



# A proposed risk framework as a tool for sustainability for the South African wine industry



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**Aim:** There is an existing gap in the literature that addresses the importance of risk management as a tool for sustainability in the winemaker's activities and operations. The purpose of this article is to propose a risk management framework for the South African wine industry that can be used as a tool for sustainability.

**Setting:** The study comprised 10 participants at five wine-producing estates located in the five different wine-growing areas within the Stellenbosch region.

**Method:** The study is exploratory in nature, adopting a case study approach. Interviews with wine producers in the Stellenbosch region of the Western Cape province of South Africa were conducted in order to identify the various risks they face.

**Result:** A thematic analysis was used to analyse the data. The four steps of risk management were used as a reference point and to underpin the proposed risk management framework. The study was done using the Supply Chain Operations Reference model, which is divided into six process categories, namely plan, source, make, deliver, return and enable.

**Conclusion:** The article makes a twofold contribution. Firstly, wine producers might use the proposed framework to identify and mitigate their risks and thus as a tool for sustainability. Secondly, the proposed framework is expected to contribute to the existing body of knowledge on risk management and sustainability.

**Keywords:** sustainability; risks; risk management; risk management framework; wine producers.

## Introduction

Sustainability can be defined as the survival of a business, requiring the successful integration of economic, social and environmental aspects. Sustainability is likely to be achieved by a business that manages and integrates economic principles (maximising welfare and improving efficiency), and social (equity principles) and environmental strategies (conservation of resources) (Arnold 2017; Rauter, Perl-Vorbach & Baumgartner 2017; Schaltegger, Lüdeke-Freund & Hansen 2012). Many businesses, including the wine industry, face significant challenges in tackling global warming, protecting ecological support structures, conserving energy and resources, and sustaining functioning societies (Arnold 2018; Santini, Cavicchi & Casini 2013). Thus, unsustainable management decisions and the neglect of social and environmental issues will prevent businesses from improving in terms of sustainability (Arnold 2017; Schaltegger et al. 2012).

The wine industry participates in and is committed to sustainability as is evidenced in an extensive and expanding body of academic literature (Santini et al. 2013). In South Africa, the industry leads the world in production integrity. Since 1974, the Wine of Origin scheme has certified that the labels stating where the grapes originate from, the vintage year and the variety are correct and valid. In 1998, guiding principles on sustainability were established, and it is estimated that 95% of the wine growers follow these principles (WOSA 2021a). Furthermore, South African wine producers are mindful of conservation – around 45 000 ha of land is owned by grape farmers who are World Wide Fund for Nature Conservation Champions, and 22 000 ha of this is held as part of the Cape Floral Kingdom (WOSA 2021a).

The South African wine industry contributes significantly to the country's economy. It employs 269 096 people across the entire wine industry and accounts for 4% of global wine production, making it the world's eighth largest wine producer (WOSA 2021b). In 2020, the various operations and value-added activities of the wine supply chains contributed over R55 billion, or 12% of South Africa's GDP (WOSA 2021b).

Achieving sustainability in the wine industry is complex, as wine producers operate and compete in a highly traded local and international wine market. All activities that are carried out on a wine farm relate to sustainability – financial and environmental activities as well as all aspects of human resources (employees and the surrounding community) (Santini et al. 2013). For a business to be sustainable in the short and medium term, it needs to understand its potential business risks, as these are recognised as one of the largest threats to sustainability. Thus, risk management, as a tool, may lead to improved competitiveness and financial performance (Giannakis & Papadopoulos 2016).

Sustainability opens up a variety of research possibilities, including the development of a risk framework that can be used as a tool. It is relevant in South Africa that Principle 11 of the King IV report on governance observes that ‘the governing body should govern risk in a way that supports the organisation in setting and achieving its strategic objectives’ (Institute for Directors Southern Africa 2016). The report further recommends practices for conducting risk management and for measuring the performance and sustainability of a business from an economic, social and environmental perspective. While the King IV report lays down principles that all JSE-listed companies are required to adhere to, its recommendations aim to cover all businesses, regardless of their size.

The study contributes to the current body of knowledge by addressing the gap that exists in literature on the importance of risk management as a tool for sustainability in the wine producer’s operations. Supply chain risk assessment and management is an important concept for handling risks within the supply chain and this approach is gaining momentum across supply chains (Mvubu & Naude 2020). Although South African wine producers are aware of the risks they face, the severity of these risks and the measures they take to mitigate those risks, they do not conduct formal risk assessments (Naude & Badenhorst-Weiss 2020). This lack is not unique to wine producers and the wine industry, and applies to small and medium enterprises (SMEs) in general. Despite evidence that companies that implement risk management strategies are more likely to survive and expand, many SMEs in South Africa do not consider risk management to be critical for organisational success (Naude & Chiweshe 2017). There is, moreover, a lack of research exploring the sustainability-related risks in an integrated manner and developing risk management strategies to treat these risks (Giannakis & Papadopoulos 2016).

