood. And I can guarantee you that if you tried cabernet that's only been in new wood and you try our cabernet, depending on the pallet in terms of structure the intensity of tannin the longevity of ageing is completely different. The flavour is completely different. Because the new wood is intense and the problem is in many cases don't want the wood to overpower the flavour. And it's getting that ratio into perfect balance" (Participant 3).*

*And: "I can't rush the maturation in barrel, there is obviously certain rules, I stick to that rigidly because if you ignore them, you run those lights then you pay later in the market" (Participant 10).*

Six participants who deal directly with the wine making process identified this broad risk category.

**(e) Human resources**

This sub-theme includes the risk of industrial relations, risks relative to the retention of skill of wine making, safety risks and the risks presented by theft and damage from employees or people in the community.

- **Industrial relations** – This is a key risk area, as a representative from all five the participating wine producers noted the potential risk from possible industrial action in view of the legacy of the apartheid era, the historic perceptions of poor industrial relations in the industry and some current negative reports of unfair labour practices in the industry:  
*"To make (the workers) part of the family, it's quite important" (Participant 2).*

*And on the possibility of industrial action in the industry - "No it is a continuous risk and I think in South Africa because of unions and because of the rhetoric and because of how*

*closely aligned unions are with politics it is for me something that we have to address. It is a major risk because if our labour all of a sudden decide that they want a union on board you can get all sorts of interference and pressure in the business and often those things to include unions is because staff feel disempowered or because they feel that their requirements are not being met" (Participant 2).*

- **Skills** – This risk relates to the retention of skills of the wine maker. A number of participants noted that there were sufficient wine makers available in the employment market, with many new wine makers being trained and developed by various training bodies. However, the importance of skill retention of wine makers is relative to the retaining such individuals in the operation. While wine making skills are not seen as unique, wine maker are seen as having organisational knowledge in that they know the strategy, focus and methods of the wine producer where they are employed. Thus the retention of the wine making skill is important to ensure consistency in process and a consistent product *"..... a challenge is that from a wine perspective we want consistency, so our style is consistent" (Participant 3).*

*And: "But what is important is that we have consistency of flavour and style" (Participant 3) "because consumers want a consistent product" (Participant 6).* Four participants identified this as a risk.

- **Safety** – This risk relates to the safety of all personnel in the wine making process due such things as carbon dioxide poisoning or perhaps falling from a height (off a tank). Three participants noted this risk.

*"Wine making is one of the most dangerous facilities to work in. It's a death trap literally. You are dealing with fermentation which produces carbon dioxide is a noxious gas. You can't see it, you can't smell it, you can't sense it, until you can't breathe" (Participant 2).*

- **Theft and damage** – This risk is relative to theft from producers. Examples included the theft of finished wine from the stores, theft of grapes from the vineyards and, in one case, the theft of copper piping from the cooling systems within the winery. This relatively minor risk was identified by two participants.

This ends the section which describes the risks identified by the participants under the *make* theme and its activities. The next section explains the ways in which the participants managed the risks to minimise the negative impacts of the risks on their operations.

#### 5.4.3.2 Risk management

The identified *make* risks were presented in the previous section. They are costs, nature, infrastructure, in-process and human resources. In this section the producers' ways of managing this risk are explained under the same codes:

##### (a) Costs

Participants from four of the participating producers stated that rising costs above the rate of the inflation level are a risk. They noted that their strategy for managing this was through tight cost control and maximising revenue by implementing selling price increases whenever possible. Three participants noted that a strategy for managing labour costs was to control the employee complement by keeping it down to a minimum and using contract labour carefully when the need arose for additional labour (for example, at grape picking time.)

##### (b) Nature

- **Drought** – As mentioned in the *make* risk section, drought impacted the wine producers and negatively impacted on the yields of three of the five producers in this study. As can be seen in Table 5.2, all of the participants have dams and use irrigation to water their vines, while another two also have other water resources, namely a stream (Participant 7) and an underground water supply (Participant 2). As a risk management step to offset the impacts of the drought, all producer estates had taken steps to conserve water as much as possible and through water recycling.

*"We mitigate our water risks by recycling all our sewage, all our runoff water. In the winery this year we used 25% of the water that we used two years ago, so we have 75% saving just by making a couple of simple changes in the way we work with water, through just by being aware and careful"* (Participant 2).

- **Picking** – The risk of not picking the grapes at the right time, when the berries are ripe and the ambient temperature is the coolest, is significant. To manage this correctly, the

producers tested the grapes, internally or through laboratories, for sugar (using a hydrometer/refractometer), for PH (using a PH meter) and for acid (using a titrator). Key personnel also taste test the grapes to ensure they are acceptable to their pallet. The formal testing and the visual and taste test are undertaken over a period leading up to the actual picking date. These control measures ensure that the grapes are picked at as close to the optimum stage of berry maturity as possible and is the way that the producer eliminates the risk of picking an over or under ripe crop. The process is explained by Participant 10:

*"The initial monitoring is weekly chemical analysis. We just measure three parameters, the sugar, the acidity and the PH. And then when we get to what we think is historically close to picking analysis then we stop analysing it and we start tastings. I do that. I go every morning and I taste two to four hours every day through the harvest. And we literally pick it when it is good to eat."*

*"It's no different from a banana or a mango in a fruit bowl. You can pick it too early and you know what that tastes like and if you pick it too late, a banana, you know what that tastes like. And it is the same with grapes. The grapes we call it, ..... I call it a sweet spot. It has a little window of opportunity. It's often just one or two days. We are talking about grape production at the high level, it's not normal production, most of my competition, the top 50 guys, ..... are doing this."*

*"Taste and also visual, there is certain visual symptoms that you need to look at."*

Besides checking for ripeness, picking the grapes during the time of the day when the ambient temperature is at its coolest is also important, especially with grapes used in white wine production. Picking takes place during the early morning when it is the coolest, and a participant noted that it is important to keep checking the ambient temperature.

*"Well temperature is important for the whites, but the reds it's not so important"*

*"We find in the vineyards 30 minutes pre-dawn in the summer, so 5:30 and we will pick, we don't pick to a time, we pick to a temperature, we pick to 20 degrees Celsius." "The reds we pick all day. It can be 35degrees."*

The participants noted that the measuring and monitoring of sugar, PH, acid and temperature was how they mitigate against the risk of the grapes not being in the best

condition to produce a good wine. *"So if you are trying to produce a beautiful vineyard you must remember at the end of the day if we do not produce the premium quality fruit, that we wish to grow, we can't make good wine out of bad fruit. We can make bad wine out of good fruit"* (Participant 3).

- **Disease** – This risk category includes mildew. The participants noted that they spray the crops with fungicides to mitigate against the disease.

*"Obviously you know you can have mildew and disease issues but you know if you are watching your viticulture you can usually mitigate the risks"* (Participant 6).

*"Mildew you should be able to do something about. We spray at the right time, spray the right stuff, so if you are a sloppy farmer then you can pay"* (Participant 7).

- **Wind, hail and frost** – Five participants noted that excessive wind can be a negative factor in damaging the buds and the vines, while two participants noted that wind can also be good for the vines to keep fungal infections at bay, and to keep the vines and grapes cooler.

*"In our case the wind does a lot more good than bad, because if you have air movement you can't have fungal infections. If you have air movement you have a mechanical cooling of the canopies, so they cool down a bit so you reduce water consumption. By moving air over leaves you increase transpiration, so it's a bit like a radiator, its cooling down"* (Participant 10).

The participants noted that there was not much they could do to mitigate against the negative risk and impact of high winds, or even of hail and frost.

- **Pests** – While four participants noted pests as a risk, three of them noted various methods to manage the risk and to mitigate against any negative impacts. One method is the use of 'cover' crops which attract other organisms which control the pests:

*"Pests are a particular problem because....because for mildews you spray fungicides, to get rid of pests you have got to spray pesticides. And they are a completely different kettle of fish. And you would rather not be spraying pesticides if you can help it." "It impacts on .....the fruits, humans and everything else, all the other little bugs. We generally don't like a sort of a scorched earth style of viticulture so we let things grow, so we use very*

*little herbicides or pesticides. We use cover crops natural cover crops, so our vineyards can look a bit tatty." "These are ..... well beneficial to weeds, some weeds are lot better than others." "They can keep other .... they allow other organisms to grow which can control the pests" (Participant 7).*

Another method was to spray with insecticides for pests. For stem-borer, when damage is detected, it is best to expose the pest by sawing through affected wood sections and destroying the adult larvae, cocoons and pupae (Wineland Media, 2013). To manage the snout beetle insecticides are used (Wineland Media, 2013).

A management tool to manage the mealybug risk was mentioned by Participant 10, who used ladybird beetles (*Cryptolaemus*) and parasitic wasps (*Coccidoxenoides perminutus* and *Anagyrus pseudococci*) as a tool:

*"We pioneered the use of biological, the first use of biological control in the wine industry was for mealybug. We released two parasitic species of wasps and ladybirds in their gazillions. The two wasps, the one's name is Perminutus and the other one is Anagyrus. We buy them in egg form and they hatch in the vineyards, the ladybirds we buy in adult form. We release them literally in their thousands, every season."*

*They (impact on the mealybug) do it like you cannot believe .....they work 24 hours a day ..... the wasps are hunter predators. All they do is hunt the mealybug. They don't strike, they don't sleep, they just hunt." "They are specific to mealybug. They go through lifecycles through a year and there is always something for them to do."*

*"Some of the wasps will attack all four cycles, the ladybirds only attack crawlers and female adults. The Anagyrus attacks just the one crawly ..... it lays its eggs inside the caterpillar and it hatches inside the caterpillar" (Participant 10 and Wineland Media, 2014).*

- **Fire** – Participant 7 noted that firebreaks were used to manage the spread of a fire and to mitigate against the risk of fire. However, if the conditions were extreme (dry and windy), they were of limited effectiveness against a major fire. He recounted the loss of a quarter of his crop in January 2016 to a major fire. He noted the only tool to use to minimise the impacts of this risk: *"Fire breaks. You just gotta plan a bit better but when you get a big fire, they can hop over the fire breaks."*

- **Baboons** – Two participants noted this risk and how destructive these creatures (they are protected species) can be. Both noted that, while electric fences were a deterrent, unfortunately the animals were prepared to get an electric shock from the fence in order to get access to food from the vines. Both participants noted that the most practical way of handling the animals was to chase them away. Participant 6 stated that the only way his farm managed them was to employ a full time baboon chaser who patrolled the perimeter of the farm on a quad bike.

(c) **Infrastructure**

- **Irrigation** – A representative from each of the five participating wine producers noted that they used irrigation to water their vines. The effective use of an irrigation system was vital, as was water conservation and following recycling protocols. This was to protect the water resources. It was also important to continuously monitor the efficacy of the irrigation system to eliminate blockage or breaks.
- **Electricity supply** – Two of the participants who noted this risk stated that the best management strategy against the risk of power losses was a stand-by generator, but the downside of this was the outlay cost and the high running costs.
- **Land** – Neither of the two participants who noted this risk stated any actions to manage or mitigate against potential loss of land for other purposes.

(d) **In-process**

Six participants noted the risk of poor in-process controls and not following systematic procedures and practices. The producer is dealing with an organic product where no grape crop is ever the same as another, therefore the wine making process is a dynamic one where adjustments and corrections can be made to ensure the production of the required wine. The wine making processes must result in a wine product that is consistent with previous vintages from the point of view of flavour and style. Various participants noted the importance of this issue.

Scientific wine analysis methods provide valuable tools for understanding a wine's deficiencies and excesses. The analysis of pH, for example, is important due to its direct influence on wine colour and biological stability and indirectly on taste and age-ability.

Such information can help prevent potential problems and thus improve wine quality significantly (Brsquared, 2018).

The risk can only be handled through constant and continuous management of the wine making processes and environment and through monitoring and testing key attributes within the process, adjusting and correcting when necessary. Management of this risk is through process control issues such as measuring, regulating and controlling temperature, acid, PH, sugar, sulphur dioxide, and malolactic acid (Participants 4, 8 and 10). Other risk management issues included: managing the length of the maceration process (for red wines, the process of soaking crushed grapes, seeds, and stems in a wine juice or must); the monitoring of the fermentation of the wine (brought on by adding yeast to the must or juice); deciding on the length of time the must (juice) remains in a wine barrel; and how often the barrels may be reused.

(e) **Human resources**

The risks under this section are relative to industrial relations, and to the skill of wine making; there are also safety risks and the risks presented by theft and damage from employees or people in the community. The management of these risks is as follows:

- **Industrial relations** – All five the participating wine producers noted that they have placed considerable management focus on equitable remuneration and working conditions. They also noted varying methods to build good relations and rapport with their employees. This strategy aimed to ensure no possibility of strikes or other types of industrial action. *"To make (the workers) part of the family, it's quite important"* and *"to pay them more and ....with an aggressive training strategy this year and develop a growth plan for key staff member in the business"* (Participant 2).

One participant noted a strategy to pay his employees well and to incentivise them.

*"Ja, I pay them well. They are the core of our business. I also changed the use of contract staff for harvest, so we use our own staff. It means that they really pull some good efficiencies so we pick with relatively not that many people."* He explained the strategy of moving away from using contract labour. *"Well the casual gets there in the morning, he has never met you, he does not know what your business is, and he does not care how he picks. But my staff at (wine producer name mentioned) if they get performance bonuses*



*and they are measured throughout the year, the quality of the pruning, the quality of their pick is good. There is a star system and you start with 100% bonus if they put a bunch of grapes in a picking basket and it is not good enough for a fruit bowl in a house somewhere in the world then they are in trouble. So they are encouraged to make sure that we get the very best fruit. And it's their work. If they spend an entire 12 months getting to that point, they know that have one opportunity to just put it to bed. Give us the best chance to do something with the grapes, so no we have got a very hard working viticultural division, their efficiencies they put out I think our industry best level. They are really good. They are extremely efficient, they work hard, it helps when you have got years of service, so a lot of them, I mean in the cellar the average time of service is about a decade. And that helps a lot" (Participant 10).*

- **Skills** – Participant 10 noted that the retention of key staff was important and this was achieved by paying them and generally ‘looking after them’. *"We look after them. The worst thing for a vineyard if you want to destroy a good property is change the winemaker or change the viticulturist just a few times over a short period of time. I guarantee it will drop a number of pegs because a lot of the intellectual capital is lost" (Participant 10).*
- **Safety** – The three participants who noted this accident risk confirmed various management actions to prevent injury to employees. These included safety training, ensuring compliance with all laws and regulations and the creation of and compliance with safety policies and procedures.  
*"We have very strict internal protocols that I have set up and there is training before each harvest. But there are responsible people that are designated pre-vintage and then around things like emptying tanks and operating the press. They are very precise step by step protocols that have been put up in the cellar. Other than all the overriding labour law regulations" (Participant 10).*
- **Theft and damage** – Neither of the two participants who noted this risk stated any particular management steps to reduce or eliminate it.

This ends the section which describes the management strategies and methods used to manage the risks identified by the participants under the *make* theme and its activities. The next section examines the risk under the *deliver* theme.

#### 5.4.4 Risks: Theme 4 – Deliver

This theme reflects the risks within the *deliver* theme. This theme includes risks raised by the participants associated with the selling and delivery process, including warehousing of the finished wine, invoicing/sales of the wine, transportation of the wine to the distributor and after sales service. Table 5.10 below indicates the sub-themes and the codes with this risk theme.

**Table 5.10: Theme 4: Deliver**

Theme	Sub-themes	Code
Theme 4: Deliver	Revenue	Sales-revenue, costs
	Customers	Bad-debts, demand
	Inventory	Stock-holding, damage, delays

##### 5.4.4.1 Risk identification

The participants noted three sub-themes under the *deliver* theme. These risks related to the deliver or sales side of the supply chain, including: risks affecting sales revenue (sales margin) and rising costs; market risks relative to the customers of bad debts and meeting customer demand; and inventory risks through damage to inventory or on time delivery to customers. Table 5.11 details the participants who raised the issues under this risk theme of deliver.

**Table 5.11: Theme 4: Deliver risks per participant**

<b>THEME 4: DELIVER</b>	<b>W1</b>		<b>W2</b>			<b>W3</b>	<b>W4</b>		<b>W5</b>	
<b>Sub-theme and code</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>	<b>P5</b>	<b>P6</b>	<b>P7</b>	<b>P8</b>	<b>P9</b>	<b>P10</b>
<b>(a) Revenue</b>										
Sales-revenue		✓	✓		✓	✓	✓		✓	
Costs						✓	✓		✓	✓
<b>(b) Market</b>										
Bad debts		✓	✓		✓	✓	✓		✓	
Demand					✓	✓			✓	✓
<b>(c) Inventory</b>										
Damage									✓	✓
Delays	✓							✓		

The revenue risk sub-theme has two risk aspects, being sales revenue and high and increasing costs.

