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Imperfect Fruit and Vegetables:
The impact of Woolworths Food aesthetic standards on post-harvest food waste in South Africa.

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Abstract

Approximately one third of all food produced is wasted in South Africa, with majority of this waste occurring at the post-harvest stage in the food supply chain (WWF, 2017). Food waste results in a host of negative environmental and socio-economic consequences such as greenhouse gas production, wasted resources, food insecurity and malnutrition (WWF, 2017; Blanckenberg, Fawole and Opara, 2022). Fruit and vegetables make up 44% of all wasted food in South Africa and an alarming amount of this waste is due to aesthetic or cosmetic quality standards imposed by retailers such as Woolworths South Africa (WWF, 2017; Blanckenberg et al, 2022). Despite its nutritional value, edible fruit and vegetables are discarded or dumped in landfill based purely on these superficial standards (Blanckenberg et al, 2022; Birau and Faure, 2017). This leads to economic, logistical, and moral burdens for stakeholders such as farmers earlier on in the food supply chain (Devin and Richards, 2018).

This research paper explores the effect of Woolworths aesthetic standards on post-harvest food waste in South Africa and the impact this has on Woolworths as a meaningful brand (Du Plooy-Cilliers, Davis and Bezuidenhout, 2014; The IIE, 2022). An interpretivist research approach that made use of qualitative research methods was conducted to gain an in-depth understanding of this phenomenon (Du Plooy-Cilliers *et al*, 2014). Qualitative content analysis was conducted to collect a non-probability purposive sample of artefacts such as company documents, a journal article and transcribed interview (Du Plooy-Cilliers *et al*, 2014). Due to lack of available data, artefacts and time constraints, the researcher delimited the research by using one fruit, namely the Packham's Triumph pear, as a case study for this research paper (Du Plooy-Cilliers *et al*, 2014). Using a hybrid, of inductive and deductive, approach the data set was coded and analysed following the six step method for thematic analysis outlined by Braun and Clarke (2006) (Du Plooy-Cilliers et al, 2014). The main themes identified from the thematic analysis were Perceived Quality, Supply Chain Inadequacies and Post-Harvest Food Waste (Braun and Clarke, 2006).

The findings from the thematic analysis of the data set indicated that aesthetic standards for fruit and vegetables adhered to by Woolworths do have a negative effect on the environment, socio-economic factors and stakeholders earlier in the food supply chain (see Food Forward SA Has Sustainable and Cost-Effective Solution to Address Hunger Crisis, 2021; Blanckenberg et al, 2022). Woolworths (2022) South Africa's value proposition is to provide customers with exceptional quality fruit and vegetables, therefore the business

adheres to aesthetic standards and government regulations for Class 1 fresh produce (Blanckenberg et al, 2022; Department Of Agriculture, Forestry And Fisheries, 2016). However, these aesthetic standards have a negative knock-on effect on post-harvest food waste on farms (see Food Forward SA Has Sustainable and Cost-Effective Solution to Address Hunger Crisis, 2021; Blanckenberg et al, 2022; Devin and Richards, 2018). Despite Woolworths (2021) efforts to be a meaningful, responsible and sustainable brand, the researcher argues that Woolworths is unintentionally amoral in its ethical management of stakeholder groups (Carroll, 2021). The findings indicated a need for government regulation that enables retailers such as Woolworths to sell imperfect fruit and vegetables as well as promotes redistribution of surplus food at the harvest level (see Food Forward SA Has Sustainable and Cost-Effective Solution to Address Hunger Crisis, 2021; Blanckenberg et al, 2022; Devin and Richards, 2018). This research paper provides insight into a critical problem which warrants further studies and primary research (WWF, 2018).

Introduction

According to the Department of Environment, Forestry and Fisheries (DEFF) and The Council for Scientific and Industrial Research (CSIR) (2021), approximately one third of all edible food in the world is lost or wasted each year. Frischmann and Mehra (2021) explain that, “Globally, 30 to 40 percent of food intended for human consumption is not eaten”. The total amount of edible food wasted throughout the food supply chain, from production to consumers, is estimated at 1.3 billion tons on a global scale (Singh and Singh, 2019; WWF, 2017). Conversely, the demand for food production is growing rapidly in order to meet the needs of an increasing global population (WWF,2017). Despite producing enough food to feed the entire global population, 800 million people around the world still go hungry on a daily basis due to food waste (WWF, 2017). Food waste is highly detrimental to the planet and has a multitude of negative effects such as water waste, food insecurity, economic implications and contributions to climate change (DEFF & CSIR, 2021).

This research paper investigates the implications of Woolworths Food’s aesthetics standards for fruit and vegetables on the post-harvest stage in the food supply chain in South Africa (The IIE, 2022). According to Porter, Reay, Bomberg and Higgins, (2018) cosmetic standards for fruit and vegetables imposed by retailers in the UK and Europe contribute to large volumes of avoidable on-farm food waste and loss which results in significant greenhouse gas emissions. In addition to greenhouse gas emissions produced from imperfect fruit and vegetables that are disposed of in landfills there are a multitude of negative environmental, socio-economic, and moral outcomes of unnecessary food waste, especially in food insecure and poverty-stricken nations such as South Africa (WWF, 2017; Porter *et al.*, 2018) Research has been conducted in other countries to investigate and understand the effects of supermarket cosmetic standards for fruit and vegetables on food waste and the knock-on effect of these earlier on in the food supply chain (Devin and Richards, 2018; Porter *et al.*, 2018; Yuan *et al.*, 2019). However, a gap in the research on this topic has been identified in South Africa and therefore necessitates study (WWF, 2017; The IIE, 2022).

The Woolworths food brand has been selected for this study due to the brand being synonymous with providing consumers high quality fresh produce (Woolworths, 2022). In addition to this Woolworths positions itself as a healthy and meaningful brand with a sustainability partnerships and food waste Corporate Social Responsibility initiatives in place to reduce food waste throughout the supply chain (Woolworths, 2021; WWF, 2016)

However, more research can be conducted into the aesthetic standards that Woolworths imposes on fresh fruit and vegetables and how these standards effect the farmers that supply the brand (Devin and Richards, 2018; WWF, 2018). Devin and Richards, (2018) explain that retailers, such as Woolworths Australia, claim corporate social responsibility kudos whilst simultaneously enforcing strict cosmetic standards for fresh produce that ultimately results in post-harvest food loss on farms, therefore shifting the food waste problem to players earlier in the food supply chain.

To investigate the above phenomena, the researcher used an interpretivist approach to conduct qualitative research (du Plooy-Cilliers, Davis and Bezuidenhout, 2014). The research design is cross-sectional making use of qualitative content analysis to gain an understanding into food-waste at a post-harvest level due to Woolworths' aesthetic standards for fruits and vegetables in South Africa (Du Plooy-Cilliers *et al,* 2014). Due to time, budget, and accessibility limitations a non-probability purposive sample of artefacts including company documents, government legislation, a journal article and transcribed interview has been selected for analysis (Du Plooy-Cilliers *et al*, 2014). The textual data collected was analysed using a hybrid approach to qualitative thematic analysis to determine themes relating to the research question (Du Plooy-Cilliers *et al*, 2014; Braun and Clarke, 2006). Finally, the researcher assessed Woolworths as a meaningful and sustainable brand in relation to Carroll's (1991) Pyramid of Corporate Social Responsibility (Cook, Enslin, Erwin, and Carmody, 2010).

Through conducting research on this topic in South Africa, we can obtain an understanding of the impact of Woolworth's actions in the larger food supply chain in South Africa (Devin and Richards, 2018). Making use of the central tenants outlined in the methodology section of this paper the researcher was able to gain insight into the existence of and reasons for fruit and vegetable aesthetic standards and the impact of these on post-harvest food waste (du Plooy-Cilliers, *et al*, 2014; Devin and Richards, 2018; The IIE, 2022). Ultimately, the aim of the research was to gain an understanding into the effect of Woolworths aesthetic standards on the post-harvest food waste in South Africa to contribute to the existing body of knowledge on the topic and motivate future studies aimed at exploring solutions to minimize avoidable food waste (Du Plooy-Cilliers *et al*; 2014; WWF, 2018).

Problem Statement

Drawing on the existing literature, the following problem has been identified: *Retailers impose aesthetic standards on fruit and vegetables which result in food wastage at the post-harvest stage of the food supply chain.*

Retailers claim that the demand for perfect fruit and vegetables from consumers lead them to set uncompromising aesthetic standards for fruit and vegetables (Devin and Richards, 2018; Finlayson, 2018). These cosmetic standards result in edible fruit and vegetables being discarded, before the produce even reaches supermarket shelves, due to their imperfect or sub-optimal appearance and regardless of their nutritional and flavour qualities (Birau and Faure, 2017; Stangherlin, Duarte Ribeiro and Barcellos, 2019). This food waste is therefore unnecessary and avoidable, as it is only discarded due to ingrained consumer and retailer beliefs about what is considered acceptable for fruit and vegetables on a purely superficial level (du Plooy-Cilliers et al, 2014; Porter et al., 2018; Varese, Cesarani and Wojnarowska, 2022).

Existing literature proposes that societal conditioning and power relations within the food supply chain result in cosmetic standards for fruit and vegetables which leads to needless food waste (Devin and Richards, 2018; Porter *et al*., 2018; Yuan *et al*., 2019; Mukherjee, Mukherjee and Iyer, 2021). The problem of avoidable food waste due to superficial appearances is amplified and unjust in South Africa where much of the population experiences food insecurity and poverty, and thus requires investigation, exposure, and eventual reform (Du Plooy-Cilliers et al, 2014; WWF, 2017).

Employing an interpretivist lens in this research paper assists in understanding how and why aesthetic standards for fruit and vegetables imposed by retailers impact post-harvest food waste and the environmental, economic, and societal cost of these standards (Du Plooy-Cilliers et al, 2014; Finlayson, 2018; Yuan et al., 2019). An exploratory study into the phenomena of aesthetic standards and the repercussion of food waste at a post-harvest level in the South African context help to identify key concepts, stakeholders and obtain new insights in an otherwise unknown area of research (Du Plooy-Cilliers *et al*, 2014).

Research Goal/Aim

This study uses an exploratory approach to examine the effect of Woolworths' aesthetic standards for fruit and vegetables on post-harvest food waste (du Plooy-Cilliers et al, 2014; The IIE, 2022). The aim of this research paper is to investigate the impact of Woolworths' fresh produce aesthetic requirements on food waste earlier on the food supply chain and Woolworths as a meaningful brand (Cook et al, 2010; du Plooy-Cilliers et al, 2014). The effects of said cosmetic standards may either detract or subtract from Woolworths' brand health (Cook et al, 2010). According to Carroll (1991) socially responsible brands adhere to economic, legal, ethical and philanthropic responsibilities across all stakeholders involved in the organisation. However, the actions of organisations may cause unintentional unethical effects elsewhere in the value chain (Carroll, 1991). Literature and global studies point to a negative effect of retailer cosmetic standards on food waste, this research paper aims to investigate this phenomenon on a local scale (du Plooy-Cilliers,et al, 2014; Devin and Richards, 2018; Porter et al, 2018).