Within this context, the purpose of this article is to present a risk management framework that may be used as a tool for sustainability for the South African wine industry. In this article, ‘sustainability’ refers to the survival by a business managing and the integration of its financial, social and environmental strategies, together with risks, responsibilities and opportunities. The operational framework suggested by Naude and Chiweshe (2017), focused on four risk management process phases, namely risk identification,

risk evaluation, risk response, and risk monitoring and control, was used as a starting point and served as the foundation of the framework presented in this article. The data were collected through in-depth semi-structured interviews with participants at selected wine producers – who grow crops and use it to produce wine; the different categories of risks were defined and are incorporated in this proposed framework.

## Theoretical background

### Risk management

Risk management can be defined as a formal process that entails different approaches in order to identify risks, assess the probability of the risks arising, analyse the potential impact of the risks, develop strategies to mitigate them, and implement risk monitoring and control (Jacobs & Chase 2018; Rogers et al. 2015). These observed steps from the definition provide managers with strategic knowledge to help them select risk mitigation strategies that improve their businesses’ overall performance (Simba et al. 2017). However, it is important that risk management is carried out in an economical and cost-effective manner in order to manage risks efficiently (Badenhorst-Weiss, Van Biljon & Ambe 2017). Each step in the management of risks is described below.

### Risk identification

The identification of the risk is the first step in the risk management process. Identifying the origins of any possible internal or external risks is part of this procedure, which begins with an examination of the supply chain to determine where risks could occur and what might cause them (Hallikas & Lintukangas 2015; Zsidisin & Ritchie 2008). Simba et al. (2017) state that it is difficult to develop appropriate mitigation strategies without first identifying the risks. A vital part of this process is to ensure that, once the risks have been identified, these risks are registered and then monitored (Scarborough, Wilson & Zimmerman 2009).

### Risk analysis and assessment

The second step in risk management is a systematic process to predict the probability of a potential risk occurring and its effects on the business. Thus, this stage has two aspects: the probability that a risk will occur, and the extent of the effect on the business if the risk occurs (Ho et al. 2015). In this process, each risk must be assessed individually in order to determine an appropriate mitigation strategy so that failure during mitigation can be avoided (Sharma & Bhat 2014). Once this step is complete, appropriate strategies can be developed and adopted in the mitigation process (Simba et al. 2017).

### Risk response and mitigation strategy

The third step in the chain risk management process entails generating and reflecting on alternative solutions, evaluating and judging the merits of these solutions, deciding on suitable solutions, and then putting these solutions into action (Chang, Ellinger & Blackhurst 2015a). This procedure leads to the agreement on risk reduction techniques to minimise, reduce or mitigate the defined risks (Hoffmann, Schiele & Krabbendam

2012). Risk avoidance, risk assumption, risk elimination, risk reduction and risk transfer are all possible strategies. Risk avoidance is the process of taking steps to prevent a risk. Risk assumption happens when the party exposed to the risk simply acknowledges the risk and the potential losses; if the cost of taking action to mitigate a risk is high in comparison to the cost of the actual loss, this will be an appropriate strategy. Risk elimination involves taking steps to eliminate a risk. Risk reduction happens when steps are taken to minimise a risk – it attempts to lower the chances of a loss occurring or to lessen the impact of a loss that does occur. Risk transfer is the act of moving a risk to another entity, such as through a lease arrangement with a third party; for example, leasing motor vehicles enables the user of the equipment to transfer the risk of obsolescence to the owner (Badenhorst-Weiss et al. 2018; Paul, Sarker & Essam 2016, Sudeep & Srikanta 2014).

### Risk monitoring and evaluation

The fourth and final step in the risk management process entails tracking, overseeing and managing solutions, as well as evaluating their effect on a specific business area or the entire business (Chang et al. 2015a). Through risk monitoring and evaluation, it can be determined how the mitigation strategies are progressing, deviations and new preventative measures can be identified, and possible further risks predicted (Simba et al. 2017). Since risks and the severity of their effect can change over time, risk management is a dynamic and continuous process (Chang, Xu & Song 2015b).

### Supply chain operations reference model

The Supply Chain Operations Reference (SCOR) model was developed in 1996 and endorsed by the Supply Chain Council as the cross-industry standard diagnostic tool for supply chain management (APICS Dictionary 2019). The SCOR model is a management tool used to address, improve and communicate supply chain choices within a company as well as to customers and key suppliers. It comprises the six broad process categories of plan, source, make, deliver, return and enable (Hugos 2018). Any business in the overall supply chain that delivers a product or a service is involved in at least one of these categories (Hugos 2018; Jacobs & Chase 2018). Each of these categories is briefly explained.

