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The Barriers to Adoption of a Cashless Economy in the South African Agri Market: A Consumer`s Perspective

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A research proposal submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business

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ABSTRACT

The agricultural sector can play a crucial role in driving South Africa's economy. However, this sector only contributes less than 3% to the country's GDP. A part of this low performance can be attributed to challenges faced by small-scale. The wholesale market generally dictates unfavourable prices for farmers' produce, and long-term payback periods that negatively affects farmers' ability to sustain their operations.

In recent years, the integration of digital technology such as electronic commerce (ecommerce) in agriculture globally has emerged as a promising solution to improving agricultural yields and impact to a country's economy. In the case of South Africa, ecommerce can be the solution to alleviate challenges faced by small scale farmers to improve their ability to sustain farming operations. This research explores which ecommerce features an Agri-Based ecommerce platform should have to encourage and facilitate direct transactions between farmers and consumers, with a focus on the sale of fresh produce.

The study employs a quantitative approach through an online survey requesting participants to rate the level of importance ecommerce features have on their intention to purchase fresh produce online. The Theory of Affordance served as the conceptual framework. The research findings reveal that the visual and descriptive presentation of produce, website aesthetics and ease of navigation, availability of multiple payment methods, customers support information and channels, store reviews and rating scores, and same day delivery features are crucial for an Agriculture Ecommerce platform to drive fresh produce sales online for farmers.

The introduction of a uniform online Agri marketplace, or individual fresh produce online stores, can improve the ability for fresh produce farmers to improve their operations profitability and sustainability, and therefore overall food security for South Africa.

KEYWORDS

Agriculture ecommerce, Agri-based Ecommerce Platform, Fresh produce ecommerce, B2C Agriculture ecommerce, Agriculture Digital Transformation, Ecommerce

DECLARATION

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

Name: Stallone Siakam Signature:

Signed at ……MIDRAND……

On the ……22nd …….. day of …February…… 2024

DEDICATION

Firstly, I dedicate this research to my business Achetes Online (AO) for which I am a co-founder. It is thanks to running this business that I embarked on the journey to further my studies in business administration (PDBA) and digital business (MMDB) to improve the performance of the business. The practical learnings from running the business gave me valuable real-life experience that made the MMDB relatable and practical in terms of application of the course's knowledge. Furthermore, I dedicate this research to the employees of AO, to Lungile Madlala who believed in the business and provided various resources to expand business operations, and to my business partner and co-founder Rufaro Rashirai who has been with me every step of the AO journey and who fully indorsed me to focus on my studies while he kept the AO 'ship' running.

To my parents, who have supported me financially when I was not able to afford paying my registration fee for the second year. Thank you for assisting me so that I could continue with the second year of my studies. Thank you for having instilled a vision to expand my studies beyond a bachelor's degree.

Your belief in me fuelled my determination. To my professors and mentors, thank you for your guidance and wisdom. This achievement is as much yours as it is mine. To my friends, for the laughter and understanding during the challenging times. Your camaraderie added joy to this academic pursuit. This work is dedicated to all those who believed in me and shared in the joys and struggles of this Master's journey. With heartfelt gratitude.

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My gratitude to Prof. Adheesh Budree for his guidance and insightful feedback throughout my research process. His expertise has been instrumental in shaping this work.

Research Participants

I very grateful to the individuals who participated in my research by completing my online survey. Without your valuable input, this study would not have been possible. Your willingness to share your online shopping experiences was crucial to the success of my project.

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LIST OF ACRONYMS

Agri:	Agriculture
B2B:	Business-to-business
B2C:	Business-to-consumer
BRICS:	Brazil, Russia, India, China, South Africa
COVID:	Coronavirus Disease
GDP:	Gross Domestic Product
IS:	Information Systems
USA:	United States of America
UTAUT:	Unified Theory of Acceptance and Usage of Technology

CHAPTER 1. INTRODUCTION

1.1 Statement of purpose

The purpose of this quantitative study is to identify the main ecommerce properties that should be developed when developing an Agriculture Ecommerce platform to influence fresh produce consumers' purchase intentions when shopping online. This is to improve market access and sales conversion for small and medium scale farmers in South Africa.

1.2 Background of the study

Ecommerce and its Adoption in South Africa

Ecommerce adoption has accelerated globally, especially since the COVID-19 pandemic. Post pandemic, ecommerce sales in South Africa continue to grow, generating over R50 billion revenue in 2022 (BusinessTech, 2022). Convenience, free shipping, and discounted prices are among key drivers in the increase in adoption (Oberlo, 2023). Ecommerce adoption, especially in the Agriculture (Agri) Sector, can improve the economic inclusion of small scale farmers and improve the country's economic performance (Joiner & Okeleke, 2019).

Ecommerce is defined by (Lutkevich et al., 2023) as the process of purchasing and selling of goods and services over the internet. As more consumers have become accustomed to online shopping, more sellers across different industries have pivoted their business models to include online sales channels (Zou & Cheshmehzang, 2022). However, eCommerce adoption in South Africa is still lower than that of more developed countries. In 2021, eCommerce contributed less than 10% of overall retail sales in South Africa, compared to 20% in the USA, and 50% in China (Hartzenberg, 2022). Inequality in the country has played a major role in the lack of technology adoption (Qureshi, 2023).

Inequality Challenge in South Africa

South Africa is ranked as the most unequal country in the world. This is based on a study conducted by the World Bank in its global poverty database (WorldBank, 2022). Racial factors, inequality in land ownership and assets, and the low presence of middle-class income earners significant drivers of inequality (WorldBank, 2022). The lack of access to assets reduces the ability of citizens having access to technology, impacting ecommerce adoption. This has played a role on the ability for farmers, especially small-scale farmers, to strive in South Africa. This will be discussed in detail in the upcoming section.

Technology can enable the reduction of inequality by facilitating access to money and jobs in South Africa (Moed, 2018). The Agriculture Sector is one of the key industries that can drive economic growth in South Africa (Moore, 2021). However, it contributed less than 3% to the country's GDP in 2022 (StatsSA, 2022a). Therefore, this is an industry that can play a pivotal role in addressing the inequality challenge. This presents an opportunity for technology adoption to improve the country's economic contribution to jobs and income earnings. It also presents an opportunity to alleviate problems faced by small scale farmers, hindering expansion of their operations.

The South African Fresh Produce Value Chain

In this section, the fresh produce value chain in South Africa will be briefly discussed as a lead into the research problem. The value chain for fruits and vegetables ranges from Inputs Phase to Distribution and Marketing Phase as depicted in Figure 1 (Fernandez-Stark et al., 2011)**.**

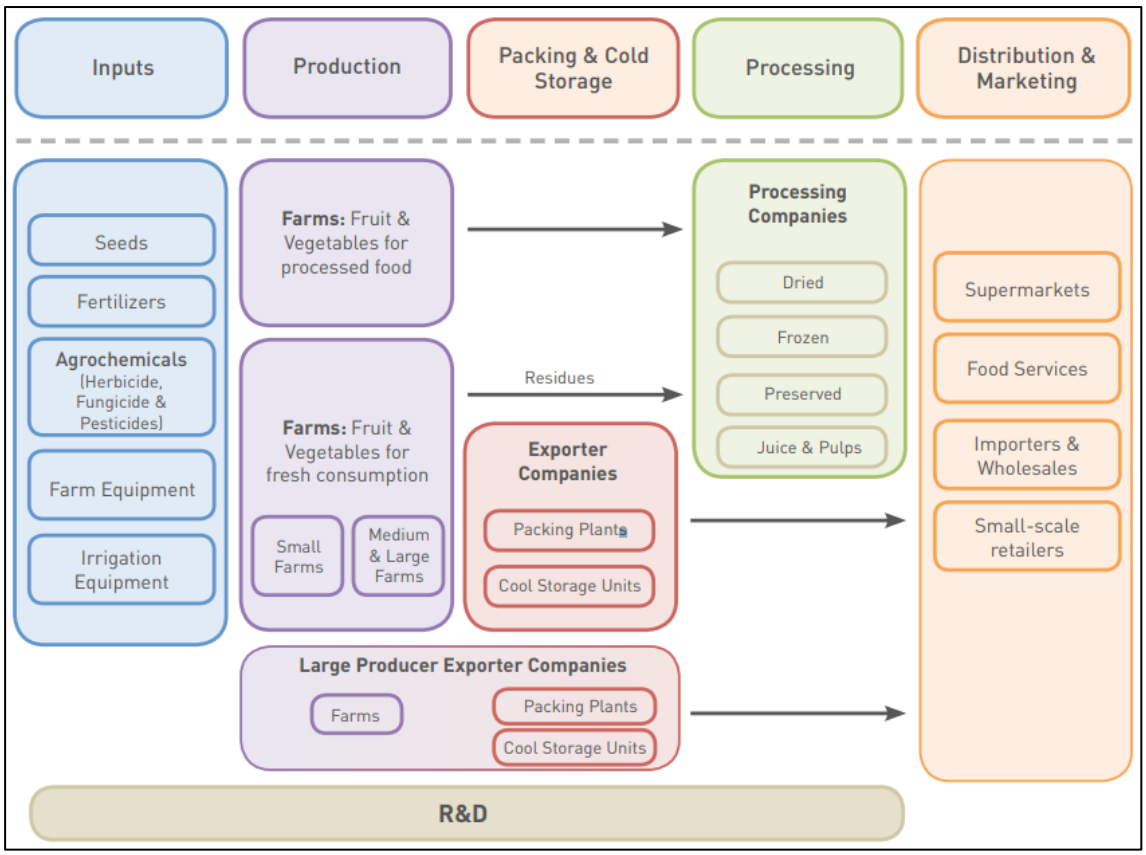

Figure 1: Typical Agriculture Food Value Chain

Farmers are mainly involved in the Production phase where they use different inputs to cultivate and harvest raw produce. Thereafter, the produce needs to be processed to consumable goods. Farmers can own their own processing facilities or make use of processing companies to make harvested produce market ready for distribution. The produce is distributed to and sold through supermarkets and other physical sales channels to consumers (Fernandez-Stark et al., 2011).

The next section will discuss various problems faced by farmers post the production phase of the value chain. It will also discuss how technology can assist farmers in overcoming these challenges.

1.3 Research Problem

Farmers face a variety of challenges across the food value chain. Challenges include farmers not realizing the full value of produce harvested when selling to the wholesale market, and having access to inputs that will allow them to generate outputs in alignment with their potential yield (Balakrishnan & Zaas, 2023). This research study will focus on two challenges that have a significantly negative impact on small scale farmers. Farmers face these challenges between the Production and Distribution phases. Small scale farmers generally face low and unstable revenue (Abokyi et al., 2020), especially from produce sold through the wholesale market. This challenge affects the profitability capability of these farmers and their ability to sustain farming operations (Li & Sexton, 2013). In addition to farmers not being able to control their desired selling prices, there are no legal time limits for the time period they must be paid for produce sold to retailers (Fredenburgh, 2015). Therefore, farmers are exposed to long payment terms that can reach 120 days (Fredenburgh, 2015).

The Issue of Low Profitability Experienced by Small-Scale Producers

Small to medium scale farmers sell the harvested and processed produce in bulk to wholesalers who in turn sell to consumers. These bulk buyers, such as Evergreens and Food Lovers Market, benefit from economies of scale by purchasing the produce in large quantities at discounted rates (Madubela, 2021).

Bulk buyers then resell these goods to consumers, adding their desired mark-up to the purchasing cost to generate profit (Li & Sexton, 2013). The lower the farmer's prices, the higher the profit generated by the wholesalers. Therefore, wholesalers generally drive farmers' prices as low as possible, resulting in many small-scale farmers generating minimal to no profit margins for their produce even though they carry the burden of cultivation (Li & Sexton, 2013).

Long Payback Periods for Produce Sold by Small-scale Farmers

In addition to driving down farmers' prices, wholesalers can take up to 120 days to fully payback farmers for purchased produce (Fredenburgh, 2015). Therefore, farmers do not get paid immediately for their produce sold. For small to medium scale farmers, this poses a significant cashflow challenge, and the cashflow is critical for farming operations continuity (Fredenburgh, 2015).

However, small scale farmers are unlikely risk losing their produce to waste without any revenue return, even if at a loss, making them price takers. Therefore, bulk buyers have price bargaining power over farmers (Li & Sexton, 2013). The severity of this problem triggered a price probe that launched in February 2023 in the fresh produce market in South Africa. The probe looked into the high food prices charged by wholesalers and retailers in conjunction with purchasing prices from farmers (Meintjes, 2023).

Agriculture Ecommerce: A Potential Solution for Farmers

In the introduction of this study, the role that technology can play in improving the South African Agri sector was discussed. The afore-mentioned problems faced by farmers could potentially be alleviated by a direct-to-consumer model through ecommerce. Farmers can sell their produce directly to consumers through their own online retail store (Bruyn, 2021). It will allow them to be in control of their prices and they can receive payments significantly faster than payback periods imposed by wholesalers (Bruyn, 2021). The introduction of an online store could further expand market reach for these farmers with various other benefits (Bruyn, 2021).

This research study seeks to identify which ecommerce factors influence to consumers to purchase fresh produce online. The level of importance of each factor will also be measured. The objective is to use the findings of this develop an agricultural marketplace with a direct-to-consumer model that will improve small-scale farmers' ability to positively contribute to the overall performance of the Agri sector in South Africa.

Exploring B2C Agri Ecommerce Platform Features

The purpose of this study is to understand the impact of B2C ecommerce technology on the Agri sector in South Africa. The study will investigate ecommerce features that influence consumers to purchase fruits and vegetables online. The objective is to improve online market reach and sales conversion for fresh produce farmers and increase their impact to the country's economy. Furthermore, the study will also expand on existing ecommerce literature for the Agri industry.

1.4 Research Question

Which ecommerce properties influence fresh produce consumers to purchase fruits and vegetables online?

1.5 Rationale

Academic Implications

There are various studies on ecommerce in agriculture focused on farmers' attitude towards eCommerce in Europe, B2B eCommerce adoption, and technology adoption in the South African Agri sector. There are limited studies that focus on the consumer aspects of Agri ecommerce. This study will expand on B2C ecommerce in agriculture, especially in South Africa.

The study is also focused on the fresh produce use case. Many studies available are generally do not focus on specific types of farming.

Agriculture Industry Implications

This study seeks to empower South African farmers, especially small-scale farmers, with the knowledge of how to use ecommerce technology to expand their farming operations. The objective is for farmers to have better direct access to their consumers and have more control over managing their consumer base. It is expected that this will result in farmers being able to generate additional revenue that will allow them to take care of their families and be able to grow their farming

operations. It is also expected that consumers in turn will benefit from lower prices compared to retail prices given they will purchase their produce directly from source.

Furthermore, the study aims to contribute towards enhancing technology adoption in the agriculture sector. With many industries continuously evolving to technological solutions driven by the fourth industrial revolution, it is important that the Agri sector be aligned to this evolution given its significance in the country's economy (Moore, 2021).

1.6 Delimitations of the study

The research study will focus on the B2C ecommerce consumer impact for small and medium scale farmers. The study excludes established farmers with large operations and their own retail and online stores.

The study will be specific to farmers cultivating fruits and vegetables for market consumption and not for personal consumption. The study will exclude poultry, ruminants, and other types of farming.

Consumers based in Gauteng Province will be the subjects of the study as it is the most populous province in South Africa (StatsSA, 2022b).

1.7 Definition of terms

Fresh Produce: fruits and vegetables that have not been processed in any form. This excludes nuts, dried fruits and vegetables, meat, and sea food (LawInsider, 2023).

Marketplace: a place where products are sold, generally in an open area (Dictionary, 2023).

Business to Consumer: this is the process of businesses selling products and services to consumers that are the end-users (Kenton, 2023).

Business to Business: refers to business transactions between companies as such as manufacturers and wholesalers (Chen, 2022).

Industry 4.0 (or Fourth Industrial Revolution): defined as the connected production of smart systems designed to collect data from, predict, and engage with the physical world, to make real-time decisions that support production (Sirimanne, 2022).

1.8 Assumptions

- All respondents understand what online shopping is or have experience in shopping online.
- Consumers have received a delivery at their location through a courier service.
- All respondents consume fruits and vegetables.
- All respondents have purchased fruits and vegetables from a physical store.
- Consumers have paid for any product online using their bank card details.
- In the case of surveys, respondents will have access to data bundles to complete the survey online.

1.9 Chapter Outline

The research study consists of the following chapters:

Chapter 1: Introduction, research problem, purpose statement, rationale, and assumptions

Chapter 2: Theoretical Framework and Literature Review

Chapter 3: Research Methodology

Chapter 4: Findings and Results

Chapter 5: Discussion

Chapter 6: Conclusion

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

The focus of this study is to identify which ecommerce features customers find beneficial to encourage them to purchase fresh produce online. There have been various studies conducted globally to understand the impact of ecommerce in agriculture. The studies have focused on various parts of the Agri value chain, and the approach and outcome of these studies will be reviewed in this section. The objective of this step is to find possible existing answers to the research question.

2.2 Background Discussion

This section will revisit the food value chain and the challenges faced by small-scale farmers but with an in-depth approach. It will lead into the various literature studies available for the implementation of Agri ecommerce globally.

Understanding the Typical Food Value Chain

The value chain for fruits and vegetables ranges from Inputs Phase to Distribution and Marketing Phase as depicted in Figure 1 (Fernandez-Stark et al., 2011)**.**

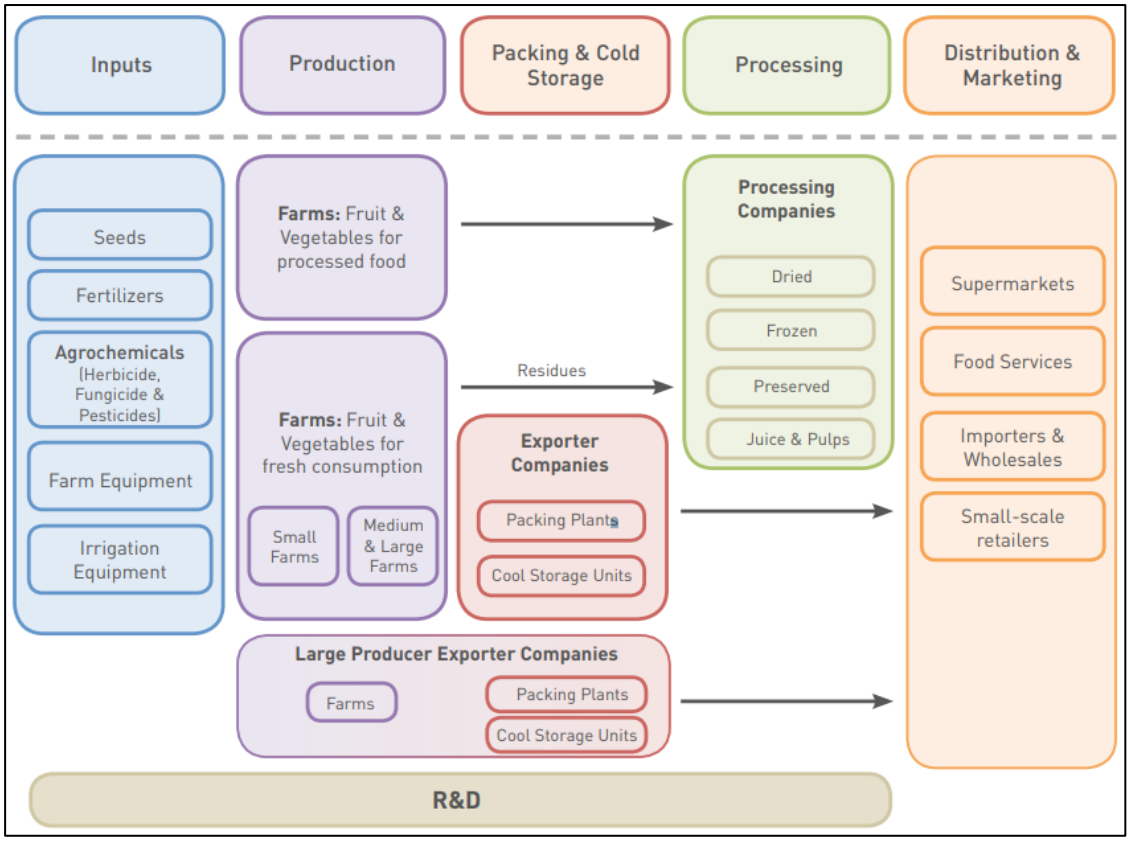

Figure 2: Typical Agriculture Food Value Chain

Farmers are involved in the Production phase where they use different inputs to cultivate and harvest raw produce. Thereafter, the produce needs to be processed to consumable goods. Farmers can use their own processing facilities or make use of processing companies to make produce market ready for distribution.

A study by (SACN, 2015) indicates and depicts that the food value chain in South Africa is similar to that of Figure 2. The value chain is depicted in Figure 3 as follows (SACN, 2015):

Functions	Input provision	Production	Trading	Transform-ation	Retailing	Consumption
Actors	Agro – supplier shops	Smallholder farmers, farmer groups	Individual traders	Agro - processors	Big four supermarkets, informal traders, export market	Domestic markets, Individuals, hotels, institutions
Support Services	Local Government Authorities, Environmental Management Agencies, Agro-dealers associations	Training / Extension services, Rural district councils, Agritex, NGOs, Smallholder farmers associations, Financial services	Department of Agriculture, forestry and fisheries, National Agricultural Marketing Council	Association of Agro – processors, Standards Association,	South African Consumer Council	
Chain Context	National Government: Policies on plant production, Laws and Regulation, road and telecommunication infrastructure, fiscal and monetary policies, sanitary policies, agricultural imports regulations, public health acts, environment acts, licensing					
	Provincial Government: Rural Development Councils		Infrastructure- road networks, water, electricity			

Figure 3: Agro-food Value Chain in South Africa

Agricultural inputs are farm production resources such as seeds, chemicals, and farming equipment (Elayelagha, 2023). The inputs are generally categorized as consumable inputs (seeds, manure, etc.) or capital inputs (tractors, tools, etc.) and these assist farmers during the production of produce (Elayelagha, 2023).

Once farming produce is ready for harvest, it then goes through post-harvest activities including preservation and preparation for consumption (Wilkinson & Rocha, 2008). This process is essential to create market ready produce that will then be sold at retailers (Wilkinson & Rocha, 2008). The Agro-processing industry is one that plays a significant role in managing produce production to consumption, and in the creation of income and employment opportunities in developing countries like South Africa (Wilkinson & Rocha, 2008).

Then, food retailers play the role of making sure consumers have access to the food produced by farmers (Trivette, 2019). Food retailers can directly source the processed produce from farms or through traders (Trivette, 2019). Farms are generally not able to distribute the food produced to regions, which is where food retailers play the important linking role between farm to fork (Trivette, 2019).

Shortfalls Negatively Impacting Farmers in the Food Value Chain

Lower Margins for Producers

Small to medium scale farmers can sell the processed produce in bulk to wholesalers and export customers that in turn sell to consumers. These bulk buyers, such as Evergreens and Food Lovers Market, benefit from economies of scale by purchasing the produce in large quantities (Madubela, 2021).

Bulk buyers then resell these goods to consumers, adding their desired mark-up to the purchasing cost to generate profit (Li & Sexton, 2013). The lower the farmer price, the higher the profit generation.