To obtain insights into potential avoidable food waste at the post-harvest level on farms, it is necessary to research the knock-on effect of Woolworths' aesthetic standards on the brand's fruit and vegetable suppliers (du Plooy-Cilliers et al, 2014; Devin and Richards, 2018). The objectives of the proposed research is to identify if superficial standards are imposed on suppliers by Woolworths, why these standards exists and the effect they have on the volume of food waste experienced at a post-harvest level (du Plooy-Cilliers et al, 2014; The IIE, 2022). In addition to this, this research paper explores the actions Woolworths' takes to mitigate potential food waste due to superficial standards and the effect this has on the brand's meaning and corporate social responsibility initiatives (Woolworths, 2021; Devin and Richards, 2018; Carroll, 1991).

Research Questions

Research Question

The overarching guiding research question for the research problem statement is (Du Plooy-Cilliers et al, 2014):

1) **What is the effect of Woolworths Food's aesthetic standards for fruit and vegetables on post-harvest food waste in South Africa?**

Central Tenants

The following central tenants and related questions will assist in solving the research problem (The IIE, 2022):

1. *Existence* of Woolworths Food aesthetic standards:

   What are the Woolworths Food aesthetic/quality standards for fruit and vegetables?

2. *Reason* for aesthetic standards

   Why do Woolworths Food impose aesthetic standards for fruit and vegetables?

3. *Identify* Post-Harvest food waste:

   What happens to fruit and vegetables that fail to meet Woolworths aesthetic standards?

4. *Volume* of post-Harvest food waste:

   How much food is lost and wasted due to Woolworths Food aesthetic standards?

5. Woolworths as a *meaningful brand:*

What is Woolworths doing to mitigate/reduce sub-optimal food wastage at the post-harvest stage?

Literature Review

Theoretical framework

This section will evaluate the existing literature on food waste management in South Africa and Woolworths' potential impact on local food waste. The literature review will assist in contextualising the research problem and identifying the research gap (The IIE, 2022).
The existing literature and theory on food waste forms the basis and guide for this study (Du Plooy-Cilliers *et al*, 2014). An interpretivist research paradigm has been selected to understand the phenomena of food waste across the food chain in South Africa. In addition to this the Pyramid if Corporate Social Responsibility outlined by Carroll (1991) will act as the theoretical framework in which Woolworths is measured as a meaningful brand. According to Carroll (1991), socially responsible brands should uphold certain economical, legal, ethical and philanthropic standards and take responsibility for said standards across all stakeholders, such as customers, employees and suppliers, involved in the organisation.

The problem of food waste

In this research paper we will make use of the term "food waste" in the broadest sense that refers to all food lost and wasted across the supply chain from harvest to consumer level (Ocicka and Raźniewska, 2018; DEFF & CSIR, 2021). According to (Benton, Bieg, Harwatt, Pudasaini and Wellesley, 2021), the global food system is the primary cause for biodiversity loss as food production relies heavily on the use of land, water, and unsustainable practices. In addition to this, food production is a major contributor to climate change and greenhouse gas emissions (Benton *et al.*, 2021). Farming alone is estimated to contribute to 10 -35% of the global greenhouse gas emissions (Varese, Cesarani and Wojnarowska, 2022). Despite mounting pressure to feed the growing global population, one third of all edible food is still lost or wasted annually resulting in food insecurity and wasted resources (DEFF & CSIR, 2021). Furthermore, the decomposition of wasted food in landfills generates environmentally harmful methane gas (DEFF & CSIR, 2021). Thus, global food waste is a crucial problem that requires the attention and management of stakeholders across the food supply chain (Benton et al., 2021; Ocicka and Raźniewska, 2018; DEFF & CSIR, 2021). Investigating and taking action to reduce food waste is a Corporate Social Responsibility and sustainability issue for brands and companies (Devin and Richards, 2018; Ocicka and Raźniewska, 2018).

South Africa as a country has equally high levels of food waste, with an estimated third of all food being lost which amounts to 10 million tonnes per year (WWF, 2017; DEFF & CSIR, 2021). This is staggering in a country where poverty and food insecurity are rife (WWF, 2017). Food waste accounts for a fifth of South Africa's water usage and costs the country R61.5 billion each year. The WWF (2017), explain that 90% of South Africa's food waste ends up in landfill which contributes to greenhouse gasses as discussed above. According to the DEFF & CSIR (2021) more food is lost in the early stages of the food supply chain in developing countries, like South Africa, versus more food lost at the consumer level in developed countries. In South Africa 50% of all food wastage happens in the agricultural or post-harvest stage, compared to only 5% of wastage occurring at the consumer level (WWF, 2017). Most of the food lost in South Africa comprises out of fruits and vegetables (WWF, 2017). In the report Food Loss and Waste: Facts and Futures for South Africa, the WWF (2017:6) highlight that, "44% of fruit and vegetables is wasted in South Africa and most of it before it reaches the supermarket shelves".

Food waste due to retailer aesthetic standards

The loss of food in the fruit and vegetable in South Africa occurs at various points along the food supply chain, specifically at the agricultural production stage, the post-harvest stage, the processing and packaging stage, the distribution and the consumption stage (Oelofse, 2014). According to DEFF & CSIR (2021), 15-44% of fruits and vegetables are lost during the postharvest handling and storage stage. The main drivers of these post-harvest losses include poor forecasting, mechanical damage, poor harvesting techniques, storage failures, farm transportation and grading or quality specifications (DEFF & CSIR, 2021). For the purpose of this research paper, we will be investigating retail fruit and vegetable grading or quality specifications that result in perfectly edible food being lost (DEFF & CSIR, 2021; Mukherjee, Mukherjee and Iyer, 2021).

Varese, Cesarani and Wojnarowska, (2022), and Birau and Faure, (2017) explain that retail or industry aesthetic standards for fresh produce are a major contributor to post-harvest food waste on a global scale. These cosmetic standards have a knock-on effect earlier in the food supply chain, causing fresh produce suppliers or farmers to simply discard fruit and vegetables due to not meeting exact physical appearance standards such as colour, weight, and size (Devin and Richards, 2018; Varese, Cesarani and Wojnarowska, 2022; Yuan, Yi, Williams and Park, 2019). To quote Yuan et al (2019:2666), "Despite the perfect nutritional value of imperfect 'ugly' produce, they are either never harvested or discarded", resulting in

escalated food waste in the USA. Ocicka and Raźniewska (2018:552) classify “non-confomity” food waste, that fails to meet specifications, as one of the main five waste types in the food sector. To elaborate, approximately 20% of onions, 25% of apples and 13% of potatoes in the UK are simply discarded on superficial standards (Mukherjee, Mukherjee and Iyer, 2021).

These aesthetic standards for fruit and vegetables result in avoidable food and resource waste as well as greenhouse gas emissions (Varese, Cesarani and Wojnarowska, 2022). The fruit and vegetables that fail to meet retailers’ strict visual standards are equal to the acceptable looking produce in all other ways such as taste and nutritional value, yet despite this an estimated 20-40% of farmers fresh produce is lost due to these standards in the US alone (Birau and Faure, 2017; Febry Afrianto, 2022) For the purpose of this research paper, we will refer to these fruits and vegetables as “imperfect” fresh produce (Stangherlin, Duarte Ribeiro and Barcellos, 2019). Through a review of current literature, imperfect fresh produce is mentioned as a cause of post-harvest food loss in South Africa, however limited data exists on the topic (WWF, 2017, 2018).

Corporate Social Responsibility and the food supply chain

The question that the existing literature poses is; who is to blame for the food wastage that occurs due to aesthetic standards set by retailers, such as Woolworths (WWF, 2017; Devin and Richards, 2018)? Retailers generally maintain that cosmetic standards are set to meet the expectations of their consumers and imperfect fruit and vegetables should be the responsibility of the farmers or suppliers of fresh produce (Devin and Richards, 2018; Yuan *et al.*, 2019; Huang *et al.*, 2021; Mukherjee, Mukherjee and Iyer, 2021). Finlayson, (2018:168) argues that “a shift in consumer preferences, an expectation for ‘perfect’ fruits and vegetables” has resulted in retailers setting strict cosmetic standards for fresh produce. Research conducted by (Huang, Manning, Wood, James, Millington, Grigoriadis and Ward, 2021) revealed that some retailers maintained that selling sup-optimal or imperfect fruit and vegetables and relaxing their cosmetic standards would be in contradiction with their brand’s customer value proposition of high quality. One can derive that a brand such as Woolworths South Africa, which is synonymous with high quality fresh produce may therefore face similar consumer perception challenges (King and Thobela, 2014; WWF, 2017; Huang et al., 2021; Carroll, 1991). Consequently, many retailers continue to implement strict aesthetic standards for fresh produce, shifting the responsibility of imperfect food waste onto farmers earlier in the food chain (Devin and Richards, 2018). However, this creates a larger problem, as the

WWF explains (2018:23) “Farmers don’t have the resources to undertake surplus food redistribution themselves and it is often ploughed back into the fields, or rots on farms”.

Devin & Richards (2018) explore the corporate social responsibility (CSR) and power relations of the food supply chain in the research paper; *Food Waste, Power, and Corporate Social Responsibility in the Australian Food Supply Chain*. The research revealed that retailers, specifically Woolworths Australia and Coles, action various sustainable practices to reduce food waste while simultaneously implementing aesthetic standards that ultimately result in high levels of food waste earlier in the supply chain (Devin and Richards, 2018). The findings from in-depth interviews with food supply, retail and rescue participants and document analysis exposed structural power dynamics that exist within the food supply chain (Devin and Richards, 2018). Large-scale supermarket brands such as Woolworths Australia maintain CSR kudos for actions and statements around food waste and sustainability, however these brands’ strict cosmetic quality assurance standards leave weaker supply chain players, in this case farmers, with the moral and economic burden of mass food waste (Devin and Richards, 2018). This raises the question of how far back in the supply chain should a brand’s responsibility go for it to be to truly sustainable or meaningful? (Devin and Richards, 2018; Carroll, 1991). According to Carroll (1991) organisations should act responsibly and ethically across all stakeholders involved in the organisation, such as suppliers and customers, without prioritising the interests of one group of stakeholders over others. Moreover, socially responsible organisations or brands should not compromise ethical responsibilities and behaviours for legal regulations or economic goals (Carroll, 1991). Participants in Devin and Richards (2018) study mentioned that although the main reason for aesthetic fresh produce standards may be consumer demands, other factors such as profit drive supermarket private standards.