#### Plan

The *plan* process covers the processes necessary strategically to manage a supply chain and is essential to the success of the other supply chain operations of source, make, deliver and return (Wisner, Tan & Leong 2016). The planning process includes demand and supply planning, balancing resources with requirements, establishing and communicating supply chain plans, planning of business rules, policies and procedures, data collection, Information Technology systems and databases, inventory, capital assets, transportation requirements and regulatory requirements (Hugos 2018; Stevenson 2021; Wisner et al. 2016). In the South African wine sector, the *plan* process refers to all facets of planning of the business and its operating activities. This category covers: planning for the business and its operations of the farm and

crop management, deciding on the procurement plan, establishing the bottling and packaging strategy, and projecting the sales and distribution of the wine (Naude 2019; Naude & Badenhorst-Weiss 2020).

#### Source

The *source* process includes the activities related to the procurement of materials and services to meet planned and actual demand (APICS 2017). This involves the selection of suppliers, the obtaining of quotes, the delivery tactics and payment processes, and the procedures for monitoring and strengthening the business's relationship with its suppliers (Badenhorst-Weiss et al. 2018; Johnson & Flynn 2020). In the South African wine sector, the source process includes the activities related to sourcing of materials, manpower, machinery and the services for the business (Naude 2019; Naude & Badenhorst-Weiss 2020).

#### Make

The *make* process includes activities related to producing the goods or providing a service to meet planned or actual demand (APICS 2017). This process includes scheduling the processes for the workers, coordinating the materials and plant and equipment to support the producing of the product, scheduling the activities that are required to produce goods on time, and the preparation for delivery (Stevenson 2021). In the South African wine sector, the *make* process includes all the activities of wine production, such as land management, vine management, crop management, harvesting, the wine production processes and the activities involved in the bottling and packaging of the wine (Naude 2019; Naude & Badenhorst-Weiss 2020).

#### Deliver

The *deliver* process is also known as the logistics aspect of the supply chain. Transporters are chosen to transport finished goods to storage warehouses and customers. These operations include activities such as planning and arranging the flow of information and goods through the supply network, designing and running a warehouse network, and managing the information systems that handle customer orders (Johnson & Flynn 2020). In the South African wine sector, the *deliver* process includes all aspects of sales customer invoicing, warehousing, sales, transportation of the wine to the distributor or customer, and after-sales service (Naude 2019).

#### Return

The *return* process provides support for customers who have problems with delivered products (APICS 2017). This process deals with returning or receiving defective products and excess products from customers (Hugos 2018; Jacobs & Chase 2018; Wisner et al. 2016). In the South African wine sector, the *return* process includes product returns and excess stock not required by the customer (Naude 2019; Naude & Badenhorst-Weiss 2020).

#### Enable

The *enable* process involves actions that support the design and management of the supply chain's planning and

execution processes. The *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). Examples include managing activities such as establishing and planning, maintaining, and monitoring information relationships, resources, assets, business rules and contracts required to operate supply chains (APICS 2017; Wisner et al. 2016). In the South African wine sector, the *enable* process includes the support, design, and management of the planning and execution processes of the supply chain (Naude 2019; Naude & Badenhorst-Weiss 2020).

Combining the six processes and their underlying activities is important to provide a quality product or service at a reasonable price. These six processes also provide a basis on how to manage and improve the components within the supply chain. Risk exists in each of these six processes. The six process categories of source, make, deliver, return and enable were used as the framework to examine the risks within the wine industry supply chain.

## Operational framework

Naude and Chiweshe (2017) present an operational risk management framework that SMEs could use (Figure 1). The four risk management process steps, namely risk identification, risk assessment, risk response and mitigation, and risk monitoring and control, form the foundation of this framework, presented across the tops of the table (Figure 1); the rows down the left side of the framework indicate the four broad risk categories of operational, market, technical

and financial risks. The four process steps of risk management are further broken down into subcategories.

### Risk identification

Identifying and understanding potential risk sources is the first step in the risk management process. There are three sections in the risk identification column: category, risk description and responsible person. The category column helps identify the general risk, the description column explains the specific risk, and the responsible person column identifies who will be in charge of managing and reducing the risk.

As shown in the rows of the framework (Figure 1), each potential risk area of the business, such as operational, market, technical and financial risks, can be populated. Naude and Chiweshe (2017:12) note that, depending on the size and nature of the business, risk categories would vary from one SME to the next. Hence, for the purpose of presenting a proposed risk framework as a tool for sustainability for the South African wine industry, these potential risk areas have been replaced by plan, make, source, deliver, return and enable, in line with the SCOR model.