Therefore, many small-scale farmers are not able to charge similar margin levels on their produce even though they carry the burden of cultivation (Li & Sexton, 2013).

Long Payback Periods Disrupting Cultivation Continuity

In addition to driving down farmers' prices, retailers can take up to 120 days to fully payback farmers for purchased produce (Fredenburgh, 2015). Therefore, farmers do not get paid immediately for their produce sold. For small to medium scale farmers, this poses a significant cashflow challenge as the cashflow is critical for farming operations continuity (Fredenburgh, 2015).

Established farmers may not be as impacted as their cashflow balance could allow them to continue operations while awaiting payment. This in turn poses a problem. Small scale farmers cannot request prices with desirable margins as bulk buyers can select lower priced offers from established farmers. Therefore, bulk buyers have price bargaining power over farmers (Li & Sexton, 2013). Farmers will unlikely risk losing their produce to waste without any revenue return,

even if at a loss, making them price takers. The severity of this problem is the trigger to a price probe launched in February 2023 in the fresh produce market. Large scale farmers and retailers are the subjects of the investigation of fastest food price increases since 2009 (Meintjes, 2023).

Can Ecommerce Technology Alleviate These Problems?

The afore-mentioned problems for farmers could potentially be alleviated by applying a direct-to-consumer model.

Results of a study conducted in India by (Levi et al., 2020) showed that by introducing an Agri-online platform, farmers prices increased by an average of up to 5.1% for certain food products. The so-called Unified Market Platform (UMP), was launched by the state government in India to improve the welfare of smallholder farmers (Levi et al., 2020).

However, the trade-off of this solution is the lower addressable market base, than wholesale, given the currently low adoption of ecommerce in South Africa (Hartzenberg, 2022).

Farmers can sell their produce directly to consumers through their own retail store (Bruyn, 2021). It will allow them to be in control of their prices and they can receive payments significantly faster than through bulk sales (Bruyn, 2021). The introduction of an online store could further expand market reach for these farmers with other added benefits (Bruyn, 2021).

Limited Research Available on Agri Ecommerce in South Africa

Although Agri ecommerce can be a potential solution to the afore-mentioned problems, there is a research gap in terms of its impact on Agriculture in South Africa. This is especially when focused on the consumer perspective.

In the next section, the research gap will be explored in detail. There have been various studies internationally conducted on the impact of ecommerce on the Agri sector (Al-Fawwaz, 2022; Cloete & Doens, 2008; Haji, 2021; Li et al., 2020; Wahdiniwaty & Esertha, 2019).

Most of the research studies found focused on farmers' propensity to adopt ecommerce in their operations and less on the consumer adoption perspective. This is also true for the research studies found for the African context (Cloete & Doens, 2008) (Amofah & Chai, 2022).

2.3 Ecommerce Implementation in the Agri Sector

There have been various research studies that have been conducted to understand the impact that ecommerce can have on the Agri Sector (Al-Fawwaz, 2022; Cloete & Doens, 2008; Haji, 2021; Li et al., 2020; Wahdiniwaty & Esertha, 2019). The studies vary from B2B to B2C models.

A research study by (Wahdiniwaty & Esertha, 2019) in Indonesia sought to analyze the influence that ecommerce technology has on the agriculture sector. By monitoring buyers and sellers' usage behaviour and sentiments who transacted on Agri-based marketplaces, the study found that convenience, ease of user journey, and ease of completing transactions makes ecommerce technology an influential tool for Agribusiness. These factors encourage consumers to make purchases online which benefits the sellers (Wahdiniwaty & Esertha, 2019).

Another study conducted in Indonesia by (Soegoto & Nugraha, 2020) analyzed the effectiveness of ecommerce in Agriculture. The research was conducted by thoroughly studying the different ecommerce capabilities including Product Listing, Merchant onboarding systems, and payment methods, of a popular Agri site called Agromarket. The outcome of the research showed that ecommerce attracted consumers to purchase Agri products online due to ease of product accessibility, ease of transactions, and view of product availability.

This being a benefit to sellers. Furthermore, marketing activities enhanced the performance of the platform.

(Li et al., 2020) conducted a research study in China on the influencing factors that drive consumers' adoption willingness and behavioural consistency of vegetables ecommerce. The study, which was conducted in a first-tier city, found

that the perception of usefulness, distance to nearest vegetable market, and logistics service quality are positively associated with the adoption and willingness to purchase vegetables online (Li et al., 2020).

(Smidt & Jokonya, 2022) researched the factors that affect the adoption of digital technology by small-scale farmers. In this study, ecommerce was one of the technologies identified to provide access to consumer in the Agri value chain. Lack of technology infrastructure, electricity, and tech knowledge are factors that have hindered adoption of digital technology (Smidt & Jokonya, 2022). In addition to these factors, small-scale farmers are generally low-income earners, making them unable to afford digital technology.

In Germany, (Schulze Schwering et al., 2022) conducted a study to understand the different attitudes of farmers towards adopting Agri ecommerce. The research found that different types of attitude clusters that impacted the intent to adopt business professionals, loyal offliners, online fans, and online hesitators. Therefore, each farmer group would find different aspects of ecommerce attractive for adoption to purchase farming inputs online.

For the South African context, (Cloete & Doens, 2008) conducted a research study on the adoption of B2B Agri ecommerce. The study found that ecommerce adoption in the B2B Agri sector in South Africa is relatively low compared to global adoption rate, though increasing in popularity. It also found that adoption is dependent on perceived ease of use and intention of use continuity. In addition, an Agri organization's values, culture, and existing technology infrastructure also plays a role on adoption. Organizations that prefer personal interaction with customers did not adopt ecommerce platforms. The finding of this study is important to note as it means not all farmers may consider profit improvement enough to consider ecommerce platforms.

As observed in this section, most of these studies are conducted in Asian countries with very few conducted in Africa. Furthermore, these studies have mainly focused on understanding farmers' adoption intent of Agri ecommerce leaving a research gap on consumer adoption intent factors in Africa, and specifically in South Africa. Therefore, this research study will contribute towards

expanding literature knowledge of consumer Agri ecommerce adoption in South Africa.

2.4 Important Attributes of a Typical Online Marketplace

Ecommerce has presented various benefits to consumers that include shopping convenience, time and money savings (Pillemer, 2020). According to (AbdAlameer, 2014; DesignRush, 2019; Jennings, 2000; Totalwebdesign, 2023), well-designed ecommerce websites that offer these benefits to consumers share a general set of attributes.

Ecommerce Website Attributes	Attribute Definition
Website Loading Time	A website that loads quickly is important as 40% of customers are likely to abandon a page should it take more than 3 seconds to load.
Mobile Friendly	Given that more and more people are using their phones to shop online, it is important that ecommerce sites be mobile responsive to assist in ease of navigation.
Ease of Navigation	Making the products one is looking for easy to find will make it easier for them to purchase it. An efficient website navigation leads to customer satisfaction.
Aesthetics	The appealing aesthetics of the online store creates a positive impression to customers about the brand. It can also attract customers to shop more on the website.
Descriptions and Imagery	Given customers are not able to see and touch the product online, images and descriptions are important for customers to understand the product being viewed. Clean professional photos and well-written descriptions are beneficial to product purchases.
Special Pricing	Offers, deals and other product specials attract customers to make purchases in general, same for a website. Price discounts or freebies can be explored in this regard.
Calls to Action	Customers need to know where to click or what to do to purchase a product. This complements the aesthetics and ease of navigation. It creates a sense of urgency for customers to take the action to purchase a product.

Efficient Shopping Cart	The online shopping cart that allows customers the ability to store multiple items that can be purchased in a single transaction provides efficiency to customers. It is important to have guest checkout option for non-registered customers.
Secure Payment Options	This attribute allows customers multiple payment options to purchase the items. This includes, debit, credit cards, and digital wallets. Customers need to know the payment channel is safe to input their payment details.
Social Features	It is important to have multiple ways customers can have access to social reassurance before purchasing a product online. Access to social media platforms to view other customer reviews and be able to share about their experience is an important attribute.
Customer Support	Great customer service is required to provide customers with assistance. Assistance must be timeous and professional through various channels support touchpoints such as email addresses and phone numbers.
Search Engine Optimization	Ecommerce websites need to rank higher on search engines to succeed. Online shoppers exploring sites will reach these sites first and the complement of all the other attributes will assist with customer conversion. It is therefore important to adequately design a SEO optimised website before launching it.

Table 1: Attributes of Successful Ecommerce Websites

In addition to the important website factors listed above, logistics and product delivery are important to complete the online shopping experience (Daniel, 2020). These services will ensure that customers receive their purchased products at the location of their choice that is not in store.

This study will seek to understand which of these attributes are critical influences on fresh produce consumers.

2.5 Ecommerce Properties That Can Influence Purchase Intentions Fruits and vegetables Online Shoppers

The previous section detailed the important attributes of a typical ecommerce platform. The factors listed have been proven by the various cited articles to afford benefits to consumers when shopping online. These benefits then influence consumers to make purchases online. For this study, it is important to identify which features afford benefits to consumers to encourage them to purchase fruits and vegetables online. It is therefore assumed that the factors below are also influential when consumers purchase fruits and vegetables online, and these will form part of the hypotheses to be tested in this study.

2.5.1. Product Presentation

Product presentation including imagery are influential in attraction attention to products (Boardman & McCormick, 2019). Images showing the food product structure, size, colour are advantageous to show consumers what the product looks like as though it was in person (Hussain et al., 2018).

2.5.2. Content and Description Quality

The quality of product content and descriptions, and searching capabilities also impact purchase behaviour of visiting consumers, ensuring an element of trust to the online platform (Liu et al., 2017). A study by (Kim & Lennon, 2008) added that written/verbal descriptions have a stronger impact on positive shopping experience than the visual presentation. The combination of both are significantly important to influence consumers towards an online purchase (Kim & Lennon, 2008).

2.5.3. Website Aesthetics and Ease of Navigation

According to a study by (Delitzas et al., 2023), customers' user experience can be enhanced by website aesthetics. It is an important factor in attracting users and customers to a website (Delitzas et al., 2023). Another study by (Douneva et al., 2016) found that users are impacted by a website's visuals to a point of remembering them within five seconds.

Regarding the usability of a website, a study was conducted to identify usability considerations that impact purchase behaviour on ecommerce sites. The study went on to differentiate the purchase behaviour between user groups (Ling & Salvendy, 2006).

Results of the study indicated that consumers' intention to make a purchase on an ecommerce site is impacted by its usability. The study went on to detail factors such as ease of comprehension, shopping support, and trustworthiness as important usability factors that are important to online shopping consumers (Ling & Salvendy, 2006).

Although there are many literature articles regarding how to develop a responsive website design, there are limited articles detailing its importance on ease of navigation. An article by (Valencia, 2022) defines Responsive Web Design as creating website pages that adapt appropriately to different devices with different screen sizes. (Valencia, 2022) further explains that a responsive web design improves the usability of your website for users, making users likely to promote a website to other users.

2.5.4. Payment Options

Online payment options have an impact on the perception of trust that customers have towards ecommerce in Africa. This is according to a study conducted by (Hassan & Lee, 2021). The presence of popular payment options on an ecommerce site has positive impact on user trust perceptions, and this sense of trust can result in an online transaction (Hassan & Lee, 2021). Additional benefits of having online payment options on ecommerce sites include providing users

with an efficient method of making payments and receiving payment notifications, leading to a desirable user experience which is critical for the performance of any store (Shrestha, 2021).

2.5.5. Pricing

Product pricing in general has an impact on customers' purchasing decisions (Al-Salamin & Al-Hassan, 2016). Nowadays, customers are well-educated on prices of different products across various channels (Al-Mamun et al., 2014). Therefore, customers have become price conscious and conduct their research before making a purchase (Al-Mamun et al., 2014). Different organizations conduct different campaigns including promotions to influence purchasing decisions of consumers (Yusuf & Sunarsi, 2020).

2.5.6. Customer Support

Given the increasing adoption of ecommerce, there is a growing requirement for customer support services for these services (berg & Shahmehri, 2000). Human support services provide a positive customer experience on these sales channels (berg & Shahmehri, 2000). A study by (Zhou et al., 2019) went on to add that there is a positive correlation between customer loyalty and the quality of service received online.

2.5.7. Word of Mouth

A research study by (Yoon, 2002) sought to identify critical factors influencing trust in online purchase decisions. The study found that a company's reputation had an impact on users' perceived trust of their website. Study findings indicate that to build trust, a company needs to provide a satisfying online experience that engraves a positive memory to the user (Yoon, 2002). Consumers that have had a positive experience will share their experience (word of mouth) which has a positive impact on product adoption (Marchand et al., 2017). The findings of (Marchand et al., 2017) study state the volume of WOM is associated with the sales on a digital channel. Therefore, it is important for an ecommerce platform

to have positive sentiments shared about user experience to improve adoption. This study will test whether this is true for a fresh produce online store.

2.5.8. Logistics: Last Mile Delivery

A study was conducted by (Vakulenko et al., 2019) to determine whether last mile delivery experience provided by online retail stores has an impact on customer satisfaction. The study concluded that indeed last mile delivery has an impact on customers' perception of the online store and overall customer experience (Vakulenko et al., 2019). Findings in another study by (Astrid Bjørgen et al., 2021) state that home delivery for food and groceries has an impact on reducing the number of trips to physical stores. This research will seek to identify whether this also applies to fresh produce shopping specifically.

2.5.9. Hypothesis

The literature review so far has discussed the potential impact that ecommerce can have on improving the profitability of small-scale farmers. Multiple studies in the Agri sector have discussed the benefits of introducing ecommerce in the food value chain. The key attributes to developing a typical ecommerce website have been identified and discussed. These attributes then form part of the compilation of the hypotheses for this research.

The hypotheses listed below assume that the typical ecommerce attributes play an influential role on purchase intentions on consumers when specifically shopping for fruits and vegetables online:

H_1: Product Presentation of fruits and vegetables on an ecommerce site is an influencing factor to consumers when shopping for fresh produce online.

H_2: The quality of website content and product descriptions of an Agri ecommerce site is an influencing factor to consumers when shopping for fresh produce online.

H_3: Website aesthetics and ease of navigation of an Agri ecommerce site is an influencing factor to consumers when shopping for fresh produce online.

H_4: The availability of different payments options on an Agri ecommerce site is an influencing factor to consumers concluding their purchases when shopping for fresh produce online.

H_5: Fruits and Vegetables pricing on an ecommerce site is an influencing factor to consumers when shopping for fresh produce online.

H_6: Customer Support services available on fruits and vegetables ecommerce sites influence consumers to regularly purchase fresh produce online.

H_7: Word of Mouth from previous shoppers of a fruits and vegetables ecommerce site is an influencing factor to on purchase intentions of new consumers when shopping on the site.

***H_8*:** Last Mile Delivery options available for purchased fruits and vegetables on an ecommerce site is an influencing factor to consumers when shopping for fresh produce online.

2.6. ANALYTICAL FRAMEWORK

2.6.1. Theoretical Framework

Technology Acceptance Model

There are various theoretical frameworks that can be used to test technology-based hypotheses. The Technology Acceptance Model (TAM) is a framework widely used to determine users' adoption and level of usage of technology (Davis, 1989). It is based off two main components being perceived usefulness and perceived ease of use. (Davis, 1989) defines perceived usefulness as the level of which someone perceives technology use to improve their productivity. Then perceived ease of use is defined as the extent to which someone feels that using technology is effortless (Davis, 1989). Based on the mode's components, this framework could be applied to this study given the e-commerce efficiency and productivity components to be tested.

The TAM model was used in a study by (Li et al., 2020) to determine factors that impact vegetables consumers' ecommerce adoption willingness in China.

Theory of Planned Behaviour

Another potentially applicable model for this study is the Theory of Planned Behaviour (TPB). In this framework, (Ajzen, 1991) states that an important factor to one's planned behaviour is the intention to perform that behaviour based on motivating factors. This study seeks to understand which motivating ecommerce factors that would encourage a fresh produce consumer to shop online. The theory suggests that the factors affecting behavioural intentions are attitudes towards the behaviour, subjective norms, and perceived behavioural control.

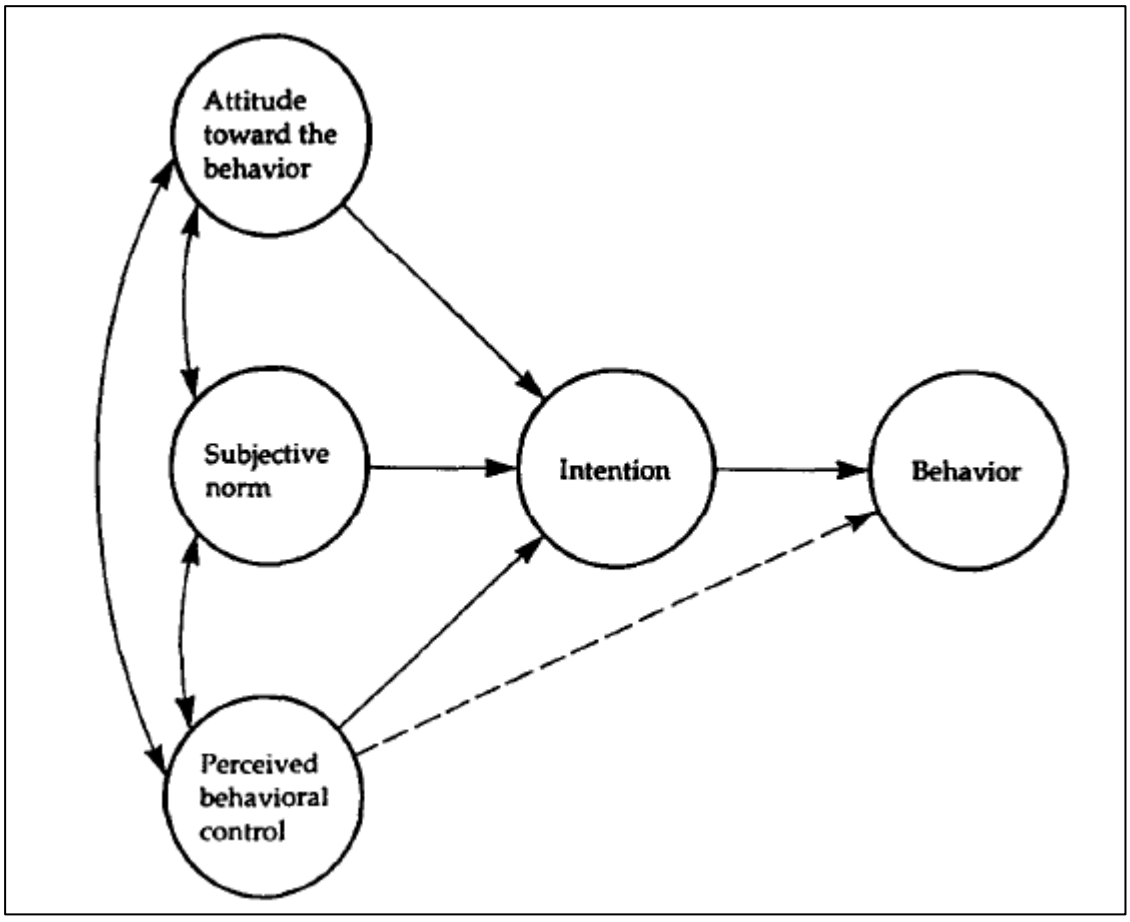

Figure 4: Theory of Planned Behaviour

Attitude in this context refers to an individual's appraisal of a behaviour based on perceived consequences of the behaviour with a subjective notion of whether they are positive or negative (Ajzen, 1991).

Subjective Norms in this model refers to the influence of society on one's behaviour (Ajzen, 1991). It involves understanding the impact that family, friends, or other people of influence have on one's perception of actions they should do or not do, and the level of which they comply to that expectation (Ajzen, 1991).

Finally, the perceived behavioural control component refers to one's perceived ability to perform a behaviour. The perception is determined by their perceived capabilities to perform the behaviour, and factors enabling or prohibiting their ability to perform the behaviour (Ajzen, 1991).

These three intentions of behaviour factors are closely related understanding the behaviour disposition of fresh produce consumers to shopping online for fruits and vegetables.

Unified Theory of Acceptance and Use of Technology

However, the model that has been identified as a better fit for this study than the afore-mentioned models is the Unified Theory of Acceptance and Use of Technology (UTAUT). The UTAUT model is the result of a study conducted by (Venkatesh et al., 2003) seeking to create a unified technology acceptance model based on eight existing prominent models. The TAM and TPB theories formed part of the eight models.

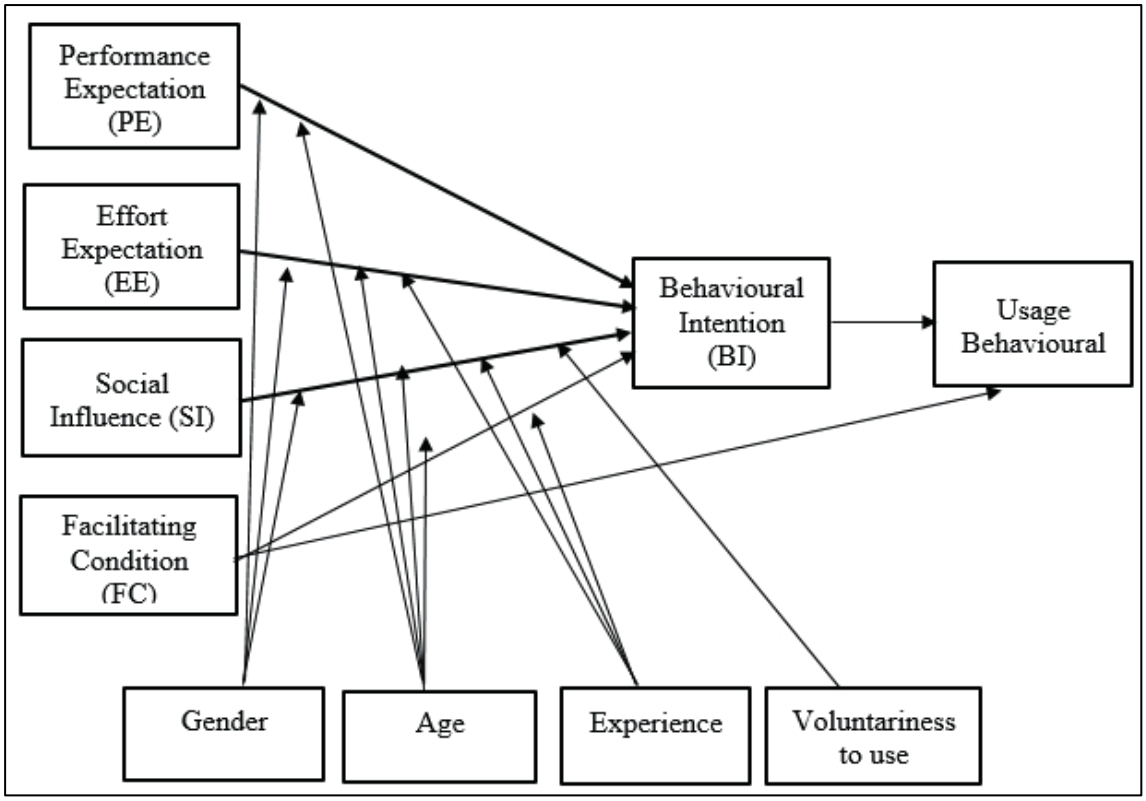

Figure 5: The UTAUT Model

(Venkatesh et al., 2003)'s study confirmed that the UTAUT model is a better acceptance framework than the individual frameworks. The model indicates that there are four direct factors that determine an individual's acceptance and usage behaviour of technology, namely, performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003):

- **Performance Expectancy** – this factor involves a user's perception of the efficiency the technology provides towards completing the user's task. It is understood that gender and age impact this factor (Venkatesh et al., 2003).
- **Effort Expectancy** – this involves how easy it is for the user to use the technology. Simplicity, ease of use, user-friendly interfaces are considered. Age, gender, and experience in using type of technology impact this factor (Venkatesh et al., 2003).
- **Social Influence** – refers to the impact that social norms have on a user's intention to adopt the technology. In this case, the user is wary of what people will think about them for using the technology. Gender, experience,

age, and voluntariness to use the technology are associating factors. (Venkatesh et al., 2003).