**(a) Revenue**

- **Sales-revenues** – This is a key risk as six of the participants identified a number of risk issues regarding sales revenue:
  - There may be relatively low selling price increases in the local market versus inflationary costs increases (margins under pressure). While the participants stated that they are increasing selling prices annually, these were generally at a level below the inflation level. This was because the competition for wine is very strong in South Africa. In the existing economic climate, the local wine consumer was looking for the best quality wine at the lowest price.

*"The biggest thing is that there is such a lot of competition out there and the other risk is obviously with consumers being under threat or pressure right now with*

*economic conditions, the buy down so they are not willing to buy better quality at a higher price. They are looking for OK or good quality at the cheaper price. Our intention has always been improve your packaging, make sure you are consistently delivering a good quality product and then people will buy it over time" and "So we for instance .....I mean I was amazed this year, that with the drought (and lower production volumes) people had the opportunity to increase their prices by 10 to 15%, if not 20%, and yet what I saw in the market these is 5, 6, 7, 8% price increases which was absurd to me. The biggest risk is ultimately farmers are pulling out their vineyards, because it's not economical and that's been happing for ten years now"* (Participant 9).

- In the export market, most of the producers were selling in the currency of the customers, being the 'hard currencies' of the Euro and US Dollar, and in those markets it was extremely difficult to put through Euro or Dollar price increases. *"So once you have attained a level where your product is selling at level what it is worth what it's being sold for then I think you are entitled to put your prices up by a certain amount every year. But then it also market dependent. In SA we can put up our prices by 4,5 to 7% every year while you can't do that in the USA because it's like a 1% inflation environment. They are not used to a 4,5% increases"* (Participant 2).
- Export sales revenues may be affected by rand volatility (exchange rate risk on exports). *"Foreign exchange is probably on the sales side, maybe on the exports .....we .....with the stronger Rand we have lost quite a bit of money"* (Participant 9).
- There may be difficulty in moving the price point of wines upwards once the product and the price point on the product is established in the marketplace. The price point is the price of a wine product as determined and set against other competing wine products. When a price point is set for a wine it is difficult to substantially move away from this price. This difficulty was identified by Participants 2, 3, 6, 7 and 9.

Participant 3 explained how pricing and the price point was established when they started out wine producing in 1999: *"What (price) should you pitch? You can't be a (Premium wine brand label named) and you can't be this and you can't be that. And it was one of these super gods in the wine industry that said to us .... you got to pitch*

*yourself here. And we duly did. You cannot get out of that. It is very, very difficult once you have pinned where you are."*

Participant 5 explained the issue further: *"It takes a lot of marketing. Say our range is R110 rand and all of a sudden we bring out a bottle of wine for R500 because we spent a lot of money into it .....everything new oak .....we dropped the yield down to 5 tonnes per hectare and chucked all the loose ends away and all these things, now you get to R500. There are some guys who will appreciate it and obviously went ..... there is R500 bottle of wine out on the market .....they will go and have a look at it. The average guys say ..... I can buy at R50 why pay R500? But to get to the market ..... to get that R500 into the market is a hell of a lot of marketing. And you have to throw a lot of money to pitch it there."*

- **Costs** – Four participants noted the risk of high and increasing logistics and selling costs.

Participant 10: About logistics costs: *"Yeah well, I find them high. Because we have been doing it for a long time, we kind of keep it in a band. We manage to keep it in a band that we kind of look at regularly. Yeah, we are always looking at ways to watch those logistic costs. I think one of the big things. You talk about selling on FOB basis. FOB cost is a big part, a very big part for selling for wineries. They often don't see it. That many wineries don't see it and they often don't break it out. So it's one factor that we are regularly looking at because there are a lot of minimums in pricing FOB. FOB we estimate as generally 2,5% of our revenue will be on FOB costs. Which is pretty high, but if you look, a lot of wineries are spending a lot more than that."*

**(b) Market**

The customer risk sub-theme includes two risk issues, namely, bad debts and sales demand.

- **Bad debts** – This was a significant risk issue for all the participating producers and was highlighted by all participants who interface with the customer (six participants in total). In the local South African market, some of the producers sell to bigger distributors such as Makro and Woolworths and also sell directly to restaurants and other smaller customers. This increased the risk profile in the local market. Three participating producers noted a bad debt experience in the export market.

Participant 9: *"We carry the book, so we carry the risk. Look my background is financial, I'm CEO or MD or to a great extent I fulfil the function of financial director as well and monthly I sit with the financial manager and the lady that's doing the debtors and we go through the list and look at that. We had some bad debts, it's very much part of the industry, typical restaurants, opening up and closing down. But thus far we have been very lucky, except for one big hit three years back that .....it was one of our agents that took our money....."*

- **Demand** – This risk category includes the issues of the risk of achieving sales volumes in an environment of variable local demand, smaller orders and the emergence in the market of the demand for craft gins and beer as an alternative to wine. It is noted that the variable local sales demand sometimes led to stock run outs. This risk has a link to the forecasting risk noted in the *plan* theme. Four participants identified this risk.

Participant 6: On managing demand and supply: *"Yeah well that's a very, very hard thing. I am still trying to figure that. It's one of the biggest challenges. It's always the wine you have is not the wine they want and the wine that you are short of is what they want."*

(c) **Inventory**

There are two risks under this sub-theme, namely, inventory damage and delivery or supply delays.

- **Damage** – This risk relates to damage in the warehouses or during shipment to the customer. Two participants identified this as a relatively minor risk.
- **Delays** – This risk includes delays in delivering wine to the customer due to strikes, weather or road closures, including road closures brought about by community action in service delivery protests and demonstrations. Two participants identified this as a relatively minor risk.

This ends the section which describes the risks identified by the participants under the *deliver* theme and its activities. The next section explains the ways in which the participants manage the risks to minimise the negative impacts of these risks on their operations.

#### 5.4.4.2 Risk management

The identified *deliver* risks were presented in the previous section. These risks are relative to costs, nature, infrastructure, in-process and human resources. In this section, the producer's ways of managing this risk are explained:

##### (a) Revenue

- **Sales-revenues** – Five participants identified pricing issues and the fact that selling prices are not increasing at the same rate as inflation. The participants noted that this presents as a major risk. They noted that their pricing strategy in the local market was to put their prices up each year, but generally this was below the level of the increase of inflation, as competition was very strong.

In the export market, three participants noted that they sell in the domestic currency of their customers with price increases in these currencies generally not being acceptable. This had been an issue for the producers as the volatility of the Rand over the past two years had proved problematic. This is seen in the Rand dollar exchange rate at various times (XE Currency charts, USD/ZAR Chart, 2018):

All to the US dollar =	15 February 2016	=	R15,72
	11 August 2016	=	R13,28
	12 November 2016	=	R14,39
	18 March 2017	=	R12,73
	13 November 2017	=	R14,40
	15 March 2018	=	R11,77
	15 June 2018	=	R13,45

The local and export pricing issues placed margins under pressure with little that the producing participants could do to manage this problem/risk.

The difficulty in moving the price point of wines upwards was noted as a risk. One producer noted that the only way to move the price point upwards was to justify it on the basis of having received international recognition through awards. This was a costly exercise that took considerable marketing effort. On moving the price point: *"So you can chose to do whatever you want, but the problem is when you started to move yourself up is really ..... it's based on awards, marketing whatever asset you can use to move it back. Obviously if*

*you get a five star platter if you get an international gold award, .....obviously yes .....people's demand on your wine is greater and yes you can" (Participant 2).*

- **Costs** – Four participants noted the risk of high and increasing logistics and selling costs. Participant 6 noted that the way to manage this issue was to constantly monitor and manage the freight costs, negotiate wherever possible and balance the size of the shipment with the transport costs. He noted that the very small consignments (one case at a time) were very costly in comparison to the value of the sale involved. Participant 10 noted that on export consignments customers could not order case loads but were restricted to buy only pallet loads.

**(b) Market**

The strategy to manage the risks is as follows:

- **Bad debts** – This is a significant risk issue for all the participating producers and has been highlighted by all participants who interface with the customer (six participants in total). Two participants noted that they managed this risk through the tight control of their debtors' book by constantly reviewing and keeping their debtors within their credit limits. They also noted that, by keeping close to their customers, they to know about the customers' business and their successes and failures. This could help, to a degree, in keeping informed on negative issues that can impact on the credit terms or the profitability/liquidity of the customers.
- **Demand** – This risk category includes the issues of the risk of achieving sales volumes in an environment of variable local demand, smaller orders and the emergence in the market of the demand for craft gins and beer as an alternative to wine. No participants noted any ways to manage this risk. However, two participants noted the importance of sales promotions of their brands

**(c) Inventory**

This risk includes the issue of damage to wine stock while in store and the delays in delivery of wine to the customers. Neither of the participants who noted this risk stated any ways to manage it.



This ends the section which details how the participants manage the risks under the *deliver* theme and its activities. The next section examines risks under the *returns* activity of the supply chain.

**5.4.5 Risks: Theme 5 – Returns**

The *return* theme includes all issues around product return for any reason such as quality problems, excess stock not required by the customer and account non-payment.

When asked probing questions about the activity of returns, the participants noted that such returns of product rarely if ever occurred in their environments. Therefore they did not consider that there was any risk in this area.

**5.4.6 Risks: Theme 6 – Enable**

This section examines the risks identified by the participants under the *enable* theme and its activities. This enable theme includes all risks within the support, design, planning and execution processes of the supply chain.

**5.4.6.1 Risk identification**

The participants noted two sub-themes within the enable or management activities. These relate to the financial management aspects of the supply chain and fall into two categories of profitability and cash-flow. The risk summaries are seen in Table 5.12 below.

**Table 5.12: Theme 6: Enabling or management activities**

Theme	Sub-themes	Code
Theme 6: Enable	Financial	Cash-flow, profitability

Table 5.13 details the participants who raised the issues under this risk theme of *enable*.

**Table 5.13: Theme 6: Enable risks per participant**

THEME 6: ENABLE	W1		W2			W3	W4		W5	
Sub-theme and code	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
(a) Financial										
Profitability						✓	✓		✓	
Cash-flow		✓	✓			✓	✓		✓	

**(a) Financial**

The financial risk sub-theme includes the three risk categories of cash flow, and profitability.

- Profitability** – All five of the participating wine producers were profitable and anticipate that they will continue to remain so (Participants 2, 3, 6, 7, and 9), but three noted concerns that profitability was decreasing. They confirmed that the sustainability of many of the South African wine producers are under threat due to overall financial pressures, as stated in the Price Waterhouse Coopers report (2013:38). *"I think return on investment [in the wine industry] or return on equity is marginal in SA. It's very low because you almost ..... most of the wine farms you get your 15%, the other 85% survive basically. There is probably another 30% which just break even and are sometimes profitable, sometimes not, and so on"* (Participant 9).

The three participants noted that input costs were increasing annually, in line with or above the South African inflation level (see section 5.4.3.1 (a) costs) with selling prices under pressure (section 5.4.4.1 (a) revenue), and that this was placing pressure on profitability. Protecting the profitability of the operation from this risk was vital (Participants 6, 7 and 9).

*"Our biggest risk to our business is cost control because of this, the inflationary pressures in South Africa, the inflation of labour. That's our biggest risk that we have. And if you look at internationally because it goes back to this idea that it is an export driven business that we don't have the inflation in the overseas markets that you do here .....so wine prices*

*have been very, very sticky over the last 20 years i.e. they have not have not had inflation. And that's a very big challenge to maintain profitability"* (Participant 6).

- **Cash flow** – This is a key risk and was identified by five participants. As mentioned in section 5.4.1.1(a), the supply chain of wine is a long one, meaning that an investment in one year could take three to five years to show a return. Therefore, considerable cash resources are absorbed by the supply chain with cash flow returns only occurring when the debtor pays for his wine, which could be between 30 to 90 days after delivery. This means the wine producers needed considerable cash resources injected through investment and perhaps through short term borrowings such as overdrafts (Participants 6, 7 and 9). The financial institutions were very concerned about the wine industry and the extension of credit. *"But the wine business is an inherently risky business. Because it costs a lot to invest in a vineyard, it costs a lot, especially if you are making red wine to carry that cost. But that feeds into the risk of things of you know handling the product that can off go off because you've got to keep it. You know you have three years of maintaining it, it's a very long time in the storage of that, so because there is inherent risk in that, that if you have an issue we can really impact on your, on your cash flow"* (Participant 6).

In response to a probing question of whether cash flow is a significant issue, the reaction was: *"Huge. Cash flow the implication is astronomical and also again people don't understand that because they deal with the big guys and then they deal with us"* (Participant 3).

Answering a probing question about planting a new vineyard, Participant 9 stated: *"But you could only plant it if you are going to get the return you know, .... and at that price point you are not going to sell unlimited volumes so you can effectively ... what is critical is that you produce what you can sell. That's ultimately is ..... otherwise cash is the biggest challenge, ... cash flow ultimately, ... how do you manage cash? ... anything you bottle is a huge investment that you put into bottles."*

This ends the section on the risks within the *enable* theme. The next section explains the risk management strategies to minimise the impact of these risk on the supply chain.

#### 5.4.6.2 Risk management

The identified *enable* risks were presented in the previous section. In this section the producer's ways of managing this risk are explained:

- **Profitability** - All five of the participating wine producers noted that, while they were profitable and anticipate remaining so, the wine industry was a risky enterprise with profitability under threat. Various participants noted their focus on a number of management strategies to ensure the financial sustainability of their operations:
  - Managing and controlling costs and cost increases from suppliers of goods and services. The higher cost of bought out grapes due to the drought and labour costs increases were of particular concern. There was little that could be done to eliminate these risks. The management of logistics costs was vital to the cost containment drive. This included managing optimum size of stock consignments.
  - Keeping their employee complement at a fixed or constant level – This would aid in keeping employee costs down. One participant noted that labour made up 40% of his costs (Participant 7).
  - Ensuring good employee relations were maintained through fair and equitable management practices and principles
  - Maximising sales revenue by increasing selling prices wherever and whenever possible
  - Strictly managing their wine making processes to ensure a consistent product that met the customers' requirements
  - Promoting their brands as much as possible, although there were budgetary/cost limitations.
- **Cash flow** - This is a risk identified by five participants. Four of the five participants noted that tight and appropriate control of cash flow was essential. This includes tight control over their debtors' book. This can protect the business and its cash resources.

This ends the section on the strategies used by the participating wine producers to manage the risk and brings to a conclusion the risks identified by the producers and the methods used to minimise the impact of the identified risks.

## **5.5 CONCLUSION**

This chapter has focused on the analysis of the research data of the study. The chapter started with a brief overview of the participants, which was followed by a brief summary of the attributes of the participating producers and then the key risks designated by the participants and the strategies the participants use to manage these risks were identified. This chapter answered the primary and secondary research question of this study

Chapter 6 will conclude the dissertation with a reflection of the objectives of the study and the findings, ending with recommendations arising from the study.

## **CHAPTER SIX: SUMMARY, RECOMMENDATIONS AND CONCLUSION**

### **6.1 INTRODUCTION**

Chapters One to Five of this study covered the research questions and the objectives of the study, and a literature review was conducted and detailed in Chapters Two and Three. Chapter Two explained the global wine industry, the South African wine industry, and provided information on the Stellenbosch wine producing area, including the developments, changes, and challenges in the industry. Chapter Three outlined the concepts and objectives of supply chain management, as well as the stages, processes and activities of the wine supply chain, and then explained risk, supply chain risk and elements of risk within the supply chain. The issues and challenges within the South African wine industry were also explained. Chapter Five presented the data analysis and the findings.

In this chapter, the research questions, purpose of the study and the objectives will be revisited. This will then be followed with a summary that links the study objectives to the data analysis and findings. The study objectives will be discussed and aligned to the empirical data analysis and findings. The main research question will be answered. The chapter continues with recommendations and the limitations of the study. The chapter will then end with areas for future research and a conclusion.

### **6.2 THE RESEARCH QUESTION, RESEARCH PURPOSE AND OBJECTIVES**

#### **6.2.1 The research question**

The main research question of this study as posed in Chapter One is as follows:

*"What are the supply chain risks that threaten the sustainability of wine producers in the Stellenbosch area and how are these identified risks managed?"*

#### **6.2.2 Research objectives**

The main aim or objective of this study is to determine what the supply chain risks experienced by the wine producers are in the Stellenbosch area.

The secondary objectives were to:

1. Examine the methods or strategies that the Stellenbosch producers use to manage the supply chain risks that have been identified.
2. Make recommendations as to how the Stellenbosch wine producers can better manage and overcome their identified risks.

### 6.2.3 Linking the literature study and objectives to the data findings in the study

A literature study was undertaken to explore the South African wine industry in the context of the global wine industry and the topic of supply chain risk, which formed the base for the empirical study.

The data from the interviews of the participants in the study comprised the primary data together with field notes taken at the time of the interviews, which give some context to the interviews and support for the interview data. This was explored in Chapter Five.

Table 6.1 links the literature review of supply chain risk explained in Chapter Three to the primary findings on risk as outlined in Chapter Five. Columns one, two and three list the actual risks identified by the wine producers in Chapter Five, while column four links this risk to the supply chain risk element as described in the literature review in Chapter Three.