Woolworths South Africa as a meaningful brand

As part of their Corporate Social Responsibility policy Woolworths South Africa formalised their commitment to sustainability to make a positive difference in key areas including farming, water, transformation, and waste in the year 2007 (King and Thobela, 2014). Woolworths’ current food waste position statement claims that the company is, “Committed to finding ways to reduce food waste and promote food security” (Woolworths, 2021:1). This position statement mentions working with supply chain partners to improve sustainable framing, packaging, labelling and surplus food (Woolworths, 2021). The brand mentions minimising post-harvest fresh produce waste by making use of sub optimal fruits and

vegetables in prepared meals like bakes and soups (Woolworths, 2021). However, there is no mention of relaxing their cosmetic standards for fresh produce (Woolworths, 2021).

A case study conducted by the WWF in 2015 (WWF, 2017) tracked spinach through the entire Woolworths supply chain to identify where the most wastage occurred. The highest levels of waste occurred on the farm during the agriculture and post-harvest stage (WWF, 2017). In the post-harvest and processing stage the waste was generally caused by quality issues in that the spinach failed to meet Woolworths' quality and size specifications (WWF, 2017). According to dos Santos, Svensson and Padin, (2013), Woolworths South Africa claims to take "responsibility for the entire lifecycle of their products including the reduction of direct environmental impacts", however more research needs to be conducted on the impact of the brand's aesthetic standards on stakeholders earlier on in the value chain (Carroll, 1991; Devin & Richards, 2018). Futhermore, additional data is required on how the Woolworths brand mitigates potential unethical consequences of their aesthetic standards (Carroll, 1991).

Solutions

Solutions to post-harvest food waste of imperfect fresh produce have been studied throughout the literature. Food rescue organisations, such as Food Forward in South Africa, operate to save surplus food that is discarded purely on cosmetic standards (Devin and Richards, 2018; WWF, 2018). According to the WWF (2018) it should be the responsibility of the farmers as well as the retailers to partner with food rescue organisations to reduce food waste. However, both Devin & Richards (2018:206) and the WWF (2018) argue that food rescue organisations should not act as a "band-aid solution" and distract from the initial waste that could be prevented by changing retail policy and other important actions to reduce food waste. Recently a few supermarkets across the world, have started to strategise ways to reduce food waste by marketing "wonky" or "ugly" fruits and vegetables to customers (Birau and Faure, 2017; Stangherlin, Duarte Ribeiro and Barcellos, 2019; Aramyan et al., 2021). One such initiative was the successful advertising campaign by French retailer Intermarche called "Inglorious fruits and vegetables" that promoted ugly and misshapen produce (Birau and Faure, 2017; Stangherlin, Duarte Ribeiro and Barcellos, 2019:2398) The campaign garnered international attention by proving that consumer perceptions can be changed if people are educated about the unnecessary food waste created by imperfect fruits and vegetables (Birau and Faure, 2017; Stangherlin, Duarte Ribeiro and Barcellos, 2019) .

Conclusion

In conclusion, the food supply chain on a global and local level is a complex and dynamic system (Patidar, Shukla and Sukhwani, 2021). Food waste occurs throughout the supply chain in South Africa and actions are required from all stakeholders to mitigate avoidable food loss and waste (WWF, 2017). Majority of the food waste in South Africa occurs at the pre-consumer stage, especially in the agricultural and post-harvest level, where edible fruits and vegetable are discarded based on appearance (WWF, 2017, 2018; DEFF & CSIR, 2021). Woolworths South Africa is known as a sustainable-focused brand that provides high quality fresh produce and therefore has strict quality and aesthetic standards (King & Thobela, 2014; WWF, 2017; Woolworths, 2021). However, little research has been done to question the amount of food waste created by these standards in the post-harvest stage of the South African food supply chain. In South Africa, there is a lack of knowledge and information on food waste in general, and more specifically a lack of accurate transparent data on the volumes and causes of food waste occurring at the different stages in the supply chain (WWF, 2017, 2018). Researching the role of Woolworths' cosmetic standards on food waste earlier in the food supply chain can help to uncover information that may assist with finding solutions to the problem of avoidable food waste (Du Plooy-Cilliers et al, 2014).

Research Paradigm

According to Du Plooy-Cilliers et al (2014), the three dominant research paradigms, or traditions, are positivism, interpretivism and critical realism. The positivist research tradition is based on hypotheses and empirical evidence (Du Plooy-Cilliers et al, 2014; The IIE, 2022). Du Plooy-Cilliers et al (2014:25), explain that “positivists believe that valid knowledge can only be gained from objective, observable (empirical) evidence”. Positivists formulate generalisations and are of the opinion that one factual reality exists and that all causes have the same effect on all people or objects (Du Plooy-Cilliers et al, 2014; The IIE 2022).Therefore, positivists make use of quantitative research methods such as statistical analysis and laboratory experiments that assist them in recoding empirical date (Du Plooy-Cilliers et al, 2014).

In contrary to positivism, Interpretivism is based on the study of human consciousness and understanding the subjective nature of human behaviour (Du Plooy-Cilliers et al, 2014; The IIE, 2022). Du Plooy-Cilliers et al (2014:29) elaborate that, “interpretivists challenge the idea of objective knowledge and objective truth”. Therefore interpretivists believe that truth and facts are based on the meaning people give them and the social context in which they exist (Du Plooy-Cilliers et al, 2014). Interpretivists seek to understand and describe social phenomena and people’s opinions or experiences (Du Plooy-Cilliers et al, 2014). Interpretivists make use of qualitative research methods such as interviews, focus groups and qualitative content analysis that assists them in collecting in-depth information that help them formulate theories based on their findings (Du Plooy-Cilliers et al, 2014; The IIE, 2022).

The third research tradition is that of critical realism which takes aspects of both positivism and interpretivism in order to question and change accepted realities (Du Plooy-Cilliers et al, 2014; The IIE, 2022). Critical Realism is the research paradigm that will be employed in this research paper, and therefore will be discussed in-depth. Akin to positivism, Critical realism acknowledges that a fixed reality does exist- however “the critical realists propose that our knowledge of reality is a result of social conditioning (Du Plooy-Cilliers et al, 2014:31). The core aim of critical realists is to make a positive change in society by empowering people through their research (Du Plooy-Cilliers et al, 2014). For this reason critical realists can often be considered as activists in society (The IIE, 2022).

This research paper will make use of the interpretivist research paradigm to explore the effect of Woolworths aesthetic standards on post-harvest food waste in South Africa (Du

Plooy-Cilliers et al, 2014). Employing an interpretivist lens assists in making sense of the social dynamics and stakeholder perspectives at play within food supply chain (Du Plooy-Cilliers *et al*, 2014; Devin and Richards, 2018). The primary aim of this research paper is to gain an in-depth understanding of the reasons behind Woolworths aesthetic standards, the consequences of such on post-harvest food waste and Woolworths as a meaningful and socially responsible brand (Carroll, 1991; du Plooy-Cilliers et al, 2014). According to According to Du Plooy-Cilliers et al (2014) and The IIE (2022), the concept of epistemology pertains to the nature of knowing and what is considered knowledge. From an epistemological position interpretivists accept that knowledge is not objective but rather embedded in social context and human interpretation of information (Du Plooy-Cilliers et al, 2014). Thus, the data collected in this research paper will be analysed within the context it was created and the sample selected by the researcher (Du Plooy-Cilliers et al, 2014).

Ontology, or the study of existence and how we understand what is real, is again subjective according to the interpretivist researcher (Du Plooy-Cilliers et al, 2014). In other words, people's experience of reality depends on their beliefs, experiences and perceptions and thus experiences may differ between people (Du Plooy-Cilliers et al, 2014; The IIE; 2022). In exploring the impact of Woolworths aesthetic standards on post-harvest food waste this interpretivist ontological position will be employed to understand the different perspectives and experiences of participants or stakeholders involved in the phenomenon (Du Plooy-Cilliers et al, 2014; Devin and Richards, 2018). For example, aesthetically pleasing fruit and vegetables may be an important factor for Woolworths customers in comparison to those who are nutritionally food insecure or food rescue organisations (Devin and Richards, 2018; Food Forward SA, 2022).

Axiology is the study of values and value judgement and from the interpretivist position, axiology is not value free (The IIE, 2022; Du Plooy-Cilliers *et al*, 2014). Du Plooy-Cilliers (2014:31), explains that interpretivists "openly discuss the values that shape their research, including their own interpretations and those of participants". In so much that the researcher should be aware of their personal values and perspectives (Du Plooy-Cilliers *et al*, 2014). The personal nature of an interpretivism makes it impossible to separate values from research (Du Plooy-Cilliers *et al*, 2014). It is these values that shape the unique realities of participants and their interaction with each other and the world around them which interpretivist researchers aim to explore (du Plooy-Cilliers, et al, 2014). In order to conduct the research using an interpretivist lens, the researcher will make use of qualitative research and analysis methods (Du Plooy-Cilliers et al, 2014). Qualitative research methods involve the study of words and their meaning that highlight the social principles and behaviours of

the research sample, instead of statistics or numbers found in quantitative research (Du Plooy-Cilliers et al, 2014). The research methodology for this research paper will be discussed in depth in the section below.

Research Methodology

To gain a deeper understanding of post-harvest food waste due to fruit and vegetable aesthetic standards from an interpretivist viewpoint, this research paper made use of qualitative research methods (Du Plooy-Cilliers et al, 2014; Devin and Richards, 2018). According to Du Plooy-Cilliers *et al* (2014:30) qualitative research "emphasizes words rather than numbers" to gain insight into multidimensional social situations and realities. Food waste that occurs throughout the food supply chain is a result of various factors including power dynamics between stakeholders and societal beliefs about fresh produce, and therefore warrants the use of subjective exploratory research (Devin and Richards, 2018; Porter *et al*., 2018). Devin and Richards (2018) made use of an interpretivist perspective and qualitative research methods in their paper *Food Waste, Power, and Corporate Social Responsibility in the Australian Food Chain*. The research methodology employed by Devin and Richards (2018), has proven to be successful and inspired the direction of the methodology conducted in this paper. Due to time, budget, and logistical constraints the overall research design of this paper is cross sectional (Du Plooy-Cilliers et al, 2014; The IIE, 2022). Thus, the research is aimed at gaining an understanding of the relationship between Woolworths aesthetic standards and post-harvest food waste at a specific point in time (The IIE, 2022).

Sampling

The research question and problem statement guided the sampling strategy for this research paper (Du Plooy-Cilliers *et al*, 2014). Due to the niche problem of food waste on farms as a repercussion of cosmetic standards and exploring the role Woolworths South Africa plays in this phenomenon, a non-probability sample was best suited for this research paper (Du Plooy-Cilliers *et al*, 2014). Du Plooy-Cilliers *et al* (2018:137) explain that a non-probability sample is often used in qualitative research to "gain an in-depth understanding of the research problem that we are exploring". Additionally, the complete population involved in the social phenomena outlined by the research question was difficult to determine as well as access due to lack of transparent data on the topic (Du Plooy-Cilliers et al, 2014; WWF, 2018; Devin and Richards, 2018). Therefore, a non-probability purposive sample of selected artefacts that best meet the parameters and aim of the research was adopted (Du Plooy-Cilliers *et al*, 2014; Devin and Richards, 2018).