### Risk assessment

The next step in the process is risk assessment. Three sub-categories have been added to the risk assessment column. The first column of the risk framework of risk assessment deals with the severity rating of the identified risk. Severity rating is sub-categorised according to the potential impact of the risk on various parts of the business, such as finances, health and safety, the natural environment, and the SME's

Risk identification			Risk assessment							Risk response and mitigation strategy	Risk monitoring and control
Category	Risk description	Responsible person	Severity rating (Scale 1–10)								
			Financial	Health and safety	Natural environment	Reputation (media)	Legal	Probability rating	Score		
<b>Operational risks:</b>											
	Production										
	Warehousing										
	Distribution										
<b>Market risks:</b>											
	Marketing										
<b>Technical risks</b>											
<b>Financial risks:</b>											
	Legal										
	General										

Source: Adapted from 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), 1–10.

FIGURE 1: Operational risk management framework.



reputation, or the potential legal implications. The risks are then ranked from 1 to 10 on a severity scale, with 10 being the most significant. The probability rating assigned to each risk is dealt with in the second column under risk assessment. On a scale of 1 to 10, businesses must assess the chance of this risk occurring. A score of 10 indicates that the risk is likely.

The risk is scored in the last column under risk assessment. The likelihood rating is then compounded by the severity risk rating. The higher the score, the more likely the risk is to materialise and affect the business. Each risk must be assigned a score, with the higher values indicating the more serious risks.

### Risk response and mitigation strategy

The risk response and mitigation strategy is the third step in the risk process framework. After each possible risk has been scored, they should be sorted and rated in order of importance. The risk management team can then work their way down the list dealing with the highest-scoring risks first.

### Risk monitoring and control

The fourth and final step will be to monitor the risks. This is a critical step since it can provide early warning of increasing risk levels, allowing the business to respond to changes and establish and change mitigation methods.

### Research methods

The purpose of this article is to present a proposed risk management framework that may be used as a tool for sustainability for the South African wine industry. In order to do this, the risks that threaten the sustainability of South African wine producers had to be identified. A case study approach was used because the study had to be focused on current events (Sekaran & Bougie 2019; Yin 2014). The target group for the study was the wine producers in the Stellenbosch wine region, South Africa's largest wine-producing region. There are 546 wineries in the country, of which 191 are situated in Stellenbosch. Wines of South Africa (WOSA 2018:31) notes that Stellenbosch includes five significant wine growing areas, namely Greater Simonsberg, Stellenbosch Berg, Helderberg, Stellenbosch Valley and the Bottelary Hills. A non-probability purposive sampling methodology was found to be suitable for selecting the wine producers. Ten participants at five wine-producing estates located in the five different wine-growing areas within the Stellenbosch region participated in the study.

In order to identify the risks wine producers face, data were collected through in-depth semi-structured interviews, using an interview guide and field notes taken during the interviews. Face-to-face semi-structured in-depth interviews were conducted, allowing the authors to probe and expand on the participants' responses. Several academics reviewed the interview guide for content validity as part of the ethical clearance procedure. The purpose was to fine-tune the questions so that participants would be able to answer them without difficulty, as well as to examine the validity of the

**TABLE 1:** List of participants.

Participant	Job title	Gender	Experience in wine industry	Wine producer estate
P1	Logistics Officer	Female	< 5 years	W1
P2	CEO and Cellar Master	Male	19 years	W1
P3	Owner and Sales & Marketing	Female	19 years	W2
P4	Winemaker	Female	< 5 years	W2
P5	Viticulturist	Male	22 years	W2
P6	Owner and Cellar Master	Male	21 years	W3
P7	Owner and Cellar Master	Male	35 years	W4
P8	Winemaker	Male	22 years	W4
P9	CEO and Financial Executive	Male	5 years	W5
P10	Cellar Master	Male	24 years	W5

questions so that the data collected would be reliable (Saunders, Lewis & Thornhill 2019). The interviews were recorded, the recordings transcribed verbatim, and the data cleaned for accuracy to ensure its trustworthiness. The data were analysed using thematic analysis. Ethical clearance through UNISA DESTTL (2018\_CEMS\_ESTTL\_005) was obtained. All participants had considerable experience in the wine industry (Table 1). In the list of the participants, pseudonyms are used for each participant and each wine producer estate to ensure anonymity.

Eight of the participants had viticulture expertise ranging from 19 to 35 years, while the owner at each wine producer estate had financial and business management skills. These participants were chosen for the study because of their in-depth knowledge of the operational tasks, challenges and risks at their wine-producing farms.