- **Facilitating Conditions** – involves the tools and infrastructure available to the user to make use of the technology. (Venkatesh et al., 2003).

This model proved to be more effective than the eight individual models (Venkatesh et al., 2003), and based on its acceptance components, will be the model applied to conduct the research for this study. It provides a significant study advantage than using the TAM or TPB models individually. The model has been used in a similar ecommerce study by (Amofah & Chai, 2022) titled “Sustaining Consumer E-Commerce Adoption in Sub-Saharan Africa”.

The Theory of Affordances (or Affordance Theory)

Affordances according to (Gibson, 1979) are perceptions that an environment affords to an animal, whether good or bad. Different things in the world provide affordance. The level of affordance depends on the unit that it is affording to (Gibson, 1979). Like a horizontal, flat, extended, and rigid surface relative to the size and weight of an animal (Gibson, 1979). This surface is suitable for said animal to stand, walk, or run on it. The same animal would not be able to do so in water as they would sink. The flat surface affords support that water cannot (Gibson, 1979).

Ecommerce websites have different properties (Totalwebdesign, 2023) and the objective of this study is to identify which of these properties have the most impact on purchasing intentions of fresh produce consumers. (Pozzi et al., 2014) conducted a study on the application of Affordance on Information Systems and proposed the following framework:

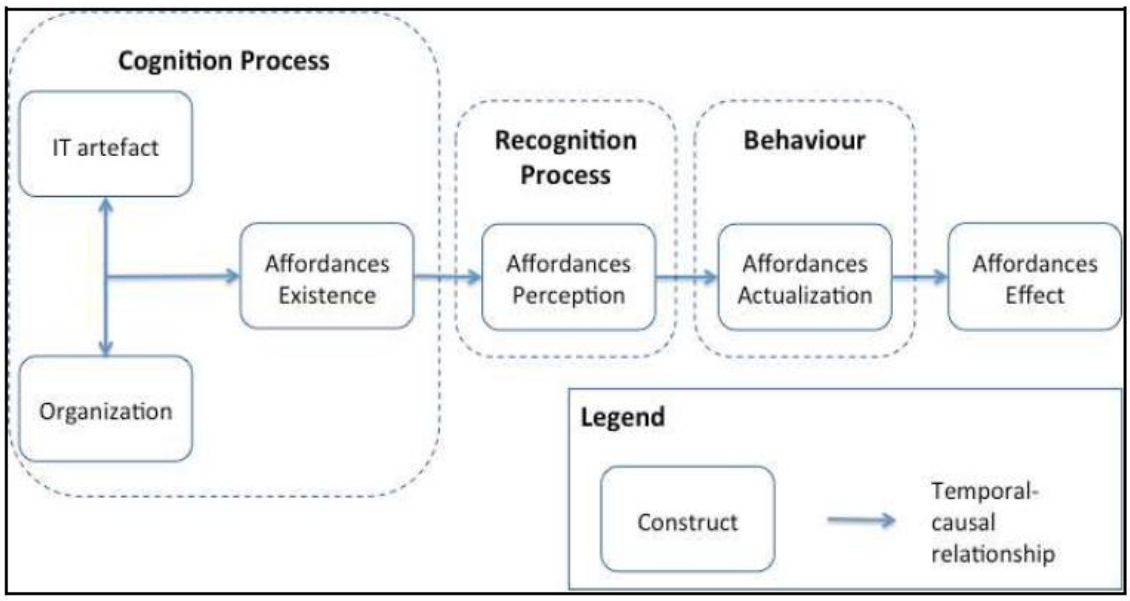

Figure 6: Theoretical Framework of Affordance Theory

The framework is made up of four steps that are defined as follows:

1. **Affordance Existence:** affordances exist in Information systems but they are not always apparent to consumers (Pozzi et al., 2014).
2. **Affordance Perception:** this involves understanding how consumers perceive affordances. The perception is affected by various factors that include the technology's design, consumer's experience, and the context of the technology's usage (Pozzi et al., 2014).
3. **Affordance Actualization:** this is about how consumers actually use the technology. Factors include the consumer's usage skills, objective of use, and affordances present (Pozzi et al., 2014).
4. **Affordance Effect:** this involves understanding the impact that affordances have on the consumer's behaviour. Affordances can impact behaviours such as performance in completing tasks, knowledge enhancement, and consumer satisfaction (Pozzi et al., 2014).

The UTAUT model is one that is generally used to gauge the acceptance of technology by users at the infancy of the technology being introduced (Venkatesh et al., 2003). Given Agri ecommerce adoption has risen over the years since introduction (Green, 2022), this research study seeks to identify which Agri ecommerce factors provide affordances leading to consumers purchasing fresh

produce online. Therefore, the Affordance Theory framework is the ideal framework to use as the guide for the research process of this study and interpretation of results (Wang et al., 2018).

2.6.2. Conceptual Framework

This research study seeks to identify ecommerce factors that influence purchase intention for fresh produce consumer. The objective is to identify which factors will convert consumers from physical stores to online shoppers, benefiting farmers selling on the platform with a direct access to the consumer market. An additional objective is to rank the factors by level of purchase influence.

The impact of the following ecommerce factors will be tested in this study: product presentation, site content and description quality, site aesthetics and ease of navigation, payment options, product pricing, customer support, word of mouth, and last mile delivery service. These factors will be especially tested for fresh produce marketplace for consumers residing in South Africa. The theoretical framework that will guide this research is the Affordance Theory model. This study will expand the application of this model in the B2C Agri ecommerce context for the South African market. It will especially identify which ecommerce factors are essential to have on a fresh produce Agri marketplace that will attract purchases from consumers to benefit farmers. Based on the model, it is expected that the relationship between the factors and purchase behaviour is as follows:

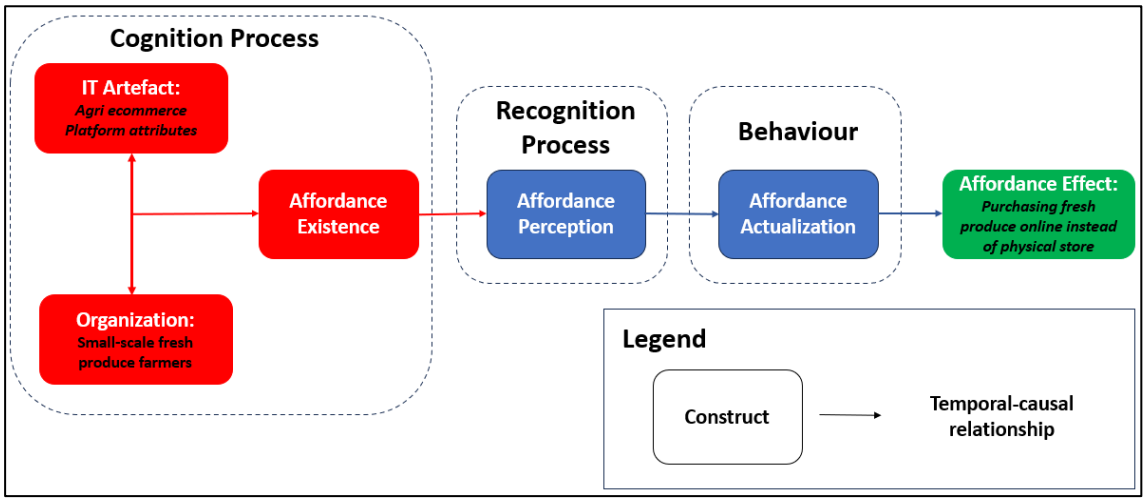

Figure 7: The Affordance Theory Model Applied to this study.

Each factor for this study has been categorised under the determinants of the Affordance Theory model. The expected outcome of the study is that all the listed ecommerce factors will have an impact on fresh produce consumers' intention to purchase fresh produce online. The expectation is supported by the study conducted by (Li et al., 2020) where the findings showed that perception of usefulness, logistics service quality, and nearest vegetables market have a positive impact on vegetables consumers' willingness to shop online in China. The next level of this study would be to identify which Agri ecommerce factors have the most influential impact on purchase behaviour of consumers. The factors will then be ranked by level of influence.

2.7. Conclusion of Literature Review

Technology can provide various benefits to many industries (Simplilearn, 2023). In the case of South African farmers, it can provide them direct access to a source of income in fresh produce consumers (Bruyn, 2021), allowing them to benefit from a higher margin in profits (Levi et al., 2020).

However, it is important that in having direct access to this market, the right parameters are present that will influence these consumers to use technology to acquire their fresh produce products instead of going into stores.

If customers continue shopping at physical well-known stores, smallholder farmers will struggle to realize higher margins for the effort they put in growing their produce (Meintjes, 2023). A study in India has shown that introducing an Agri marketplace targeted at consumers does increase the profitability margins of farmers (Levi et al., 2020). There have been various studies conducted to understand ecommerce technology and its implementation in Agriculture globally. However, based on the literature review, there is an opportunity to expand the research to the B2C context in South Africa, which is the objective of this study. There are various ecommerce factors that have been identified to influence consumers usage and purchase behaviour. This study seeks to understand which of these factors apply for an Agri specific ecommerce platform for fresh produce consumers in South Africa. The expected finding of the study is that all

the identified factors will have an impact on consumers' usage and purchase behaviour:

H_1: Product Presentation of fruits and vegetables on an ecommerce site is an influencing factor to consumers when shopping for fresh produce online.

H_2: The quality of website content and product descriptions of an Agri ecommerce site is an influencing factor to consumers when shopping for fresh produce online.

H_3: Website aesthetics and ease of navigation of an Agri ecommerce site is an influencing factor to consumers when shopping for fresh produce online.

H_4: The availability of different payments options on an Agri ecommerce site is an influencing factor to consumers concluding their purchases when shopping for fresh produce online.

H_5: Fruits and Vegetables pricing on an ecommerce site is an influencing factor to consumers when shopping for fresh produce online.

H_6: Customer Support services available on fruits and vegetables ecommerce sites influence consumers to regularly purchase fresh produce online.

H_7: Word of Mouth from previous shoppers of a fruits and vegetables ecommerce site is an influencing factor to on purchase intentions of new consumers when shopping on the site.

H_8: Last Mile Delivery options available for purchased fruits and vegetables on an ecommerce site is an influencing factor to consumers when shopping for fresh produce online.

The theoretical framework that will be used to conduct this study is the Affordance Theory model. A quantitative study will be conducted to identify the applicable factors and customers' expectations of how these factors should be applied for an Agri ecommerce store. The findings of this study will contribute towards the application of ecommerce technology in the Agri sector in South Africa with the objective to improve smallholder farmers' ability to access the consumer market and improve profitability.

CHAPTER 3. RESEARCH METHODOLOGY

This chapter will outline how the research is going to be conducted. The research approach will be explored along with how the research will be deployed and the resulting data analyzed. The chapter will also outline the precautions the research will take to ensure that the research is academically sound.

3.1. Research approach

The purpose of this study is to identify which Agri ecommerce factors entice fresh produce customers to purchase fruits and vegetables online in South Africa. The objective is to identify which features are the most important to customers to encourage them to make a purchase, leading to better purchase conversion rates of these platforms. The better conversion rate should improve the revenue and profit generation of farmers as experienced in the study by (Levi et al., 2020).

Ontology

Ontology is defined as the study of being, especially looking to understand the type of world which is being investigated (Ahmed, 2008). It is concerned with the current state of the world and what exists in it that humans can use to acquire knowledge (Moon & Blackman, 2017).

Objectivism is a position whereby the truth about a world is achieved by gathering evidence indicating its reality (Al-Saadi, 2014), and the same evidence can be gathered irrespective of the researcher (Trivedi, 2020). It is also a view that there is a single truth and the researcher's task is to find this truth (OpenLearn, 2024). Therefore, this view suggests that the truth is static and studies of this natures makes use of data collection and interpretation methods such as hypotheses tests to realize the truth (Al-Saadi, 2014).

Constructionism on the other is the view that people's perceptions can be used to interpret the world around them (Al-Saadi, 2014). It is based on one's reflections on events rather than the actual lived experience (Al-Saadi, 2014). (OpenLearn, 2024) describes this view as one where the truth is interpreted by

individuals' views by asking questions that gather insight on how people interpret reality. This approach being generally associated with qualitative research methods (OpenLearn, 2024).

The approach aligned with this research is the objectivism ontology position. This research seeks to understand the objective affordances provided by the various ecommerce factors to be tested to fresh produce consumers. The expectation of the research findings is to identify the reality of the influence of these ecommerce factors towards purchase intentions.

Epistemology

According to (Saunders et al., 2003), epistemology is a branch of philosophy that focuses on what is known as true and what is not true. (Moon & Blackman, 2017) say that epistemology is based on all aspects involved in validating a body of knowledge, the method in which the knowledge is acquired or produced, and the extent of the knowledge's transferability. In simple terms, "it concerns itself with the theory of knowledge." (Sol & Heng, 2022).

As discussed in the Literature review, there are various research studies that have explored the use of ecommerce technology in Agriculture (Al-Fawwaz, 2022; Cloete & Doens, 2008; Haji, 2021; Li et al., 2020; Wahdiniwaty & Esertha, 2019). This is referred to as Authoritarian knowledge (Moon & Blackman, 2017). It is accepted that farmers have made use of ecommerce technology and has resulted in the improvement of their profits in India (Levi et al., 2020).

It is also accepted that ecommerce technology has a positive influence in agriculture in a way that encourages consumers to make purchases on Agri-based marketplaces (Wahdiniwaty & Esertha, 2019). Furthermore, it is accepted that there exists specific ecommerce website design features that consumers find beneficial when shopping online that drives them to make online purchases (AbdAlameer, 2014). The accepted knowledge plays a significant role in the objective of this research which is to determine which ecommerce factors influence consumers to purchase fruits and vegetables online, specifically in South Africa.

There are various Epistemology research philosophies including Pragmatism, Positivism, and Realism (Moon & Blackman, 2017). Focusing on Positivism, it is understood as a research approach that focuses on gathering facts about a certain observations, which is then conducted through hypotheses tests and interpreted through statistical studies (Flick, 2015; Moon & Blackman, 2017; Sol & Heng, 2022). Therefore, this approach aims to avoid speculation and rather rely on facts when making an observation (Flick, 2015). This research approach is associated with the Objectivism Ontology position.

This research study will be conducted using the Positivism approach through a quantitative research approach to observe the preferences of fresh consumers when shopping online for their goods. Data will be collected from a sample of participants and analyzed through various statistical methods to derive fact based observations from the sample as associated with quantitative research (Jansen & Warren, 2020). The objective is to identify a generalizable behaviour (Flick, 2015) that can be used to determine the influential ecommerce factors in the context of this study. The research will be conducted by applying principles of the Theory of Affordances.

Assumptions

The following assumptions are important for the research approach.

- All research participants understand what online shopping is or have experience in shopping online.
- Research participants have received a delivery at their location through a courier service.
- Research participants consume fruits and vegetables at least once a week.
- All research participants have purchased fruits and vegetables from a physical store.
- Research participants have made use of online payment options to purchase products.
- All participants are based in Gauteng province.

Research participants have access to data bundles and data connectivity to complete the online survey.

3.2. Research design

The study will be conducted by making use of an online survey. Participants will be requested to respond to questions seeking to understanding the importance of each ecommerce feature to their purchase intentions.

The survey structure will allow participants to respond using numerical indicators that will be used to make statistical inferences to answer the research question. The survey questions will be categorized by feature in a way that each feature will have an overall score based on the responses. The analysis of the scores will assist in identifying the importance of the feature, as well as rank the feature in comparison to the other features.

There are various advantages to conducting a survey for the purpose of this study:

- **Survey Reach:** a quantitative research will be conducted therefore a large participant size is ideal (Phair & Warren, 2021) to make inferences with more precise confidence levels (Littler, 2023). Surveys are generally responded to by many people that can create an adequate sample size representing the larger population (Sincero, 2012).
- **Gathering Method:** there are various online survey tools that collect survey responses efficiently with some providing reports (Sincero, 2012). The surveys can be presented to targeted participants across various digital channels such as social media or email, and all data collected in one repository. The collection method aids to the expansive reach in respondents of surveys (Sincero, 2012).
- **Cost:** it is cost effective to administer a survey (Sincero, 2012). It avoids other costs such as driving to different participants as one would for a census. Survey costs can include online software service charges or incentives costs.

However, there are also disadvantages to conducting a survey:

- **Response Authenticity:** surveys can be responded for the sake of being responded. Such responses can have an impact on the data output. This can happen especially when the survey is long (Nikulchev et al., 2021). This can be mitigated by posing questions in a certain way that tests authenticity is responses (Nikulchev et al., 2021).
- **Flexibility:** surveys are generally created to expect short answers. They do not provide in-depth responses as would interviews (Irvine, 2018). There may be more information that respondents would like to share but may not be able to. This information can be useful to clarify the reason a participant responded in a certain way.

3.3. Data collection methods

The survey data for this research will be solicited through an online questionnaire. This questionnaire will be sent to the targeted population sample residing in Gauteng Province given it is the most populous province in South Africa (StatsSA, 2022b). It is also the province with the most internet users in South Africa at 42.7% of the population (Cowling, 2023). The survey responses will be collected and stored in an online repository.

The online questionnaire format aligns with the expected respondents being internet users. The online format of the questionnaire ensures that it can be distributed to various participants using multiple channels, increasing the likelihood of response count (Sincero, 2012). The response options available to respondents will be in numerical format to allow for statistical analysis of the results.

As previously stated, to achieve a narrower and precise confidence interval, a large sample size is required (Littler, 2023). The targeted population and sample will be discussed in the next section.

3.4. Population and sample

3.4.1. Population

The research study is aimed at participants residing in South Africa. The Department of Statistics South Africa estimated the country's population in 2022 to be 60.6 million (StatsSA, 2022b). Gauteng Province has the highest population at 16.1 million, with Kwazulu-Natal and Western Cape provinces having the second and third highest population respectively (StatsSA, 2022b).

Based on ecommerce statistics in South Africa, there is about a 41% ecommerce penetration in South Africa, making the ecommerce population 25 million (Eden et al., 2021). Given the assumptions of this research study, the ecommerce population will serve as the main population targeted for the purpose of this research study.

Therefore, consumers based in Gauteng Province will be the subjects of the study given that it is the most populous province in the country (StatsSA, 2022b) and has the most internet users in the country (Cowling, 2023). Consumers aged 18 years and older will be considered for this study. The next section will identify the addressable population base to serve as the sample for this study.

3.4.2. Sample and sampling method

There are two main categories of sampling methods; Probability sampling and Non-Probability sampling (Turner, 2020). The Stratified Sampling method (a type of Probability Sampling method) is one where there are subgroups of interest of the population (Turner, 2020). This method will be used to determine the sample base for this study.

To assist in ensuring there is a high survey response rate, it is important to target participants that are online shoppers. (Eden et al., 2021) compiled a report on ecommerce shoppers in South Africa and the findings of this study will play a major role in the population segmentation.

The report indicates that there was a 41% ecommerce penetration in South Africa in 2021. It is assumed that this penetration is retained. Therefore, there are approximately 25 million ecommerce shoppers in South Africa. To further segment this base, given that Gauteng is the province with the highest population, at 27% of total population (StatsSA, 2022b), the survey will be targeted to participants residing in Gauteng. It is then assumed that 27% of ecommerce consumers are residing in Gauteng, therefore, approximately 6.7 million consumers.

In South Africa, 85% of online shoppers are aged between 18 – 44 years old (Eden et al., 2021). The age groups proportions are broken down as follows; 26% between 18-24 years old, 35% between 25-34 years old, and 24% between 35-44 years old (Eden et al., 2021). Therefore, the survey will be targeted to participants of these age groups, making the addressable base approximately 5.7 million consumers.

The Food and Drinks category is the third most popular category for online shoppers in South Africa (Eden et al., 2021). 73% of respondents indicated that they shop for food and drinks online. It is therefore assumed that 73% of the addressable base are likely to purchase fresh produce online. Therefore, this narrows down the base to 4.16million consumers. Furthermore, 54% of females shop for food online compared to 46% of males (Eden et al., 2021). It is expected that the ecommerce factors will have different influences based on gender. Therefore, gender will play a significant role in survey participants. It is assumed that there target population are as follows: Females – 2.25million, Males – 1.91million.

The population sample size has been calculated based on two sample formulas, namely, Yamane Formula and Normal Distribution Formula. The formula for the Yamane sample size calculation is as follows (Yamane, 1967):

$$n = \frac{N}{1 + N\,(e)^2}$$

n=Sample Size
N=Population Size
e=Margin of error

Figure 8: Yamane Sample Size Formula

The formula for the Normal Distribution sample size calculation is as follows (Srivastav & Vaidya, 2023):

$$\text{Sample size, } n = N * \frac{\frac{Z^2 * p * (1-p)}{e^2}}{[N - 1 + \frac{Z^2 * p * (1-p)}{e^2}]}$$

Figure 9: Normal Distribution Sample Size Formula

Based on the sampling method above, the research sample has been identified and summarized in the table below:

Population		
Type	**Rate**	**Number of People**
South Africa		60 600 000
Ecommerce (41%)	41%	24 846 000
Gauteng	27%	6 708 420
Age: 18 - 44 Years Old	85%	5 702 157
Food and Drinks Online Shoppers	73%	4 162 575
Females	*54%*	*2 247 790*
Males	*46%*	*1 914 784*

Sample (Yamane Formula)				
Type	**Rate**	**Size**	**Male**	**Female**
Population (N)		4 162 575	46%	54%
Sample	$n = \frac{N}{1 + N * (e)^2}$	400	184	216
Age Group Distribution	*18-24 Years Old*	*26%*	*48*	*56*

	25-34 Years Old	*35%*	*64*	*76*
	35-44 Years Old	*24%*	*44*	*52*
Sample (Normal Formula)				
Type	**Rate**	**Size**	**Male**	**Female**
Population (N)		4 162 575	46%	54%
Sample	$n = N * \frac{\frac{Z^2 * p * (1-p)}{e^2}}{[N-1+\frac{Z^2 * p * (1-p)}{e^2}]}$	384	177	207
Age Group Distribution	*18-24 Years Old*	*26%*	*46*	*54*
	25-34 Years Old	*35%*	*62*	*73*
	35-44 Years Old	*24%*	*42*	*50*

Table 2: Research Study Sample Breakdown

The survey questionnaire will be distributed through various online and social channels to reach as many target participants as possible. The survey will also be shared using influencers to ensure participation of followers. This will include an incentive prize, if required, to encourage participants to complete the survey. The incentive will be introduced if the response rate is low compared to the targets.