**Table 6.1: Linking the literature review of supply chain risk to the findings on risk**

Theme	Sub-themes	Risk code	Risk element per literature review
<b>Theme 1 - Plan (section 5.4.1)</b>	5.4.1.1 (a) Demand versus supply	Forecasting	3.5.4 (1) Demand and supply planning risks.
		Planning	3.5.2.2 (3) Risk of not being agile and flexible.
	5.4.1.1 (b) Investment	New vineyards	3.5.4 (2) Capacity planning risks
<b>Theme 2 - Source (section 5.4.2.)</b>	5.4.2.1 (a) Bought out grapes	Drought	3.5.1 (7) Price and cost risk <i>and</i> 3.5.1 (3) Risk of a shortage of a key material.
	5.4.2.1 (b) Dry goods	Costs	3.5.1 (6) Foreign exchange risk <i>and</i> 3.5.1 (7) Price and cost risk.

		Supply	3.5.1 (15) The risk of delivery delays <i>and</i> 3.5.1 (11) The risk of supply problems.
		Quality	3.5.1 (12) Risk of poor quality of goods or materials supplied.
<b>Theme 3 - Make (section 5.4.3)</b>	5.4.3.1 (a). Costs	Costs	3.5.1 (7) Price and cost risk.
	5.4.3.1 (b) Nature	Drought, Picking, Disease, Wind/hail/frost, Pests, Fire, Baboons	3.5.3 (2) External hazard risks.
	5.4.3.1 (c) Infrastructure	Irrigation	3.5.2.2 (4) Risk of equipment and machinery failures 3.5.2.2 (5) Disruption to the supply of water and electricity.
		Electricity	3.5.2.2 (5) Disruption to the supply of water and electricity.
		Land	3.5.3 (7) Risks brought on through legislation and regulations.
	5.4.3.1 (d) In-process	Controls	3.5.2.2 (1) Poor process controls 3.5.2.2 (2) The risk of operational failure.
	5.4.3.1 (e) Human resources	Industrial-relations	3.5.2.1 (4) The risk of industrial action.
		Skills	3.5.2.1 (9) The risk of not being able to find, attract and retain employees.
		Safety	3.5.2.2 (8) The risk to the occupational health and safety of employees.
		Theft/damage	3.5.3 (3) Risk of crime.



<b>Theme 4 - Deliver (section 5.4.4)</b>	5.4.4.1 (a) Revenue	Sales-revenue	3.5.4 (3) Risk of loss of a customer 3.5.1 (6) Foreign exchange risk.
		Costs	3.5.1 (7) Price and cost risk.
	5.4.4.1 (b) Market	Bad-debts	3.5.1 (10) Risk of customer failure 3.5.1 (4) Liquidity risk.
		Demand	3.5.4 (3) Risk of loss of customers 3.5.4 (1) Demand and supply planning risks.
5.4.4.1 (c) Inventory	Damage / Delays	3.5.1 (15) Risk of delivery damage.	
<b>Theme 5 - Return (section 5.4.5)</b>	Nil	Nil	Nil
<b>Theme 6 - Enable (section 5.4.6)</b>	5.4.6.1 Financial	Profitability	3.5.1 (1) Risk of poor financial performance 3.5.1 (7) Price and cost risk.
		Cash-flow	3.5.1 (4) Liquidity risk.

Source: Compiled by the researcher (2018)

Linking the primary and secondary data with the objectives serves as a confirmation that the study objectives have been achieved in order to answer the risk question. Table 6.2 reflects this linking. Column one lists the study objective, column two the finding or risk theme identified in this study and column three the applicable section within this study where the risks were described.

**Table 6.2: Linking the objectives to the findings and relevant sections**

Objective	Finding	Applicable section
1. To identify the supply chain risks experienced by the wine producers are in the Stellenbosch area	<b>Identified risks</b> Plan risks Source risks Make risks Deliver risks Return risks Enable risks	5.4.1.1 5.4.2.1 5.4.3.1 5.4.4.1 5.4.5 5.4.6.1
2. To examine the methods or strategies that the Stellenbosch producers use to manage the supply chain risks	<b>Risk management</b> Plan risk management Source risk management Make risk management Deliver risk management Return risk management Enable risks management	5.4.1.2 5.4.2.2 5.4.3.2 5.4.4.2 5.4.5.2 5.4.6.2
3. To identify and suggest solutions as to how the Stellenbosch wine producers can manage or overcome the supply chain risks	Recommendations	6.3.3

Source: Compiled by the researcher (2018)

It is clear from Table 6.2 that the objectives were addressed in the study. The next section will continue with the discussion and the conclusion of the objective of the study. This will be followed by recommendations of ways the producers can better manage or overcome their supply chain risks.

## **6.3 DISCUSSION OF THE RESEARCH OBJECTIVE**

### **6.3.1 Research objective 1**

*To identify the supply chain risks experienced by the wine producers in the Stellenbosch area.*

The first objective of this study was to identify the supply chain risks experienced by the wine producers. The main research objective was met through the interviews with the participants from five wine producing estates where they explained the supply chain risk faced by their operations. A summary that confirms that objective one has been achieved is outlined below, in five broad risk groups:

The first two key risk groups identified by the individual participants are risks around the agricultural and the wine producing activities and the need to monitor and manage these areas, as best as possible.

**1. Key risks due to the impact of nature on vine and grape growing (including bought out grapes from third parties)**

The greatest number of risk codes – seven individual codes (drought, picking, disease, wind/hail/frost, pests, fire, and baboons) – were identified under the *nature* sub-theme, and these focused on the risks associated with the agricultural activities at the wine producer (section 5.4.3.1 (b)). These risks are of an external hazard nature (section 3.5.3) and thus beyond the direct control of the producer. Such risks are:

- ***Drought*** – A key risk issue that was raised by 6 of the 10 participants was the *drought* and its impacts (section 5.4.3.1 (b)), which should be read in conjunction with the risk of problems with effective *irrigation* (section 5.4.3.1 (c)). The ability of the vines to receive sufficient moisture is seen as a critical element of the Stellenbosch wine supply chain. Even though all the producers have dams, use irrigation and have other water resources (participating producers 1 and 4 have underground water resources and a stream respectively), the drought still impacted on the wine crop, with three of the five producers naming the drought conditions as having negatively affected their crop yield. While the yield might be lower due to water issues, a smaller yield does not generally affect the quality of the grape berry or of the wine that is produced from it.

The impact of the drought was also noted as affecting overall grapes yields within the Stellenbosch wine community, impacted on the available volume of *bought out grapes*, creating a supply shortage and raised the price of these grapes (section 5.4.2.1 (a)). This has particularly impacted on the producers who buy out a portion of their

grape requirements for wine production. This risk issue under bought out grapes is also noted under the financial risk issues (section 3.5.1).

- **Picking** (section 5.4.3.1 (b)) – The next important risk, noted by 6 participants, was of picking the grape crop at the wrong time (over or under ripe) and in the best temperature conditions. This is generally when the ambient temperature is the coolest. The risk of getting this wrong can lead to a wine that does not meet the wine producer's requirements of a product that is consistent with previous vintages.
- **Disease** (section 5.4.3.1 (b)) – High on the list of risks is the risk of disease, which was also noted by five participants as an important issue, with the impact of this affecting the grape crop. This refers to the risk presented by powdery and downy mildew which can affect the health of the vines and the crop.
- **Pests** (section 5.4.3.1 (b)) – Four participants noted the risk of damage to the vines from pests, most notably the mealybug. One participant also noted the risk of the stem borer which damage the vine trunks and can eventually impact on bud burst, and the snout beetle which can cause serious feeding damage to emerging buds, sprouts and young shoot tips on the vines.
- **Wind, hail and frost** (section 5.4.3.1 (b)) – Five participants noted the impact of wind on the flowers and the vines.
- **Fire and Baboons**. (section 5.4.3.1 (b)) – These risks were also noted by two participants each.

## 2. Risks within the wine making process (in-process risks)

Besides the agricultural (viticultural) risks another key risk that was identified was the maintaining of production *in-process controls* sub-theme during the actual wine making process (section 5.4.3.1 (d)) to ensure the production of a high quality and a product that is consistent with previous vintages in flavour and style. This control risk was highlighted by six of the participants.

Issues included under this risk category are relative to the management of the processes and the impacts that occur if the process is not well managed or gets out of control, and this can lead to the wine being spoilt. Process control issues include the need to measure, control and adjust (if necessary) such issues such as temperature, acid, PH, sugar, sulphur

dioxide and malolactic acid (Participants 4, 8 and 10). Poor control of these issues can impact on the quality of the wine from a point of view of taste, aroma and appearance.

Other issues that need to be controlled and present as risk if they are not, include: the monitoring of the fermentation of the wine (brought on by adding yeast to the must or juice) to ensure proper fermentation and correction if necessary; managing the length of the maceration process in red wines (the process of soaking crushed grapes, seeds, and stems in a wine juice or must) to ensure the correct wine colour and quality; and deciding on the length of time the must (juice) remains in a wine barrel, and how often the barrels are reused, to ensure the desired wine flavours. Again, poor management and control of these issues can result in a substandard wine or a wine that does not match up to previous vintages.

### **3. Financial risk issues**

This covers cost risk and the impacts on profitability of the wine producer, as well as the risk of bad debts and the management of cash resources. Risks that have an impact on the *profitability* (section 5.4.6.) and the long term financial sustainability and of the producers were highlighted in various risk themes and sub-themes. While all the participating wine producers in this study are profitable there were concerns relative to long term profit decline. A 15-20% drop in yield or volume, due to the drought, or any other reason, is extremely difficult for a wine producer to manage. The fixed cost component of the wine producers' operation is significant, and therefore the loss of yield, results in an increase in the unit cost of a bottle of wine. A simple calculation indicates that even if year on year costs remained the same (ignoring inflationary cost increases) a 15% reduction in volume calculates out to a 17% unit cost increase. To compensate for this, knowing that the producer will sell 15% less bottles of wine, the producer would need to increase the unit selling price by at least 17% to make the same profit as he did in the previous year. This will not be achievable as the consumer will not be willing to pay significantly more for a bottle of wine in the previous year.

A key aspect of the financial sustainability of the wine producers is not only their ability to make profits, but also to continue to generate enough cash resources on an ongoing basis to be able to discharge its debts and to collect monies owed to it by its customers.

This is the businesses liquidity (Collins English Dictionary, 2003:950) and it has been included under this broad financial risk group. These risks issues arose in four main areas:

- **Costs** – This key risk arose in the area of the production or make activity (section 5.4.3.1 (a)) where four participants noted concerns about all *costs* rising at a level above that of inflation, but particularly labour and electricity costs. Costs risks again increased on the selling side or deliver side (section 5.4.4.1 (a)), particularly high logistics and selling costs (four participants), and on the source side (section 5.4.2.1 (b)) of dry goods (seven participants), most notably the increasing cost of barrels. Another aspect of this risk was the impact of the depreciating Rand on the cost of the producers' imported purchases. Four participants noted the importance of a constant supply of electricity (section 5.4.3.1 (c)) on their operations and the risk to the continuity of this supply on their cost. A power failure necessitates the use of backup generators with the high running costs associated with this.

The impact of the *drought* on cost risk was also noted as affecting overall grape yields within the Stellenbosch wine community and beyond. This has impacted on the available volume of *bought out grapes* sub-theme, creating a supply shortage and raised the price of the grapes (section 5.4.2.1 (a)). This particularly impacted on the producers who buy out a portion of their grape requirements for wine production.

The poor *quality* and unreliability of *supply* of dry good from local suppliers (section 5.4.2.1 (b)) is included under this cost risk subheading, as both of these risk issues ultimately have a cost implication for the wine producer. The poor quality of many of these goods and the need to import substitutes, in some cases with additional stocking costs, all impact on production costs. Unreliable suppliers and longer lead times also have cost implications for the producer.

- **Sales revenue** – This *sales-revenue* risk (section 5.4.4.1 (a)) was raised by six participants, who were concerned about the impact of the Rand volatility on their sales revenue, as well as their inability to raise their local selling prices at a rate comparable to the rate of cost increases or to compensate for the loss in yield and higher unit costs. An inability to move or alter the price point of their wine in the market, which keeps them in a fairly tight pricing range, was also noted as a limiting factor which impacted on the risk.

- **Bad debts** – Six participants raised the cost risk issue of *bad debts*, with three noting actual bad debts experiences (section 5.4.4.1 (b)). The incurring of a bad debt not only affects the producer's bottom line profit but also the inflow of cash. The first indication of a likely bad debt is the inability of the debtor to pay its supplier which impacts on cash resources.
- **Cash flow** (section 5.4.6.1) – As mentioned in section 5.4.1.1 under the planning section, the wine supply chain is long and consumes considerable cash resources. Many South African wine producers fall within the SMME sector (small, micro and medium business enterprises), including all of the participating wine producers in this study. A study in 2014 noted a failure rate of between 70% - 80% of these businesses and that one of the top ten reasons why they failed was around *cash flow* and cash flow management (Aren & Sibindi, 2014:88). This has a linkage to the bad debts risk as the non-payment of monies owed by debtors significantly impacts on cash flow and profitability of the wine producers.

#### 4. Planning risks

Planning risks include demand and supply risks and new investment risk.

The risk of and uncertainty of matching *demand and supply* was raised by four participants in each of the planning (section 5.4.1.1 (a)) and the delivery themes (section 5.4.4.1 (b)). This risk includes uncertainty regarding what wine types to produce and what volumes to actually grow and produce of the particular grapes. The reasons for this uncertainty include:

- Variable demand and or a variable sales history
- Small customers purchasing patterns
- High level of competition for wine in the South African market
- The emergence of competition in the South African market of craft gins and beers
- Competition from the larger corporate producers with ability to affect buying patterns with high promotional spend
- The drought which impacted on actual production volumes (impacting supply)
- Lack of market information.

This planning risk also impacted on the producers in that the uncertainty about the market *demand* made investing in a *new vineyard*, a risky process (section 5.4.1.1 (b)).

Four participants noted that the wine making business, from growing vines to final maturation and storage of the finished wine was a long one, and took considerable *planning* and coordination. However, due to the variables that the producer encountered (for example, changes in the weather condition such as the drought and temperature), these plans needed to be adapted and changed. The knock-on-effect on processes and activities created risk.

## 5. Human resources risks

Human resources risks refer to section 5.4.3.1 €. This risk grouping covers a number of issues including the potential risk of *industrial action* (five participants), the retention of wine making *skills* (four participants) and the *health and safety* of the wine producers' employees (three participants). The key risk under this category was the risk of potential industrial action.

In conclusion, the five risk points highlighted above are the key risk issues faced by the wine producers and confirm that the main research questions has been answered by this study.

### 6.3.2 Research objective 2

*To examine the methods or strategies that the Stellenbosch producers use to manage the supply chain risks that have been identified in objective 1.*

The producers use certain management methods and strategies to manage the risks as outlined in section 6.3.1. These methods and strategies are explained under the same broad headings in which the risks were detailed.

#### 1. The risks due to the impact of nature on vine and grape growing, including bought-out grapes from third parties.

As noted in Chapter Five, the producers have various management strategies to minimise the negative impacts of the various risks, as follows:

- The *drought* has impacted the wine industry and as explained has affected yields and ultimately costs. Three of the participating wine producers noted the negative impact of the drought on yields. By way of managing their water resources in an attempt to



mitigate against the impact of the drought and as noted in section 5.4.3.2 (b), the wine producers have all taken steps to conserve and recycle water to protect their water resources (dam, streams and underground water supplies) and use *irrigation* to deliver water to the vines.

- **Picking** (section 5.4.3.2 (b)) – To ensure that the grapes are picked at the optimum time, being not overripe or under-ripe, as the picking time nears, the wine producers constantly test the grapes for sugar, PH and acidity; in addition, they use visual inspection and a taste test.
- **Disease** (section 5.4.3.2 (b)) – To mitigate against this risk the producers spray fungicides against mildew.
- **Pests** (section 5.4.3.2 (b)) – One participant noted the use of ‘cover’ crops which attract other organisms to control the pests and others noted spraying with insecticide. A management tool to manage the mealybug risk was raised by another participant who uses ladybird beetles (*Cryptolaemus*) and parasitic wasps (*Coccidoxenoides perminutus* and *Anagyrus pseudococci*) as a tool against the mealybug.
- **Wind, hail and frost** (section 5.4.3.2 (b)) – The wine producers who noted this risk stated that there was not much they could do to prevent damage from these naturally occurring threats. It was not economically viable to insure against such risks.
- **Fire and Baboons** (section 5.4.3.2 (b)) – The producers noted that the way to best manage the risk of fire was through firebreaks. Two participants noted that, while electric fences were a deterrent, unfortunately the baboons were prepared to get an electric shock from the fence in order to get access to food from the vines. Both participants noted that the most practical way of handling the animals was to chase them away.