### Ethical considerations

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 04 June 2018 by the UNISA DESTTL Ethics Review Committee

### Results

The objective of the interviews was to identify the supply chain risks of the wine producers that threaten their sustainability or survival. This section presents the findings according to the thematic analysis. The key risk themes are plan, source, make, deliver, return and enable. The themes, sub-themes and codes are dealt with in the sections that follow.

#### Risk category 1 – Plan

This section encompasses the risks highlighted by participants in the business planning area, as well as all of its operations, from farming and crop management to wine sales and distribution. The findings revealed two main sub-themes, namely *demand vs supply* and *long-term investment*. The plan risks identified by each participant are indicated in Table 2.

*Demand vs supply* relates to managing and balancing product supply so as to avoid excess inventory or stock-outs. Excess inventory would result from fewer sales than planned and stock-outs from higher demand than planned:

'A lot of the customers will order now, but that will be stock for 6 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's a big challenge.' (Participant 6, Owner and Cellar Master, Male, 21 years experience)

'You could overproduce or under produce. We have had a few cases of underproduction as well that's quite tricky. What we do is, 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, CEO and Financial Executive, Male, 5 years experience)

'The South African and overseas customers are 'spoilt for choice' for wines and can move their purchases from producer to producer.' (Participant 3, Owner and Sales & Marketing, Female, 19 years experience)

*Long-term investment* is the risk that wine producers experience in investing in new vineyards. The risk is the uncertainty that consumers will buy the wine from the vineyard, as current and future tastes may change. Since investment in a new vineyard is significant, the challenge is to decide what cultivar to plant:

'You are planting over 3000 vines in a hectare. This little block here [pointing to a map] is a hectare. To plant a vineyard, it probably sets you back R250 000.' (Participant 7, Owner and Cellar Master, Male, 35 years experience)

'We are planning another vineyard now. While this vineyard is going to last 25 years, what is the demand going to be like in 25 years what will the style be? How can I know that?' (Participant 6, Owner and Cellar Master, Male, 21 years experience)

## Risk category 2 – Source

This section presents the risks identified by the participants in the source component of the business and its activities. The findings revealed two main sub-themes, namely *bought out grapes* and *dry goods*. The source risks identified by each participant are indicated in Table 3.

It was found that many wine producers acquire grapes for wine production (bought out grapes). The risk highlighted was the recent drought, which had resulted not only in a

shortage of grapes for purchase but also a substantial increase in the price of grapes:

'The prices of grapes have gone up substantially. It is now 2018 and because of the drought, everybody said that the 2018 grape yield would be 25% down. Everybody was saying – 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.' (Participant 3, Owner and Sales & Marketing, Female, 19 years experience)

'We could buy a year or two ago, at R5 000 to R7 000 per tonne. Now we pay R14 000 to R18 000 per tonne.' (Participant 5, Viticulturist, Male, 22 years experience)

'I have seen the prices double already in the last 6 months.' (Participant 10, Cellar Master, Male, 24 years experience)

*Dry goods* comprise all the items used in the wine-making process, as well as bottling and packaging of the wine. Items used in the production of wine include yeast and oak wine barrels used for wine maturation. Packing includes bottles, boxes, labels and corks. The risks highlighted in this area were the costs of the products, the lead time for these goods that resulted in the holding of excess stock by wine producers, and the poor quality of these items. Among the examples provided were weak and faulty bottles, labels that do not attach to bottles, cartons that collapse, and contaminated cork:

'On the sourcing side, bottles, boxes, capsules, barrels we tend to pay higher prices. The suppliers tend to work on high margins in general because it's a small industry. To give you an example, on average we are paying 40% more for our glass than what they are paying in Europe. And when you look at the costs of labour, the cost of raw materials, it doesn't even make sense.' (Participant 6, Owner and Cellar Master, Male, 21 years experience)

'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, Owner and Cellar Master, Male, 21 years experience)

'The problem is convenience because if we are 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, Owner and Cellar Master, Male, 35 years experience)

**TABLE 2:** Plan risks identified by participants.

Risk Category 1: Plan	Sub-theme	W1		W2		W3		W4		W5	
		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Demand versus supply	Forecasting			✓			✓	✓		✓	
	Planning			✓	✓		✓				✓
Investment	Vineyards						✓	✓			

**TABLE 3:** Source risks identified by participants.

Risk Category 2: Source	Sub-theme	W1		W2		W3		W4		W5	
		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Bought out grapes	Drought		✓	✓		✓					✓
Dry goods	Costs		✓	✓			✓	✓	✓	✓	✓
	Supply	✓		✓			✓	✓	✓		
	Quality	✓		✓		✓	✓	✓	✓		✓

‘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 quality of the bottles is very poor and we’ve also had labels that don’t stick on the bottles.’ (Participant 7, Owner and Cellar Master, Male, 35 years experience)

Participant 10 explained his move from cork to ‘fragmented cork’ 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’.