3.5. The Research Instrument

The research instrument will be in the form of a questionnaire. The questionnaire, available in APPENDIX C, will be posed in a manner that will gauge the influence of each ecommerce factor listed in Chapter 2 on participants' purchase behaviour. It will also allow for data to be analysed by gender and by age group.

The first section of the survey will allow participants to share information such as their gender, age, and their frequency level of shopping online.

The main body of the questionnaire will be categorized based on the ecommerce features: Product Presentation, Content and Description Quality, Website Aesthetics and Ease of Navigation, Payment Options, Pricing, Customer Support, and Word of Mouth. Each category will have questions gauging the level of

influence the factor has on the participant making a fresh produce online purchase.

The final portion of the questionnaire will thank the participant for sharing their responses. The actual research instrument is available in Annexure B of this research proposal.

3.6. Procedure for data collection

There are various channels through which the online questionnaire can be distributed to targeted participants. This study's survey will be predominantly shared through online channels to reach as many participants as possible.

Academic Channels

The survey will be shared via email to University of Witwatersrand (Wits) students and lecturers. This will require a request form to be completed and approved prior. Similarly, there is an opportunity to share the online survey through other academic institutions' channels. A similar request form is available be completed by non-students of those institutions. Institutions of interest are the University of Pretoria, University of Johannesburg, and Tshwane University of Technology. These are Gauteng based institutions and it is assumed that most of the students and staff reside in Gauteng.

Social Media

The survey link will be shared across social media platforms WhatsApp, Instagram, Facebook, LinkedIn and Twitter. It will be requested that friends, family, and acquaintances share the survey link on their respective profiles.

Individuals with significant followers (Influencers) on these platforms representing the target base of participants will be approached to share the survey. Some Influencers may be required to be paid to share the survey. Others may require providing an incentive to influence their followers to complete the survey. These options will be explored and finalized on a case-by-case basis.

Agriculture Channels

Bizcommunity, Harvest SA and Farmers Weekly are online publications channels for Agriculture in South Africa. These publications will be approached to have the survey link shared with their readers through a dedicated article page and newsletters. The options will depend on the associated costs.

The survey will also be distributed through different agricultural councils by leveraging existing relationships. The African Agricultural Council, F'SAGRI, NEPAD, and UNDP will be approached to share the survey within their staff members and through their respective digital channels including social media platforms and email newsletters.

Professional Network

Organizations such as Vodacom, XLink, and 22onSloane will be approached to share the survey their communication channels. There is an existing relationship with these organizations, and they have interests in the Agri sector. Therefore, this project will be of value to them with special interests on the results of the study.

The survey questionnaire will include a section where participants can indicate where they heard about the survey. This will assist in identifying the channel through which most of the participants were reached.

3.7. Data analysis strategies and interpretation

The survey responses will be stored on the online survey repository. At the conclusion of soliciting participants' responses, the research data will be collected from the repository (Kelley, 2023).

Once the data has been collected, it will go through a process of data cleaning (Kelley, 2023). During this process, the data will be reviewed and responses that are not deemed useful will be discarded. This can present itself in the form of incomplete survey responses, duplicate records, and other errors identified.

Once the data is ready for analysis, a statistical analysis will be conducted. The process of this analysis includes data analysis, applying statistical models to the data, interpretation of the data, and visualization of findings (Kelley, 2023). The data will be summarized by making use of descriptive analysis principles. The following metrics will be calculated for the different scores of influence of each ecommerce factor: mean, median, mode, standard deviation. These metrics will describe varibality and distribution of the data and show patterns in the data (Rawat, 2021). At this stage, the results should start showing a pattern of influence level of each ecommerce factor. The descriptive analysis metrics will be gauged by age and gender with patterns in the result starting to formulate (Rawat, 2021).

To expand the analysis on the patterns identified, it is important to employ a statistical model to test the research hypothesis (Kelley, 2023). The data results need to be fitted to an appropriate model to gauge whether each ecommerce feature tested is influential to purchase behaviour of fresh produce consumers (identifying correlations). This process will include the creation of confidence intervals to determine precision of results. The outcome of the analysis will conclude the hypothesis testing.

Graphs and other data visualization tools will be used to visually represent the statistical findings of the research results (Rawat, 2021). The graphs will portray the relationship between each ecommerce feature and its influence on purchasing behaviour. It will also present correlation data based on gender and age.

The data collected will be interpreted by making use of both descriptive and inferential statistics approaches (Jansen & Warren, 2020). The intention to make inferences about the South African population based on the sample size of survey participants while understanding the subgroups by age and gender.

A confirmatory factor analysis will be conducted to analyse the impact of the various ecommerce variables listed in the hypotheses on likelihood of consumers purchasing fresh produce online along with path diagrams (Jansen & Warren, 2020; Lleras, 2005). The factors' impact on purchase likelihood behaviour will be

analyzed by gender and age group. Variables such as the mean and standard deviation will be calculated to understand the behaviour of consumers by their age group and gender at sample level (Jansen & Warren, 2020).

3.8. Possible limitations and challenges of the study

- The research is primarily targeted at consumers that have already adopted ecommerce in South Africa. Therefore, ignoring the factors that could influence non-ecommerce consumers to adopt the channel.
- Given the digital divide in South Africa, this research approach could potentially increase the adoption gap given the first point above.
- The study is focussed on understanding consumers purchase behaviour but not farmers' intention to adopt ecommerce channels.
- The research is only conducted in one out of nine provinces in the country.
- Research location in selecting sample population is not analysed at a lower level, for example, rural versus suburb areas).
- The questionnaire will be posed in English only while there are 11 official languages in South Africa.

3.9. Quality Assurance

3.9.1. External validity OR transferability

It is important that the findings of this study can be generalized/transferred to other settings in South Africa. The research meets the following criteria:

- **Large and representative sample** (Cuncic, 2022): Gauteng is selected as a target province as it hosts the majority of South Africa's population and is the economic hub of the country (StatsSA, 2022b). Furthermore, the target population and sample size was selected by making use of ecommerce research findings in the country (Eden et al., 2021).
- **Period of Study** (Cuncic, 2022)**:** Given the study is based on consumers' purchase experience on ecommerce, and their desired experience for shopping for fresh produce, the study is not limited to data for a specific

time period. The data collection period will be 5 months to allow as many participants as possible to complete the questionnaire.

- **No controlled environment** (Cuncic, 2022): the research study will not be conducted in a laboratory or controlled environment. Participants will be able to respond based on their experience or desired experience.

3.9.2. Internal validity OR credibility

Internal validation of a study refers to how the research has been conducted to ensure credible results (Cuncic, 2022). To ensure credibility of this research, the following considerations will be made:

- **Randomized participation** (Cuncic, 2022): Also the survey has a specific target audience, the participants completing the survey will be reached randomly. The survey is open to be completed by those who may not necessarily be the target market as their input will be considered valuable.
- **Questionnaire Completion** (Cuncic, 2022): the questionnaire will be constructed so that it does not take too long to complete. It will have a maximum of 30 questions that can be completed within 10 minutes (Chudoda, 2023; Sharma, 2022). This is to avoid participants rushing answering questions to finish the survey quickly.
- **Question Style**: Questions will be posed in a way that frivolous responses will be identified and discarded from the data. Questions will also be posed in a manner that respondents will understand easily (Cint, 2022). Questions will not be posed in a way that is leading/influencing respondents to a particular answer (Cuncic, 2022).
- **No Experiment Bias (Cuncic, 2022)**: The conductor of this survey will not be interacting directly with respondents during the completion of the survey. This will avoid any bias in the responses. The survey will be distributed through online channels for participants to respond at their own leisure. The survey will be completely anonymous to allow respondents to answer without fear of prejudice.

3.9.3. Reliability OR dependability

The reliability of this research will be tested and achieved through various activities:

- **Multiple Testing** (Scribbr, 2019): To ensure the validity of the data analysis results, the analysis will be conducted at least three times to monitor the results achieved. The results will be considered valid only if similar outcomes are achieved after each testing round.
- **External Audit** (Scribbr, 2019): the data will be presented to two independent statisticians to analyse. The data will be considered valid should they reach similar outcomes to this research's outcomes.
- **Testing Measures**: the measures of this study have been clearly defined and stated in section 3.7. These are standard statistical measures make the research replicable by other researchers.
- **Pilot Study** (Scribbr, 2019): Prior to sending the survey out to the masses, there will be a pilot survey that will be launched for 50 participants to respond. The survey itself and responses data will be analyzed and amended where changes need to be made to ensure credible data is collected.
- **Peer Review Journals**: The research study will made available to researchers in the ecommerce industry for review. Industry experts will be identified and invited to review the research. The review process will be open peer review (Sleeman, 2022). The research study will be published in peer-reviewed journals to ensure its quality.

3.10. Ethical considerations

The research study seeks to understand what influences customers' purchasing behaviour, especially for ecommerce. South African consumers are shopping online regularly , accepting the risks that come with using the technology (Eden et al., 2021).

This study seeks to how this behaviour can be enhanced for consumers purchasing fresh produce online. Therefore, the risk category for this projected is expected to be minimal as it seeks to understand consumers' regular activity online.

The research will be based on data collected from an online questionnaire completed by participants. The target participants have been identified using ecommerce usage behaviour statistics gathered by research experts. There have been no discriminatory approaches applied. The research will be shared across various online platforms to ensure as many participants as possible can be reached in South Africa.

Participants will have the option of completing the survey. Participants will confirm their understanding of the consent form (see APPENDIX B) by participating in the survey. There will be no repercussions for not completing the survey. The survey will have a cover page that will describe the intention of the survey. Survey respondents will complete the survey unanimously without have to share their names, addresses, or telephone numbers. The responses shared by the participants will be stored securely the online survey repository and on Microsoft OneDrive only accessible by the researcher. The results will not be published outside of the academic guidelines provided by Wits Business School.

The research data is collected for purely academic purposes. The data will not be sold to external parties. At the completion of the research study, the stored participants responses raw data will not be made available to any external parties unless requested by or approved by Wits Business School.

3.11. Proposed schedule and timelines

Action	Deadline
Create Online Survey	24-Jul-23
Launch Pilot Survey	25-Jul-23
Collect Responses and Amend Survey	25 - 31 July 2023
Launch Official Survey	02-Aug-23
Collect Survey Responses	02 Aug - 31 Oct 2023
Data Analysis and Interpretation	01 Nov - 01 Dec 2023
Submission of Final Report Draft to Supervisor	15-Dec-23
Final Report Submission	27-Dec-23

CHAPTER 4. PRESENTATION OF RESULTS / FINDINGS

4.1. Introduction

The online survey discussed in Chapter 3 was launched to with more than 260 participants. The results of this survey were studied and complied into informative charts. The results of the survey have been depicted by charts, detailing participants' responses to each question and the questions are categorized by each factor they represent. This section focuses on presenting the results of the survey and not necessarily discussing the outcome of the results.

A total of 262 participants completed the survey of which 248 responses were valid, which meets the sample size requirements. Females accounted for the majority of the participants at 56%. Males accounted for 43.5% of the participant responses. 1 participant identified themselves as another gender than male or female.

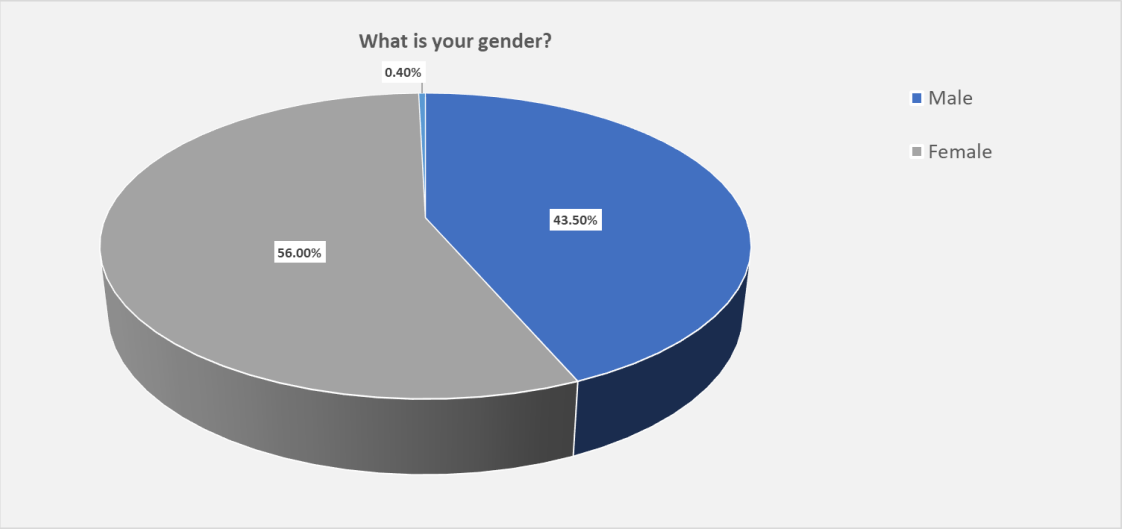

Figure 10: Chart Depicting Gender Split of Participants

Survey participants were prompted to select which age group they belong to. The results shows that the majority of participants belong to the age group 25-34 years old (48.2% of participants).

The age group 35-44 years old accounted for 29.1% of the participants. The table below details the proportion spread across all the age groups. This adequately represents the population as discussed in Chapter 3.

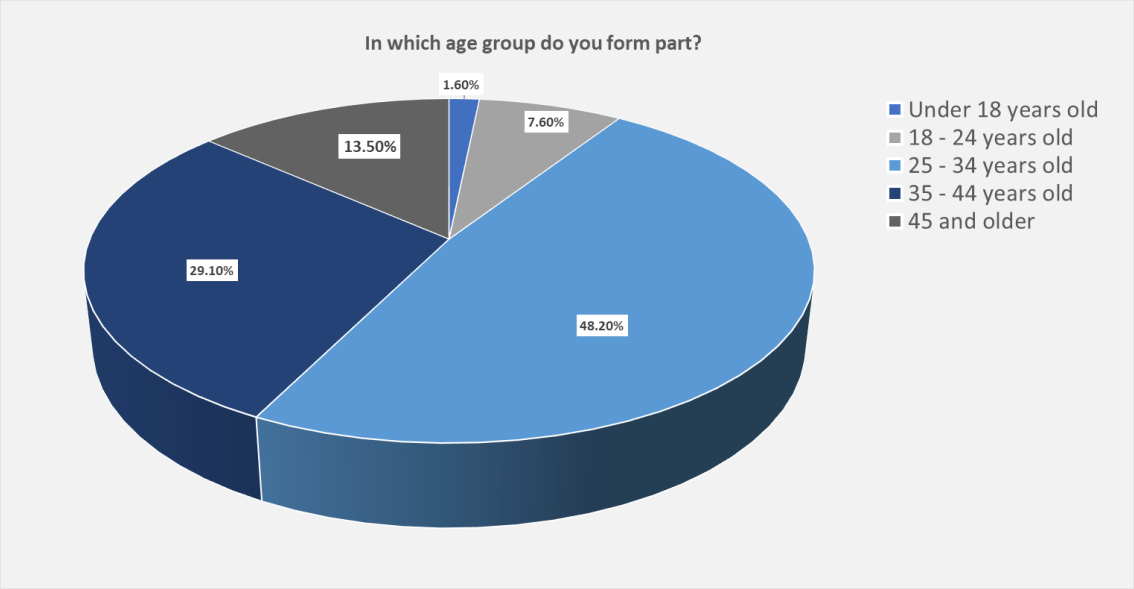

Figure 11: Age Group Proportion Spread of Participants

The upcoming sections will discuss the results specific to the various ecommerce factors as per the hypotheses of this study. To determine the importance of these factors to participants' intention to purchase fresh produce online, a Likert scale of 1 to 5 was employed with the following definitions: 1 = Not Important, 2 = Slightly Important, 3 = Important, 4 = Very Important, 5 = Crucial. This scale leverages the typical Likert scale which ranges from 1 = strongly disagree to 5 = strongly agree (Jamieson, 2004). Participants then had to score the level of each factor's importance by using this scale. The questions posed in the survey were guided and categorized per ecommerce factor being tested.

The results of the survey responses will be presented in three formats, namely, Descriptive Analysis, Inferential Analysis, and Confirmatory Factorial Analysis.

4.2. Section A: Descriptive Analysis

4.2.1. Importance of Product Presentation Results

To identify the importance of Product Presentation to the participants' intention to purchase fresh produce online, the following questions were posed:

- When shopping for fruits and vegetables online, how important are the images of the produce sold to your desire to purchase the produce?
- How important is it to you that the images online reflect the actual structure (size, colour) of the fruits or vegetables that you will receive?

The following charts indicate the results of the responses received from participants to the questions above:

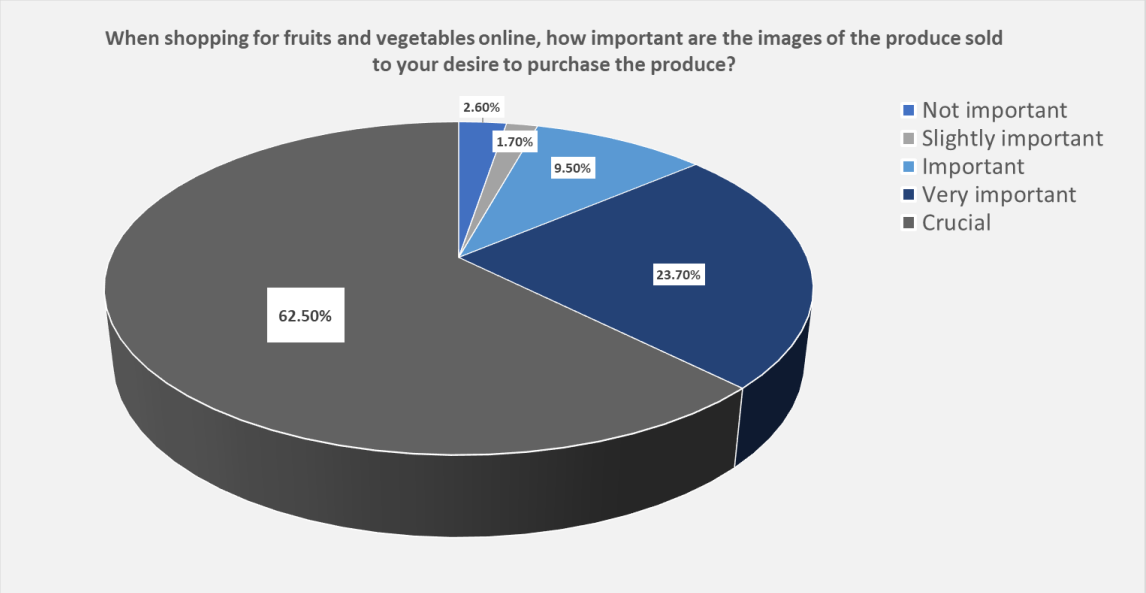

Figure 12: Chart Depicting Responses Spread to the First Question

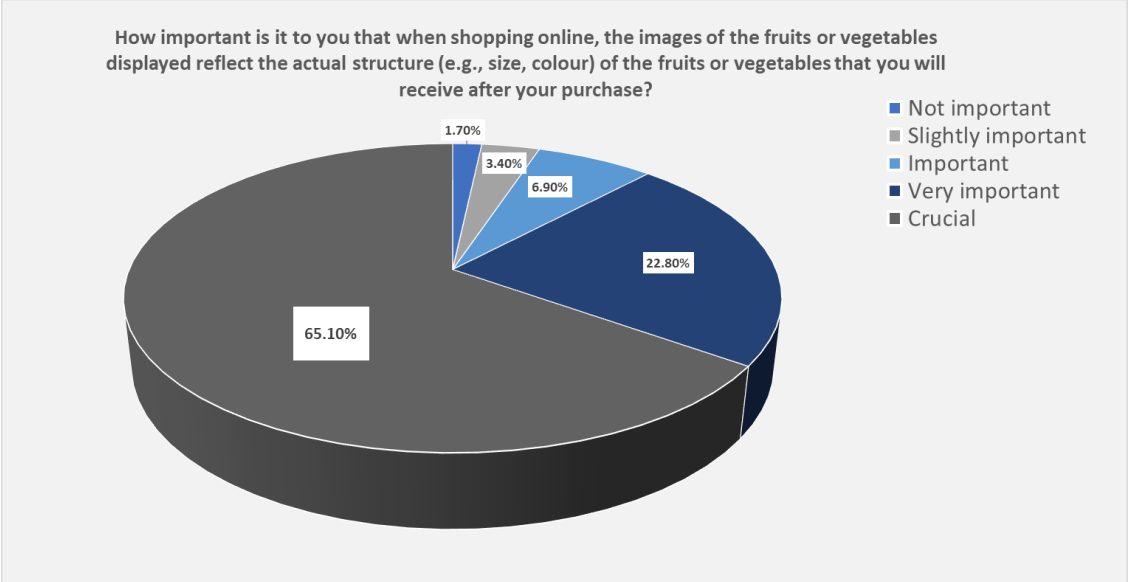

Figure 13: Participants Responses to the Second Question

The questions have an average score of 4.41 and 4.46, respectively, out of 5. The importance of having an image of the produce sold online gathered at combined 86.21% score between “Very Important” and “Crucial”. While the question regarding the product imagery online reflecting the actual size of the produce gathered a combined 87.93% for the same scores. The “Crucial” score gathered the majority selection by participants for both questions.

The results above indicate that participants find it essential to have images of the fresh produce sold on an ecommerce platform to make a decision on whether they will make the purchase. Furthermore, it is crucial that the images depict the actual product structure they will receive upon purchasing online.

4.2.2. Importance of Content and Description Results

The survey questions further sought to understand how participants valued the content of a website and product description when deciding to purchase fresh produce online. The results of the two questions posed to identify the importance will be discussed in this section.

4.2.2.1. Product Description of Fresh Produce

Survey participants had the opportunity to score how important written descriptions of fresh produce sold online to their purchase intentions. Descriptions include the size of the product and the quantity of product sold. The chart below details the results of the participants' responses:

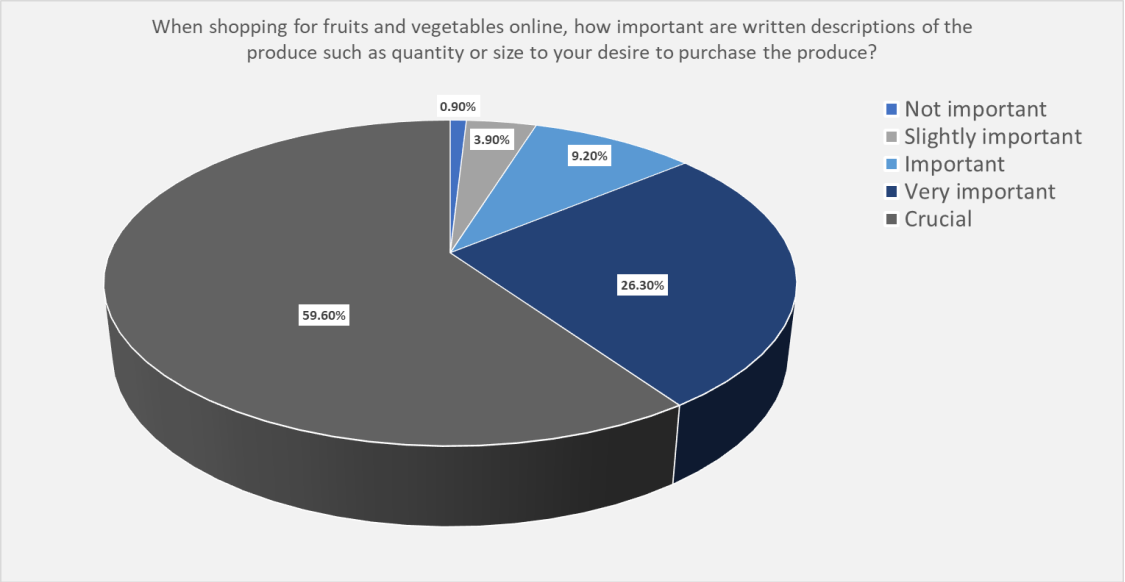

Figure 14: Importance of Written Product Descriptions to Survey Participants

59.6% of survey participants indicated that it is crucial that an ecommerce platform have written descriptions of fresh produce sold. Another 26.3% indicated that it is very important, leading to a combined total of 85.9% of participants scoring this question 4 or higher. In fact, the average score for this question is 4.39.