## 2. **Risks within the wine making process (in-process risks section 5.4.3.2 (d))**

Six participants noted the risk of poor in-process controls and of not following systematic procedures. The participants noted that this risk can only be handled through constant and continuous management of the wine making processes and environment and through monitoring and testing key attributes within the process, adjusting and correcting when

necessary. The wine making processes must result in a product that is consistent with previous vintages from the point of view of flavour and style. Management of this risk is through process control issues such as measuring, regulating and controlling temperature, acid, PH, sugar, sulphur dioxide and malolactic acid (Participants 4, 8 and 10). Other risk management issues include: the monitoring of the fermentation of the wine (brought on by adding yeast to the must or juice) to ensure proper fermentation and correction if necessary; managing the length of the maceration process in red wines (the process of soaking crushed grapes, seeds, and stems in a wine juice or must) to ensure the correct wine colour and quality; and deciding on the length of time the must (juice) remains in a wine barrel and how often the barrels are reused to ensure the desired wine flavours.

### **3. Financial risk issues**

While all the wine producers in this study are profitable, three noted concerns that profitability was declining as they were experiencing various financial pressures. Risk increases because costs are increasing above the inflation rate, with declining yields, difficulties in increasing selling prices to offset the inflationary cost increases and a heavily traded market with competition from other wine brands and alternate alcoholic drinks. Various participants noted that risk management strategies to offset the negative impacts of the financial risks include:

- **Costs** – Cost control strategies to manage this risk include:
  - The tight management and control of make costs, including controlling the size of the staff complement using contract labour wisely and sparingly (section 5.4.3.2 (a))
  - Tough negotiation regarding price increases from suppliers, and the negotiation of purchase contracts for bought out grapes (section 5.4.2.2 (b))
  - Import substitution to offset increasing costs on local goods – The impact of the poor *quality* and unreliability of *supply* of dry good from local suppliers has also been mitigated by using imported dry goods (section 5.4.2.2 (b)). Five participants have internal incoming process checks to inspect dry goods to ensure that the good supplied meet the required quality standards.

- Monitoring and managing logistics cost by managing the size of each consignment, as very small lot sizes (one case of wine at a time) incur high freight costs (section 5.4.4.2 (a)). Participant 10 noted that this meant only selling and dispatching pallet loads versus case loads to any one customer.
- Tight control of selling costs (section 5.4.4.2 (a)).
- **Sales revenue** – Sales revenue can be increased by increasing the selling price of local wine sales on an annual basis (section 5.4.4.2 (a)).
- **Bad debts** – Bad debt is managed by tight debtors control, and the producers having close relationships with their customers, and staying close to them. This relationship knowledge enables the producer to know of any potential danger of such things as failure of the customer (section 5.4.4.2 (b)).
- **Cash flow** – The tight management and control over cash resources, and particularly the debtor book (section 5.4.6.2)

#### 4. **Planning risks including demand and supply risks and new investment.**

The risk of and uncertainty of matching *demand and supply* was raised by 4 participants in each of the planning (section 5.4.1.2.a.) and the delivery themes (section 5.4.4.2 (b)). Various participants noted ways to try to manage this risk and to mitigate its negative impacts by:

- Creating customer loyalty
- Managing the customers' expectations
- Manage stock supply to customers as best as possible
- Having ready access to customers sales history
- Employing the correct experienced sales and marketing staff.

The participants noted that managing the long wine supply chain required considerable *planning* and coordination, with the need for these plans to change as and when necessary. This created risk as the changes often have a significant impact on the planning and timing of the processes. Various participants noted ways to try to manage the risk and to mitigate the negative impact on planning by:

- Doing as much forward planning as possible
- Knowing and understanding past history and practices; recognising the need for changes as early as possible; anticipating the impacts of any changes make; and managing the operation accordingly
- Being flexible and adaptable enough to make changes
- Following precision viticulture practices to try to put as much ‘science’ in the wine making process as possible (see section 5.4.1.2 (a) and section 6.3.3).

#### **5. Human resources risks (section 5.4.3.2 (e))**

The risks included under this heading were the risk of industrial action, the retention of key personnel and the health and safety of employees. Various participants indicated that their efforts to manage against the risk of potential industrial action involved ensuring that their employees were paid and treated fairly and equitably, spending time and effort in training and developing them and ensuring good communication between management and employees. One participant noted the implementation of a bonus incentive programme for employees.

The risk of the loss of key skills was noted. One participant noted that the way to ensure the retention of key skills, most notably wine making skills, was to pay these employees well and to "look after them" (Participant 10).

The participants noted that their strategies to mitigate risk of injury to employees (safety issues) was to have safety protocols (systems and procedures) in place and to manage the work environment in line with these protocols, training all employees on safety practices and methods.

In conclusion, this section summarised the key methods and strategies that the Stellenbosch wine producers use to manage their key supply chain risks. This confirms that the main research question has been answered by this study.

#### **6.3.3 Research objective 3**

The third research objective of this study was to make recommendations as to how the Stellenbosch wine producers can better manage or overcome their identified risks. Four

recommendations are made with the potential to reduce the supply chain risk or to allow for better management of risk. These are detailed as follows:

### **1. A formal risk management appraisal process**

A number of participants in this study noted that the industry is inherently risky, being as it is in the agricultural sector. The importance of risk management and risk mitigation to the activities and processes of a wine producer was noted: *".....And that's why wine making is all about mitigating your risks"* (Participant 6).

It is clear from this study and the response of the participants that they are aware of the risks that they face, and more particularly the unique risks faced by their type of businesses. All the participants were open and honest about these risks, its negative effects and the steps they take to manage these risks. However, all noted the management of the risks is based on past events and experiences, using knowledge of historical occurrences. The negative aspect of this is that the wine producers do not take the time to formally contemplate the future and the potential risks that might present.

However, this is not unique to the wine producers and the wine industry but applies to SMEs in general. SMEs in South Africa do not view the formal management of risk as being important for organisational success (Smit & Watkins 2012:4), despite evidence that businesses that adopt risk management strategies are more likely to survive and grow (Islam *et al.*, 2012:4).

The opinion of one participant is that there was a "certain lack of professionalism" in the wine industry. He suggested that many producers follow historic practices but do not formalise systems and this includes not formally assessing risks and having formal plans to manage the risks. He is of the opinion that a formal process could be beneficial to the wine producers:

*"And I kind of look at it and say well actually what's held back South African wine, the wine industry a bit, is a lack of professionalism and that goes back again to..... like our suppliers and all that ..... to what we demand of them". "They don't give a professional service to us, but it's also going in our own houses, in that we also don't handle some of*

*these things like we should. And we should be doing examinations of things like risk control management ..... and things like that. And I don't think that is negative, I think that is a positive. It leads you to greater, profit and greater profit actually gives you more freedom to do those things that you want to do. So I think it becomes the positive you know. Your positive feedback loop....."* (Participant 6).

This idea of the wine producers undertaking a formal risk management process is therefore a recommendation of this study.

A possible objection to the undertaking of a formal risk assessment and risk management process could be a concern regarding the time needed to do this in view of the fact that the management team at any wine producer is small. However, this process need not be onerous and could be handled in an annual one day risk review session. Such a process, which the wine producers could follow, has been suggested in an article titled "A proposed operational risk management framework for small and medium enterprises" by Naude and Chiweshe (2017).

## **2. Improved management of pests**

Mealybug is a pest that bites the grape vine and passes on the leafroll virus to the plant. Four participants noted pests as a risk, with three of them explaining various methods to manage the risk and to mitigate against any negative impacts. One such method is the use of ladybird beetles (*Cryptolaemus*) and parasitic wasps (*Coccidoxenoides perminutus* and *Anagyrus pseudococci*) as a tool against the worst of the pests, the mealybug (Wineland Media, 2014). This solution is based on the research undertaken in various countries (namely, Israel, USA, Australia) to combat the predators in the citrus industry. South African research in this area had been undertaken by Professor Gerhard Pietersen, based at Stellenbosch University (Participant 10).

Participant 10 noted that, in order to get rid of the problem of the mealybug pest, most producers spray insecticides but that great care has to be taken as to how and when the poisons are administered as these poisons are dangerous to humans and other naturally occurring wild life such as guinea fowl. Another concern was that the pest was developing a resistance to the pesticides. The participant (10) noted that this pest had caused severe

harm to many producers, who had removed whole vineyards due to the damage inflicted and the severity of the infestation. As explained in section 5.4.1.1 (b), the planting of a new average size vineyard is very expensive at approximately R250 000. He stated that the life of a South African vineyard was comparatively short in relation to that of the 'old world' wine producers.

The producer stated that the ladybirds and wasps had been introduced to his wine producing estate over ten years ago:

*"We recently had a seminar in Franschoek about it .....there is a number of reasons, you can't believe .... there is so much good science but the examples are there to see ..... but a lot of the farmers .....especially the guys who just grow grapes ..... the primary producers.....they see it as a hassle to manage them, but it is actually less of a hassle. They see it as a cost factor. It's actually cheaper, once you have control of your vineyard. This farm has along with (name of another producer quoted)..... those are the only farms in the country that have vineyards that are up to 15 years old that are completely virus free, because science has shown over a long period of time that the older your vineyards generally, the better the quality you get. We replace vineyards as a country at 15 to 25 years. Europe as a continent, replaces vineyards 50 to 80 years. So our neighbours are quite happy ..... and there is a well-known estate that has just ploughed up a Shiraz vineyard ..... the vineyard is 12 years old, but because they have virtually no control against mealybug they use chemicals. They spray now and again .....chemically but you can't knock them out chemically because these animals have evolved and they have developed resistance. So people still blindly spray .....and the poison is not good for people either. You need to be very careful how you apply it. So much so that have to apply it in the winter because it kills everything else, it is not selective at all. And there's a lot of ignorance and a lot of prejudice" (Participant 10).*

The participant noted that he had monitored the progress achieved in fighting the scourge of the pest which revealed great success: *"We literally don't find it on our vines anymore ..... on an annual basis if we find three vines out 100 hectares of vineyard, it's a lot. We just don't see it anymore. It teaches you that nature can be way more efficient than you could ever be" (Participant 10).*

While the participant had imparted his knowledge and experience in using this method to various wine producers, he noted reluctance on their part, especially from primary wine producers who were under financial pressure to keep their costs down and felt that the solution was a longer term one that needed monitoring and management. Participant 10 noted the success of the solution and the opportunity for the other wine producers: *"To me it's one of the single biggest opportunities for the industry"* (Participant 10).

It is recommended that the other wine producers investigate this as a natural solution to control the mealybug problem

### **3. Improved viticulture practices to bring more science in vine and grape growing**

In order to take as much complexity, judgment and subjectivity out of managing the agricultural activities and to add disciplines, controls and more objectivity to it, Participant 7 is using 'precision viticulture practices'.

The participant noted that he had "invested" in such practices, following this strategy for a number of years and for a number of reasons:

- The highest degree of complexity is in the area of viticulture due to the fact that a number of issues affect vine and grape growing and, as a consequence, the planning timeframes: *"..... the thing is, it is much more complicated .....the viticulture is. You don't um, you know with wine making you can do something and you get an almost an immediate effect. With viticulture it can take years. And then you don't always know that you are on the right track. In wine, if it suddenly tastes bad then you know you are on the wrong track"* (Participant 7).
- The object was to put more 'science' into the vineyard growing / grape growing and harvesting processes and to reduce the complexity and the risk of managing of the operation.
- It assists with planning the farm but also importantly with the quality of the wine produced: *"That's what we are striving for, ja (better quality wines)"* (Producer 7). To produce quality wine, according to this producer, the focus should be on the vine and grape growing and the harvesting of the grapes: *"The problem is that everyone .....who goes to university to study viticulture and technology, they all want*



*to be winemakers and they don't want to be in the vineyards. The vineyards are much more important than the wine making. But it is not as glamorous .....and outside ..... its dusty, but that where the importance is. Because you cannot make great wine with mediocre fruit. It's just as simple as that. So this is where we should be concentrating"* (Producer 7).

- By using the precision viticulture strategy, emphasis can be placed on the vineyards that are sub-producing in order to take corrective action in order to improve the yields of the vines in those areas and the quality of the grapes produced: *"We practice what's called 'precision' viticulture and these we find very useful because it's quite easy to do the measurements and then pretty soon we will know which blocks are not hitting target and then we try and do something about it"* (Participant 7).
- By using the precision viticulture strategy and processes and focusing the on yield data with appropriate corrective action this helped him to ensure that there was no yield loss from the grape crop versus the previous year. This was in spite of the drought and its impact.

The participant (and owner) explained just a few of the processes involved in the precision viticulture strategy which is followed at his producer estate:

1. **Infrared photographs of each vineyard are taken from the air to understand the condition of the vineyard (state of the foliage) and to take corrective action.** It is important to manage the vineyards so that they are not producing, for example, too much vegetation rather than fruit in order to take appropriate corrective actions to ensure better yields in future: *"So we take ..... viticulture to me is very important (looking into a report and indicating in the report) and then we also do these infrared photographs and we can actually tell, you can see the differences in the ..... and then you try to work out why there are these differences. The red colouring within vineyard foliage "..... it is telling you it that there is a difference in vegetation, it's a vegetative index, so this measures .....so in this case..... (pointing) these ones here are growing more vegetatively than those. This one is clearer you can see the difference there. So this is all part of what we do"* (Participant 7).

2. **The pruning activities are planned to achieve the best grape yield and to adjust accordingly to improve the future yield:** *"You need a balance between what you produce and how much, that's why we do measurements every year after ..... just before we prune, we will have in a vineyard we will have little, we call them 'vakkies'<sup>5</sup> .....or markers between some poles we will just mark it and that will be sort of our test block. And when we pick we will pick that little thing on its own and weigh how much fruit there was. So we say ok there are four vines in this little 'vakkie', we have got 12 kgs of grapes or something like that. And then in the winter we will prune those and weight the mass of shoots that you have taken off and we work out ratios for each thing and there are sort of target ratios of fruit to pruning weights that we are striving for. It's not ..... we are one of the very few people who go to these lengths"* (Participant 7).
3. **Historical records of vineyards are compiled in order to understand historical time frames for growing and picking and to plan accordingly.** This strategy is followed in order to manage future activities and, importantly, to plan the time frame for picking: *"We do reports, (shows bound reports) in every block we do we have management records and what have you. But I think we are probably the only people who do it." "For example, here is ..... (opening report) ..... ok we have this block C3 of Shiraz, we've got our dates of when we had bud break, flowering, veraison<sup>6</sup>, harvest ..... and what have you. I can pretty much ..... and we have got days, it tells me the days from bud burst to 50% ... 51% flowering to harvest, 127 and these things, they are pretty consistent so I can tell as soon as we have got a flowering, I can predict the day we are going to pick this block from this information. I find that useful, some people find it a pain."* (Participant 7).
4. **A process is undertaken in order to know when *actually* to pick the grapes.** The importance of picking the grapes when they are at the 'perfect' time for picking, not over or under ripe, was explained in section 5.4.3.1 (b). Participant 7 explains the process which ascertains whether the grapes are right for picking (the testing of the grapes for acid, PH and sugar, and other testing methods such as the visual inspection and tasting) and how the use of precision viticultural practices has helped with this

---

<sup>5</sup> Small bay; compartment' span

<sup>6</sup> Veraison is the onset of ripening

process: "Well it's an interesting thing, I have a vineyard out here, it looks very even, and about 15 years ago .....and also when you pick ..... generally your sample, you start walking and take every 10th vine..... and you take 4 berries and you walk another 10 paces on the other side .....you take 4 and one from the top .....from this side .....and back, and you come out the block, you mash it all up and then you test it for acidity, ph and sugar .....something like that. But one year I had a student here and I said OK, we took a sample ..... I have all the berries I said they can take each berry and measure on a refractometer, measure the sugar on this, so we had stuff like ..... you got, so this (pointing on page of a report) ..... 18 brix<sup>7</sup> ..... 19 brix .... we plotted the thing and we got a graph sort of going like that (pointing upwards). So there were unripe ones and there were very ripe ones. But we took the median and said ok we wanted to get a 24 brix or something like that .....and in actual fact you had some at 30 and others at 18. So we said well ....what we actually want we want everything perfectly ripe .....and that's when started getting interested in all this sort of stuff and say now this will ..... this can tell in some blocks .....because there is such a big difference, we will actually pick the one section separate to the other. And so it's all a question of getting to learn and getting to know each vineyard block better" (Participant 7).

Question: "And that's actually helped you to make sure that everything is ripe at the same time? So you not got a mixed bag of unripe and very ripe?" (Researcher).

"That's what we like, there are other people who reckon that that's what you need, you need the green and the ripe, but my view is if I have one foot in a bucket of ice water and the other one in boiling water on average I am not comfortable... So I am a stickler for this and that keeps me out of trouble... But ..... well it's a long process, getting to know the vineyard" (Participant 7).

---

<sup>7</sup> For harvesting grapes obtaining accurate sugar measurements is important. A measurement of the sugar content of grapes (must or grape juice and wine) indicates the degree of the grapes' ripeness (meaning sugar level) at harvest. Grape sugar content is usually measured in units of degrees brix with brix being a measure of the percent solids (TSS) in a given weight of plant juice. Most table-wine grapes are harvested at between 21 and 25 brix. (To get an alcohol conversion level, multiply the stated brix by 0,55) (Wine Spectator:2018)

The producer noted that the process he followed of precision viticulture took time, effort and cost but strongly believed that the strategy and its processes had been very beneficial to his planning and managing his producer estate.