### Risk category 3 – Make

The risks identified by the participants in the *make* component of the business are presented in this section. All aspects of land, vine and crop management, as well as harvesting and all other wine-making processes, are included. The findings revealed five sub-themes, namely *costs*, *nature*, *infrastructure*, *in-process* and *human resources*. The *make* risks identified by each participant are indicated in Table 4.

High and increasing costs of all the farming activities were identified by participants as a significant risk. Land tending, planting, growing, vine tending, picking, labour, water, power and waste treatment are examples of farming activities.

Explaining the impact of costs increases, participant 6 commented:

‘It’s created pressure on the business. I mean obviously you can’t keep paying more than inflation. Our labour costs, if you look at it over the past 20 years has way outpaced the inflation level.’ (Participant 6, Owner and Cellar Master, Male, 21 years experience)

The yield or volume declines also have an impact on unit 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, CEO and Financial Executive, Male, 5 years experience)

The sub-theme *nature* covers the environmental concerns that winemakers must contend with in order to grow vines and grapes. A key risk was the negative impact of the drought on the yield of grapes. The picking of the berries when they are ripe and when the ambient temperature is the coolest was another key risk identified by the participants. The risk of disease (powdery and downy mildew) and pests (mealybug, stemborer and snout beetle) were also identified as risks. Another risk factor impacting wine producers is fire. Not only does fire burn the vines but also smoke damages the fruit (smoke taint):

‘In 2018 we were down about 20% and that was because of the drought.’ (Participant 6, Owner and Cellar Master, Male, 21 years experience)

The importance of ripeness was explained:

‘It affects the whole style of the wine potentially. Over ripe, we have a window where we have to pick and if we get delayed by a week, then your sugar jumps and your alcohol will end up a lot higher than you intended it to be. That can happen. You can lose market. Supermarkets won’t stock your wine, won’t shelve it if you have more than 14% alcohol level.’ (Participant 8, Winemaker, Male, 22 years experience)

‘Diseases, it’s basically oidium which is a powdery and downy mildew, so the two mildews are the two main diseases that we would be concerned about.’ (Participant 2, CEO and Cellar Master, Male, 19 years experience)

‘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 cm then the shoots are not well cemented to the main frame and they can be blown off quite easily.’ (Participant 10, Cellar Master, Male, 24 years experience)

‘You get a variety of pests; the most dangerous ones are called mealybug which is the carrier of the leaf-roll.’ (Participant 10, Cellar Master, Male, 24 years experience)

The sub-theme *infrastructure* covers all the risks associated with the infrastructure required for vine and grape growing, such as irrigation, power and use of land. *In-process* is a broad risk that

**TABLE 4:** Make risks identified by participants.

Risk Category 3: make	Sub-theme	W1		W2		W3		W4		W5	
		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Costs	–			✓			✓	✓		✓	
Nature	Drought		✓	✓		✓	✓			✓	✓
	Picking		✓	✓		✓		✓	✓		✓
	Disease		✓			✓	✓	✓			✓
	Wind, hail and frost			✓			✓	✓			✓
	Pests		✓			✓		✓			✓
	Fire			✓					✓		
Infrastructure	Irrigation			✓		✓		✓		✓	✓
	Electricity			✓			✓	✓	✓		
	Land						✓			✓	
In-process	Controls		✓	✓	✓		✓		✓		✓
Human resources	Industrial relations		✓			✓	✓	✓			✓
	Skills		✓	✓			✓				✓
	Safety				✓		✓		✓		
	Theft or damage			✓					✓		

is associated with the process activities during the wine-making process. These include the checking, testing and managing of the must to ensure that the wine develops correctly. With regard to this risk category, participants indicated the necessity of controlling the processes as well as the consequences if they are not adequately managed or become out of control. The risk is that this could result in spoiled wine. Finally, *human resources* includes the risks of industrial action or strikes, the retention of skills of winemaking, safety risks and the risks of damage and theft from employees.

### Risk category 4 – Deliver

The risks identified by the participants in the *deliver* component of the business are presented in this section. The category includes all actions related to the selling and delivery of wine. This would involve finished wine warehousing, invoicing, sales, delivery of the wine to the customer, and after-sales service. The findings revealed three sub-themes, namely *revenue*, *market* and *inventory*; the risks identified by each participant are indicated in Table 5.