Due to the limited data and information available on the topic of aesthetic standards for fruit and vegetables in South Africa the researcher has decided to use one fruit, namely the

Packham's Triumph Pear, as a case study for this research project (WWF, 2018; Blanckenberg, Fawole and Opara, 2022). The sample was selected from the population of available secondary sources according to the artefact's relevance to the research question (Du Plooy-Cilliers *et al*, 2014; Devin and Richards, 2018). The non-probability purposive sample selected for qualitative thematic analysis consists of the following transcribed or textual documents (Du Plooy-Cilliers *et al*, 2014):

1. **Company Position Statement:** Woolworths (2021). *Food Waste and Food Security Position Statement.*
2. **Company Policy:** Woolworths Holdings Limited (2022). *Our Purpose, Vision And Values.*
3. **Company Webpage:** Woolworths Online Store (2022). *Ripe & Ready Juicy Pears 6 Pk.*
4. **Interview:** Interview With Food Forward South Africa Managing Director, Andy Du Plessis, On Newzroom Afrika (2021). *Food Forward SA Has Sustainable and Cost-Effective Solution To Address Hunger Crisis.*
5. **Journal Article:** . Blanckenberg A., Fawole O., and Opara U. (2022) *Postharvest Losses In Quantity And Quality Of Pear (Cv. Packham's Triumph) Along The Supply Chain And Associated Economic, Environmental And Resource Impacts. Sustainability (Switzerland) 14(2).*
6. **Governmental Legislature:** Department Of Agriculture, Forestry And Fisheries (2016). *Regulations Relating To The Grading, Packing And Marking Of Pears Destined For Sale In The Republic Of South Africa.*

These documents have been attached as appendices to this research paper and the original sources referenced in the research paper reference list.

Data Collection

The qualitative data collection method of content analysis that includes company documents, websites, government regulations, interviews and previous studies relating to post-harvest food waste and Woolworths aesthetic standards for fruit and vegetables was utilized in this research paper (Du Plooy-Cilliers et al, 2014; Devin and Richards, 2018). According to Du Plooy-Cilliers et al (2014:168), "Content analysis is a data collection technique as well as a data analysis technique". In this research paper qualitative content analysis will be used to

collect data from the selected sample outlined allowing the researcher to interpret the content to identify subjective patterns and themes (Du Plooy-Cilliers et al, 2014).

Devin and Richards (2018) explain that document analysis proved useful in gaining an understanding of supermarkets' corporate responsibility and sustainability claims and how these relate to the issue of food waste. Similarly, performing a content analysis of Woolworths South Africa's sustainability practices within the context of food waste and aesthetic standards aids in understanding the brand's policies (Du Plooy-Cilliers et al, 2014; Devin and Richards, 2018). For this research paper three Woolworths (2022) artefacts have been collected for analysis – namely the company position statement, company purpose, vision and values and textual data from a web page on the company's online store.

Due to limitations on access to participants for primary research interviews initially proposed by the researcher, a secondary research approach was utilised (Du Plooy-Cilliers et al, 2014). This involved the collection of a recorded interview with a representative from a South African food rescue organisation on the topic of food waste in the country (see Food Forward SA has sustainable and cost-effective solution to address hunger crisis, 2021). This interview, conducted by news channel Newzroom Afrika, with Andy Du Plessis (Managing Director of Food Forward South Africa), was recorded and uploaded to YouTube on 22 September 2021. According to Devin and Richards (2018:203) who made use of interviews for their study, "a non-probability, purposive sampling strategy was deployed to target actors involved in food supply, retail, and food rescue". Similarly, the interview with Andy Du Plessis of Food Forward was selected because it possesses characteristics that are important to the research question (du Plooy-Cilliers et al, 2014). Futhermore, Andy Du Plessis has valuable insight to share due to Food Forward's interaction with the food supply chain in South Africa and exposure to the research problem (Devin and Richards, 2018).

As mentioned in the sampling section above, the decision was made to collect data on the Packham's Triumph Pear variety to use this as a case study for the research paper. This decision stems from the limited data available on aesthetic standards for fruit and vegetables and post-harvest food waste, as well as the need to delimit the scope of the data collected due to research constraints (WWF, 2018; du Plooy-Cilliers et al, 2014). An extensive search through the research population led to the collection of the quantitative study; *Postharvest Losses in Quantity and Quality of Pear (cv. Packham's Triumph) along the Supply Chain and Associated Economic, Environmental and Resource Impacts*, published in 2022 by Blanckenberg, Fawole and Opara (du Plooy-Cilliers et al, 2014). This paper quantifies the loss of Packham's Pears across the food supply chain in South Africa and was selected

based on its relevance to the research question and central tenants especially regarding the volume of post-harvest food waste (Blanckenberg et al, 2022). To supplement the above data set, the following government regulations were sourced from the South African Department of Agriculture, Forestry and Fisheries; *Regulations Relating To The Grading, Packing And Marking Of Pears Destined For Sale In The Republic Of South Africa* (2016). This document assisted in contextualising the selected sample and completed the data set (Braun and Clarke, 2006).

Research Analysis

Thematic Analysis

As discussed above, content analysis is both a data collection method and a data analysis method (Du Plooy-Cilliers *et al*, 2014). The data collected has been analysed from an interpretivist perspective, which is subjective, or hermeneutic, in nature and is aimed at gaining an in-depth understanding of the experiences and views of the interviewee and artefacts such as company policy documents (Du Plooy-Cilliers *et al*, 2014). Qualitative thematic analysis has been conducted to interpret the data set collected from the research sample (Du Plooy-Cilliers *et al*, 2014; Braun and Clarke, 2006). The renowned seminal paper by Braun and Clarke (2006), *Using Thematic Analysis in Psychology*, outlines a six step process for conducting thematic analysis in qualitative studies. The methodology outlined in Braun and Clarke's (2006) paper provided the guide for the data analysis in this research paper. According to Braun and Clarke (2006:79) "Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data". Thematic analysis is an active process in which the researcher identifies themes and patterns across the entire data set (Braun and Clarke, 2006). Furthermore, thematic analysis is used to explore the meaning of data by identifying overt and covert concepts embedded in the text (Du Plooy-Cilliers *et al*, 2014; Braun and Clarke, 2006).

A hybrid of inductive and deductive thematic analysis was implemented when analysing the data set (Du Plooy-Cilliers *et al*, 2014; Braun and Clarke, 2006; Fereday et al., 2006). The gap in research on the impact of retailer aesthetic standards for fruit and vegetables on post-harvest food waste, necessitates an inductive approach whereby situation specific data is analysed to develop general assumptions or theories about the topic (Du Plooy-Cilliers *et al*, 2014; Devin and Richards, 2018). Braun and Clarke (2006:83) explain that, "an inductive approach means the themes identified are strongly linked to the data themselves". However, in this research paper the research question is the golden thread that runs through the entire study, and therefore the data has been coded and analysed with the research question and central tenants in mind (Braun and Clarke, 2006; du Plooy-Cilliers, Davis and Bezuidenhout, 2014). Belotto (2018:2624) refers to this strategy of coding data extracts around the research questions as "structural coding". This method was useful in reducing the number of codes, given the time limitations of this research project, and provided a "context to create categories of codes or code families" that are related to the research questions (Belotto, 2018:2625).

Analysis Process

The following six-step method, outlined by Braun and Clarke (2006), for thematic analysis was conducted in order to analyse the data set:

Step 1: Familiarization and Transcription of Data

In the initial phase of analysis the researcher transcribed the verbal interview data collected and read and re-read all textual data collected (Braun and Clarke, 2006). According to Braun and Clarke (2006), it is critical to immerse oneself in the data from the onset of the analysis process because ideas for potential codes and themes are likely to begin to take shape at this stage.

Step 2: Initial Coding

Du Plooy-Cilliers *et al* (2014:235) refer to the process of coding as grouping data into categories of meaning which is referred to as "indexing textual units". In the initial phase of coding the data, the researcher assigned codes to identify sematic features of the data that are relevant to the research questions and the overall aim of the research project (Braun and Clarke, 2006). Coding assists the researcher in organising the data to identify broader prevalent themes (Braun and Clarke, 2006) For example the major themes identified from coded data in Devin and Richards' (2018:203) study included "relevance of food standards", "geographies of waste" and power and Corporate Social Responsibility (Du Plooy-Cilliers *et al*, 2014).

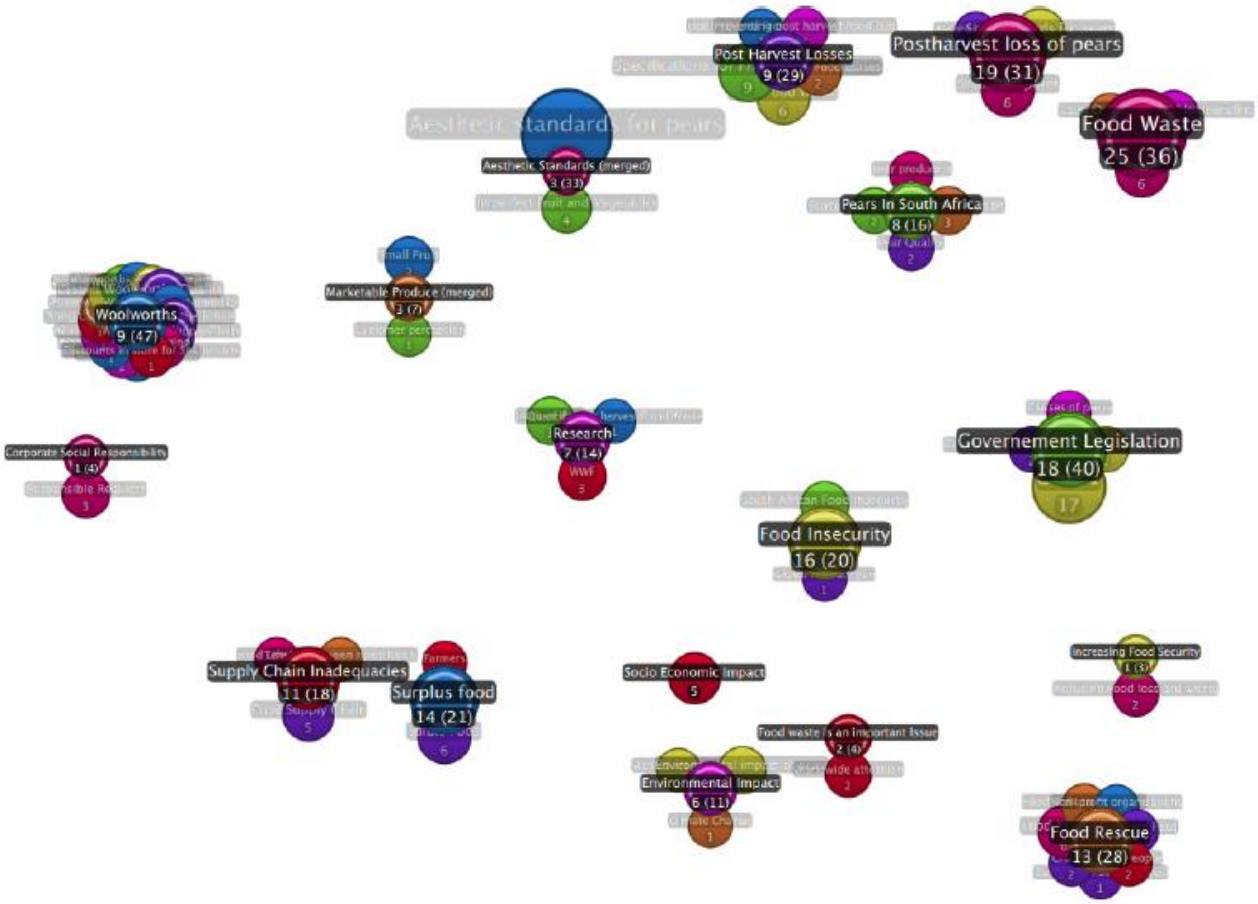
The researcher made use of Quirkos (2022) qualitative analysis software to assist in the coding process. With the aid of Quirkos (2022) software the data set was coded according to units of meaning stemming from the data itself and relating to the research questions (Braun and Clarke, 2006; Belotto, 2018). It is important to note that although the entire data set was considered and read, only sections of the data set that are relevant to the research question were coded for this research paper (Braun and Clarke, 2006). Extracts of data, such as sentences, words or paragraphs, were coded by the researcher into categories (also called codes or "quirks" in Quirkos) using the Quirkos application (Quirkos, 2022). The Quirkos software is a useful tool to help organise codes and visualize potential patterns (Quirkos, 2022; Braun and Clarke, 2006). In total 391 extracts of data were coded into 93 codes or categories. The final coded data can be found in the Quirkos report in the appendices section. Below is a table of the ten most prevalent codes in the data set:

Code Name (referred to as Quirks in the Quirkos (2022) software)	Number of data extracts coded using this category of meaning
Aesthetic standards for pears	27
Food waste	25
Post-harvest losses of pears	20
Government Legislation	18
Class 1	17
Food Insecurity	16
Surplus Food	14
Food Rescue	14
Supply Chain Inadequacies	12
Specifications for Fruit and Vegetables	9

Step 3: Looking for Themes

In this phase the initial codes were considered and sorted into groups of overarching related categories or concepts (Braun and Clarke, 2006). Using the Quirkos (2022) application, the codes were sorted by placing specific codes as sub-themes under overarching themes, or codes, identified by the researcher (Braun and Clarke, 2006). Quirkos (2022) identifies this relationship between codes as a "parent, child and grandchild" categories. According to Braun and Clarke, (2006:89), in this phase the researcher begins, "to analyse your codes and consider how different codes may combine to form an overarching theme". The authors also explain that eventually initial codes may become main themes, subthemes or be discarded completely (Braun and Clarke, 2006). Once certain codes were divided and placed into overarching parent code groups or initial themes, a visual representation of these dominant themes started to develop on the Quirkos (2022) application (Braun and Clarke, 2006). This early phase of this visualization has been captured in the image from Quirkos (2022) application referred to as Figure 1 (Braun and Clarke, 2006):

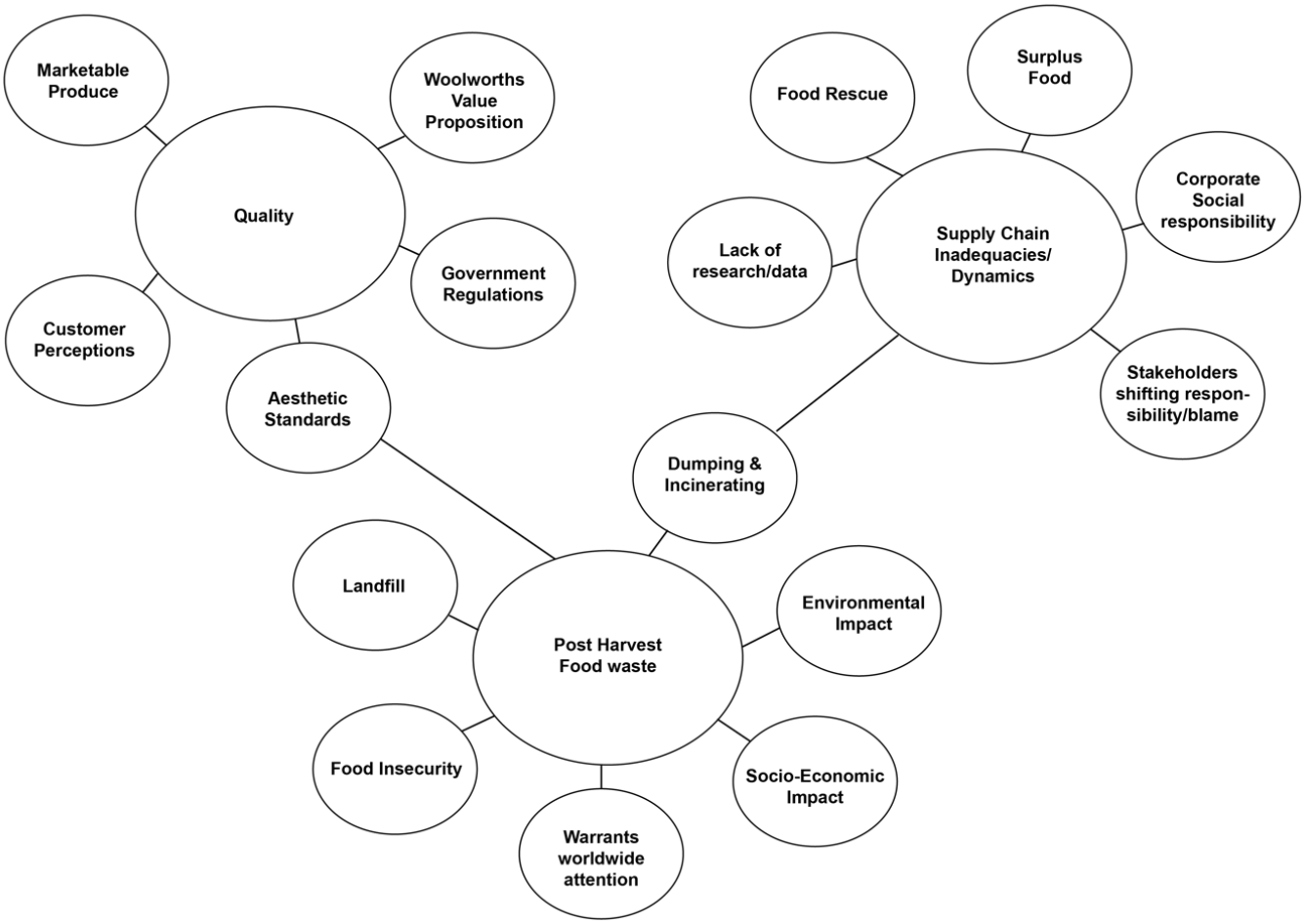
Figure 1:



<u>Step Four: Reviewing and Refining Themes</u>

In this phase the initial themes emerging from the groups of codes in the image above were reviewed to develop a refined thematic map (Braun and Clarke, 2006). This process involved re-reading of the coded data extracts and the entire data set to confirm that the candidate themes accurately reflect the data and answer the research question (Braun and Clarke, 2006). This process also involves coding any additional data into the themes that may have been missed in the initial coding stage (Braun and Clarke, 2006). Du Plooy-Cilliers *et al* (2014) explain that the process of qualitative content analysis should be exhaustive and is iterative, in that more categories and subcategories emerge during the process of examining the text. Through this refinement the thematic map presented in figure 2 was developed.

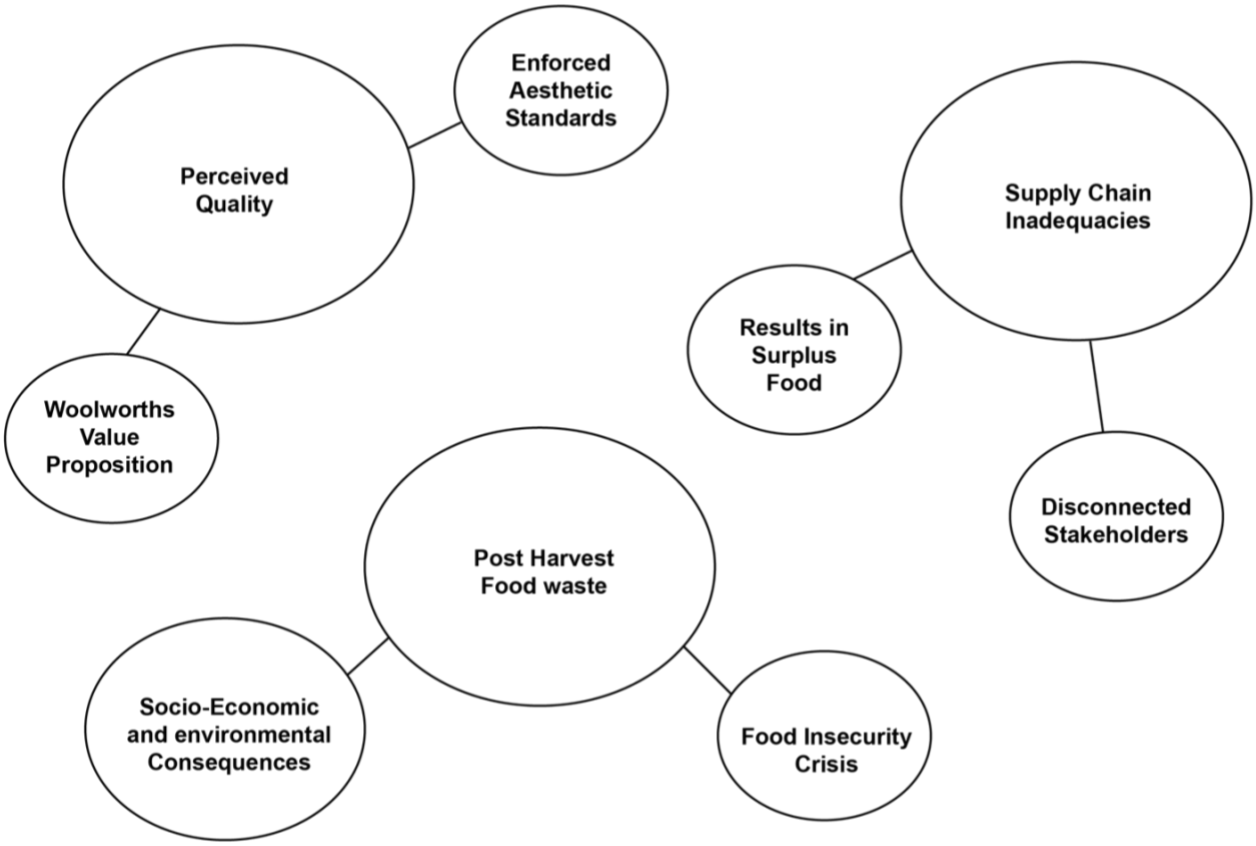
Figure 2:



Step Five: Final Themes

In this stage of the analysis, the themes developed above were refined further into 3 overarching themes, namely: Perceived Quality, Supply Chain Inadequacies and Post-Harvest Food Waste (Braun and Clarke, 2006). Braun and Clarke (2006) explain that the final theme names should capture the essence of the themes and data. These three main themes have 2 sub-themes each. The final thematic map is illustrated in Figure 3 below:

Figure 3:



Step Six: Reporting on the Findings

According to Braun and Clarke (2006:93) producing the research report involves telling the story of the data “within and across themes” as well as making an argument in relation to the research question. This section will be discussed in more detail in the Findings below.