4.2.2.2. Description of the Origin of the Produce (Farm or Farmer)

Participants were also asked whether descriptions of the farm where the produce comes from would influence them to purchase the produce. The scores to this question seem relatively evenly spread compared to the previous section's results. This is also depicted in the figure below.

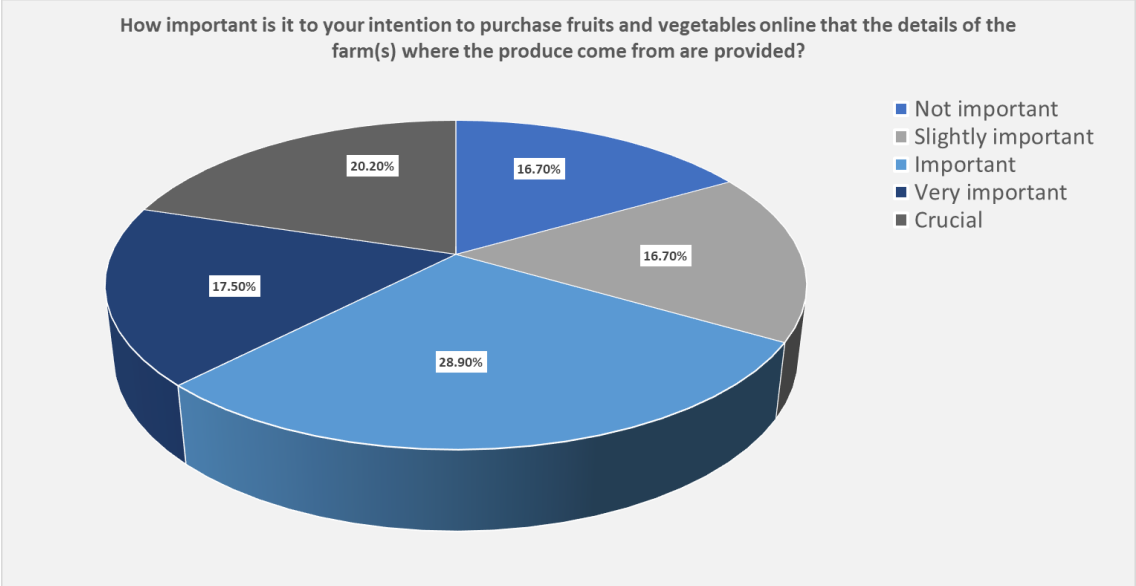

Figure 15: Importance of Farm Details to Participants

The score of “Important” amassed 28.9% percent of participants’ responses. The “Crucial” and “Very Important” scores had a combined 37.7% participant selection, while “Slightly Important” and “Not Important” had a combined 33.4%.

The results from the two questions above indicate that survey participants find it essential that content of an ecommerce platform selling fresh produce include written descriptions of the produce sold. However, when it comes to the information about the farm from where the produce come, it is considered important to have this information although not having this information may not have an adverse impact towards the probability of the produce being sold.

4.2.3. Importance of Website Aesthetics and Ease of Navigation Results

Another factor that was tested in this study is the importance of an ecommerce platform’s aesthetics and ease of navigation. This includes the layout of the website and associated colours. It also includes how easy it is for consumers to find the products they desire when navigating the platform.

4.2.3.1. The Influence of Visual Appeal

Survey participants were asked how much the visual appeal of an ecommerce site affected their desire to purchase fresh produce online. The results of their responses are detailed below:

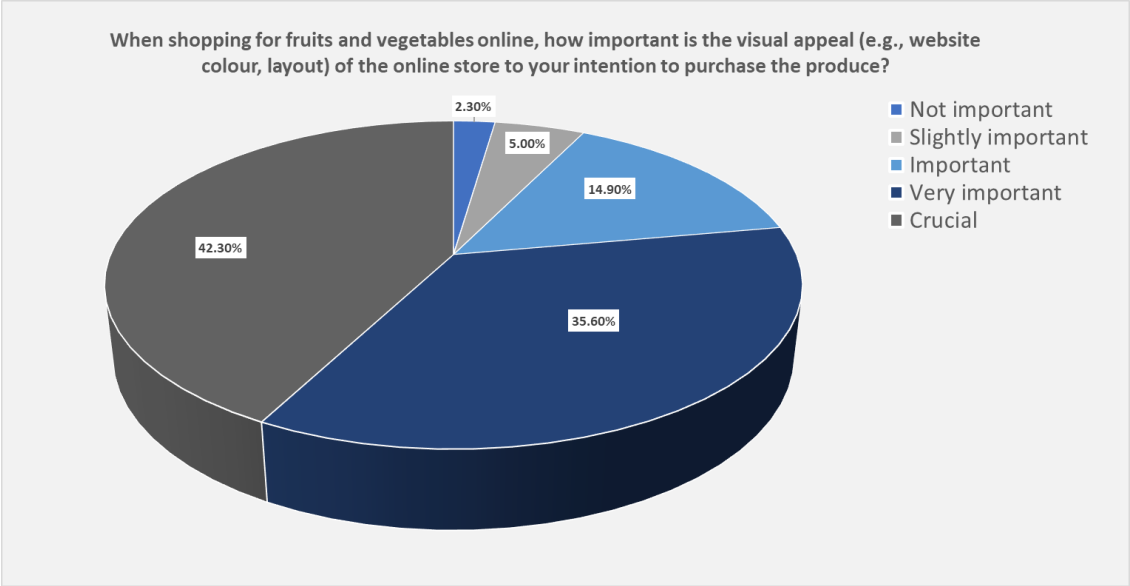

Figure 16: Impact of Visual Appeal on Purchase Intentions

42.34% of participants responded that they find visual appeal “Crucial” while 35.59% said it is “Very Important”. A combined 92.79% of participants find it important to crucial. The result indicate that visual appeal plays a significant influential role on participants’ intention to purchase fresh produce online.

4.2.3.2. Importance of Ease of Navigation of an Online Store

When it comes to an online store’s ease of navigation, 91.4% of participants indicated that this factor plays an important to crucial role to their intention to purchase fresh produce online. In fact, 67.1% of participants indicated that it plays a crucial role.

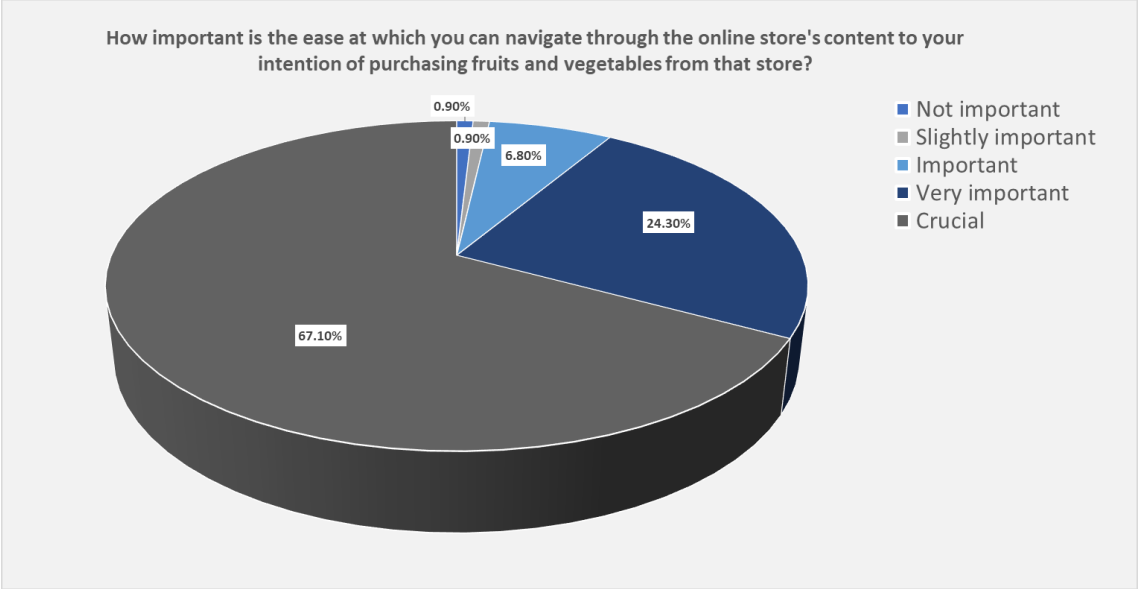

Figure 17: The Importance of Website Ease of Navigation

Furthermore, participants were asked to rate how important it is that they can use a search bar to search for products on an ecommerce site. The results indicate that 95.7% participants found it important to crucial, with 54.4% alone finding it a "Crucial" feature. The detailed results are on the chart below.

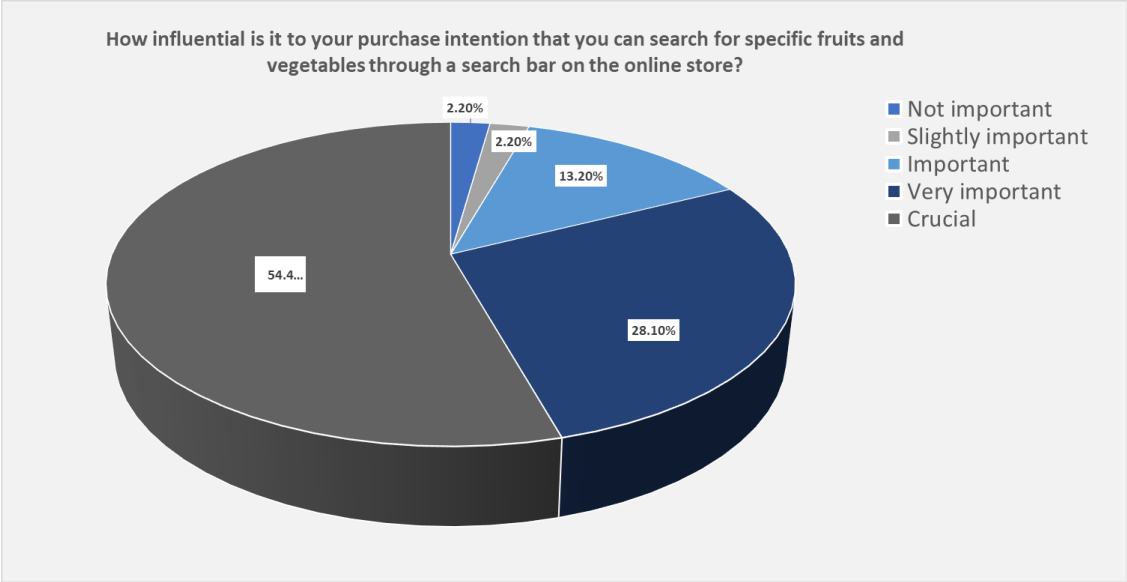

Figure 18: The Importance of Search Navigation

Finally, participants were also asked whether online stores that are mobile-phone compatible would have an impact on their intention to purchase. The results indicate that a combined 80.9% of participants find this factor very important or

crucial. Another 10.4% find it important. This indicates that creating online stores that are mobile-compatible is an essential consideration to drive fresh produce purchases.

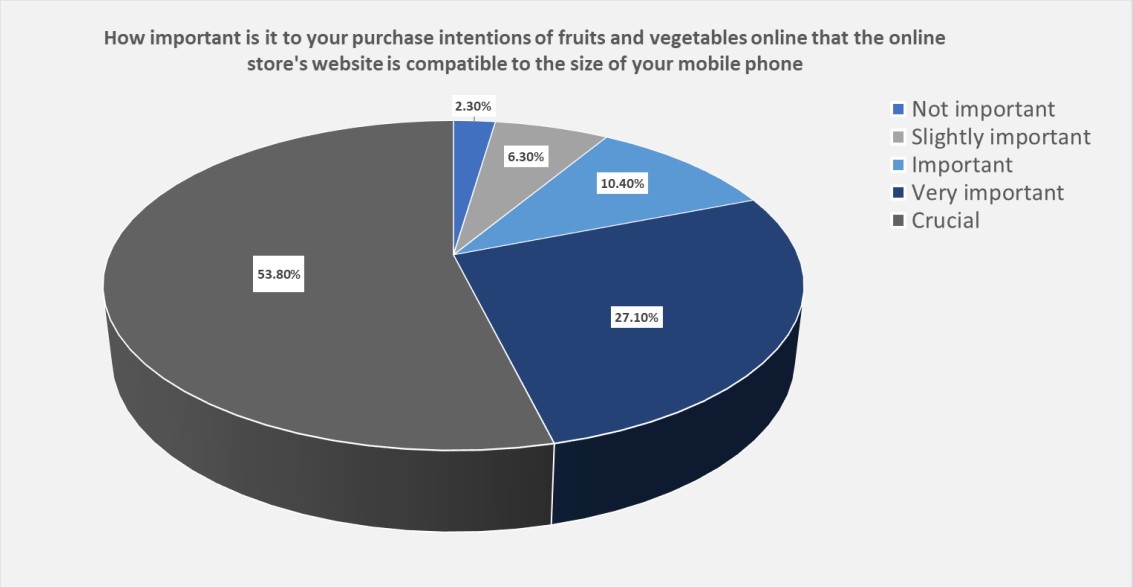

Figure 19: The Impact of Mobile-Friendly Sites on Purchase Intentions

The overall results of participants' responses to the importance of website aesthetics and ease of navigation indicate that this factor plays an essential role in influencing shoppers to purchase fresh produce online. While visual appeal plays a very important role, the results indicate that a website's ease of navigation plays an even more important role.

4.2.4. Importance of Online Payment Options and Safety

Online payment options allow consumers to make electronic purchases for fresh produce on ecommerce platforms. Participants were requested to rank how important it is to have various payment options available to their intention to purchase fresh produce at checkout, as well as how important it is that the payment options are secure.

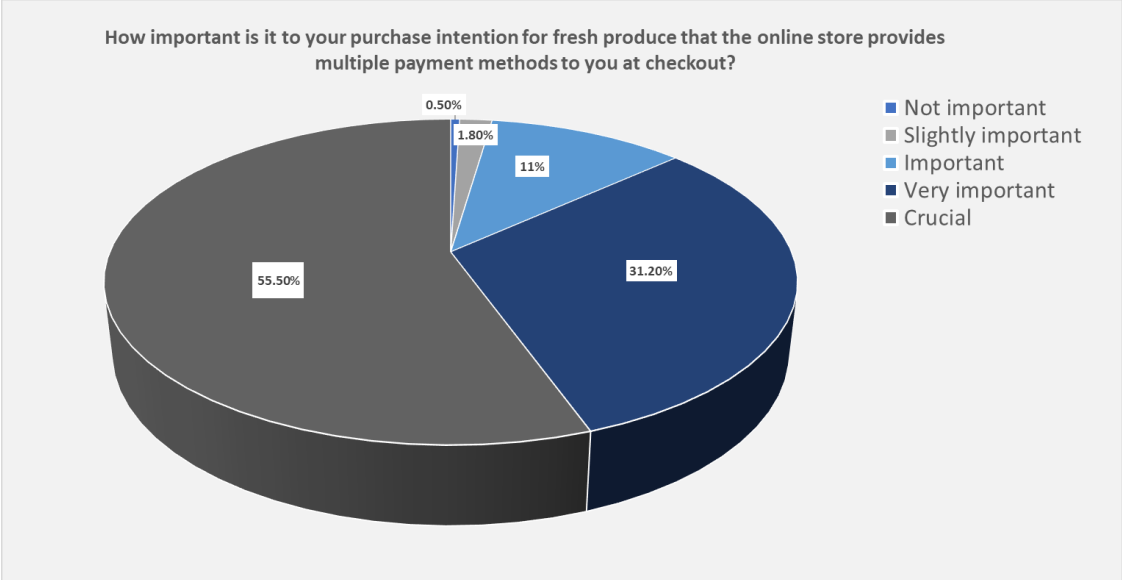

Figure 20: Results of the Importance of Various Payment options to Participants

The results show that 55.5% of survey participants find it crucial that ecommerce platforms have multiple payment options and 31.2% find it very important.

In terms of payment gateway security, a substantial 91.7% of respondents indicated that it is crucial that the payment gateway is secure to influence them into purchasing fresh produce online. The combined results indicate that the consumers are likely to purchase fresh produce online if they have multiple ways to pay online and those options are secure.

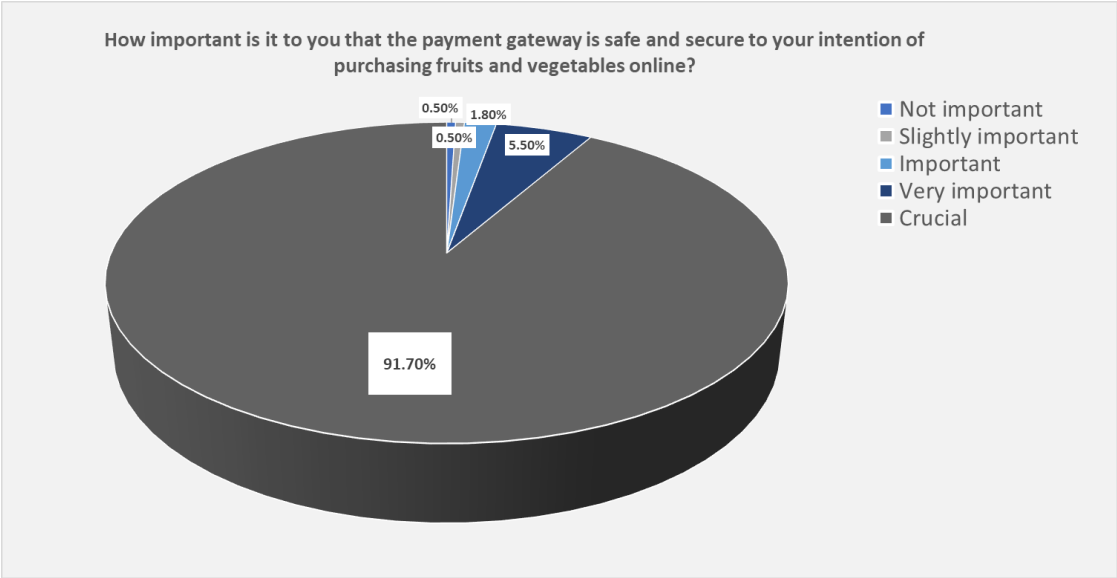

Figure 21: The Importance of Secured Online Payment Options

4.2.5. Importance of Customer Support Results

Participants were asked whether an ecommerce platform having customer support channels would encourage them to purchase fresh produce online. The results indicate that 69.4% of participants find it crucial that ecommerce platforms have information on how the stores can be contacted for support queries. 19.6% find it very important.

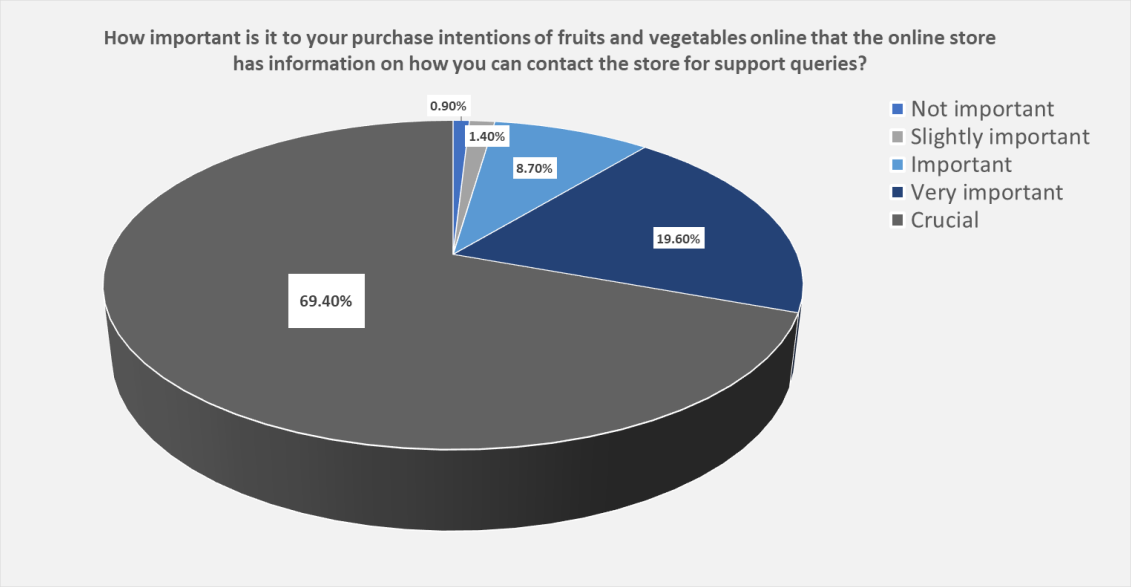

Figure 22: The Importance of Support Channels to Participants

This means a combined 89% of participants found it very important or crucial that support channels be made available to participants shopping for fresh produce online. This is an indication that this feature plays an essential role to making fresh produce purchases online.

4.2.6. Importance of Online Pricing Results

Just over half of the survey's participants indicated that the pricing of fresh produce sold online plays a crucial role on their intentions to purchase the produce. Furthermore, half indicated that the online price compared to physical stores price also plays a crucial role on their intentions to purchase the fresh produce.

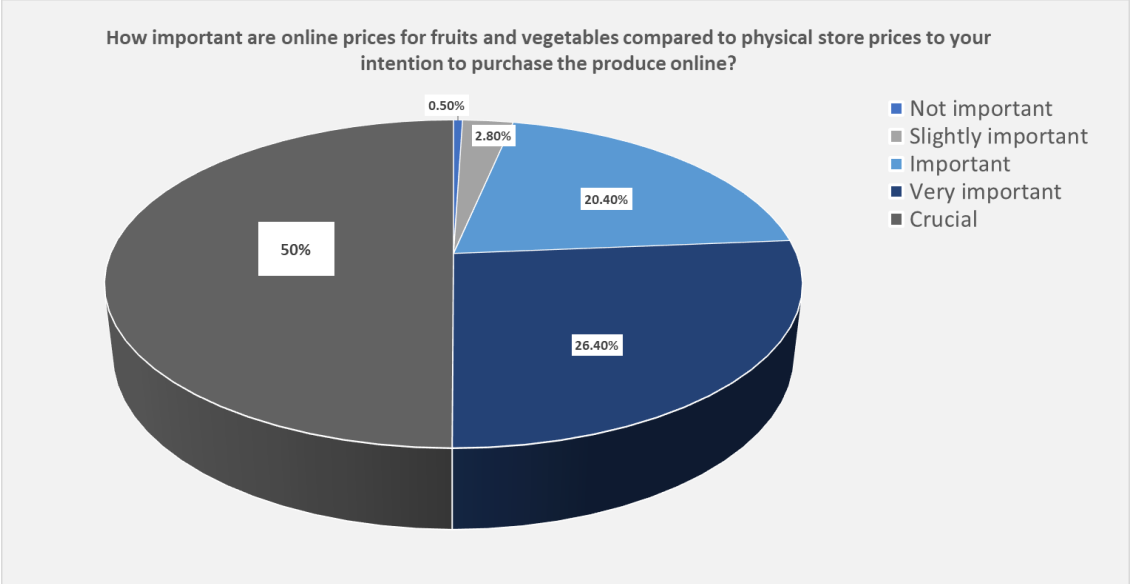

Figure 23: The Importance Participants Give to Online Prices vs Store Prices

Another combined 46.8% of participants indicated that comparing the prices between online and physical stores is important or very important. Therefore, participants are conscious of how prices of fresh produce online compare to physical stores before making purchases online. It is an essential factor to making their decision.