It is recommended that this strategy and its processes be investigated for use by other producers. This investigation should include a cost benefit analysis to ascertain that the introduction and use of the strategy would be financially viable

#### **4. Supplier development**

A theme raised by the participants was the poor service offered by their suppliers, especially dry good suppliers. This was in all categories but referred most notably to boxes, labels and bottles. This poor service had two dimensions, namely, long order lead times and the poor quality of the goods supplied. This manifested in disruption to the supply chain and often led to the need to build in additional time to the order process. Both dimensions had negative cost implications for the wine producers.

While all producers stated that they had engaged with their suppliers on the issue, they noted with concern a lack of understanding on the part of the suppliers of the impact of their poor service and quality issues. It is suggested that the producers engage in supplier development initiatives. Lysons and Farrington (2016:599) define supplier development as an activity undertaken by a buying organisation to improve a supplier's performance and/or capabilities to meet the buying organisation's short or long term needs.

This process could involve:

- Formally appraising the supplier performance
- Determining the gap between the current and desired supplier performance
- Reducing this detail into a written and concise summary 'gap' report.
- Meeting with the supplier's management team to discuss the gap report. This engagement should be with the supplier's senior level of management in order to impress upon the management the concern about the gaps between what service is provided and what is required
- Negotiating with the supplier on ways to close the gap
- Setting deadlines for the closing of the gaps,

- Monitoring supplier performance on a regular basis, probably on a monthly basis to begin with.

(Lysons & Farrington, 2016:560)

It is important to the success of this process for the producer to agree with the supplier that, if there are any problems, the wine producer has open access to contact the senior manager at the supplier company to explain the issues and to express concerns. The producer should seek a commitment from the supplier management representative that the problems or issues will be addressed once he or she becomes aware of them.

Key to this could be supplier visits to the wine producer's site to understand first-hand the difficulties and costs to the operation that result from the supplier problems. There are two focus areas for this process: to building relationships and trust between the producer and the supplier **and** educating the supplier about the problems and their consequences.

While these supplier development steps and actions will take some time to establish at the outset, the benefits could become evident in the long term.

This ends the recommendations for this study and addresses the third research objective.

The next section examines the limitations of this study.

#### **6.4 LIMITATIONS OF THIS STUDY**

This research study is limited to one wine producer within each of the five wine route areas of the Stellenbosch wine producing region of South Africa (WOSA, 2017). As a result the findings of the study may not be representative of the whole wine producing region of Stellenbosch, and any conclusions and recommendations made in the study cannot be generalised to the whole Stellenbosch area or other wine producing areas.

The study focuses on the first four stages of the supply chain, from the wine producer to the storage of wine prior to distribution. It does not focus on the selling and distribution side of the supply chain beyond the wine producer.

While a number of risks were identified by the ten participants in the Stellenbosch wine producing area, it is possible that not all of the risks have been identified.

## **6.5 FURTHER RESEARCH AREAS**

While this study identified the risk faced by five wine producers within the Stellenbosch wine producing area, this study could be extended to all producers in the area or to all South African wine producers. This could provide knowledge concerning additional supply chain risks and how the wine producers manage these identified risks.

Two producers highlighted the issue of land risk relating to the threat to the ownership of the land through possible land claims. The findings also noted that more and more land in the Stellenbosch area is being converted from use as vineyards to property development. Although it can be argued that this risk is not part of the supply chain, this element could be investigated through further research as it may become a more serious issue in the future.

## **6.6 CONCLUSION**

The main purpose of this chapter was to summarise the findings of this study as explained in Chapter Five and to confirm that the three research questions of this study were achieved.

The main research question was to identify the supply chain risks experienced by the wine producers in Stellenbosch area, to examine how they manage their risks and to make recommendations on how to better manage the risks was explored by this study. This was achieved by conducting ten interviews with five wine producers. The research was supported through literature reviews on the South African wine industry within the global wine industry and on risk and supply chain risk. This gave depth and context to this research study. Various recommendations were made as to how wine producers can be better manage or overcome their identified risks.

## LIST OF REFERENCES

- African Classical Encounters. 2017. *History of the South African Wine Industry*. [Online] Available at: <http://www.classicencounters.com/winehistory.htm> [Accessed 14 June 2017].
- AgriSA, 2016. *Drought and fires cause loss*. [Online] Available at: <http://www.agrisa.co.za/drought-and-fires-cause-loss/> [Accessed 11 March 2017].
- Anderson, K. & Wittwer, G. 2015. "Asia's evolving role in global wine markets". Working Paper No. 2015/07. April 2015. Australian National University.
- APICS. 2017. Supply Chain Operations Reference Model [Online] Available at: [http://www.apics.org/docs/default-source/scc-non-research/apicsscc\\_scor\\_quick\\_reference\\_guide.pdf](http://www.apics.org/docs/default-source/scc-non-research/apicsscc_scor_quick_reference_guide.pdf) [Accessed 5 March 2018].
- Aren, A.O. & Sibindi, A.B. 2014. "Cash flow management practices: an empirical study of small businesses operating in the South African retail sector". *Risk Governance & Control: Financial Markets & Institutions*, 4(2):87-100.
- Babbie, E. 2016. *The practice of social research*. 14<sup>th</sup> ed. Boston: Cengage.
- Badenhorst-Weiss, J.A., Van Biljoen E.H.B. & Ambe I.M. 2017. *Supply chain management: A balanced approach*. 2<sup>nd</sup> ed. Pretoria: Van Schaik.
- Balestrini, P. & Gamble, P. 2006. "Country of Origin Effects on Chinese Wine Consumers." *British Food Journal*, 108(5): 396-412.
- Benton, W.C. 2014. *Supply chain focused manufacturing planning and control*. Australia: Cengage Learning.
- Berg, B.L. 2007. *Qualitative research methods for the social sciences*. 6<sup>th</sup> ed. San Francisco: Pearson Education, Inc.
- Bezuidenhout, F.A. 2014. *South African producer/co-operative wineries*. Institute of Cape Wine Masters. [Online] Available at: <https://www.icwm.co.za/dissertations/downloadable-dissertations/5-2014-bezuidenhout-francois-south-african-producer-a-co-operative-winerries/file> [Accessed 28 July 2017].

Bisson, L., Waterhouse, A.L., Ebeler, S.E., Walker, S.E. & Lapsley, J.T. 2002. "The present and future of the international wine industry". *Nature* 418(6898): 696-699.

Booyesen, J. 2017. Makers of wine hit by drought. *Cape Times*. [Online] Available at: <https://www.pressreader.com/south-africa/cape-times/20170210/282200830665488>. [Accessed 11 March 2017].

Borders, K.S. & Abbott, B.B. 2011. *Research design and methods. A process approach*. 8<sup>th</sup> ed. New York: McGraw-Hill.

Boyatzis, R.E. 1998. *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks, California: Sage.

Braun, V & Clarke V. 2006. "Using thematic analysis in psychology". *Qualitative Research in Psychology*, 3(2):77-101.

Braun, V. & Clarke, V. 2013. "Teaching thematic analysis: Over-coming challenges and developing strategies for effective learning." *The Psychologist*, 26 (2):120-123.

Brsquared. Improved Winemaking 2004. Winemaking art and science in winemaking. [Online] Available at: <http://www.brsquared.org/wine/Articles/ArtSci.htm> [Accessed 12 September 2018].

Bryman, A. & Bell, E. 2015. *Business research methods*. International 4th ed. Oxford, UK: Oxford University Press.

Camillo, A.A. 2012. "A strategic investigation of the determinants of wine consumption in China". *International Journal of Wine Business Research*, 24(1): 68-92.

Castaldi, R.M., Cholette, S. & Frederick. A. 2005. "Globalization and the emergence of new business models in the wine industry." *International Business & Economics Research Journal* 4(3):21-30.

Chang, C.H., Xu, J. & Song, D.P. 2015. "Risk analysis for container shipping from a logistics perspective". *The International Journal of Logistics Management*, 26(1):147-171.



Chanticleer Wines. 2017. *Harvest information article. When do you harvest wine grapes?* [Online] Available at: [www.chanticleerwine.com/assets/client/File/Harvest-Information-Article.pdf](http://www.chanticleerwine.com/assets/client/File/Harvest-Information-Article.pdf) [Accessed 15 August 2018].

Chopra, S. & Meindl, P. 2016. *Supply chain management: Strategy, planning and operation*. 6<sup>th</sup> ed. Harlow, Essex: Pearson.

City University of Hong Kong, 2017. Chapter Three: Research Methodology. [Online] Available at: <http://www.is.cityu.edu.hk/staff/isrobert/phd/ch3.pdf> [Accessed 21 December 2017].

Cockram, G., Ospinal, M. & Bordas, R. 2016. The European Influence on the global wine industry. *Universidad Carlos III Madrid*. [Online] Available at: <http://madi.uc3m.es/en/international-research-en/markets-and-industries-en/the-european-influence-on-the-global-wine-industry/> [Accessed 16 June 2017].

Collins English Dictionary. 2003. *A dictionary of the English Language*. 6<sup>th</sup> ed. Glasgow: Harpers Collins Publishers.

Collis, J. & Hussey, R. 2013. *Business research: A practical guide for undergraduate and postgraduate students*. 4<sup>th</sup> ed. UK: Palgrave Macmillan.

Creationwines, 2014. The Impact of Oak During Wine Making [Online] Available from: <https://www.creationwines.com/2014/impact-oak-wine-making> [Accessed 13 August 2018.]

Creswell, J.W. 2003. *Research Design. Qualitative, quantitative and mixed method approaches*. Thousand Oaks, California: Sage.

Cooper, D.R. & Schindler, P.S. 2006. *Business research methods*. 9<sup>th</sup> ed. Boston: McGraw-Hill.

EFOW. Vide European Federation of Origin Wines.

Eriksson, P. & Kovalainen, A. 2015. *Qualitative methods in business research: A practical guide to social research*. 2<sup>nd</sup> ed. London: Sage

Esterhuizen, D. & Van Rooyen, C.J. 2017. "An inquiry into factors impacting on the competitiveness of the South African wine industry". *Agrekon*, 45(4): 467-485.

Euromonitor International. 2017. *Wine in South Africa, Country report*. 2017. [Online] Available at: <http://www.euromonitor.com/wine-in-south-africa/report> [Accessed 17 July 2017].

European Federation of Origin Wines (EFOW). 2017. *Our missions and organisation* [Online]. Available at: <http://efow.eu/our-history/> [Accessed on 19 July 2017].

Fawcett, S.E., Ellram, L.M. & Ogden, J.A. 2014. *Supply chain management: From vision to implementation*. 1<sup>st</sup> ed. Upper Saddle River, NJ: Pearson.

Fleming, E., Mounter, S., Grant, B., Griffith, G. & Villano, R. 2014. "The new world challenges: Performance trends in wine production in major wine-exporting countries in the 2000s and their implications for the Australian wine industry". *Wine Economics and Policy*, 3:115-126.

Hallikas, J. & Lintukangas, K. 2016. "Purchasing and supply: An investigation of risk management performance". *International Journal of Production Economics*, Elsevier, 171(4), 487-494.

Heckmann, I., Comes, T. & Nickel, S. 2014. "A critical review on supply chain risk: Definition, measure and modelling". *Omega*, 52:119-132.

Heizer, J., Render, B., Munson, C. 2017. *Principles of Operations Management. Sustainability and Supply Chain Management*. 10<sup>th</sup> ed. New Jersey: Pearson Education.

Ho, W., Zheng, T., Yildiz, H. & Talluri, S. 2015. "Supply chain risk management: A literature review". *International Journal of Production Research*, 53(16):5031–5069.

Hoffmann, P., Schiele, H. & Krabbendam, KJ. 2012. *Uncertainty, supply risk management principles and the impact on performance*. 21<sup>st</sup> Annual IPSERA Conference. Naples, Italy, 1-4 April 2012.

Hopkin, P. 2017. *The fundamentals of risk management*. 4<sup>th</sup> ed. London: Kogan Page Limited.

Hugo, W.M.J. & Badenhorst-Weiss, J.A. 2011. *Purchasing & supply management*. 6<sup>th</sup> ed. Pretoria: Van Schaik.

Hugos, M. 2018. *Essentials of Supply Chain Management*. 4<sup>th</sup> ed. Hoboken, NJ: John Wiley & Sons.

Hussain, M., Chollete, S. & Castaldi, R.M. 2007. „An analysis of globalization forces in the wine industry: implications and recommendations for wineries“. *Journal of Global Marketing*, 21(1):33-47.

International Association of Vine and Wine (OIV). 2016. *2016 Global Economic Vitiviniculture Data*. [Online] Available at <http://www.oiv.int/public/medias/5009/en-communique-depresse-octobre-2016.pdf> [Accessed on 26 February 2017].

International Association of Vine and Wine (OIV). 2017. *2017 Global Economic Vitiviniculture Data*. [Online] Available at: <http://www.oiv.int/public/medias/5686/ptconj-octobre2017-en.pdf> [Accessed 6 September 2018].

International Association of Vine and Wine (OIV). 2018. *State of the Vitiviniculture World Market, April 2018* [Online] Available at <http://www.oiv.int/public/medias/5958/oiv-state-of-the-vitiviniculture-world-market-april-2018.pdf> [Accessed on 6 September 2018].

Institute and Faculty of Actuaries, 2017. Operational Risk. *The Actuary* [Online] Available at: <https://www.theactuary.com/archive/old-articles/part-6/operational-risk/> [Accessed 29 August 2017].

*International Organization for Standardization (ISO)*, 2017. [Online] Available at: <https://www.iso.org/about-us.html> [Accessed 26 February 2017].

ISO. *Vide International Organization for Standardization*.

Islam, A. & Tedford, D., 2012, ‘Risk determinants of small and medium-sized manufacturing enterprises (SMEs) – An exploratory study in New Zealand’, *Journal of Industrial Engineering International* 8, 12.

Italian Wine Central, 2017. *Get into Italian Wine. Top fifteen wine producing countries*. [Online] Available at: [<https://italianwinecentral.com/top-fifteen-wine-producing-countries/>] [Accessed 6 September 2018].

Jacobs, F.R. & Chase, R.B. 2018. *Operations and supply chain management*. 15<sup>th</sup> ed. Berkshire: McGraw-Hill.

Johnson, P.F. & Flynn, A.E. 2015. *Purchasing and supply management*. 14<sup>th</sup> ed. New York: McGraw-Hill.

Kassier, E., Vink, N., Cherry, M., van Wyk, G., Hobson, S., Sefoko, N., & van Rooyen, J. 2008. *Wine Industry Benchmarking Final Draft report*. Department of Agricultural Economics, Extension and Rural Development. Working paper 2008. University of Pretoria.

Kim, Y.J. & Vonortas, N.S. 2014. "Managing risk in the formative years: Evidence from young enterprises in Europe". *Technovation*, 34:454-465.

King Report IV:2016. *Report on Corporate Governance for South Africa, 2016*. Institute of Directors, South Africa. [Online] Available at: [https://c.ymcdn.com/sites/iodsa.site-ym.com/resource/collection/684B68A7-B768-465C-8214-E3A007F15A5A/IoDSA\\_King\\_IV\\_Report\\_-\\_WebVersion.pdf](https://c.ymcdn.com/sites/iodsa.site-ym.com/resource/collection/684B68A7-B768-465C-8214-E3A007F15A5A/IoDSA_King_IV_Report_-_WebVersion.pdf) [Accessed 9 August 2017].

Knaup, M. 2010. "The world wine trade group and the need to promote cooperation among wine producers of the new world". *International Trade Committee Newsletter of the American Bar Association, Section of International Law*, IV(3): 8-9.

Kolbe, R.H. & Burnett, M.S. 1991. "Content analysis research: and examination of applications with directives for improving research reliability and objectivity". *Journal of Consumer Research*, 18: 243-250.

Kruger, S., Du Toit, A., Ponte, S. 2006. De-racialising exploitation: Black Economic Empowerment in the South African wine sector. *DIIS Working Paper 2006/34*. Danish Institute for International Studies, Copenhagen.

Kuhlman, T. & Farrington, J. 2010. "What is sustainability"? *Journal of Sustainability*, 2:3436-3448.

Kuhn, M. 2017. "Mergers and acquisitions activity in the wine industry: The bigger picture of supply and demand, globalisation and competition". *VinIntell*, Issue 31(March 2017). Ibis a SAWIS Publication.

Lam, J. 2014. *Enterprise risk management: From incentives to controls*. 2<sup>nd</sup> ed. Hoboken, NJ: John Wiley & Sons.

Lincoln, Y.S. & Guba, E.C. 1999. *Establishing trustworthiness*. London: Sage.

Loots, J. 2016. *Biased documentary condemned*. Vinpro. Available at: <http://vinpro.co.za/biased-documentary-condemned/> [Accessed 11 March 2017].