Findings

The following section discusses the key findings from the data analysis that answers the overarching research question: What is the effect of Woolworths Food's aesthetic standards for fruit and vegetables on post-harvest food waste in South Africa? (Braun and Clarke, 2006). The findings are organised around the central tenants or sub-questions for ease of reference (Devin and Richards, 2018). The research questions will be addressed within the themes and subthemes presented in Figure 3. Evidence to support the findings and argument will be provided through the use of quotes and data extracts from the data set (Braun and Clarke, 2006; Devin and Richards, 2018). As discussed, the researcher decided to delimit the scope of the research to use one fruit, namely the Packham's Triumph pear, as a case study for this research paper (Du Plooy-Cilliers et al, 2014).

What are the Woolworths Food aesthetic/quality standards for fruit and vegetables?

Woolworths (2022) places the upmost importance on providing quality products to their customers, which includes that of fresh produce such as fruit and vegetables. According to Woolworths Holdings Limited (WHL) (2022) official Purpose, Vision and Values; "Quality is the heart of our business. We are committed to quality, in whatever we do, wherever we do it." Moreover, the brand states that its purpose is "adding quality to life" (Woolworths, 2022). Woolworths Food (2022) online store page for "Ripe & Ready Juicy Pears" of the Packham's Triumph variety states that, "Only the best is good enough: Expect only the best varieties grown in superb locations to deliver the best quality and flavour". The brand's emphasis on quality is significant and formed the basis for the main theme Perceived Quality (Braun and Clarke, 2006).

Fresh produce quality is upheld through the use of product standards for fruit and vegetables (Woolworths, 2022). Woolworths (2022) claims that their Packham's Pears are of "Class 1" specification. According to the South African regulations for grading, packing and marking pears, "There are three classes of pears, namely Class 1, Class 2 and Lowest Class." (Department of Agriculture, Forestry and Fisheries, 2016). Thus, Class 1 refers to the highest quality standards for pears in South Africa. Class 1 Packham's Triumph pears must meet strict aesthetic standards according to South African legislature (Department of Agriculture, Forestry and Fisheries, 2016). Outlined in the table below are 7 examples of mandatory aesthetic standards for Class 1 Packham's Triumph pears in South Africa

(Department of Agriculture, Forestry and Fisheries, 2016). The entire table of quality standards can be found in the attached appendices.

Quality Factor	Class 1
General Appearance	Sound, attractive and true to cultivar
Shape	Well-formed for the cultivar concerned
Malformation	As depicted in colour plate no. P1A photo no. 5
Stem	May be absent: Provided that the adjacent skin shall not be damaged and that if the stem is present, it may not be damaged
Pelican necks	The angle formed by the stem of the pear and an imaginary line drawn through the middle of the pear parallel to the longitudinal axis, shall not exceed 45°
Minimum diameter	55 mm
Blemishes excluding rough marks	A combined surface of not more than 400 mm²

Woolworths (2022) sells Class 1 Packham's Triumph pears, which therefore abide to the detailed aesthetic standards set out by the South African Government for pears. From the data analysis it is assumed that Woolworths (2022) implements the same quality and aesthetic standards for all fruit and vegetables sold by the brand.

Why do Woolworths Food impose aesthetic standards for fruit and vegetables?

As discussed above, Woolworths' (2022) purpose is to provide products of "exceptional quality" to customers. The brand has become synonymous with quality produce in South Africa. One of the core values of WHL (2022) is stated by the brand a; "Customer Obsessed, means that in our world, the customer always comes first". In the study, *Postharvest Losses in Quantity and Quality of Pear (cv. Packham's Triumph) along the Supply Chain and Associated Economic, Environmental and Resource Impacts,* Blanckenberg et al (2022:12) explain along with quality standards imposed by government, "consumer demand for blemish-free produce" results in aesthetic standards for pears being imposed throughout the food supply chain. When referring to the minimum size standards for pears Blanckenberg et al (2022:15), give an example of how customer perception influences size standards and how smaller pears could be marketed to customers: "One example is a line of child-sized pears centred on flavour that could transform the way consumers view small pears."

Interestingly, in the Woolworths Food Waste and Food Security Position Statement (2021), the brand refers to acceptable fresh produce as “marketable produce”, indicating their awareness of customer expectations and perceptions for fresh produce. Along with stating that their pears are “only the best”, Woolworths (2022) highlights to customers that, “Our farmers are quality: Before we pick our fruit, we pick our farmers. They’re as obsessed with quality as we are”. Woolworths (2022) value proposition is based on providing consumers with high quality produce and it is insinuated that these consumers prefer aesthetically pleasing fruit and vegetables. Therefore, by abiding to aesthetic standards for high quality fruit and vegetables (such as class 1 Packham’s Triumph pears) Woolworths (2022) is adhering to government regulations, meeting the needs of their consumer’s, and fulfilling their value proposition. According to Carroll (1991), if a business fails to meet its core economic responsibilities of making a profit by providing consumers with goods or services that are wanted or needed then all other corporate social responsibilities become irrelevant.

What happens to fruit and vegetables that fail to meet Woolworths aesthetic standards?

In an interview on Newzroom Afrika (2021) Andy Du Plessis, Food Forward South Africa’s (a local food rescue organisation) Managing Director explained that a large amount of food is wasted at the post-harvest level because it fails to meet aesthetic standards. The following quote explains the phenomena:

> “So the wastage occurs throughout the supply chain, but most of the waste occurs either on farms, so the farmer grows for a manufacturer or a retailer, and the retailer or manufacturer will only take within spec goods. So anything that's out of specification, it's got a Blemish on, it's too big or it's too small. While it's a perfectly edible product, that goods will not be taken up by whoever's purchasing it.” (see Food Forward SA has sustainable and Cost-Effective Solution To Address Hunger crisis, 2021)

Furthermore, Du Plessis explains that the above situation results in surplus edible food which the farmer has no choice but to dump in landfill or donate to food rescue organisations such as Food Forward (see Food Forward SA has Sustainable And Cost-Effective Solution To Address Hunger Crisis, 2021). However as mentioned in the interview by the anchor, Ayanda Nyati, a lot of surplus food is thrown away instead of donated due to the costs involved in donation and distribution (see Food Forward SA has sustainable and cost-effective solution to address hunger crisis, 2021). This is in line with the exiting literature that explains that most food wastage occurs on farms and the farmers do not have the economic

resources to distribute surplus food and are therefore left with the moral burden of discarding edible food (WWF, 2018; Devin and Richards, 2018).

The quantitative study by Blanckenberg et al (2022) on the post-harvest losses of Packham's Triumph pears in South Africa reinforce these statements. According to Blanckenberg et al (2022), the greatest post-harvest loss of Packham's Triumph pear across the pear supply chain occurred on the farm at the harvest stage. Additionally, the data revealed that, "The most common source of such losses is financial reasons which influence producers' willingness to bring their product to market" (Blanckenberg et al, 2022:12) Thus, aesthetic factors such as small size, blemished and misshapen produce result in pears being discarded before reaching the retailers or the market (Blanckenberg et al, 2022; WWF, 2018).

Du Plessis, of Food Forward, emphasised that this wastage of edible food in a country with a net surplus of food leads to unnecessary food insecurity and malnutrition in the country (see Food Forward SA has Sustainable And Cost-Effective Solution To Address Hunger Crisis, 2021). Additionally, Du Plessis argues that an estimated 10 million tonnes of food is wasted each year in South Africa due to "supply chain inadequacies" (see Food Forward SA Has Sustainable and Cost-Effective Solution To Address Hunger Crisis, 2021). These inadequacies are felt at farm level where food is lost at harvest due to specifications (see Food Forward SA has Sustainable And Cost-Effective Solution To Address Hunger Crisis, 2021; Blanckenberg et al, 2022). Woolworths (2021:1) claims to "work in partnership" with their supply chain suppliers such as farmers and factories to reduce surplus food waste. However, simultaneously the brand states that, "We recognise that much of the waste we generate as a business does not happen in our own operations, but rather in our customers' homes and in the supply chain", implying a separation between the brand and other supply chain stakeholders (Woolworths, 2021:2). This is further implied by the following extract from the brand's position statement, "Woolworths is committed to halving food waste to landfill by 2030, aligned to Sustainable Development Goal 12.3. Woolworths is also encouraging suppliers to sign and commit to the VA" (Woolworths, 2021:2).

Surplus food that is not rescued by organisations such as Food Forward and is instead discarded or dumped in landfill results negative environmental and socio-economic consequences (Blanckenberg et al, 2022; see Food Forward SA has Sustainable and Cost-Effective Solution To Address Hunger Crisis, 2021). Blanckenberg et al (2022:14) argue that the post-harvest loss of pears "have a serious impact on food security, profitability, and the sustainable management of resources". Du Plessis concurs in that food waste in South

Africa leads to an annual loss of R64 billion, social issues such as malnutrition and stunting as well causing environmental harm (see Food Forward SA has Sustainable and Cost-Effective Solution to Address Hunger Crisis, 2021). Furthermore, Woolworths (2021:1) acknowledges the global and local food waste problem, stating that: “With food security being such a key priority for South Africa, it is a significant problem that so much food is going to waste.”

How much food is lost and wasted due to Woolworths Food aesthetic standards?