4.2.7. Importance of Word-of-Mouth Results

Another important factor to test is the influence word-of-mouth has on participants' intention to purchase fresh produce from an online platform. The survey tested how reading other customers' reviews and ratings of a platform played a role on the participants' purchase intentions.

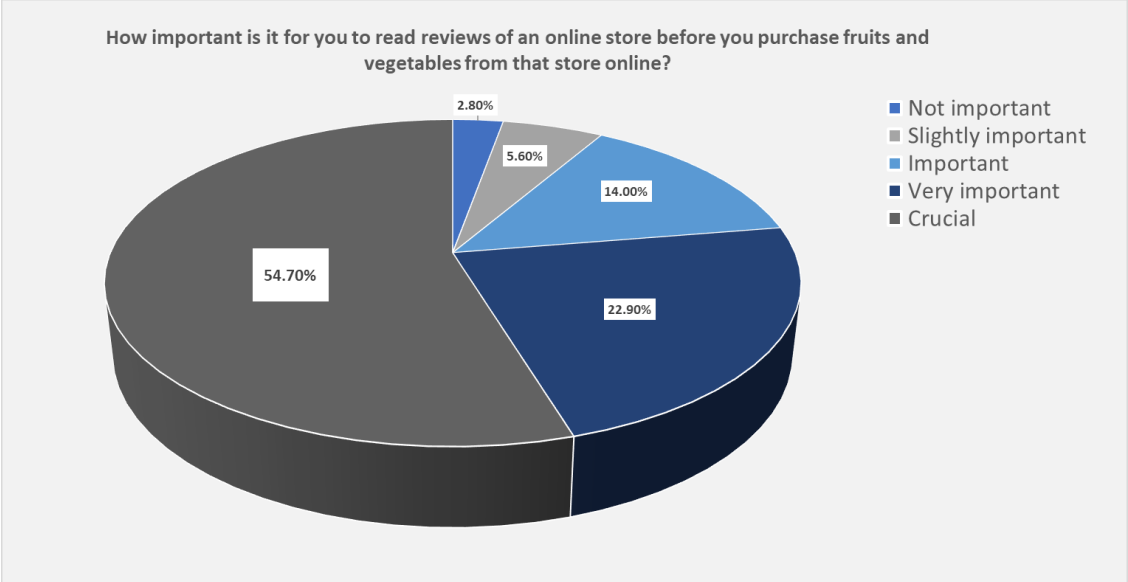

Figure 24: The Importance of Reading Online Store Reviews to Participants

The results show that 77.8% of participants find it very important or crucial to read reviews of an online platform before they decide to make a purchase online. Another 14% find it important, making it a combined 91.8% of participants indicating that reviews have an impact on their intentions to purchase fresh produce online.

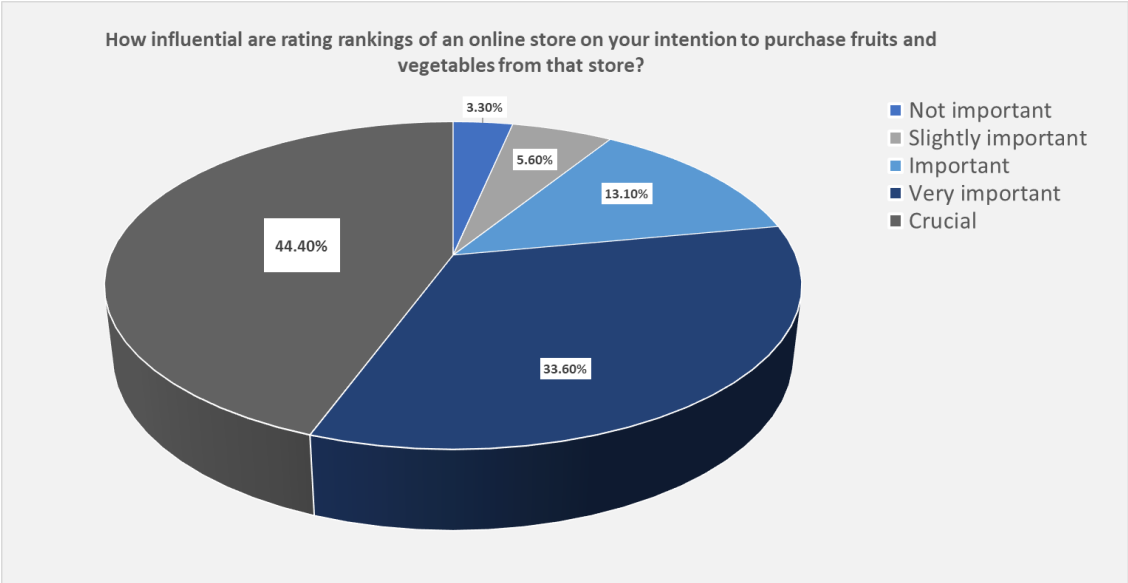

Figure 25: The Importance of Online Store Ratings to Participants

A similar trend is experienced when it comes the influence of rating rankings however a higher percentage finding it “Very Important” and a lower percentage finding it “Crucial”. However, a combined 91.1% find ratings “important” to “crucial” which indicates that participants find it essential, but the results suggest that reviews play a more important role than ratings.

Overall, the results show that word-of-mouth plays an essential role in influencing the likelihood that survey participants would purchase fresh produce online.

4.2.8. Type of Product Delivery Option Preferred Results

The final factor tested in this study is the desired option that participants would prefer when it comes to delivery of fresh produce. Participants were asked to select their preference in terms of delivery location options and time of delivery from purchase.

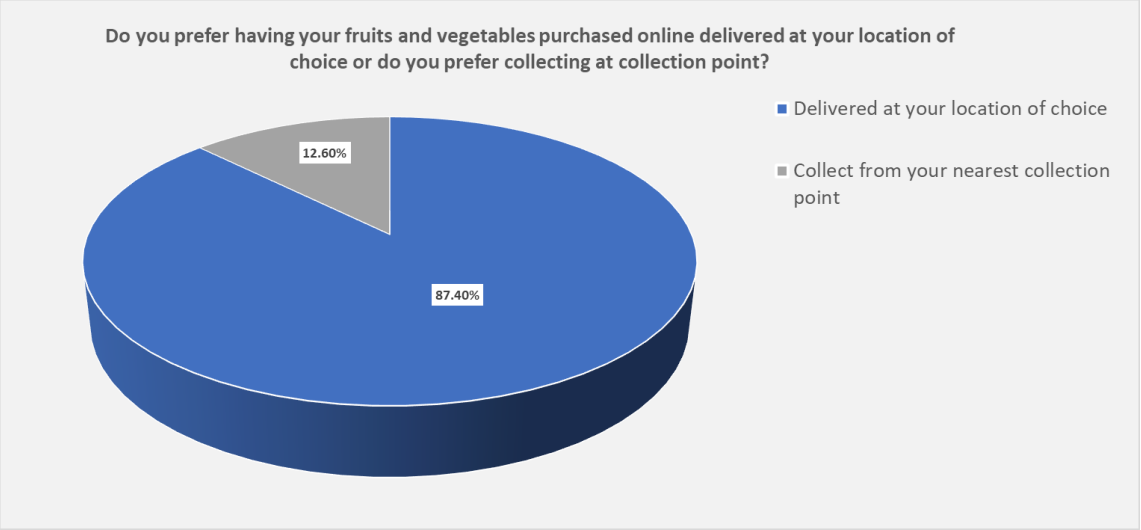

Figure 26: Survey Participants Delivery Location Preference

When it comes to delivery options, 87.4% of respondents prefer that the fresh produce they have purchased online be delivered to their location of choice. The other 12.6% indicated they prefer collecting from a collection point.

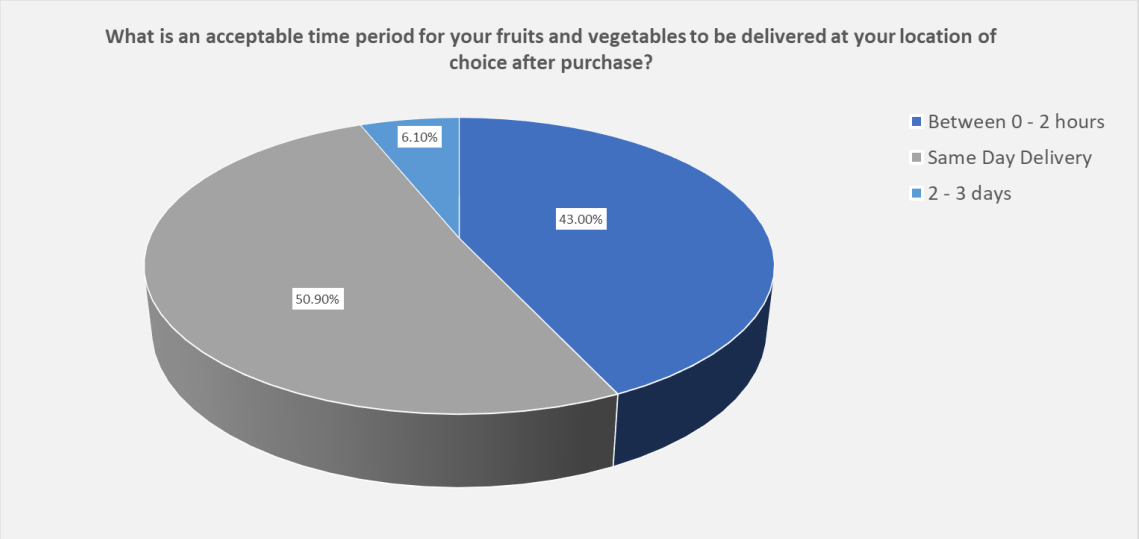

Figure 27: Survey Participants Delivery Time Preference

Survey participants further indicated by when they would prefer their delivery to be made. 93.9% of participants indicated that they would prefer same day delivery, with 43% expecting it within two hours from their online purchase confirmation. Only 6.1% of participants are willing to wait two to three days for their fresh produce delivery.

Ther combined results indicates that participants generally prefer having their fresh produced purchased online to be delivered to their desired location the same day of purchase.

4.3. Section B: Inferential Analysis

The results in the descriptive analysis were provided for each question individually. This section will assess whether these responses differ by gender and age groups. An inferential analysis has been conducted to identify the statistical significance of gender and age groups on the responses (Jansen, 2023). The Chi-square test was used to conduct the analysis as this test is used to identify difference in propositions between categories (Jansen, 2023). Basically, whether there is a statistical relationship between two variables.

The Chi-Square Test of independence was used to determine the dependence between the ecommerce factors and independent variables (age group and gender). It is a non-parametric statistical tool that analyses differences between variables to determine significance (McHugh, 2013). The formula to calculate the chi-square value is as follows (McHugh, 2013):

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

where:

c = degrees of freedom

O = observed frequencies

E = expected frequencies

Given there are eight ecommerce factors to test, the degrees of freedom for this research is eight (McHugh, 2013).

4.3.1. The Impact of Gender on the Ecommerce Factors' Level of Importance

4.3.1.1. Product Description

Respondent's gender versus the importance of images of the fruits or vegetables displayed reflecting the actual structure (e.g., size, colour) of the fruits or vegetables when shopping online.

Null hypothesis H_0: There was no association between gender and the importance of shopping online, with regard to images of the fruits or vegetables displayed**.**

Alternative hypothesis H_1: There existed at least some significant association between gender and the importance of shopping online, with regard to images of the fruits or vegetables displayed.

Level of significance: 0.10

The observed p-value is: 0.130

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12.498[a]	8	.130
Likelihood Ratio	14.909	8	.061
Linear-by-Linear Association	8.713	1	.003
N of Valid Cases	227		

Table 3: Chi-Square Tests for Gender and Product Images

Observation: The observed p-value was larger than the level of significance

Decision: Since the p-value was far larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis

Conclusion:

Respondent's gender and the importance of shopping online, with regard to images of the fruits or vegetables displayed reflecting the actual structure (e.g., size, colour) of the fruits or vegetables have no association.

From the subject point of view, gender does not influence one's view of images of fruits and vegetables when shopping online.

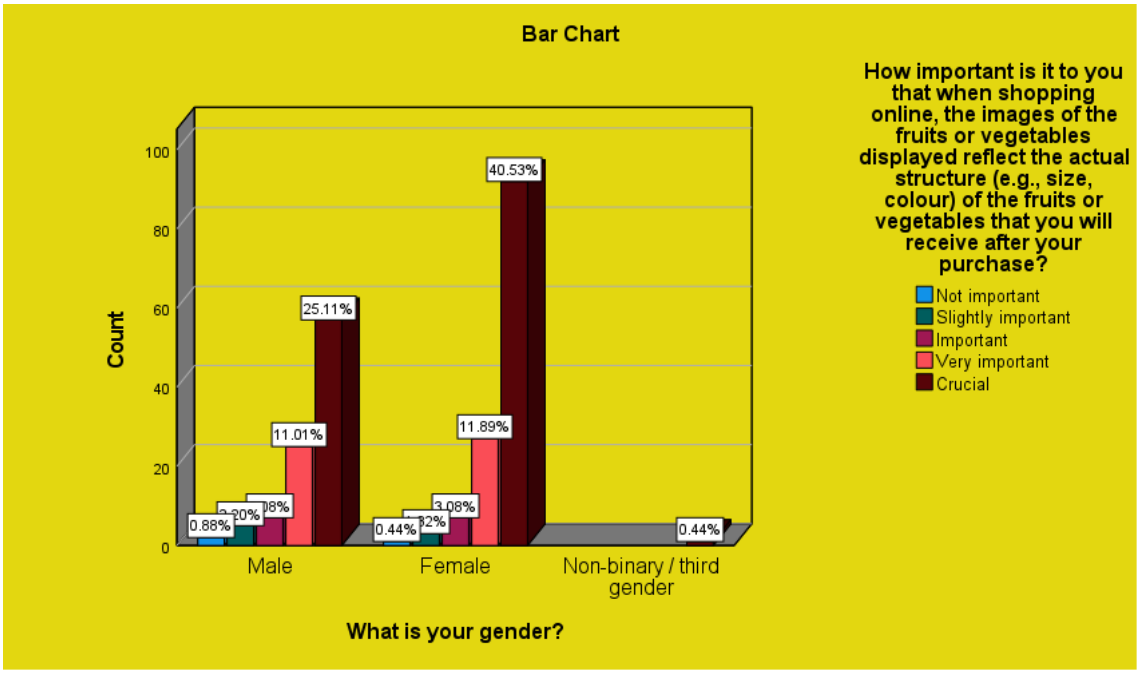

Figure 28: Responses to the Product Images by Gender

4.3.1.2. Content and Description

Respondent's gender versus when shopping for fruits and vegetables online, how important written descriptions of the produce such as quantity or size to your desire to purchase the produce.

Null hypothesis H_0: There was no association between gender and the importance of shopping online, with regard to written descriptions of the fruits or vegetables displayed.

Alternative hypothesis H_1: There existed at least some significant association between gender and the importance of shopping online, with regard to written descriptions of the fruits or vegetables displayed.

Level of significance: 0.10

The observed p-value is: 0.796

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.636[a]	8	.796
Likelihood Ratio	4.917	8	.766
Linear-by-Linear Association	4.236	1	.040
N of Valid Cases	227		

Table 4: Chi-Square Tests for Gender and Product Descriptions

Observation: The observed p-value was larger than the level of significance

Decision: Since the p-value was far larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis

Conclusion:

Respondent's gender and the importance of shopping online, with regard to written descriptions of the fruits or vegetables displayed reflecting the actual structure (e.g., size, colour) of the fruits or vegetables have no association.

From the subject point of view, gender does not influence one's view of written of fruits and vegetables when shopping online.

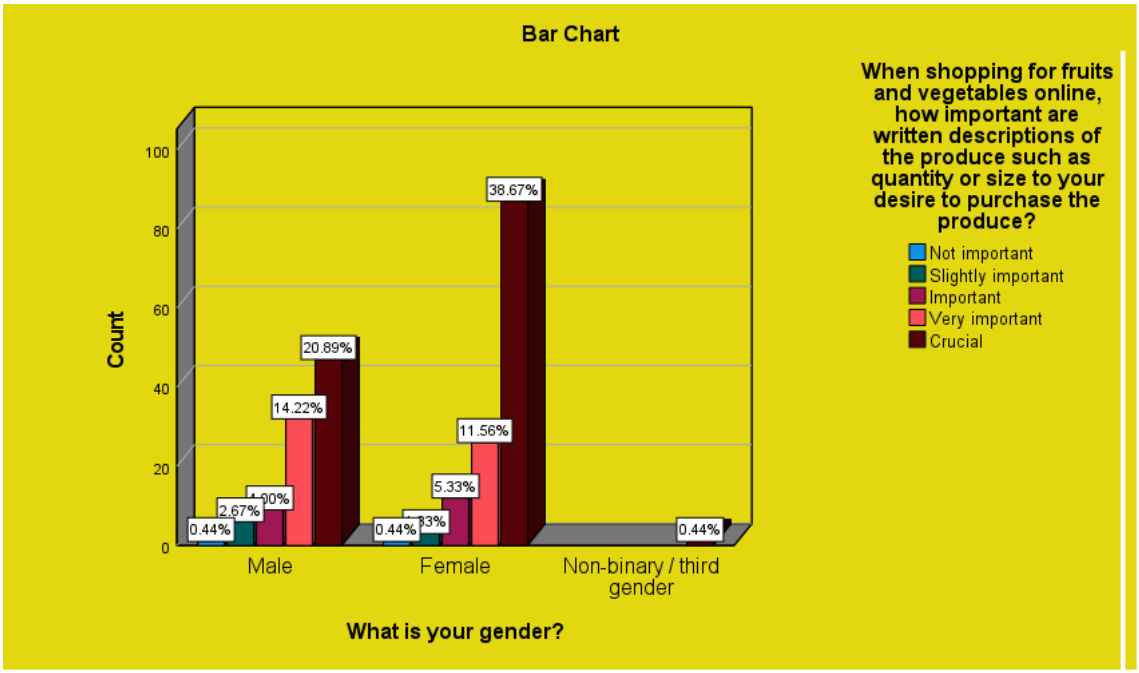

Figure 29: The Importance of Product Description Based on Gender

Respondent's gender versus the importance to the intention to purchase fruits and vegetables online that the details of the farm(s) where the produce come from are provided.

Null hypothesis H_0: There was no association between gender and the importance to the intention to purchase fruits and vegetables online that the details of the farm(s) where the produce come from are provided.

Alternative hypothesis H_1: There existed at least some significant association between gender and the importance to the intention to purchase fruits and vegetables online that the details of the farm(s) where the produce come from are provided.

Level of significance: 0.10

The observed p-value is: 0.369

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.689[a]	8	.369
Likelihood Ratio	8.762	8	.363
Linear-by-Linear Association	1.154	1	.283
N of Valid Cases	225		

Table 5: Chi-Square Test for Gender and Farm Description Relationship

Observation: The observed p-value was larger than the level of significance

Decision: Since the p-value was far larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis

Conclusion:

Respondent's gender and the importance to the intention to purchase fruits and vegetables online that the details of the farm(s) where the produce come from are provided have no association.

From the subject matter, gender does not influence the intention to purchase fruits and vegetables online given the details of the farm(s) where the produce come from are provided.

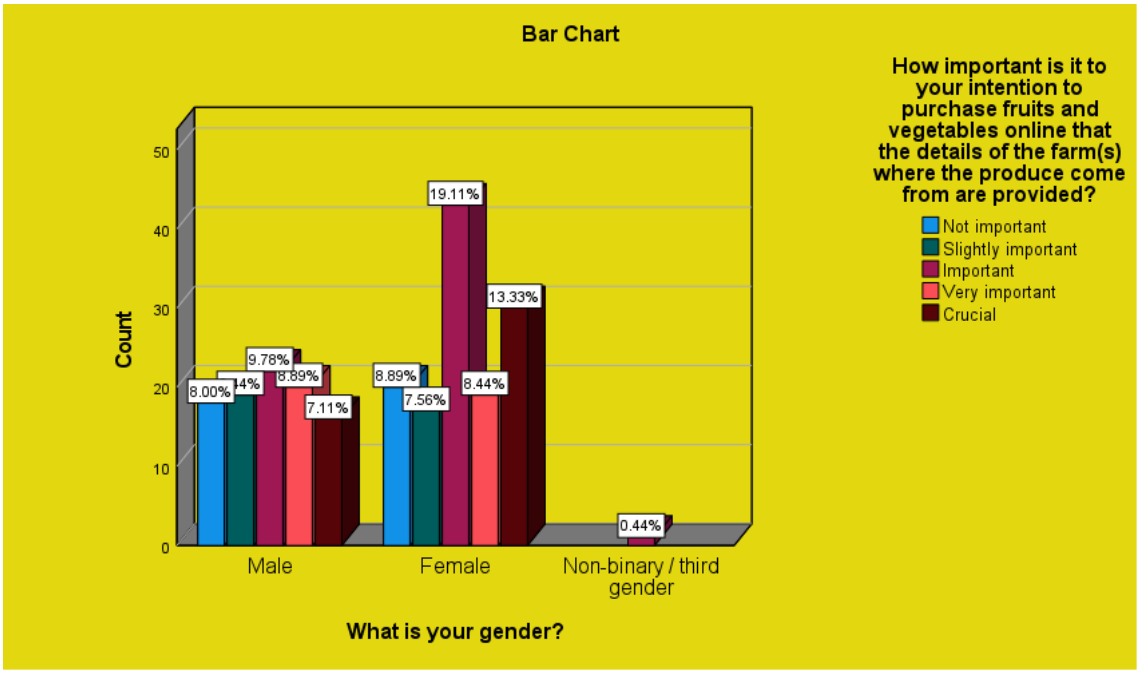

Figure 30: Importance of Provision of Farm Details by Gender

4.3.1.3. Website Aesthetics and Ease of Navigation

Respondent's gender versus while shopping for fruits and vegetables online, the importance of the visual appeal (e.g., website colour, layout) of the online store to your intention to purchase the produce.

Null hypothesis H_0: There was no association between gender and while shopping for fruits and vegetables online, the importance of the visual appeal (e.g., website colour, layout) of the online store to your intention to purchase the produce.