Lysons, K. & Farrington, B. 2016. *Procurement and supply chain management*. Edinburgh: Pearson Education.

Manners-Bell, J. 2017. *Supply chain risk management: Understanding emerging threats to global supply chains*. London: Kogan Page Publishers

Mariani, A., Pomarici, E. & Boatto, V. 2012. "The international wine trade: recent trends and critical issues". *Wine Economics and Policy*, 1: 24-40.

McEwan, C. & Bek, D. 2009. "The political economy of the alternative sector: Social and environmental certification in the South African wine industry". *Journal of Rural Studies*, 25:255-266.

Merriam-Webster, 2018. *Dictionary*. [Online] Available at: <https://www.merriam-webster.com/dictionary/cellar%20master> [Accessed 11 march 2017]

Michalski, G. 2009. "Inventory management optimisation as part of operational risk management". *Economic Computation and Economic Cybernetics Studies and Research*, 4:213-222.

Mishra, D., Sharma, R.R.K., Kumar S. & Dubey, R. 2016. “Bridging and buffering: Strategies for mitigating supply risk and improving supply chain performance”. *International Journal Production Economics* 180:183–197.

Mohammed, A. & Sykes, R. 2015. “Sharpening strategic risk management”. Reprinted from *Resilience: A journal of strategy and risk*. Available at: [https://www.pwc.com/gx/en/governance-risk-compliance-consulting-services/resilience/publications/pdfs/issue1/sharpening\\_strategic\\_risk\\_management.pdf](https://www.pwc.com/gx/en/governance-risk-compliance-consulting-services/resilience/publications/pdfs/issue1/sharpening_strategic_risk_management.pdf) [Accessed 11 March 2017].

Monczka, R.M, Handfield, R.B., Giunipero, L.C. & Patterson, J.L. 2016. *Purchasing and Supply Chain Management*. 6th ed. Boston: Cengage Learning.

Mordor Intelligence Business Report, 2017. *Global wine market - Growth, trends and forecasts (2017-2022)*. [Online]. Available at: <https://www.mordorintelligence.com/industry-reports/wine-market>. [Accessed 5 May 2017].

Morrison, A., Pietrobelli, C. & Rabbellotti, R. 2010. “Who are the researchers that are collaborating with industry? An analysis of the wine sectors in Chile, South Africa and Italy”. *Elsevier. BV*:1-14.

Monday, A. & Wood-Harper, T. 2010. “Exploring the supply chain of small and medium-sized South Australian wine producers”. *Supply Chain Forum. An International Journal*, 11(1):16-26.

Naude, M.J. & Chiweshe, N. 2017. “A proposed risk management framework for small and medium enterprises.” *South African Journal of Economic and Management Sciences*, 20(1):-10.

OIV, refer to International Association of Vine and Wine.

Olson, D. & Wu, D.D. 2015. *Enterprise risk management*. 2<sup>nd</sup> ed. Singapore: World Scientific Publishing Company Pty. Ltd.

Onwuegbuzie, A.J. & Frels, R.K. 2011. *A framework for conducting a literature review*. Unpublished manuscript, Sam Houston State University, Huntsville, Texas.

Pakhchanyan, S. 2016. "Operational risk management in financial institutions: A literature review". *International Journal of Financial Studies*, 1:1-21

Petti, L., Raggi, A., De Camillis, C., Matteucci, P., Sara, B. & Pagliuca, G. 2005. *Life cycle approach in an organic wine making firm: An Italian case study*. 5<sup>th</sup> Australian Conference on LCA. November 2006, Melbourne Australia.

Ponte, S. 2007. "Governance in the value chain for South African Wine". *Tralac Working Paper*. No. 9 [Online]. Available at: [www.tralac.org](http://www.tralac.org). [Accessed 5 May 2017].

Ponte, S. 2009. "Governing through quality: conventions and supply relations in the value chain for South African wine". *Sociologia Ruralis*, 39(3):236-257.

Ponte, S. & Ewart, J. 2007. "South African Wine - An Industry in Ferment". *Tralac Working Paper* No. 8. [Online]. Available at: [www.tralac.org](http://www.tralac.org). [Accessed 5 May 2017].

Ponte, S. & Ewart, J. 2009. "Which way is "Up" in upgrading: Trajectories of change in the value chain of South African Wine". *World Development*, 37(10):1637-1650.

Price Waterhouse Coopers. 2010. *The South African Wine industry: Insights survey 2010*. Available at: <http://www.pwc.co.za/en/publications/wine-benchmarking-survey-2010.html>. [Accessed 11 March 2017].

Price Waterhouse Coopers. 2013. *The South African Wine industry: Insights survey 2013*. [Online] Available at: <https://www.pwc.co.za/en/assets/pdf/wine-benchmark-2012-pwc.pdf> [Accessed 11 March 2017].

Rahman, M.M., Yap, Y.H., Ramli, N.R., Dullah, M.A. & Shamsuddin, M.S.W. 2017. "Causes of shortage and delay in material supply: A preliminary study". *IOP Conference Series: Materials Science and Engineering*, 271(012037):1-8.

Ras, P.J. & Vermeulen, J.V. 2009. "Sustainable production and the performance of South African entrepreneurs in a global supply chain: The case of South African table grape producers". *Sustainable Development*, 17:325-340.

Roberto, M.A. 2003. "The changing structure of the global wine industry". *International Business and Economics Research*, 2(9):1-14.

Sadgrove, K. 2016. *The complete guide to business risk management*. 2nd ed. London: Routledge Taylor & Francis Group.

Sanders, N.R. 2012. *Supply chain management: A global perspective*. Hoboken, NJ: John Wiley & Sons Inc.

Saunders, M., Lewis, P. & Thornhill, A. 2016. *Research Methods for Business Students*. 7<sup>th</sup> ed. Harlow, UK: Prentice Hall.

SAWIS, 2009. *Final Report 2009. Macro-economic Impact of the Wine Industry on the South African Economy (also with reference to the Impacts on the Western Cape)*. Available at: [http://www.sawis.co.za/info/download/Macro\\_study\\_2009.pdf](http://www.sawis.co.za/info/download/Macro_study_2009.pdf) [Accessed 11 March 2017].

SAWIS, 2015. *Final report January 2015. Macro-economic impact on the South African economy. South African wine industry information and systems*. Available at: [http://www.sawis.co.za/info/download/Macro-economic\\_impact\\_study\\_-\\_Final\\_Report\\_Version\\_4\\_30Jan2015.pdf](http://www.sawis.co.za/info/download/Macro-economic_impact_study_-_Final_Report_Version_4_30Jan2015.pdf) [accessed 11 March 2017].

SAWIS, 2017. *SA Wine Industry Statistics NR 42. South African Wine Industry Statistics (SAWIS)* [Online] Available at: [http://www.sawis.co.za/info/download/Book\\_2017\\_statistics\\_year\\_english\\_final.pdf](http://www.sawis.co.za/info/download/Book_2017_statistics_year_english_final.pdf) [Accessed 6 September 2018].

Scarborough, N.M., Wilson, D.L. & Zimmerman, T.W. 2009. *Effective small business management: An entrepreneurial approach*. 9<sup>th</sup> ed. London: Pearson Education.

Science Direct. 2017. *Astringency*. [Online] Available at: <https://www.sciencedirect.com/topics/food-science/astringency> [Accessed 12 September 2018].

Sekaran, U. & Bougie, R. 2016. *Research methods for business*. 7th ed. West Sussex: John Wiley & Sons Inc.



Shenton, A.K. 2004. "Strategies for ensuring trustworthiness in qualitative research projects". *Education for information*, 22:63-75.

Simon, M.K. 2011. *Dissertation and scholarly research: Recipes for success* 2<sup>nd</sup> ed. Seattle, WA, Dissertation Success, LLC.

Smit, Y. & Watkins, J.A. 2012. "A literature review of small and medium enterprises (SME) risk management practices in South Africa". *African Journal of Business Management*, 6(21):6324-63303.

South African Government, 2011. *South Africa accedes to the agreements on mutual acceptance of oenological practices and the requirements for wine labelling of the World Wine Trade Group*. [Online] Available at: <http://www.gov.za/south-africa-accedes-agreements-mutual-acceptance-oenological-practices-and-requirements-wine> [Accessed 19 July 2017].

South African Government, Department of Agriculture, Forestry and Fisheries, 2011. *A profile of the South African wine market value chain 2011*. [Online] Available at: <http://www.daff.gov.za/docs/AMCP/WINEMVCP2011-12.pdf> [Accessed 2 June 2017].

Stellenbosch Wine Route. 2017 *Our story* [Online] Available at: <http://www.wineroute.co.za/page/?page=ourstory.htm> [Accessed 2 June 2017].

Stevenson, W.J. 2018. *Operations Management*. 13<sup>th</sup> ed. Berkshire, UK. McGraw-Hill Education.

Supply Chain Council. 2012. *Supply Chain operations reference model*. [Online] Available at: <http://docs.huihoo.com/scm/supply-chain-operations-reference-model-r11.0.pdf> [Accessed 2 June 2017].

Swink, M., Melnyk, S.A., Hartley, J.L. & Cooper M.B. 2017. *Managing operations across the supply chain*. 3<sup>rd</sup> ed. New York: McGraw-Hill.

Tang, O. & Musa, M. 2011. "Identifying risk issues and research advancements in supply chain risk management". *International Journal of Production Economics*, 133(1):25-34.

Terre Blanche, M., Durrheim, K. & Painter, D. 2012. *Research in practice*. 2<sup>nd</sup> ed. Cape Town: UCT Press.

Thach, L. 2016. *The State of the US wine industry in 2016 - Trends and statistics*. [Online] Available at: <https://lizthachmw.com/2016/02/06/state-of-the-us-wine-industry-in-2016-trends-and-statistics/> accessed 2 June 2017).

Tomlin, B. & Wang, Y. 2011. *Handbook of integrated risk management in global supply chains*. Hoboken, NJ: John Wiley & Sons.

Tummala, R. & Schoenherr, T. 2011. “Assessing and managing risks using the Supply Chain Risk Management Process (SCRMP)”. *Supply Chain Management: An International Journal* 16(6):474-483.

University of Colorado at Boulder. 2017. Leeds School of Business. *A typical supply chain and its flows*. [Online] Available at: <http://slideplayer.com/slide/5137816/16/images/10/Material/Product+Flow.jpg> [Accessed on 26 February 2017].

Van Eeden, J., Louw, J., van Dyk, E., & Goedhals-Gerber, L. 2012. *Wine supply chain survey 2012: Findings and challenges*. 35<sup>th</sup> Annual SAPICS Conference. Sun City, South Africa, 2- 4 June 2013.

Van Leeuwen, C. & Darriet, P. 2016. “The impact of climate change on viticulture and wine quality”. *Journal of Wine Economics*, 11(1):150–167.

Van Wyk, J., Dahmer, W. & Custy, M.C. 2004. “Risk management and the business environment in South Africa”. *Long Range planning*, 37:259-276.

Vink, N., Deloire, A., Bonnardot, V. & Ewert, J. 2009. “Terroir, climate change, and the future of South Africa’s wine industry”. *AARES conference*. Adelaide, South Australia, December 2009

Vrontis, D. & Thrassou, A. 2011. “Italian wine firms: strategic branding and financial performance”. *International Journal of Organizational Analysis*, 19(4):288-304.

Wagner, S.M & Bode, C, 2008. “An empirical examination of supply chain performance along several dimensions of risk”. *Journal of Business Logistics*, 29(1):307–325

Wagner, C., Kawulich, B. & Garner, M. 2012. *Doing social research: A global context*. London: McGraw-Hill.

Welman. C., Kruger, F. & Mitchell, B. 2005. *Research methodology*. 3<sup>rd</sup> ed. Cape Town: Oxford University Press.

Wesgro, Cape Town and Western Cape Research 2017. *Sector - Wine: March 2017*. [Online] Available at: [http://www.wesgro.co.za/pdf\\_repository/Wine%20Fact%20Sheet%20-%20Mar%202017%20-%20Final.pdf](http://www.wesgro.co.za/pdf_repository/Wine%20Fact%20Sheet%20-%20Mar%202017%20-%20Final.pdf) [Accessed on 16 October 2017].

Wine Folly. 2013. *What Are Tannins in Wine?* [Online] Available at: <https://winefolly.com/review/what-are-tannins-in-wine/> [Accessed 12 September 2018].

Wine Industry Advisor. 2016. *Advini enlarges its footprint within South Africa*. [Online] Available at: <http://www.wineindustryadvisor.com/2016/09/14/advini-enlarges-footprint-south-africa> [Accessed 30 July 2017].

Wine Spectator. 2018. *Glossary*. [Online] Available at: <https://www.winespectator.com/glossary/index/word/Brix> [Accessed 05 September 2018].

Wine Mag South Africa. 2015. *Tim James: On American investment in the South African wine industry*. [Online] Available at: <http://winemag.co.za/tim-james-on-american-investment-in-the-south-african-wine-industry/> [Accessed 30 July 2017].

Winemaker's Academy. 2013. *How to pick a wine making yeast*. [Online] Available at: <http://winemakersacademy.org/category/the-art-of-winemaking/> [Accessed 12 September 2018].

Winemaker's Academy. 2013. *Maceration of Wine Must*. [Online] Available at: <http://winemakersacademy.com/maceration-wine/> [Accessed 12 September 2018.]

Wineland Media. 2001. *A South African perspective of powdery mildew in grapevines*. [Online] Available at: <http://www.wineland.co.za/a-south-african-perspective-of-powdery-mildew-in-grapevines/> [Accessed 15 August 2018].

Wineland Media. 2013. A Guide to Grapevine Abnormalities in South Africa:Grapevine pests: Stem-borers, snails and fruit fly (part 5.5) [Online] Available from: <http://www.wineland.co.za/a-guide-to-grapevine-abnormalities-in-south-africagrapevine-pests-stem-borerssnails-and-fruit-fly-part-5-5/> [Accessed 15 August 2018.]

Wineland Media. 2013. A Guide to Grapevine Abnormalities in South Africa: Grapevine pests – Snout beetles and long-horned grasshoppers (part 5.2) [Online] Available from: <http://www.wineland.co.za/a-guide-to-grapevine-abnormalities-in-south-africa-grapevine-pests-snout-beetles-and-long-horned-grasshoppers-part-5-2/> [Accessed 15 August 2018.]

Wineland Media. 2014. Integrated pest management of mealybug in vineyards – a step towards more natural and cost-effective farming [Online] Available from: <http://www.wineland.co.za/integrated-pest-management-of-mealybug-in-vineyards-a-step-towards-more-natural-and-cost-effective-farming/> [Accessed 15 August 2018.]

Wineland Media. 2017. *Foreign finance*. [Online] Available at: <http://www.wineland.co.za/foreign-finance/> [Accessed 30 July 2017].

Wisner, J., Tan, K. & Leong, G.K. 2016. *Supply chain management: A balanced approach*. 4<sup>th</sup> ed. Cengage Learning, South-Western.

World Wine Trade Group (WWTG), 2017. [Online] Available at: <https://www.trade.gov/td/ocg/wwtg.htm> [Accessed 17 July 2017.]

WOSA. 2015. *Map links. Wine regions of South Africa*. [Online] Available at: <http://www.wosa.co.za/Multimedia/Maps-Links/> [Accessed 10 March 2017].

WOSA. 2017. *Three centuries of Cape wine*. [Online] Available at: <http://www.wosa.co.za/The-Industry/History/Three-Centuries-of-Cape-Wine> [Accessed 8 March 2017].

Wu, D.D. & Olson, D.L. 2009. "Enterprise risk management: Small business scorecard analysis". *Production Planning and Control: The Management of Operations*, 20(4):362-369.

WWTG, vide World Wine Trade Group.

XE Corporation [CA] XE Currency Charts. USD/ZAR Chart [Online] Available at: <https://www.xe.com/currencycharts/?from=USD&to=ZAR&view=5Y> [Accessed 15 August 2018.]

Yin, R.K. 2014. *Case study research: Design and methods*. 5<sup>th</sup> ed. Los Angeles: Sage Publications Inc.

Zsidisin, G.A. & Ritchie, B. 2008. "Supply chain risk: A handbook of assessment, management, and performance". Bowling Green, OH: Springer.

## APPENDIX 1: Ethical Clearance Approval



### UNISA DESTTL ETHICS REVIEW COMMITTEE

Date: 04/06/2018

Dear Mr RT Naude

Reference number : 2018\_CEMS\_ESTTL\_005

Name: Mr Rodney Trevor Naude

Student number: 7692374

Staff number:

**Decision: Ethics Approval from  
06/2018 to 06/2021**

**Researcher(s):** Mr Rodney Trevor Naude  
mailto:rodneytnaude@gmail.com  
083 303 1660 / 033 347 1115

**Supervisor (s):** Prof Johanna Badenhorst-Weiss  
badenja@unisa.ac.za  
082 449 7507 / 012 429 4356

**Working title of research:**

**Supply Chain Risks experienced by Stellenbosch Wine Producers**

**Qualification:** Masters of Commerce (Business Management)

Thank you for the application for research ethics clearance by the Unisa DESTTL Ethics Review Committee for the above mentioned research. Ethics approval is granted for three years.