The data set did not include a study on the exact volume of waste generated by Woolworths’ aesthetic standards for fruit and vegetables due to the limitations on existing research and access to willing interviewees or data (Devin and Richards, 2018; Blanckenberg et al, 2022). However, the quantitative study on post-harvest losses of Packham’s Triumph pears by Blanckenberg et al (2022) provides a snapshot into the volume of fruit and vegetables wasted due to aesthetic standards. The following statistics collected during the study reveal how aesthetic standards affect post-harvest food waste at the farm level:

> “The average loss at harvest on the farm level was 18%. Of the 18% lost at harvest on the first farm, the main reasons were due to deformed fruit (50%), small size (48%), and chafed peel (2%) on the first farm, while on the second farm, the main reasons were the same, but the proportions differed: the majority of the losses were due to small size (80%), chafed peel (18%) and deformities (2%). The average values for both farms together were small size (65%), deformity (26%), and chafed peel (9%)” (Blanckenberg et al, 2022:5)

Furthermore, the data collected indicated that wastage of pears at harvest in South Africa was significantly higher than many other countries (Blanckenberg et al, 2022). When interpreting the socio-economic and environmental consequences of post-harvest pear waste, it is important to bear in mind that the greatest losses of pears (in the pear supply chain) occurred at the post-harvest level on farms and due to aesthetic reasons such as small size, deformity and chafed peels (Blanckenberg et al, 2022). Blanckenberg et al (2022:1) summarise the these consequences below:

> “The socio-economic impacts of these postharvest losses amounted to financial losses of between ZAR 492 million (USD 34.1 million according to the conversion rate of 14 April 2021) to over ZAR 831 million annually, and this was associated with the loss of 301 million MJ of fossil energy, 69 millionm3 of fresh water and

> contributed to the emission of approximately 19,690 tons of CO2 equivalent. The fresh water lost could sustain 3.7 million individuals daily for a whole year at a daily minimum usage rate of 0.05 m3 per day while it will require planting 0.5 million trees to sink the 19,690 tons GHG emissions of the pear losses (0.039 metric ton per urban tree planted)."

Taking the above data into account and the fact that Woolworths (2022) sells Class 1 quality standard pears and high quality fresh produce, the researcher argues that a significant amount of fruit and vegetables are wasted due to Woolworths Foods' aesthetic standards. This is further substantiated by the quality standards for Class 1 pears enforced by South African government regulations (Department Of Agriculture, Forestry And Fisheries, 2016).

<u>What is Woolworths doing to mitigate/reduce food wastage due to aesthetic standards at the post-harvest stage?</u>

Woolworths (2021) claims to be committed to reducing food waste and increasing food security in South Africa as a part of their Good Business Journey initiative. The brand explains that it adopts a "food waste utilisation hierarchy" which prioritises the use, reduction, avoidance, and redistribution of surplus food (Woolworths 2021:1). According to Woolworths (2021:1), "Our goal is to ensure that no edible food should end up in a landfill." Woolworths (2021:2) refers to their surplus food as any Woolworths products that "that is past its 'Sell By' date but before its 'Use By date" and this is the food that is donated to charities such as Food Forward SA. Interestingly, Woolworths (2021) does not mention the surplus food that occurs on farms due to the brand's aesthetic standards for fruit and vegetables as a part of their food waste. However, the brand acknowledges the existence of food waste caused by aesthetic standards, with the following statement:

> "We also aim to minimise waste in the processing of fresh fruit and vegetables, for example, by using oddly shaped produce such as carrots and butternut in prepared foods like soups and bakes" (Woolworths, 2021:1).

Yet, no mention is made of dropping their standards to a lower class to accommodate "oddly shaped produce" (Woolworths, 2021:1). Furthermore, the brand does not mention their involvement in redistributing surplus food that occurs on farms because of aesthetic standards (Woolworths, 2021). Rather Woolworths (2021:1) encourages their suppliers to employ "sustainable farming practices" that help to increase the amount of "marketable produce" produced and thus assists in avoiding food waste. Interestingly, Woolworths (2021)

claims to work in partnership with their suppliers yet still maintain a distinct separation from them making use of terms such as “promoting sustainable farming practices”, and “encouraging suppliers”. The disconnect between Woolworths (2021:2) and other stakeholders in the food supply chain is highlighted in their statement; “much of the food waste we generate as a business does not happen in our own operations”. However, the brand does acknowledge their role to play as a business in the waste generated throughout the food supply chain (Woolworths, 2021).

The aforementioned responsibility and acknowledgment is a reflection of Woolworths’ (2022) vision to be “one of the world’s most responsible retailers”. This is exemplified in their efforts to understand where food waste occurs within their supply chain as to make changes to reduce this critical problem (Woolworths, 2021). The brand partnered with WWF to conduct a study that tracked the loss and waste of spinach across the entire Woolworths Food Supply chain (Woolworths, 2021; WWF, 2018). Woolworths (2021:2) explains that this study “was possibly the first in the world where a retailer investigated one product with multiple stock-keeping units (SKUs), over 50 in the case of spinach.” This advocates for Woolworths (2021) taking action to live up to its values of collaboration (in this case with stakeholders), being responsible and inspirational by taking the lead to understand and reduce food waste in their food supply chain.

Woolworths’ has set into action various initiatives to reduce food waste and be meaningful and socially responsible brand (2021). However, post-harvest food waste is an unfortunate and unavoidable consequence of the retailer adhering to aesthetic standards for fruit and vegetables (see Food Forward SA Has Sustainable And Cost-Effective Solution To Address Hunger Crisis, 2021; Blanckenberg et al, 2022). These aesthetic standards ensure that Woolworths (2022) provides its customers with exceptional quality fruit and vegetables, which in turn ensures that the brand fulfils its value proposition and purpose. Woolworths (2022) Food faces a paradox between satisfying the needs of its customers with serving its suppliers, specifically farmers who feel the impact of aesthetic standards on post-harvest food waste (see Food Forward SA Has Sustainable And Cost-Effective Solution To Address Hunger Crisis, 2021; Blanckenberg et al, 2022). In addition to this, Woolworths must comply to a host of government quality standards for Class 1 fruit and vegetables, which is exemplified by the standards imposed for Packham’s Triumph Pears (Department Of Agriculture, Forestry And Fisheries, 2016).

According to Carroll’s Pyramid of Social Responsibility (1991), Woolworths (2022) is fulfilling its economic and legal responsibilities and striving to be ethically and philanthropically

responsible as possible. Carroll (1991:41) explains, “Ethical responsibilities embody those standards, norms, or expectations that reflect a concern for what consumers, employees, shareholders, and the community regard as fair, just, or in keeping with the respect or protection of stakeholders' moral rights”. Woolworths (2022) clearly values sustainability and corporate responsibility, however for the business to be profitable, according to its value proposition, it needs to satisfy its consumers’ quality preferences and thus adhere to aesthetic standards which unfortunately result in post-harvest food waste (see Food Forward SA Has Sustainable and Cost-Effective Solution To Address Hunger Crisis, 2021; Blanckenberg et al, 2022). Carroll (1991:41) argues that economic responsibilities form foundation upon which all other corporate responsibilities rest, and without acceptable profitability the business’ legal, ethical, and philanthropic responsibilities “become moot considerations”.

Thus, it can be argued that Woolworths (2022) is not intentionally trying to cause harm by implementing aesthetic quality standards, but rather putting the needs of certain stakeholders, such as customers, above those of others such as farmers earlier on in the value chain (Carroll, 1991). Furthermore, the socio-economic and environmental impacts of post-harvest food waste due to aesthetic standards for high quality fruit and vegetables are substantial and decrease the overall brand health of Woolworths (see Food Forward SA Has Sustainable and Cost-Effective Solution to Address Hunger Crisis, 2021; Blanckenberg et al, 2022; Cook et al, 2010). Carroll (1991) argues that an organisation is socially responsible when it manages all of its stakeholders groups in an ethical and moral manner. The above findings reveal that Woolworths’ aesthetic standards for fruit and vegetables have a negative effect on stakeholders such as farmers at the harvest level in the food supply chain, albeit not intentional (see Food Forward SA Has Sustainable and Cost-Effective Solution to Address Hunger Crisis, 2021; Blanckenberg et al, 2022). The researcher argues that Woolworths (2022) can be considered as taking an unintentional amoral approach to stakeholder management ethics (Carroll, 1991). Carroll (1991:45) explains that unintentional amoral business managers “may be well intentioned, but do not see that their business decisions and actions may be hurting those with whom they transact business or interact.”

Ethical Considerations

According to Du Plooy-Cilliers *et al* (2014:273), ethics "is the cornerstone of research" and affects all stakeholders in the research process, including the participants, academic institution, society at large and the researcher. The researcher has used The Belmont Report (1978) and the ethical considerations outlined in Du Plooy-Cilliers *et al* (2014) as a guide for conducting ethical research in this study.

The research undertaken in this paper consisted on qualitative thematic analysis of artefacts – namely textual documents and a transcribed interview (du Plooy-Cilliers, Davis and Bezuidenhout, 2014). The sample from which data was collected consisted of publicly available published artefacts, and therefore the research does not warrant the need for confidentiality or anonymity (du Plooy-Cilliers, Davis and Bezuidenhout, 2014). The research methodology employed alleviates the issue of confidentiality, which is of particular importance when dealing with sensitive information that may influence the participants livelihood or prospects (Du Plooy-Cilliers *et al*, 2014; States National Commission for the Protection of Human Subjects of Biomedical and Research, 1978). Devin and Richards (2018:203) explain that talking about food waste may be a sensitive area for suppliers who are "reluctant to bite the hand that feeds in monopsonistic/duopsonistic markets". It is for this reason that the researcher actioned a qualitative analysis of public secondary data sources (Du Plooy-Cilliers *et al*, 2014).

During the research process the researcher was aware of any potential bias when analysing the qualitative data collected (Du Plooy-Cilliers *et al*, 2014). This involves the interpretation and analysis of both transcribed interview and document text collected in the research (Du Plooy-Cilliers *et al*, 2014). The researcher took responsibility to report on the data objectively without emphasizing aspects of evidence that support their desire of achieving preferred results (Du Plooy-Cilliers *et al*, 2014). Braun and Clarke (2006) explain that it is the responsibility of the researcher to ensure that the interpretation and analytic argument reflect the data extracts and data set. In addition, the researcher treated all parties involved in the research fairly, allowing for all parties to benefit from the research (Du Plooy-Cilliers *et al*, 2014; States National Commission for the Protection of Human Subjects of Biomedical and Research, 1978). The aim of the research is to contribute to the body of knowledge on food waste in South Africa to contribute to finding solutions that minimize food waste for all stakeholders involved and society at large (Du Plooy-Cilliers et al, 2014; WWF, 2018)

Limitations of the study

According to Du Plooy-Cilliers *et al* (2014) limitations of a research study refer to constraints that are generally out of the researcher's control. The purpose of the research is academic and therefore limited in terms of budget, time, and scope (Du Plooy-Cilliers *et al*, 2014; The IIE, 2018). The research is unfunded and therefore the scope of the research is narrow (Du Plooy-Cilliers *et al*, 2014). The research conducted will focus only on the effects of the Woolworths brand's aesthetic standards for fruit and vegetables on post-harvest food waste in South Africa. The narrow scope is furthermore justified given the timeframe of 6 weeks to complete the data collection and analysis (The IIE, 2022). On recommendation of The IIE (2022) the research is limited to between one and three documents for content analysis, however due to the nature of the research methodology the researcher increased the sample to six documents for analysis.