A significant risk identified by the participants was that of *sales revenue*. It was noted that there was a negative correlation between input costs and selling price increases. In as much as selling prices increased annually, these were generally below the inflation level, as a consequence of the intense competition for wine in South Africa. Another challenge is the volatility of the rand and the difficulty of increasing wine prices once the product and price point have been established in the market. With regard to *costs*, participants highlighted the risk of high and increasing logistics and transportation costs:

‘The biggest thing is that there is a lot of competition out there and the other risk is obviously with consumers being under threat or pressure right now with economic conditions, they buy down so they are not willing to buy better quality at a higher price. They are looking for OK or good quality at a cheaper price.’ (Participant 9, CEO and Financial Executive, Male, 5 years experience)

‘We are always watching those logistic costs. One of the big things is selling on FOB [*free on board*] basis. FOB cost is a big part, a very big part for selling for wineries. It’s one factor that we are regularly

looking at because there are a lot of minimums in pricing FOB. We estimate that 2,5% of our revenue will be spent on FOB costs, which is pretty high, but a lot of wineries are spending a lot more on that.’ (Participant 10, Cellar Master, Male, 24 years experience)

Under the sub-theme *market*, a significant risk identified by all participants who interface with the customer is *bad debts*. Some producers sell to large wholesalers as well as restaurants and other small businesses. As a result, their risk profile increases. An example of bad debts was provided where restaurants started up and then closed:

‘We had some bad debts, it’s very much part of the industry, typical restaurants, opening up and closing down.’ (Participant 9, CEO and Financial Executive, Male, 5 years experience)

Two different types of risks were identified under *inventory*, namely *inventory damage* in the warehouse or during transportation, and *delays* in getting the wine to the consumer. Delivery delays can be as a result of strikes, weather conditions, road closure, service delivery protests and demonstrations.

### Risk category 5 – Return

The sub-theme *return* encompasses the activities associated with the returns of the product and of stock not required by the customer. The participants noted that product returns rarely occurred and that there were no risks around this area.

### Risk category 6 – Enable

The risks identified by the participants in the *enable* process of the business are presented in this section. This category includes all activities related to the support, design, planning and execution processes of the supply chain. The findings revealed two sub-themes, namely *profitability* and *cash flow*. The enable risks identified by each participant are indicated in Table 6.

With regard to *profitability*, it was found that all the participating wine estates were profitable; however, there were concerns that profitability was declining. Participants noted that the sustainability of many South African wine producers was threatened due to financial constraints. One of the reasons highlighted was the increasing annual

**TABLE 5:** Deliver risks identified by participants.

Risk Category 4: Deliver	Sub-theme	W1		W2		W3		W4		W5	
		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Revenue	Sales revenue		✓	✓		✓	✓	✓		✓	
	Costs						✓	✓		✓	✓
Market	Bad debts		✓	✓		✓	✓	✓		✓	
	Demand					✓	✓			✓	✓
Inventory	Damage									✓	✓
	Delays	✓							✓		

**TABLE 6:** Enable risks identified by participants.

Risk Category 6: Enable	Sub-theme	W1		W2		W3		W4		W5	
		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Financial	Profitability						✓	✓		✓	
	Cash flow		✓	✓			✓	✓		✓	



input costs, in line with or above the level of inflation in South Africa:

'Our biggest risk to our business is cost control because the inflationary pressures in South Africa, the inflation of labour. That's our biggest risk. 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 now, wine prices have been very, very sticky over the last 20 years, i.e. they have not had inflation increases. And that's a very big challenge to maintain profitability.' (Participant 6, Owner and Cellar Master, Male, 21 years experience)

'I think return on investment [*in the wine industry*] or return on equity is marginal in SA. It's very low. Most of the wine farms ... you get your 15%; the other 85% survive basically. There is probably another 30% who just break even and are sometimes profitable, sometimes not, and so on.' (Participant 9, CEO and Financial Executive, Male, 5 years experience).

The second sub-theme was that of *cash flow*, which was identified as another significant risk. The wine supply chain is long, and a 1-year investment might pay off in 3–5 years. Hence, the supply chain absorbs cash resources, with cash returns occurring only when the debtor pays for the wine – usually 30–90 days after delivery. It was found that wine producers require large capital resources, which can be obtained through investment or short-term borrowings such as overdrafts. However, banks are concerned about the wine business and extending of credit:

'But the wine business is an inherently risky business. Because it costs a lot to invest in a vineyard, especially if you are making red wine. But that feeds into the risk of things of 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, so if you have an issue it can really impact on your, on your cash flow.' (Participant 6, Owner and Cellar Master, Male, 21 years experience)

## Proposed operational risk framework

This section presents the proposed risk framework that can be used as a tool for sustainability for South African wine producers. It integrates the key risk categories of plan, source, make, deliver, return and enable with the risks identified from the interviews in the form of the themes, sub-themes and codes. These have been populated in the proposed risk framework (Figure 2) in the objectives and description of risk columns.