*The **low risk application** was **reviewed** by the DESTTL Ethics Review Committee in June 2018 in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment. The decision was approved on the 4<sup>th</sup> of June 2018.*

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the DESTTL Committee.



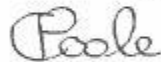
University of South Africa  
Pretter Street, Muckleneuk Ridge, City of Tshwane  
PO Box 392 UNISA 0003 South Africa  
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150  
www.unisa.ac.za

3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No field work activities may continue after the expiry date (06/2021). Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

*Note:*

*The reference number **2018\_CEMS\_ESTTL\_005** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,



Signature

Chair of DESTTL-RERC

E-mail: [loedoc@unisa.ac.za](mailto:loedoc@unisa.ac.za)

Tel: (012) 433-4668



Executive Dean: CEMS

E-mail: [mogalmt@unisa.ac.za](mailto:mogalmt@unisa.ac.za)

Tel: (012) 429-4419

## APPENDIX 2: Informed consent

19 High Level Place  
PIETERMARITZBURG  
3201  
Phone - 083 303 1660  
Date .....

### COVER LETTER: CONSENT TO PARTICIPATE IN A STUDY

Dear Prospective participant,

You are invited to participate in a survey conducted by Mr Rodney Naude under the supervision of Prof JA Badenhorst-Weiss, a Professor in the Department of **Entrepreneurship, Supply Chain, Transport, Tourism and Logistics Management** towards a Masters of Commerce degree at the University of South Africa.

The interview guide you have received has been designed to study the what you perceive to be the supply chain risks experienced by wine producers in the Stellenbosch area. You were selected to participate in this study because of your experience and knowledge in the wine industry. If you are under the age of 18, you will not be eligible to participate in this study. By participating of this study, you agree that the information you provide may be used for research purposes, including dissemination through peer-reviewed publications and conference proceedings.

It is anticipated that the information we gain from this study will help us to contribute to the field of supply chain management and particularly supply chain risks, focusing on the wine producers in the Stellenbosch area. You are, however, under no obligation to participate in the study and you can withdraw from the study at any time. I would like to assure you that the discussion will be anonymous and will be kept confidential. We will keep all recordings safe until it is transcribed word by word. No personal details of any participant will be mentioned in any of the transcriptions. In other words, there will be no information that would allow individual subjects to be linked to specific statements. If you choose to participate in this survey it will take up no more than 60 minutes of your time. You will not benefit from your participation as an individual, however, it is envisioned that the findings of this study will contribute to the body of knowledge in the supply chain management field. We do not foresee that you will experience any negative consequences by participating in this study. The researcher undertakes to keep any information provided herein confidential, not to let it out of his possession and to report on the findings from the perspective of the participating group and not from the perspective of an individual.

The records will be kept for five years for audit purposes where after it will be permanently destroyed. Hard copies will be shredded and electronic versions will be permanently deleted from the hard drive of the computer. You will not be reimbursed or receive any incentives for your participation in the survey.

The research was reviewed and approved by the Department Of Entrepreneurship, Supply Chain, Transport, Tourism and Logistics Management Research Ethics Review Committee (ESTTL-RERC). The primary researcher, Mr Rodney Naude can be contacted during office hours at 0833031660. The study leader, Prof JA Badenhorst-Weiss, can be contacted during office hours at 0824497507. Should you have any questions regarding the ethical aspects of the study, you can contact the chairperson of the Chair of the ESTTL RERC Tel: 012 433 4668. Alternatively, you can report any serious unethical behaviour at the University's Toll Free Hotline 0800 86 96 93.



You are making a decision whether or not to participate by continuing to the next page.

I, \_\_\_\_\_ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I understand the study as explained to me.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of the study will be anonymously processed into a research report, journal publication and/or conference proceedings.

I agree to the recording of the interviews.

I have received a signed copy of the informed consent agreement.

Participant name & surname: \_\_\_\_\_ (please print)

Participant signature: \_\_\_\_\_ Date: \_\_\_\_\_

Researcher's name and surname: \_\_\_\_\_ (please print)

Researcher's signature: \_\_\_\_\_ Date: \_\_\_\_\_

Witness name & surname: \_\_\_\_\_ (please print)

Witness's signature: \_\_\_\_\_ Date: \_\_\_\_\_

## APPENDIX 3: INTERVIEW GUIDE

### SUPPLY CHAIN RISKS EXPERIENCED BY THE STELLENBOSCH WINE PRODUCERS.

#### Introduction

Good morning. Thank you so much for taking time out of your busy life to participate in this study. I am pleased that you are willing to share your experiences, knowledge and activities with us.

We are here to discuss what you perceive to be the supply chain risks experienced by wine producers in the Stellenbosch area.

This interview should take no more than one hour. Firstly, may I record our discussion to facilitate recollection? (*If yes, switch on recorder*). Despite our discussion being voice recorded, I would like to assure you that the discussion will be anonymous and will be kept confidential. We will keep all recordings safe until it is transcribed word by word. No personal details of any participant will be mentioned in any of the transcriptions. In other words, there will be no information that would allow individual subjects to be linked to specific statements.

*The researcher to explain the definition of supply chain risk to each participant.*

Do you have any questions or comments before we start?

1. *Explain that this section incorporates all the supply chain risks of the wine producers.*
  - 1.1. Could you please explain some of the main supply chain risks you currently face? (See probe section)
  - 1.2. How does your wine producing farm manage/reduce these supply chain risks?
  - 1.3. What do you regard as the main challenges in managing/reducing these supply chain risks?
  - 1.4. Do you have any suggestions on how your wine producing farm can overcome the challenges in the management/reduction of supply chain risks?

**Probe:** In terms of planning, do you experience any supply chain risks? (*Explain if necessary, that this incorporates all planning risks of the wine producer including planning of the land, crop and farm management and wine production and distribution*).

In terms of sourcing (procurement), do you experience any supply chain risks? *(Explain if necessary that this incorporates all the sourcing risks, including of the procurement of materials, manpower, machinery and services).*

In terms of making (grape growing and wine making), do you experience any supply chain risks? *(Explain if necessary that this incorporates all the production activities of the producer including vine tending, crop management, harvesting, all wine making processes, wine bottling and packaging activities).*

In terms of delivery (selling and delivering), do you experience any supply chain risks? *(Explain if necessary that this incorporates all the delivery or logistics risks and sales risks of the supply chain including sales, invoicing, warehousing and transportation).*

In terms of returns, do you experience any supply chain risks? *(Explain if necessary that this incorporates everything to do with the returning of wine and packaging to the producer).*

In terms of enable, do you experience any supply chain risks? *(Explain that this his incorporates overall issues such as the support, design and management of the processes and activities of the wine producer and its overall operation).*

**2.** Do you have any comments/suggestions?

Thank you very much for your time. It is greatly appreciated.

## APPENDIX 4: Personal Field Notes

①

14H00

DATE: 11.6.18

PARTICIPANT NO : 1  
 FACILITY (STATE OF) : OLD BUILDINGS (HISTORICAL FIBRE/GOOD)  
 HOUSEKEEPING : GOOD  
 INTERVIEW LOCATION : TABLE IN OPEN WINE MARKET AREA (NOISE)  
 DAM/S : YES  
 IRRIGATION : YES  
 IMPRESSION : V. FRIENDLY

### LOGISTICS :

USE NATIONAL DISTRIBUTOR

EXPORT - DELAYS : WEATHER MOSTLY

IMPORT - BARRELS FROM FRANCE / DELAYS

DELAYS IN TRANSPORT  
 - SERVICES DELIVERABLE  
 ROAD CLOSURES  
 - DELAYS INTO/OUT OF PORT

DRY GOODS - BOXES, LABELS, BOTTLES, CAPSULING.  
 - 30 DAY TERMS.

↳ MOSTLY LOCAL SOURCED (IE RSA)

EXPORT DOCUMENTS : USA OK / COMMS EXCELLENT

EUROPS - STRICT / ONEROUS / CONDITIONS

CANADIAN RULES - TOUGH : HARDER TO COMPLY WITH

EXPORTS - TEMPA LINKING TO KEEP TEMPERATURES CONSTANT

- CANNOT RISK WINE GETTING WARM.

VAT CHANGES : CREATED ISSUES IT INFRASTRUCTURE.

LONG TIME DELAY FOR DRY GOODS ! LEAD TIME 6-8 WEEKS

QUALITY OF DRY GOODS - BOXES / COLOUR VARIATION

- BOTTLES

LOTS OF PLANNING TO GET DRY GOODS STOCKS COMPLETED : DELAYS AND INEFFICIENT.

PLANNING HIGH ON RESERVE WINES.

DRY GOODS - TERMS

②

RISKS : CARGO THEFT / DAMAGE : SMALL ISSUE  
CHANGES - STORAGE SPACE  
FINISHED GOODS  
& DRY GOODS

} CONSTRAINT

STOCK STORAGE AN ISSUE

TRANSPORT RISKS - LONG D.G. LEAD TIMES.

TRANSPORT ISSUES - TRUCKS / DELIVERY ROAD CLOSURES.

CASH FLOW TO BUS MANAGER! CHANGE TO BALANCE

D. GOODS STOCK / SPACE, CASH FLOW

NOT TO THE W EXCESS CASH IN STOCK

TIME FRAMES ALWAYS AN ISSUE.

③

DATE: 11.6.19.

PARTICIPANT No: : 2  
 FACILITY (STATE OF) : GOOD - WELL MAINTAINED  
 HOUSEKEEPING : GOOD  
 INTERVIEW LOCATION : TABLE ADJACENT TO C.I.M. DESK  
 DAM/S : YES  
 IRRIGATION : YES  
 IMPRESSION : PEDANTIC & ACCURACY KEY.

BUY OUT GRABS.  
 - NO DIRECT CONTROL  
 - HIGH / MANAGED CONDITIONS.  
 BUY OUT 50% & GROW 50%  
 RISK OF BUYOUT - MANAGED PROTOCOLS.  
 RISK THE SAME / LOCAL & B. OUT.  
 HARVEST DATE - RISK - RIPENESS

WATER CONSULTATION  
 - BIG ISSUE  
 VERY GOOD

EARLY DATES FOR PICKING

3 WEEKS!  
 MOST IMPORTANT DECISION.

WATER - DROUGHT / DATES / IRRIGATION - UNDERWATER  
 SUPPLY  
 SOIL  
 TEMPERATURES - HIGHER.

PESTS - MEALIE BUG / LEAFROLL VIRUS / SNOUT BEETLES.  
 STBY BORDER

RAND VANS AN' ISSUES: BARRELS & YEAST  
 NO FORWARD COVER ON IMPORTS.  
 BARREL SUPPLY NOT A RISK - COST

NATURAL WIND HARVEST - USES ADAPTIVES

PLANNING AN' ISSUES.  
 PRO. JUST US

NO FIRE RISK - PINNACLES - HIGH UP FAR FROM FORESTS.

②

LABOUR - ALWAYS A RISK

- POLITICS IN RSA.

UNIT STAFF - PAY AGREEMENTS WELL

- TRAIN STAFF (POLITICIANS) WELL

GOOD RELATIONSHIPS - KEY

UNIONS A RISK - CALDS UNNECESSARY TROUBLES.

CONTRACTORS FOR ANY ADDITIONAL WORK - <sup>MANAGE</sup> PLenty OF LABOUR

BIGGEST: RISKY & DOWNY HUNDEN.

NO CASH FROM CONTRACTORS / EXTERNAL CASH ALWAYS A RISK.

PLANNING - RAIN - MOISTURE.

RAND INFLATION A RISK - LABOUR ISSUE

DARKELS: 10-15% OF COST OF UNIT OF WIND.

B. OUT WINDS! WORK WITH PREPULORS.

- MANAGE WEATHER.

ADVANCE CONTRACTS - TRY TO BE FAIR.

FIRST RIGHT OF REVERSAL.

CASH FLOW NOT AN ISSUE.

SAVES! TOUGH CONTROLS / EXCLUSIVITY

WATCH TRANSPORT COSTS! RISK.

SPEAK RISKS - CO<sub>2</sub> - SUFFOCATION.

18-19 SKENS.

↳ STAYS CAPACITY IN WINDMILL.

RAND DEVALUATION / REVALUATION: RISK TO PRICING.

- DIFFICULT! CUSTOMERS ORDERS DO NOT HAVE INFLATION.

PRICING: GOOD WINDS: 1111111111

- PRICING

DEBTORS - BAD DEBT: £80,000.

RISK OF LOSING WIND MARKET: KNOWS THE ESTABLISH

ITS WINDS 25% PROBLEMS.



⑤

NOT AROUND A PERSON - BUT A GROUP OF SKILLS & METHODS  
BUILT A STRONG BRAND .

NEW WINS MAKING SKILLS AVAILABLE .

IT INFRASTRUCTURE GOOD .

EMPLOYEE RELATIONS KEY - RISK OF INDUSTRIAL ACTION

TOURISM IMPORTANT .

TRAINING - LITTLE GOVT / INDUSTRY SUPPORT .

NO FROST AT ESTATE .



6

INTERVIEWED LOTS  
12.6.18 9.15

PARTICIPANT NO	3
FACILITY (STATE OF)	GOOD / NEW ALLOCATIONS.
HOUSEKEEPING	GOOD
INTERVIEW LOCATION	MEET AT <sup>TESTING ROOM</sup> WINERY IN STUBBINSBORO
DATE/S	YES / NEVER SAW
IRRIGATION	YES / NEVER SAW
IMPRESSION	GOOD - COOL ENVIRONMENT / GOOD VIBES FOR WINE TASTING.

CHALLENGES / BECOMING RISKS IF NOT MANAGED.

RISK - CLIMATIC CONDITIONS.

BARONS - RISK

CHOICE OF WINE ESTATE = RISK.

DATE / USE THE ~~WATERS~~ WATER

BLOCK IRRIGATION PIPES - RISK TO WINE / NO WATER.

RISK AGRICULTURE - WINE MAKING

2 PROBLEMS. - TIME FRAMES CHANGED.

WIND - DAMAGES FLOWERS.

GOOD SOILS

MECHANICAL: TRIMMING: EFFECT ON VINES.

BEEES - TO POLLINATE: FLOWERS FOR GRAPES.

DESTRUCTIVE. BARON RISK - CHASE (PROTECTED SPECIES)

HEAT AROUND PICKING TIME - RISK TOO HOT

DROUGHT - SHAWER BOTTLES / WATER CONTENTION: SUCK

CHANGE IS RISK - AFFECT PLANNING

FIRE IS A RISK.

VISCIOUS

HERLOT VINEYARD / ELECTRIC FENCES.

RAIN SHAWER YIELD & SHAWER BOTTLES.

MERLOT ON SAH BUSINESS 2 FIRST CLAS

RISK - WINE CONSUMER DOES NOT UNDERSTAND WINE.  
OLD DAYS OF POOL <sup>255</sup> QUALITY WINE ! KVVU

①

LACK OF UNITY & COLLABORATION

USA - MARKET - MORE EDUCATED.

WINE MARKET NOT THE ISSUE! CONSISTENCY.

WINE BARRELS - RISK - PROMISES / BROKON.

PLANNING: 2/3RD FULL OF BARRELS

- ~~REUSO~~ REUSO / HOW MUCH

CASH FLOW RISK

BANKERS NOT KEEN TO GIVE CREDIT TO W. MAKERS

LACK OF COLLABORATION. IN INDUSTRY

BOUGHT AT GRAPES - PRICE / RISK / SUPPLY

SELLING PRICE INCREASES - DIFFICULT

PRICE RANGES: MOVING DIFFICULT

COMPETITION HEAVY.

AGREING CORRELATION - RISK: ALTERNATIVE DRINKS

DISTRIBUTORS - RELATIONSHIPS

PLANNING / MARKETING

SELL IN DOLLARS

PARTNERSHIP

ALCOHOL CONTENT / RISK

EXPORT CERTIFICATES

SHIPMENT RISKS: PAYMENT RISK - 60 DAYS

COSTS A RISK - DRY GOODS

WATER TINGS ON DRY GOODS: HIGH

RISK OF WINDS - DRYING THINGS: DROUGHT

PETTY CRIME A RISK

SUPPLIERS OF DRY GOODS - DON'T LOOK AFTER WIND

PRODUCES / SMALL CUSTOMER PERCEPTION

CASH FLOW RISK OF DRY GOODS

BOTTLE SUPPLY AN ISSUE - KEEP STOCK DOWN

SHORT TERM SUPPLY CAN BE A PROBLEM

RISK - VINEYARD PROGRESS, POST S, SPRAY FOR

MILDEN

6

PEAK CRIME - STEALING GRAPES AN ISSUE .  
AND STEALING WINE BOTTLES .

WORKING WITH CONTRACT EMPLOYEES - AGENCIES  
- TIMING AN ISSUE .