According to Devin and Richards (2018) power dynamics in the food supply chain and the issue of morality surrounding food waste makes the topic sensitive in nature. The researcher intended on conducting primary research in the form of qualitative interviews, however limitations on accessibility to willing interviewees from the relevant stakeholder groups was encountered (Du Plooy-Cilliers *et al*, 2014; Devin and Richards, 2018). The Woolworths brand did not agree to participate in the interview process of this study but directed the researcher to their online documents for analysis. Stakeholders within the food supply chain were unresponsive to requests for interviews for this research paper. This is in line with previous studies on the topic of aesthetic standards and food waste, as Devin and Richards (2018:203) explain on the topic of interviewees, "The overall response rate was relatively low at 30 %, anecdotally, this is consistent with previous research in this field." Additionally, there is a lack of "reliable and transparent" data on the topic of food waste in South Africa which places a limit on the access to knowledge and awareness of key stakeholders involved in the phenomena (WWF, 2018; Du Plooy-Cilliers *et al*, 2014).

Due to these limitations a non-probability purposive sample of social artefacts was selected for thematic analysis (Du Plooy-Cilliers *et al*, 2014). The lack of research and data on the topic of post-harvest food waste influenced the researcher to delimit the scope of the analysis to centre around one fruit, namely the Packham's Triumph pear (WWF, 2018; Du Plooy-Cilliers *et al*, 2014). Setting the parameters of the study to focus on only one fruit as a case study for the research conducted was essential in providing the researcher with a clear direction and aided in answering the research question (WWF, 2018; Du Plooy-Cilliers *et al*,

2014). Furthermore, the research has been delimited by the researcher to a qualitative study that follows an interpretivist approach (Du Plooy-Cilliers *et al*, 2014). Therefore, the research will not include a quantitative statistical competent whereby accurate figures for post-harvest food waste due to Woolworth's aesthetic standards on fruit and vegetables can be obtained (Du Plooy-Cilliers *et al*, 2014). Rather the research design and methodology are aimed at obtaining a deeper understanding of this social phenomena to answer the research question and central tenants to substantiate further studies (Du Plooy-Cilliers *et al*, 2014). The theoretical framework is also delimited to the impact of Woolworths aesthetic standards for fruit and vegetables on post-harvest food waste in South Africa and the influence this has on the brand's meaning according to Carroll's (1991) Pyramid of Corporate Social Responsibility model (Du Plooy-Cilliers *et al*, 2014).

Trustworthiness

Qualitative research is measured according to “trustworthiness”, which refers to the credibility, transferability, dependability and confirmability of the data collection and analysis (Du Plooy-Cilliers *et al*, 2014). The limitations and the delimitations in the research design affect the trustworthiness of the study in the following ways (The IIE, 2022; Du Plooy-Cilliers *et al*, 2014). The credibility of the study is reduced due to the limited timeframe in which the study is conducted (Du Plooy-Cilliers *et al*, 2014). According to Du Plooy-Cilliers *et al* (2014:258), “Credibility is increased when the researcher spends long periods of time with the participants in order to understand them better and gain insight into their lives”. The researcher has attempted to mitigate this reduction in credibility by collecting data from a varied sample that represents different aspects of the research problem (Du Plooy-Cilliers *et al*, 2014).

Additionally, the credibility of the research is reduced due to food supply chain stakeholders and Woolworths not agreeing to partake in interviews for this study. In-depth interviews would have provided a second research method resulting in increased credibility through triangulation (Du Plooy-Cilliers *et al*, 2014). Furthermore, the use of a primary research such as interviews with participants involved in the research problem, could provide more insight into their experiences and therefore create a richer data set and increase credibility (Du Plooy-Cilliers *et al*, 2014). However, due to time constraints the researcher acknowledges that one method of data collection proved to be more manageable, therefore resulting in more thorough analysis and in turn increasing the trustworthiness of the study in other aspects (Du Plooy-Cilliers *et al*, 2014).

Braun and Clarke (2006) explained that insufficient detail about the process of thematic analysis is a factor in decreasing the trustworthiness of qualitative thematic analysis research. Trustworthiness is reduced when the researcher does not explain how they went about collecting and analysing their data (Braun and Clarke, 2006). This leads to difficulty in evaluating and comparing the research as well as impeding “other researchers carrying out related projects in the future” (Braun and Clarke, 2006:80). It is for these reasons that the researcher has outlined the data collection and analysis in detail in order to increase the dependability, transferability and confirmability of this research paper (du Plooy-Cilliers, Davis and Bezuidenhout, 2014). The respected six step method for thematic analysis developed by Braun and Clarke (2006) was followed in order to provide clarity on the research process and to increase credibility of this study.

The process of coding the textual data set is a means to increase trustworthiness in qualitative research (Skjott Linneberg and Korsgaard, 2019). Coding data allows the reader to understand how the researcher interpreted the data and reached conclusions, thus ensuring transparency (Skjott Linneberg and Korsgaard, 2019). According to (Skjott Linneberg and Korsgaard, 2019:262) “Showing the data to the reader forces you to develop a chain of evidence depicting your arguments and showing how you have reached your conclusions.” Furthermore, coding is an important phase in data analysis that assists in preserving coherence between the data and findings (Skjott Linneberg and Korsgaard, 2019). Skjott Linneberg and Korsgaard, (2019:262) explain that coding is also an opportunity for researchers “to come to terms with confirmatory bias” by noticing and including “contradictory evidence”. The researcher has thus attached the entire data set and coding report produced by Quirkos (2022) application in order to ensure transparency and therefore dependability and confirmability (du Plooy-Cilliers, Davis and Bezuidenhout, 2014; Skjott Linneberg and Korsgaard, 2019).

Conclusion and Recommendations

In conclusion, Woolworths Food South Africa's aesthetic standards for fruit and vegetables have a negative effect on post-harvest food waste in South Africa (see Food Forward SA Has Sustainable and Cost-Effective Solution to Address Hunger Crisis, 2021; Blanckenberg et al, 2022). The qualitative thematic analysis of the data set collected for this research paper revealed that a high volume of food is wasted at the post-harvest level, mainly on farms, due to aesthetic quality standards imposed by retailers such as Woolworths (see Food Forward SA Has Sustainable and Cost-Effective Solution to Address Hunger Crisis, 2021; Blanckenberg et al, 2022; Woolworths, 2022). According to Du Plessis (see Food Forward SA Has Sustainable And Cost-Effective Solution To Address Hunger Crisis, 2021) and Blanckenberg et al (2022), fresh produce that is out of retailer and specification is not marketable and is often disposed of leading to negative environmental and socio economic consequences for South Africa.

Although Woolworths (2021) has every intention to reduce food waste and increase food security in South Africa, their value proposition of high quality fruit and vegetables is in direct opposition with that of improving post-harvest food waste occurring earlier on in the supply chain (Devin and Richards, 2018). In addition to this Woolworths has to comply to the South African government regulations for Class 1 fruit and vegetables in order to sell high quality fruit and vegetables (Department Of Agriculture, Forestry And Fisheries, 2016). Thus, the organisation upholds its legal responsibilities (Carroll, 1991). The researcher argues that Woolworths is unintentionally amoral in its ethical approach to stakeholder management because even though the business is well intentioned, their aesthetic standards do have a negative impact earlier on in the food supply chain (Carroll, 1991). Carroll (1991:45) explains that an unintentional amoral stakeholder management approach is often characterised by an orientation "towards the letter of the law" as the primary ethical guide.

Furthermore, it is difficult for Woolworths (2022) to reduce their aesthetic standards for fruit and vegetables without affecting their value proposition and consumer satisfaction. According to Carroll (1991) it is not always possible for an organisation to meet the needs of and serve all stakeholder groups equally, yet this should be a desirable goal for the firm to aspire to. Woolworths (2021) is transparent about the brand's various initiatives put into place to reduce and understand food waste within the food supply chain. The company states their vision is "to be one of the world's most responsible retailers" and this reflects

their goal to do good business in terms of all stakeholder groups (Woolworths, 2022; Carroll, 1991).

Food waste and food insecurity remains a critical issue with an array of negative consequences globally and locally within South Africa (WWF, 2017). The research conducted confirmed that majority of the food wasted in South Africa occurs earlier in the supply chain at the post-harvest stage, and much of this due to aesthetic standards (see Food Forward SA Has Sustainable and Cost-Effective Solution to Address Hunger Crisis, 2021; Blanckenberg et al, 2022). Woolworths could action a variety of strategies to reduce post-harvest food waste of imperfect fruits and vegetables. These include educating customers about the negative effects of imperfect fruit and vegetable food waste via campaigns and in store activations such as the “Inglorious Fruits and Vegetable” campaign by French retailer Intermarch (Birau and Faure, 2017; Stangherlin, Duarte Ribeiro and Barcellos, 2019:2398). Creating awareness among customers could in turn result in public acceptance of imperfect fruit and vegetables and in turn increase Woolworths’ brand health (Blanckenberg et al, 2022; Cook et al, 2010). Furthermore, Woolworths could assist suppliers at the harvest level, such as farmers, redistribute surplus food generated from fruit and vegetables that do not meet aesthetic standards to food rescue organisations like Food Forward South Africa (see Food Forward SA Has Sustainable and Cost-Effective Solution to Address Hunger Crisis, 2021). Thus, sharing the responsibility and moral burden of food waste generated by imperfect fruit and vegetables (Devin and Richards, 2018).

Finally, as mentioned in the literature and data analysis, a change in government regulation and policy regarding food waste that enables more surplus food redistribution and prohibits dumping of surplus food in landfill is necessary to accelerate large scale change throughout the food supply chain (WWF, 2017; Devin and Richards, 2018; see Food Forward SA Has Sustainable and Cost-Effective Solution to Address Hunger Crisis, 2021). Furthermore, a change in regulations regarding the size and shape of fruit and vegetables would aid retailers such as Woolworths to market sell imperfect fruit and vegetables, especially to environmentally conscious consumers (Birau and Faure, 2017; Blanckenberg et al, 2022; Department Of Agriculture, Forestry And Fisheries, 2016). Ultimately there is a lack of research and data on post-harvest food waste in general, specifically in South Africa (WWF, 2018). Further research is needed in order to gain a thorough understanding of the reasons for and volume of post-harvest food waste as a consequence of retailer aesthetic standards for fresh produce (WWF, 2018; Blanckenberg et al, 2022). This research paper aimed at contributing to the body of knowledge on the niche problem of post-harvest food waste due

to aesthetic standards for fruit and vegetables associated with Woolworths Food in South Africa.

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