## Conclusion

To recap, the purpose of this article is to present a risk management framework that may be used as a tool for sustainability for South African wine producers. The operational framework presented by Naude and Chiweshe (2017:9) was utilised as a reference point and created the foundation for the framework presented in this article, which was based on the four risk management process steps of risk identification, risk assessment, risk response, and risk monitoring and control. This proposed framework

incorporates the many categories of risks identified through in-depth semi-structured interviews with participants at wineries. It summarises the key risk categories of *plan, source, make, deliver, return* and *enable* with the risks detailed under the description of the risks.

Although the participants in this study were aware of the risks they face, risk management is dependent on previous occurrences and experiences. The downside is that winemakers do not formally consider the future or potential risks that may occur. For this reason, Naude (2019:184) suggested that, because the wine industry is inherently risky, wine producers should implement a structured risk assessment and risk management procedure. This is key to the survival and sustainability of wine producers.

It has already been noted here that sustainability can be achieved through managing and integrating financial principles, and social and environmental strategies. However, achieving sustainability in the agricultural sector is complex as it involves everything that is done on the farm, including the economics, the environmental impact, human resources and the surrounding community. Within this context, the risk framework proposed here can be used as a tool for sustainability for South African wine producers. Various risks identified encompass financial risks (demand vs supply, costs, sales revenue, etc.), environmental risks (weather conditions, pests and diseases) and social risks (human resources).

The study is not without its limitations. Only one wine producer from each of Stellenbosch's five wine regions was included. Accordingly, the findings and the list of identified risks is not exhaustive and cannot be generalised across the whole wine-producing region of South Africa. Risks could differ from wine producer to wine producer and from country to country. The proposed risk framework is robust, allowing for identified risks to be included or excluded where necessary. Another limitation is that, since the management team at any wine producer is small, wine producers may view the undertaking of a formal risk assessment as a time-consuming exercise. It would, however, be possible for the process to be handled on an annual basis in only one day during a risk review session. It is suggested for future research that this study could be extended to all South African wine producers in order to (1) identify additional supply chain risks, (2) measure the extent of these risks and (3) explore how these risks can be mitigated.

This article makes a twofold contribution. Firstly, wine producers can use the proposed framework to assess and mitigate their risks, making it a tool for sustainability. Secondly, the proposed framework is expected to contribute to the existing body of knowledge on risk management and sustainability.

Risk management to achieve business success and sustainability is of great importance. As Gary Cohn (Harper 2011) wrote, 'if you don't invest in risk

Risk Identification			Risk assessment							Risk response and mitigation strategy	Risk monitoring and control
Category	Risk description	Responsible person	Severity rating (scale 1–10)								
			Financial	Health and safety	Natural environment	Reputation	Legal	Probability rating	Score		
<b>Plan</b>											
Demand vs supply	Forecasting – matching demand and supply										
	Planning of facility and processes										
Long-term investment	Planting new vineyards –changing market, customer tastes and demands										
<b>Source</b>											
Bought out grapes	Drought created shortage of grapes – raised prices of bought out grapes										
Dry goods (yeast, oak wine barrels, bottles, boxes, labels and corks)	Costs of product										
	On-time receipt of dry goods										
	Poor quality of dry goods										
<b>Make</b>											
Costs	High and increasing input costs of the farming activities										
Nature	Yield reductions caused by the drought										
	When to pick grapes										
	Effect of disease, i.e. mildew, on the vine and its products										
	Pests that damage the vines and spread along the rows										
	Wind, hail and frost damaging the flowers and the vine shoots										
	Fire resulting in burning of the vines and smoke taint										
Infrastructure	Inability to irrigate due to a water shortage										
	Interruption of electricity supply										
	Threat of ownership through possible land claims										
In-process	Managing in-process activities and the impact if the process gets out of control										
Human resources	Possibility of industrial action										
	Retention of skills of the winemaker										
	Safety of all staff in the wine-making process										
	Theft from producers										
<b>Deliver</b>											
Sales revenue	Low selling price increases vs inflationary cost increases										
	Exchange rate risk										
	Moving the price point of wine upwards										
Costs	Increasing logistics costs										
Market	Bad debts										
Inventory	Damage in the warehouses										
	Damage during shipment to the customer										
	Delays in delivery wine to the customer										
<b>Return</b>											
Nil											
<b>Enable</b>											
Financial	Decreasing profitability										
	Cash flow										

FIGURE 2: Proposed risk framework for the South African wine industry.

management, it doesn't matter what business you're in, it's a risky business'.

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## Authors' contributions

The research methodology and findings are derived from the master's study of R.T.N; M.J.N. was the project leader, made conceptual contributions and finalised the article and R.T.N. collected and analysed the primary and secondary data and wrote up the literature review.

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## Data availability

The data that support the findings of this study are available from the corresponding author, M.N. upon reasonable request.

## Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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