Alternative hypothesis H_1: There existed at least some significant association between gender and while shopping for fruits and vegetables online, the importance of the visual appeal (e.g., website colour, layout) of the online store to your intention to purchase the produce.

Level of significance: 0.10

The observed p-value is: 0.909

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.375[a]	8	.909
Likelihood Ratio	3.632	8	.889
Linear-by-Linear Association	.256	1	.613
N of Valid Cases	220		

Table 6: Chi-Square Test for The Relationship between Gender and Online Store Visual Appeal

Observation: The observed p-value was larger than the level of significance

Decision: Since the p-value was far larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis

Conclusion:

The respondents' gender does not influence the importance of the visual appeal (e.g., website colour, layout) of the online store to their intention to purchase the produce online.

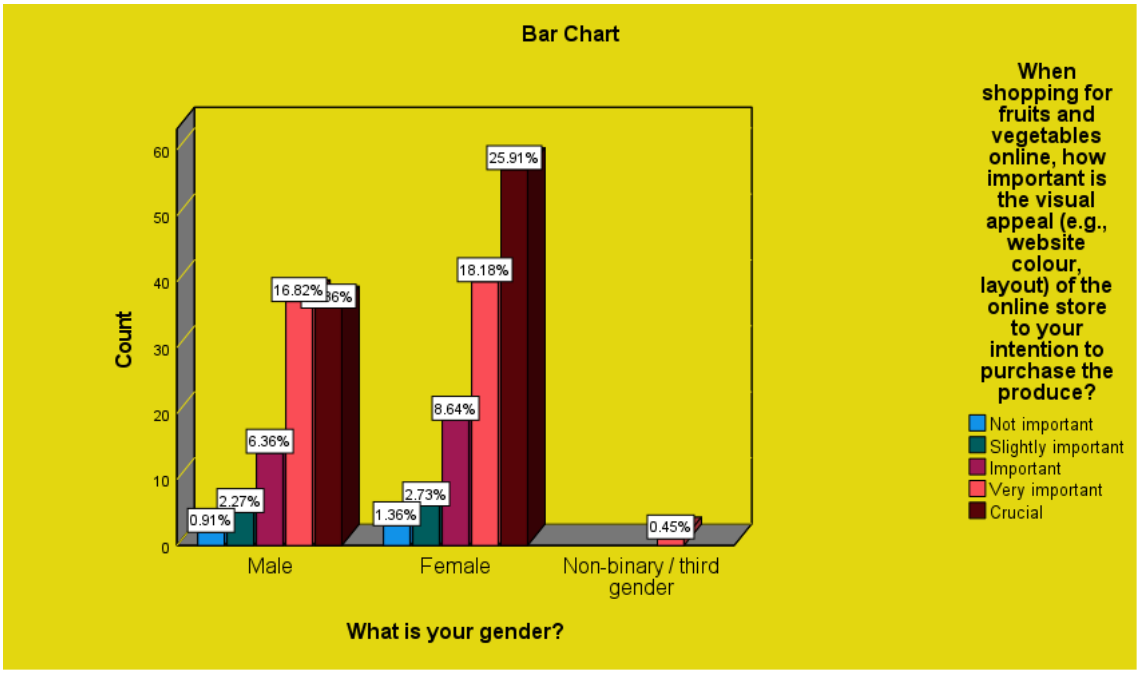

Figure 31: The Importance of Online Store Visual Appeal by Gender

Respondent's gender versus ease of the importance with which to navigate through online store's content to the intention of purchasing fruits and vegetables.

Null hypothesis H_0: There was no association between gender and the importance of the ease with which navigating through the online store's content to the intention of purchasing fruits and vegetables online.

Alternative hypothesis H_1: There existed at least some significant association between gender and the importance of the ease with which navigating through the online store's content to the intention of purchasing fruits and vegetables.

Level of significance: 0.10

The observed p-value is: 0.069

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.543[a]	8	.069
Likelihood Ratio	15.530	8	.050
Linear-by-Linear Association	10.593	1	.001
N of Valid Cases	220		

Table 7: Chi-Square Test for Gender and Ease of Online Store Navigation Relationship

Observation: The observed p-value was smaller than the level of significance.

Decision: Since the p-value was far larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion:

From the subject matter, gender does influence the importance of the ease of navigating through online store's content has on the intention of purchasing fruits and vegetables online.

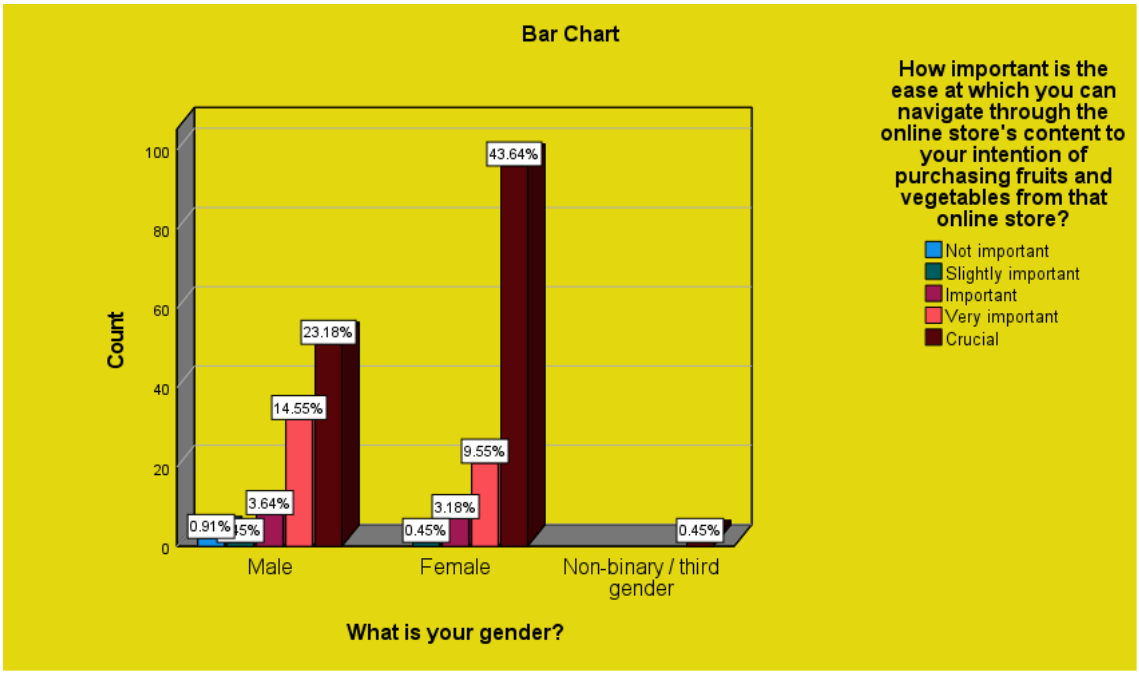

Figure 32: The Importance of the Ease of Website Navigation by Gender

Respondents' gender versus the influence to their purchase intention given fresh produce could be searched for through a search bar on the online store.

Null hypothesis H_0: There was no association between gender and the influence to the purchase intention that fresh produce could be searched for through a search bar on the online store.

Alternative hypothesis H_1: There existed at least some significant association between gender and the influence to the intention to purchase fruits and vegetables online given they can be searched through a search bar on the online store.

Level of significance: 0.10

The observed p-value is: 0.799

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.604[a]	8	.799
Likelihood Ratio	4.978	8	.760
Linear-by-Linear Association	3.328	1	.068
N of Valid Cases	225		

Table 8: Chi-Square Test for the Relationship Between Gender and Search Bar Importance

Observation: The observed p-value was larger than the level of significance

Decision: Since the p-value was far larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion:

Respondents' gender and the influence to the intention to purchase fruits and vegetables online given they can be searched for using a search bar on the online website.

From the subject matter, gender does not impact the influence that searching for fresh produce through an online store's search bar has on respondents' purchase intentions.

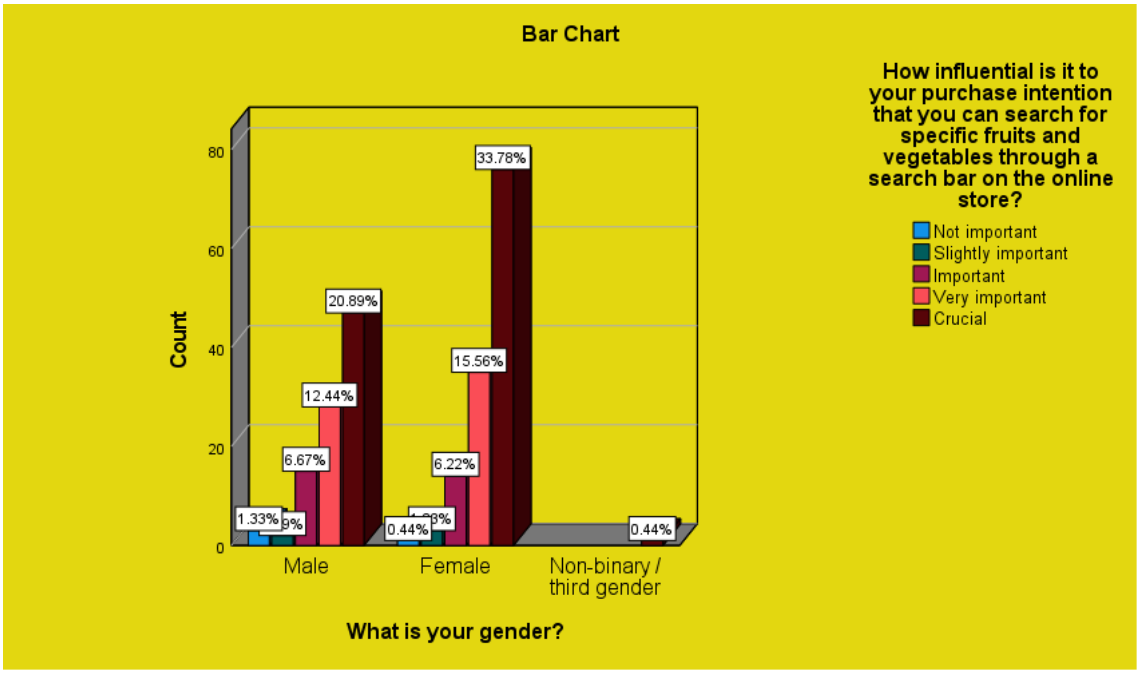

Figure 33: The Influence of Search Function by Gender

Respondents' gender versus the importance of purchasing intentions of fruits and vegetables online given the online store's website is compatible to the size of your mobile phone screen.

Null hypothesis H_0: There was no association between gender and the importance of purchasing intentions of fruits and vegetables online given that the online store's website is compatible to the size of your mobile phone screen.

Alternative hypothesis H_1: There existed at least some significant association between gender and the importance of purchasing intentions of fruits and vegetables online given that the online store's website is compatible to the size of your mobile phone screen.

Level of significance: 0.10

The observed p-value is: 0.064

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.766[a]	8	.064
Likelihood Ratio	14.768	8	.064
Linear-by-Linear Association	.148	1	.701
N of Valid Cases	219		

Table 9: Chi-Square Test for Gender and Mobile Phone Compatibility Relationship

Observation: The observed p-value was smaller than the level of significance.

Decision: Since the p-value was far smaller than the level of significance, the null hypothesis was rejected in favour of the alternative hypothesis

Conclusion:

Respondents' gender and the importance of purchasing intentions of fruits and vegetables online given that the online store's website is compatible to the size of your mobile phone screen are associated.

From the subject matter, gender has a significant influence on the importance of the online store website's compatibility to mobile phone screens to the intention of purchasing fruits and vegetables online.

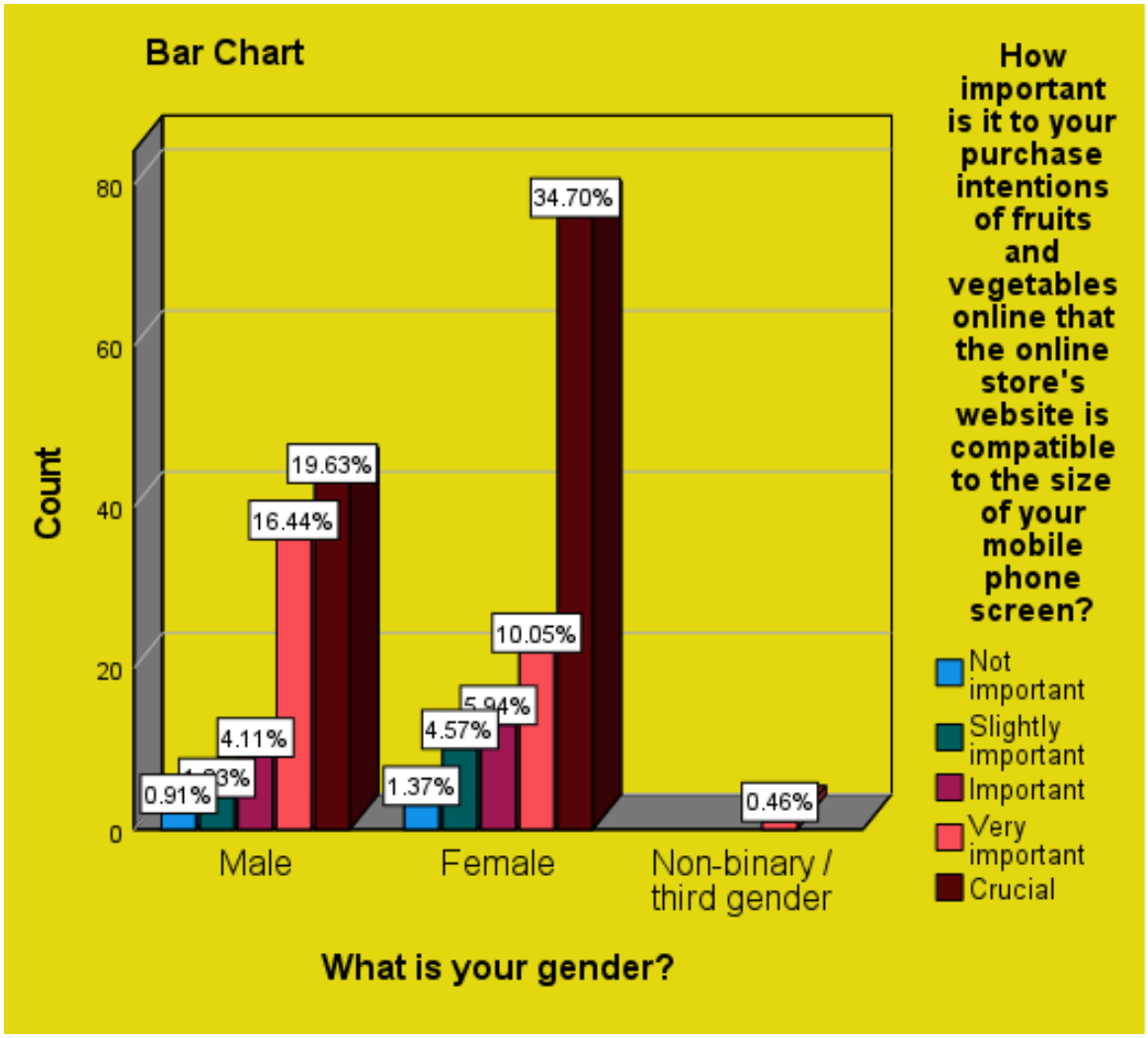

Figure 34: The Importance of Mobile Phone Compatibility by Gender

4.3.1.4. Customer Support

Respondent's gender versus the importance of purchasing intentions of fruits and vegetables online by the online store having information on how you can contact the store for support queries.

Null hypothesis H_0: There was no association between gender and the importance of purchasing intentions of fruits and vegetables online by the online store having information on how you can contact the store for support queries**.**

Alternative hypothesis H_1: There existed at least some significant association between gender and the importance of purchasing intentions of fruits

and vegetables online by the online store having information on how you can contact the store for support queries.

Level of significance: 0.10

The observed p-value is: 0.207

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.906[a]	8	.207
Likelihood Ratio	12.990	8	.112
Linear-by-Linear Association	9.497	1	.002
N of Valid Cases	217		

Table 10: Chi-Square Test for Gender and Customer Support Relationship

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was far smaller than the level of significance, the null hypothesis was not rejected in favour of the alternative hypothesis

Conclusion:

Respondents' gender and the importance of purchasing intentions of fruits and vegetables online by the online store having information on how you can contact the store for support queries are not associated.

From the subject matter, gender has no influence on the importance that an online store has contact details for support queries on the purchase intentions of fresh produce online.

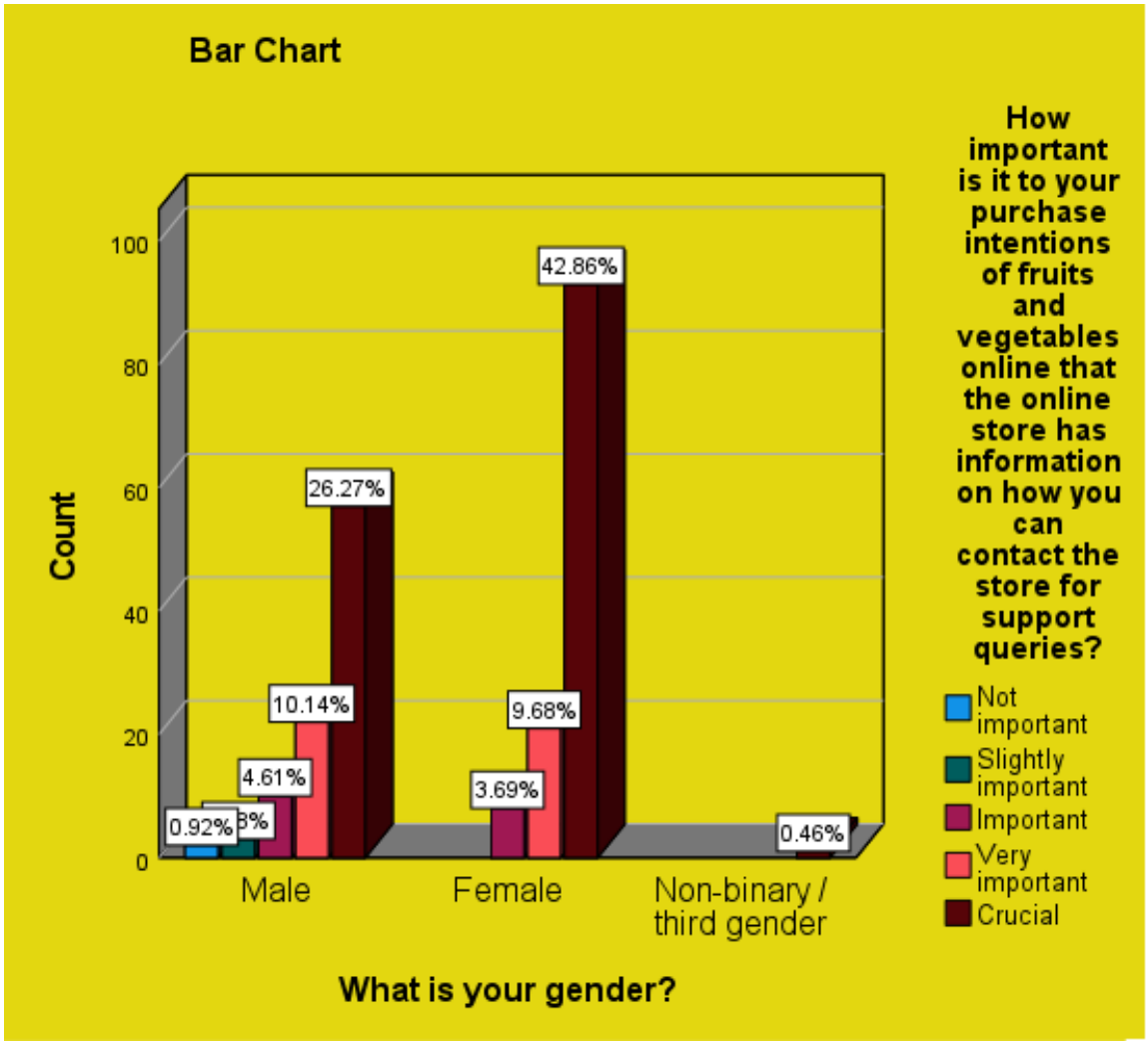

Figure 35: The Importance of Customer Support Availability by Gender

4.3.1.5. Payment Options

Respondents' gender versus the importance that the online store provides multiple payment methods to you at checkout has on the intention to purchase fresh produce online.

Null hypothesis H_0: There was no association between gender and the importance that the online store provides multiple payment methods to you at checkout has on the intention to purchase fresh produce online.

Alternative hypothesis H_1: There existed at least some significant association between gender and the importance that the online store provides multiple payment methods to you at checkout has on the intention to purchase fresh produce online.

Level of significance: 0.10

The observed p-value is: 0.571

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.688[a]	8	.571
Likelihood Ratio	7.435	8	.490
Linear-by-Linear Association	1.256	1	.262
N of Valid Cases	216		

Table 11: Chi-Square Test for Relationship Between Payment Options and Gender

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was far smaller than the level of significance, the null hypothesis was not rejected in favour of the alternative hypothesis.

Conclusion:

Respondents' gender and the importance that the online store provides multiple payment methods to you at checkout has on the intention to purchase fresh produce online.are not associated.

From the subject matter, gender has no influence on the importance that the online store provides multiple payment methods to you at checkout has on the intention to purchase fresh produce online.

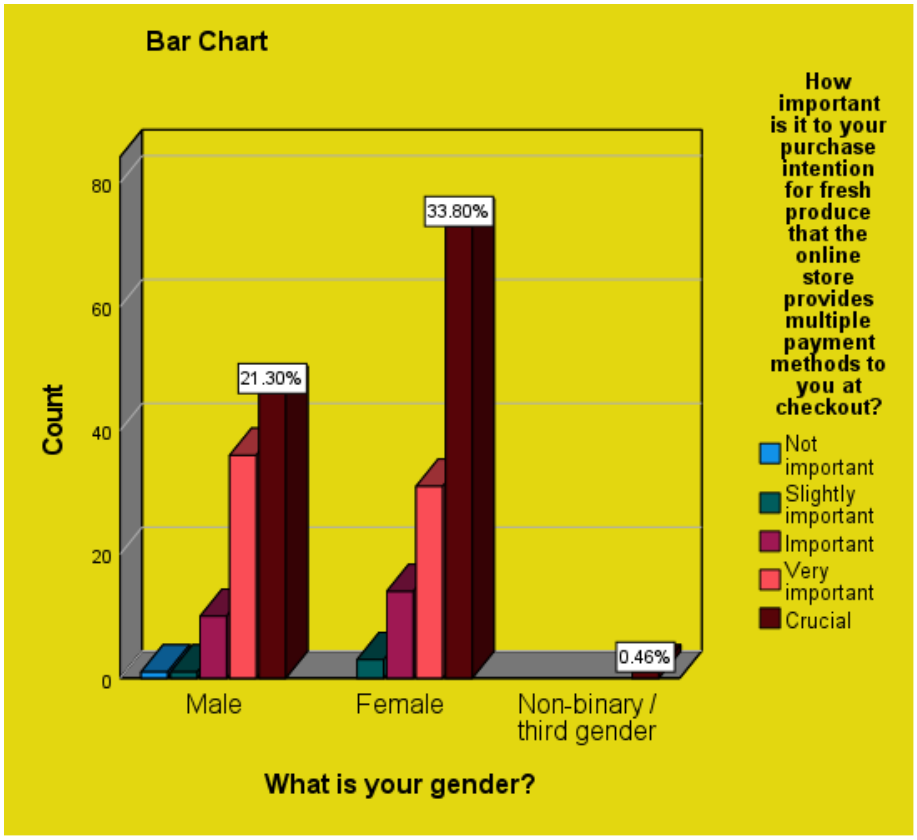

Figure 36: Gender versus The Importance of Multiple Payment Options Availability

Respondent's gender versus the importance of payment gateway being safe and secure to the intention of purchasing fruits and vegetables online.