PLANNING AN EVENT - TIMING . ? LABORERS .

VITICULTURAL SKILL NOT AN ISSUE - SECTORS  
NO RISK OF STRIKE - LOOK AFTER .

SULFUR RISK & YEAST .

CHANGE IS CONSTANT - CONSISTENT WINE A RISK .

MOST BS SAYS AS PREVIOUS VINTAGES - RISK .

CONSUMER KNOWLEDGE POOR - ESPECIALLY NATAL  
GRAPES & WINE GOOD .

④

PARTICIPANT 4:

SEE FACILITY SUMMARY FOR PARTICIPANT 3.

HEAT RISK.

COOLING - BLAST FRIGID

KEEP GRAPES COOL FROM PICKING THROUGH THE PROCESS.

ACCIDENT RISK EXISTS: HANDS IN MACHINES.

CO<sub>2</sub> THE BIGGEST RISK.

OPEN TANKS HEADS - DO NOT TRAP CO<sub>2</sub>.

CONTAMINANTS IN TANKS - SMALL RISK.

SKILLS OF VET EMPLOYEES - NOT WINE MAKERS BUT THEY KNOW THEIR STUFF

SKILLS IMPORTANT.

INCOMING CHEBS - SUPPLIERS UNRELIABLE.

SPOILAGE RISK POSSIBLE - TCA RISK.

POWER TRIPPING - RISK TO COOLING SYSTEM.

RISK WINGS: GRAPES OUT FOR 5 DAYS & COOL

WINGS = 10 - 15 DAYS.

MIXING OF YEAST & OTHER CHEBS - RISK.

TOO MUCH SULPHUR FOR EXAMPLE.

CONSTANT TESTING / CHECKING / AUDIT PROBLEMS & AUDIT RISK.



10

PARTICIPANT : 5

SEE FACILITY FOR PARTICIPANT 3

DOCUMENTATION FOR LIFE OF THE WINE - GOOD RECORD KEEPING.

COLOUR OF WINE : PERCEPTION.

TAXES ; HIGH / COSTS

DROUGH / MILDOW / BUG - RST ALL RISKS.

HEAT - AFFECTS IRRIGATION NEEDS.

CASH FLOW RISKS - HOVING & MATURING WINE.

WINE MAKE SHOULD NOT BE THE BRAND.

BETTER TO EXPORT - RISK OF TRANSPORTATION BUT MONEY BETTER.

SALES PAPER WORK.

CHINESE EXPORTS A RISK.

CHEAP AUSTRALIAN WINES - YELLOW TAIL.

DELAYS IN GETTING LABELS.

COPPER PIPING STOLEN FROM COOLING UNITS.

SKILLS AVAILABLE ; PICKERS.

TESTING / TASTING SKILLS.

RIPENING AT DIFFERENT TIMES.

SKILL TRANSFER : ELSBURG / PROF EBENHAEZEL.

NO SKILL LOSS - THREAT STRIKES - LOCK AFTER WORKERS - EVEN CONTRACTORS.

11

VERY POSITIVE



13.6.18. 1400

PARTICIPANT 6:

PARCEL (STATE OF) : EXCELLENT  
HOUSEKEEPING : V. GOOD  
INTERVIEW LOCATION : KING TASTING ROOM ANNEX  
DRINKS : YES / DONE BY RESTAURANT  
IRRIGATION : YES - VISIBLE  
IMPRESSION : VERY GOOD ENVIRONMENT

LOW MARGIN PRESSURES - NEED SOME FRESH START

WINE MAKING INHERENT RISK

VOLUME FLUCTUATIONS

CASH FLOW RISK

→ BALANCING COSTS & INPUTS / WITH VOLUMES DOWN  
COST PER UNIT WAY UP.

SMALL MARKET - WINE PRODUCER / SMALL OFFERS  
SO SUPPLIERS DO NOT PAY ANY ATTENTION  
TO WINE MARKET.

SOURCING SIDE - DRY GOODS

GRASS PRICES - VERY HIGH / EUROPE + 10%

INFLATION IN RSA A RISK

COMPLAINTS SATISFACTION TO CUSTOMERS

BOTTLE PROBLEMS A BIG ISSUE

CARELESS AN ISSUE

SUPPLY CHAIN ON DRY GOODS - VERY LONG

USA / JAPAN - 2 WEEKS

STOCK HOLDING HIGH

FINANCIAL RISK BIG IN WINE INDUSTRY - FINANCIAL

ACCOUNT

ALWAYS PROFITABLE

VOLUMES MOSTLY ALL 260 GROWN - SMALL B. OUT / PINOT NOIR

(12)

HUMAN RESOURCES: PICKING.

GOOD WORKING RELATIONSHIPS - EFFORTS.

SEMI - NOT MUCH VALUE.

BLACK & COLOURED PICKERS - SEEN AS LOW VALUE WORK,  
ENOUGH WINE MAKING SKILLS.

LACK OF BUSINESS SKILL & TRAINING.

NO FORWARD COVER ON IMPORTS.

EXPORT IN FOREX - TRADE OFF.

LABOUR INFLATION

COST INCREASES. - RISK.

LOGISTICS COSTS - RISK

FOB EXPORTS.

MANAGE - WATCH FREIGHT COSTS.

SALIS / GOVT - NO REAL ISSUES.

CONSERVATIVE; FOLLOW FRENCH MODEL.

ACCIDENT RISK: CO2 & MACHINES.

MANAGING DEMAND VS SUPPLY - RISK.

GOOD COMPUTER DATA

NEED LITTLE VINTAGE VARIATION

OVERSEAS DEMAND - MORE CONSISTENT.

MARKET VISIBILITY - DIFFICULT.

BUYING PATTERNS VARY

PRICES INCREASES - BELOW INFLATION ON LOCAL SIDE.

LOCAL PROFITABILITY - DIFFICULT.

PROFITABILITY - AN ISSUE.

HIGH COMPETITION.

PROPERTY ISSUES.

②

VERY ANTIUM  
13.6.18. 09.00

PARTICIPANT 7.

FACILITY (SIMTO OT): VERY NEAT & TIDY  
HOUSEKEEPING: EXCELLENT  
INTERVIEW LOCATION: PARTICIPANTS OFFICE  
DAYS: NOT SEEN  
IRRIGATION: YES / VISIBLE.  
IMPRESSION: VERY PROFESSIONAL

ACCOUNT  
READILY  
AVAILABLE  
REPORTS

MATCHING DEMAND / SUPPLY - BIG RISK.

- FREE LOCAL  
OWN ACCESS

PAYMENT TERMS: 30 DAYS LOCAL / 90 DAYS FROM  
CONTAINER LOADING (OSDAS)

65% LOCAL  
35% EXPORT.

HOLLAND, SWITZERLAND, SCANDINAVIAN COUNTRIES.

USA DIFFICULT MARKET.

BAD DEBT RISK.

TOUGH PRICING.

RESTAURANTS - RISK.

MARKO, WOOLWORTHS NOT PICKN PAY.

GROW OWN GRAPES.

DRY GOODS SUPPLIERS - HOPELESS.

BOTTLE PROBLEMS - CONSOL: BTD.

LD QUALITY POOR / DIRTY  
IMPORT FROM CHINA

STOCKING COSTS.

LABELS THAT DONT STICK

DELIVERY ISSUES - ON DRY GOODS.

CAPSULES - LARGE STOCK: IMPORTED.

CONTRACTORS FOR PICKING - AVAILABLE / NO PROBLEM.

GRABOU LABOUR PROBLEMS.

LD SERVICES DELIVERY.



12

WEATHER RISK .

HAIL STORMS — NOT NORMAL .

SHOW PICTURES OF HAIL DAMAGE .

MILDEW — SPRAYING .

POSTS .

WIND

DAYS — IRRIGATION PLUS STRAW .

NO YIELD IMPACT .

QUALITY — VERY GOOD .

NOT TOO MUCH FOLIAGE .

MONITORING WEIGHT — YIELDS .

PRECISION VITICULTURE .

↳ GOOD FOR PLANNING .

↳ DATES — EASIER FOR MONITORING .

SHOWS REPORTS .

VINE FOLIAGE ISSUES .

CHANGE IN HOW "WE" DO THINGS .

RIPENING & PICKING .

MORE SURETY / LESS GUESSED WORK .

MORE WORK IN VITICULTURE — IN VINEYARDS NOT  
IN CELLAR .

HEAT AN ISSUE — BUT NOT A BIG PROBLEM .

DRINKING WATER : WINERY IMPACTS / CLEANING .

WASHING BOTTLES A BIG ISSUE .

DO OUR OWN BOTTLING .

MILDEW — SPRAY .

COVER CROPS VS INSECT SPRAYING .

SPRAYING — RISKS .

CONTROL L VIRUS .

APHIDS ! MEALBUG RISK ; SPARKING

NEW VINES — VIRUS FREE (RISK !??)

NEW VINEYARD — VERY EXPENSIVE .

15

FROST - NOTHING TO BE PAID / AUGUST.  
LOTS OF WINE MARKETS.  
MAKING OF WINE - RISK - MANAGING & CONTROLLING  
ECONOM POLICE - UNRELIABLE.  
GENERATOR.  
3 PLS - COSTS A RISK.  
PILFOWING - RISK BUT SMALL  
DEBTORS BOOK.  
FIRE RISK: JAN/FEB  
NO DEBT - OLD FASHIONED.  
COST OF SALES AND MARKETING! HIGH OVER  
THE YEARS (PART OF WHAT IS  
REQUIRED)  
MILLENNIALS - CHANGING TASTES.  
INFLATION A RISK.  
PRICE OF GRAINS - RISING - USA: RAISED.  
- US FORMULA  
- RISK FOR THOSE WHO BUY OUT: COSTS.



16

PARTICIPANT 8

FACILITY ETC : SAME AS FOR P.7.

IMPRESSION! VERY KNOWLEDGEABLE.

RISKS - FIRE, DROUGHT, HEAT

ALCOHOL CONTENT - CONTROLLED.

OVERRIPE - HIGHER ALCOHOL.

YIELD IMPACTS : DROUGHT

MANAGING BARREL USAGE : TIMING.

FRENCH OAK BARRELS.

- TIMING / ROTATION.

STORMS - WEATHER AFFECTS RECEIPT OF BARRELS.

COST OF BARRELS INCREASING : RMB DEVALUATION.

CFC ACCOUNT FOR IMPORTS / EXPORTS.

CORKS & BOTTLE RISK.

WASH BOTTLES.

COATING ON BOTTLES - EFFECT WIND.

CORK RISK.

TORQUE - BOTTLE SEALING.

IMPORTED BOTTLES - CHINA - STOCK HOLDING.

LOCAL BOTTLES

COOLING FACILITY KEY TO PROCESS

YEAST QUANTITY ISSUES → CHEMICAL DATA SHEETS.

TESTING DAILY : PROCESS IN CONTROL

RISK → CHECKS

SUGAR LEVELS. } KEY CONTROLS.

TEMPERATURE

SKILLS OF EMPLOYEES

FUNING MACHING : 1451

①7

BOTTLE FILLING OPERATOR - SKILLS  
PRESENT FOR MACHINE SPAREDS.  
- LOCAL SUPPLIER REPAIRS

MACHINE  
NEEDS  
TO  
BE  
IMPORTED.

NO CONTAMINATION RISK: SWING LIDS

CO<sub>2</sub> SAFETY LIDS - LET CO<sub>2</sub> OUT CONSISTENTLY.  
↳ FANS / EXTRACTORS.

MACHINERY MOVING PARTS: TRAINING.

WATER SUPPLY KEY - MOUNTAIN STREAM.

DAM: WATER FOR WASHING.

THEFT / PILFERING & SOME DAMAGE.

REIOUS IMPURITIES - RISK - CAN LOSE A BARREL OR  
TWO - EXPENSIVE.

BEST INSTRUCTIONS

↳ RISK TO ELIMINATE.

BARRELS - CLEAN - BUT CAN HAVE CONTAMINATORS.  
MEASURE OUTPUT / INPUT.

18

PUNCTUAL  
13.6.13 1400

Participant 9:

FACILITY: (STATE OF): GOOD  
 HOUSEKEEPING: V GOOD  
 INTERVIEW LOCATION: BOARD ROOM  
 DAM/S: YES / 2 / SEED  
 IRRIGATION: YES - SEED  
 IMPRESSION: GOOD ENVIRONMENT! STAINLESS STEEL EQUIPMENT

FINANCIAL / ECONOMIC / CLIMATE.

SA - 30%  
EXPORT - 30%

GAUTENG BIG MARKET / CT BIG TOO.

PRICING - NOT TAKING ADVANTAGE OF GRAPES  
SHORTAGE TO PUT UP PRICES.

S. AMERICA: BAD YEAR PREVIOUS YEAR.

90% OF OWN GRAPES.

IMPORTED BLENDED FROM VARIOUS DESTINATIONS  
- ARGENTINA / CHINA.

DROUGHT IMPACT - YIELD DOWN

COST PER UNIT WAY UP.

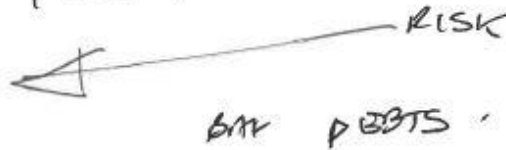
IRRIGATION - DAM RUN DAM! PROBLEM FOR IRRIGATION  
- SILT / FISH MUCK

SELLING AGENT.

SHRINKAGES = NIL.

NO HIJACKING / THEFT.

DEBTORS BOOK



300 DEBTORS

CASH UP FRONT - CHINA / AFRICA

EUROPE: G / F / UK / BELGIUM / AUSTRIA.

19

DEBTORS RISK

NOT CHOP MARKET / UK = M&S & HARRODS.

FOB - EXPORTS : 90 DAYS

CONSIGNMENTS : PALLET LOADS MINIMUM.

TEMPERATURE BLANKETS.

DEMAND

VS

SUPPLY

ISSUE / PROBLEM / RISK

NEXT YEAR PROJECTIONS

LIMITED SKUS - CUT DOWN.

RAND IMPACT - CFC : IMPORTS VS EXPORTS.

8 DIFFERENT BARREL TYPES

LOSS OF WINE PRODUCERS - 85% SURVIVE.

SA INFLATION A PROBLEM.

BORGHOLDS. PLUS THE BATHS KLEOF ALLOCATION

LOGISTICS COSTS. AN ISSUE

STORAGE SPACES A PROBLEM ← RISK.

CASH FLOW.

MEASUREMENTS / NOT AS FORMAL AS OTHER INDUSTRIES.

NO CREDIT GUARANTEES ON DEBTORS

DRY GOODS SUPPLIERS.

PRICING - PRICE BARRIERS.

SAWIS / WOSA : GOOD → REGULATES INDUSTRY.

10

PARTICIPANT 10!

SEE FACULTY ETC AS PARTICIPANT 9

INTERVIEW LOCATION - COLUMBIA WASTERS OFFICE

DRY GOOD S - PROBLEMS! RISKS

COST OF B. OUT GRAPE! HIGH

DROUGHT - YIELD DOWN

HEAT AN ISSUE BUT NO A RISK

GOOD VINTAGE - 2017 & 2018

LOWER ALCOHOL CONTENT

FILTRATION; RISKS IN PROCESS

TESTING / MEASURES

TOUGH

CONTROLS

QUALITY OF GRAPE GOOD

PRESSURE TO REVERSE WINGS WHEN STOCKS  
DOWN - RESIST



BOTTLE SHOCK ← MANAGERS

COMMS DIFFICULT

FULL TIME VITICULTURIST

WIND A FACTOR

→ CAN BE GOOD, BUT CAN DAMAGE  
SHOOTS

MEAN BUG A RISK

↑ MANAGEMENT WARS / LADYBIRDS &  
TO MANAGE

↑  
STUBENBOCH PROFESSOR



21

NEW VINES - RISK OF INFECTION.  
TEMPERATURES RISK.

↳ PICK AT COOLST

PICK TO TEMPERATURES.

MEASURING / MONITORING → SUGARS, PH, RIBOSESS  
COOLING: VITAL

YEAST - NO RISK - GOOD SUPPLIER -

↑ PROTEA.

WASH BOTTLES - RISK.

CARTONS AND ISSUES: COLLAPSING.

FRAGMENTED CORK: CORK A BIG RISK.

↑  
POOR SUPPLIERS - UNRELIABLE / POOR QUALITY.

STAFF: PERFORMANCE BONUS & INCENTIVES.

NO MECHANISATION OF PICKING.

STAINLESS STEEL EQUIPMENT

BOXES A PROBLEM.

MITIGATION AGAINST SUPPLIER PRICE INCREASES

→ TOUGH NEGOTIATION.

FREE BARRELS - TO ENCOURAGE BUYING.

↑  
BARREL COSTS HIGH.

CHEEK BOTTLES →

BOTTLING EQUIPMENT - FINIKY ← SKILL OF OPERATOR.

LOGISTICS COSTS A RISK.

SAFETY PROTOCOLS.

↑  
CO2 TIGHT CONTROLS.