Null hypothesis H_0: There was no association between gender and the importance of payment gateway being safe and secure to the intention of purchasing fruits and vegetables online.

Alternative hypothesis H_1: There existed at least some significant association between gender and the importance of payment gateway being safe and secure to the intention of purchasing fruits and vegetables online.

Level of significance: 0.10

The observed p-value is: 0.741

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.150[a]	8	.741
Likelihood Ratio	5.955	8	.652
Linear-by-Linear Association	4.971	1	.026
N of Valid Cases	215		

Table 12: Chi-Square Test for Gender and Secure Payment Options Relationship

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was far larger than the level of significance, the null hypothesis was not rejected in favour of the alternative hypothesis.

Conclusion:

Respondents' gender and the importance of payment gateway being safe and secure to the intention of purchasing fruits and vegetables online are not associated.

From the subject matter, gender has no influence on the importance of payment gateway being safe and secure to the intention of purchasing fruits and vegetables online.

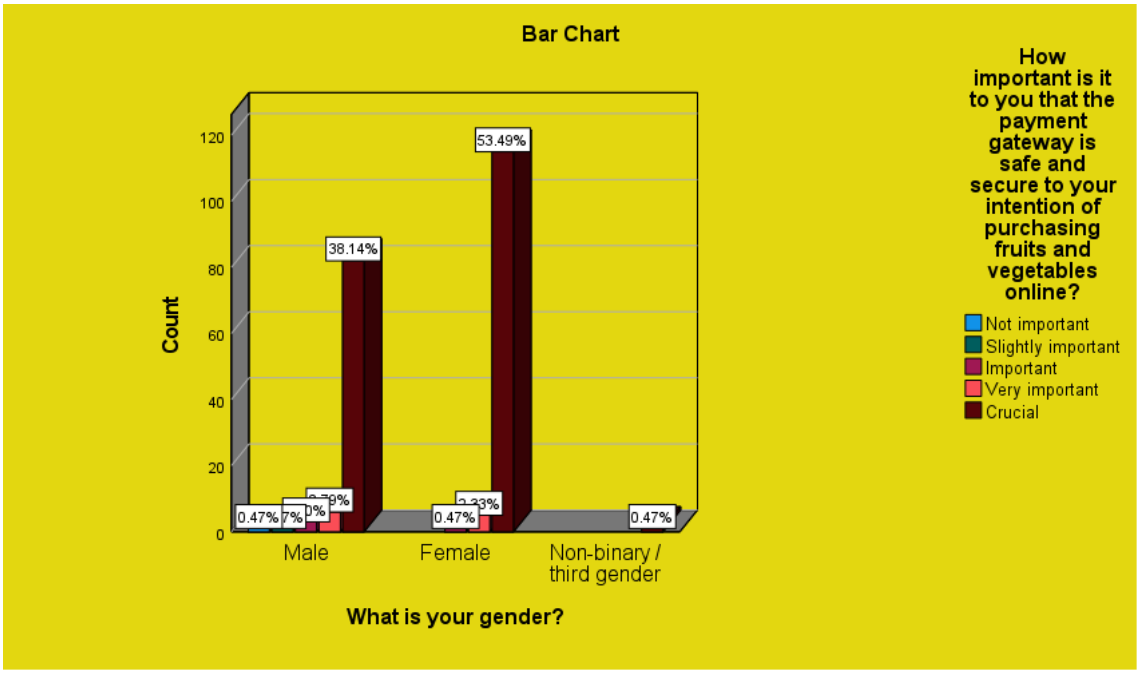

Figure 37: The Importance of Secure Payment Options by Gender

4.3.1.6. Online Pricing

Respondent's gender versus the importance the online prices for fruits and vegetables have on the intention of purchasing the fresh produce online.

Null hypothesis H_0: There was no association between gender and the importance of online prices for fruits and vegetables have on the intention to purchase fresh produce online.

Alternative hypothesis H_1: There existed at least some significant association between gender and the importance of online prices for fruits and vegetables on the intention to purchase fresh produce online.

Level of significance: 0.10

The observed p-value is: 0.566

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.730[a]	8	.566
Likelihood Ratio	7.692	8	.464
Linear-by-Linear Association	3.777	1	.052
N of Valid Cases	215		

Table 13: Chi-Square Test for Gender and Online Prices Relationship

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was far larger than the level of significance, the null hypothesis was not rejected in favour of the alternative hypothesis.

Conclusion:

Respondents' gender and the importance of online prices for fruits and vegetables to the intention of purchasing fresh produce online are not associated.

From the subject matter, gender has no influence on the importance of online prices for fruits and vegetables to the intention of purchasing fresh produce online.

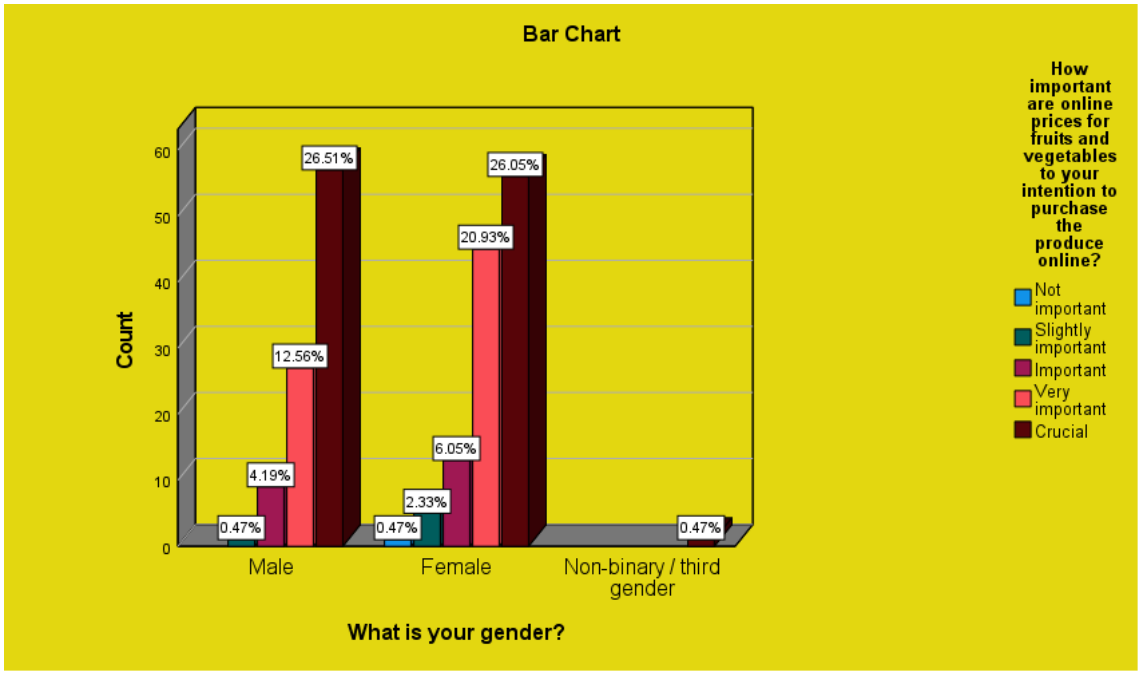

Figure 38: The Importance of Online Pricing by Gender

4.3.1.7. Word of Mouth

Respondent's gender versus the importance of reading reviews of an online store before you purchase fruits and vegetables from that online store.

Null hypothesis H_0: There was no association between gender and the importance of reading reviews of an online store before you purchase fruits and vegetables from that online store.

Alternative hypothesis H_1: There existed at least some association between gender and the importance of reading reviews of an online store before you purchase fruits and vegetables from the online store.

Level of significance: 0.10

The observed p-value is: 0.901

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.479[a]	8	.901
Likelihood Ratio	4.063	8	.851
Linear-by-Linear Association	.012	1	.912
N of Valid Cases	212		

Table 14: Chi-Square Test for Gender and Online Store Reviews Relationship

Observation: The observed p-value was far larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Gender and the importance of reading reviews of an online store before you purchase fruits and vegetables from that store were not associated.

Thus, gender does not influence the importance of reading reviews of an online store before you purchase fruits and vegetables from that store.

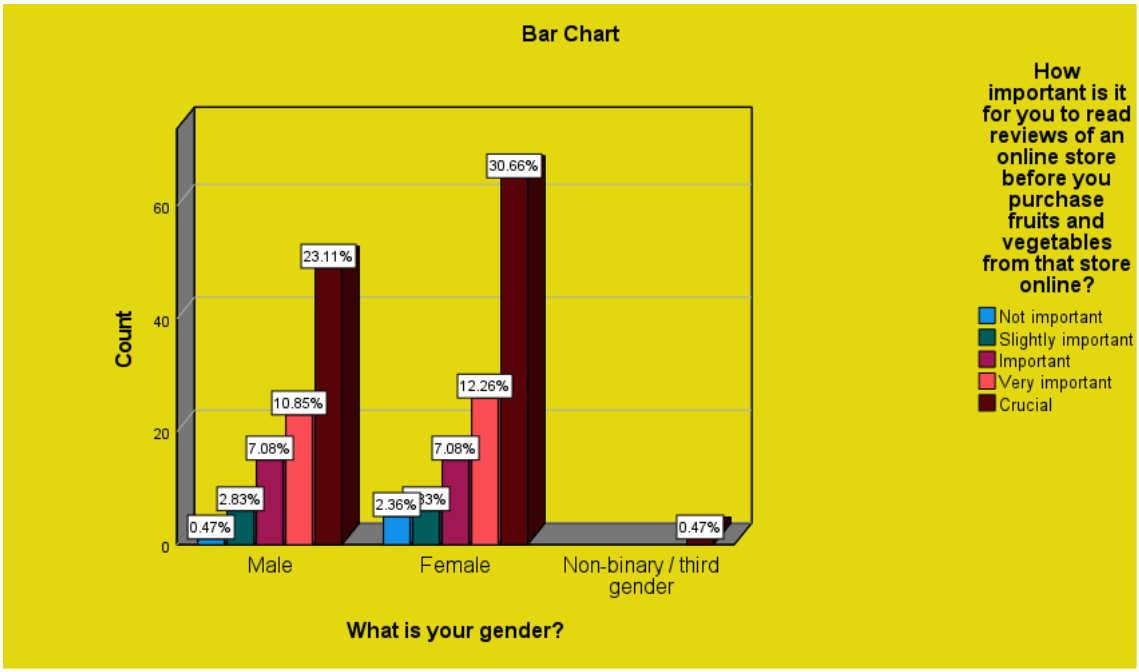

Figure 39: The Importance of Online Store Reviews by Gender

Respondents' gender versus the influence of rating rankings of an online store on the intention to purchase fruits and vegetables from that store.

Null hypothesis H_0: There was no association between gender and the influence of rating rankings of an online store on the intention to purchase fruits and vegetables from that store.

Alternative hypothesis H_1: There existed at least some association between gender and the influence of rating rankings of an online store on the intention to purchase fruits and vegetables from that store.

Level of significance: 0.10

The observed p-value is: 0.901

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.479[a]	8	.901
Likelihood Ratio	4.063	8	.851
Linear-by-Linear Association	.012	1	.912
N of Valid Cases	212		

Table 15: Chi-Square Test for Gender and Rating Rankings Relationship

Observation: The observed p-value was far larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Gender and the influence of rating rankings of an online store on the intention to purchase fruits and vegetables from that store are not associated.

Thus, gender does not influence the influence the importance of rating rankings of an online store on the intention to purchase fruits and vegetables from the store.

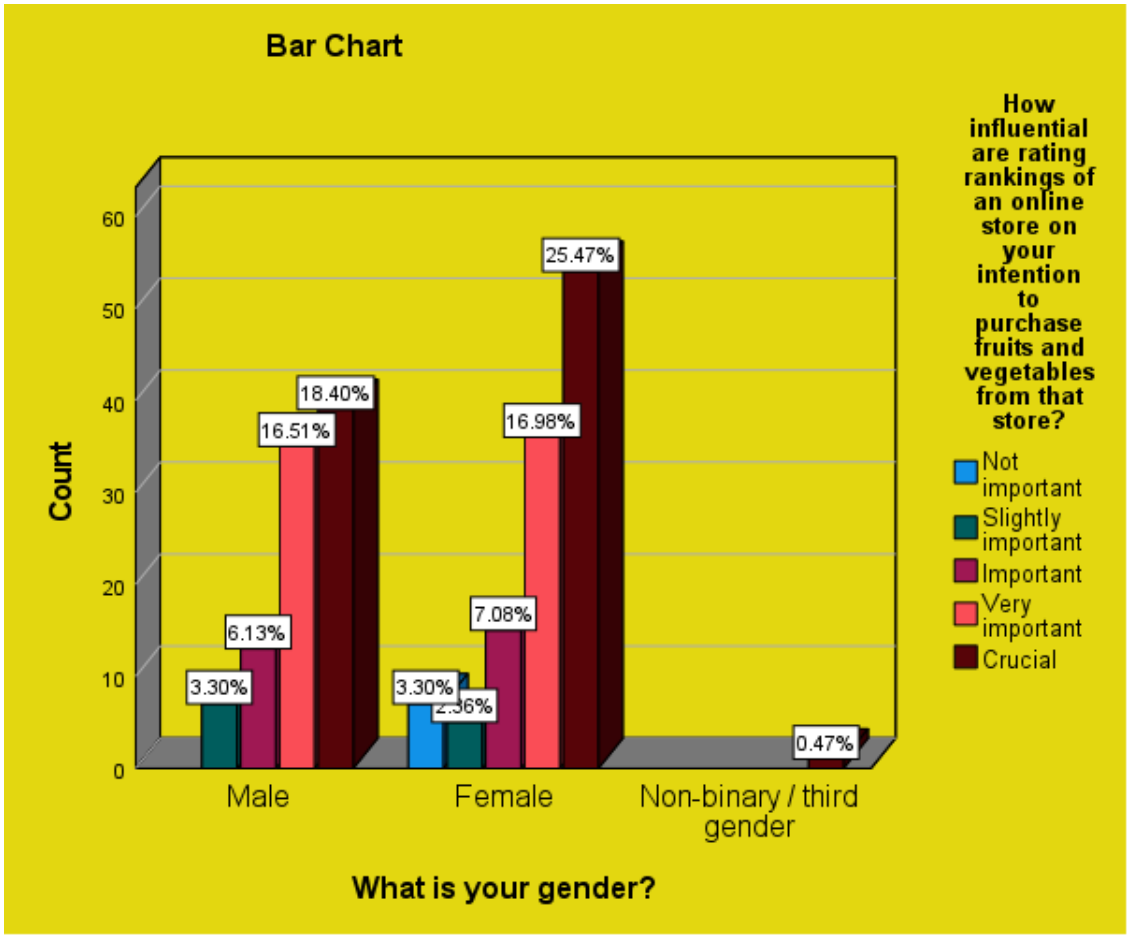

Figure 40: The Importance of Online Store Rating Rankings by Gender

4.3.1.8. Product Delivery

Respondents' gender versus whether respondent prefers fruits and vegetables purchased online be delivered at their location of choice or prefer collecting at a collection point.

Null hypothesis H_0: There was no association between gender and whether respondent prefers fruits and vegetables purchased online delivered at their location of choice or prefer collecting at a collection point.

Alternative hypothesis H_1: There existed at least some association between gender and whether respondent prefers fruits and vegetables purchased online delivered at their location of choice or prefer collecting at a collection point.

Level of significance: 0.10

The observed p-value is: 0.111

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.391[a]	2	.111
Likelihood Ratio	4.495	2	.106
Linear-by-Linear Association	4.367	1	.037
N of Valid Cases	197		

Table 16: Chi-Square Test of Gender and Delivery Location Preference Relationship

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Gender and whether respondents prefer fruits and vegetables purchased online delivered at their location of choice or prefer collecting at a collection point are not associated.

Thus, gender does not influence whether respondent prefers fruits and vegetables purchased online delivered at their location of choice or prefer collecting at a collection point.

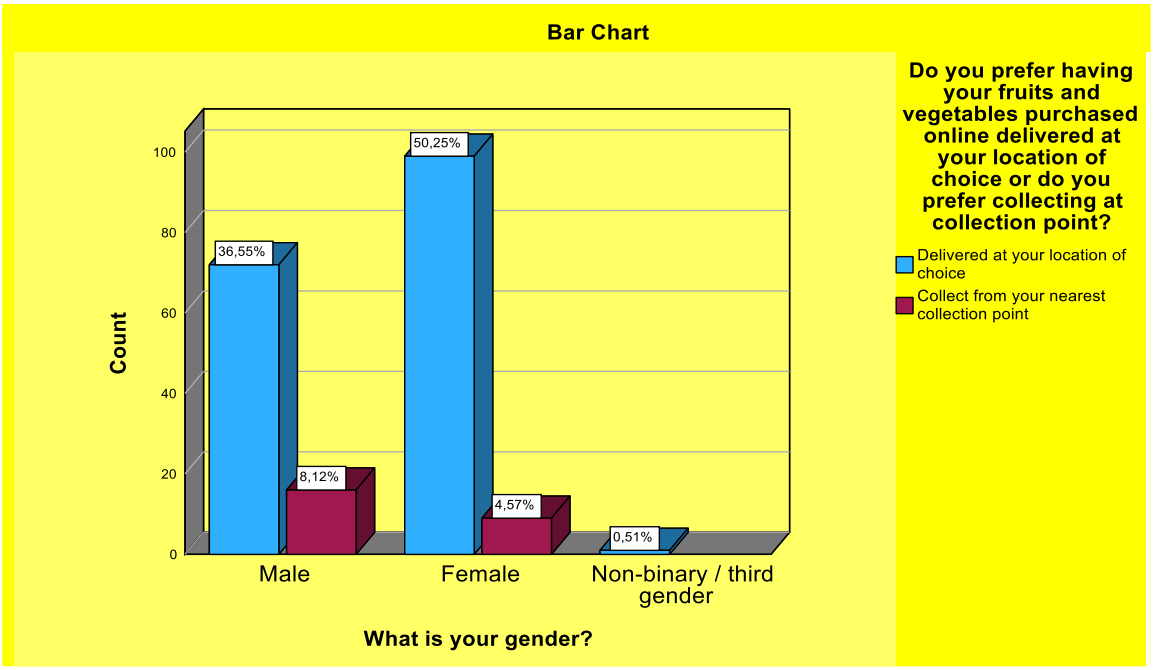

Figure 41: The Preferred Delivery Option by Gender

Respondents' gender versus their acceptable time period for fruits and vegetables to be delivered at their location of choice after purchase.

Null hypothesis H_0: There was no association between gender and the acceptable time period for fruits and vegetables to be delivered at one's location of choice after purchase.

Alternative hypothesis H_1: There existed at least some association between gender and the acceptable time period for fruits and vegetables to be delivered at one's location of choice after purchase.

Level of significance: 0.10

The observed p-value is: 0.714

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.120[a]	4	.714
Likelihood Ratio	2.482	4	.648
Linear-by-Linear Association	1.117	1	.291
N of Valid Cases	212		

Table 17: Chi-Square Test for Gender and Delivery Time Preference Relationship

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Gender and the acceptable time period for fruits and vegetables to be delivered at one's location of choice after purchase are not associated.

Thus, gender does not influence the acceptable time period for fruits and vegetables to be delivered at one's location of choice after purchase.

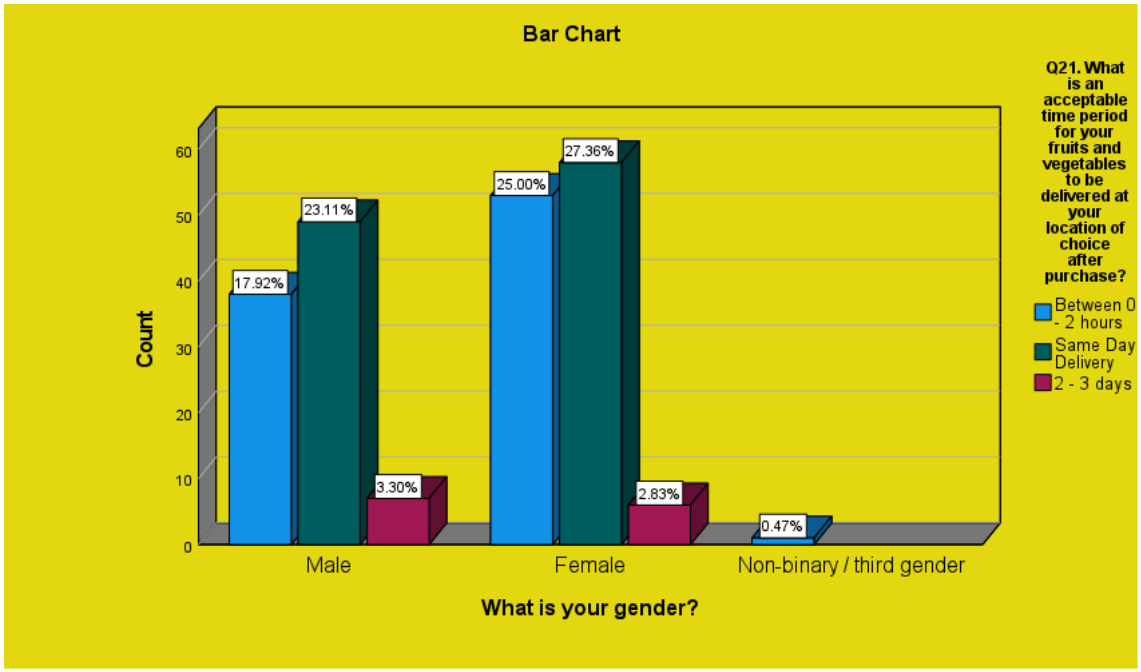

Figure 42: Preferred Delivery Time by Gender

4.3.2. The Impact of Age Group on the Ecommerce Factors' Level of Importance

4.3.2.1. Product Presentation

Respondents' age group versus while shopping for fruits and vegetables online, the importance of images of the fresh produce sold online to their desire to purchase the produce online.

Null hypothesis H_0: There was no association between gender and the importance of fresh produce images when shopping online to the intentions to purchase the fresh produce online.

Alternative hypothesis H_1: There existed at least some association between age group and the importance of fresh produce images when shopping online to the intentions to purchase the fresh produce online.

Level of significance: 0.10

The observed p-value is: 0.306

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.305[a]	16	.306
Likelihood Ratio	15.009	16	.524
Linear-by-Linear Association	.047	1	.829
N of Valid Cases	229		

Table 18: Chi-Square Test for Age Group and Product Images Relationship

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Age group and the importance of fresh produce images when shopping online to the intentions to purchase the fresh produce online are not associated.

Thus, age group does not influence the importance of fresh produce images online on the respondents' intentions to purchase fresh produce when shopping online.

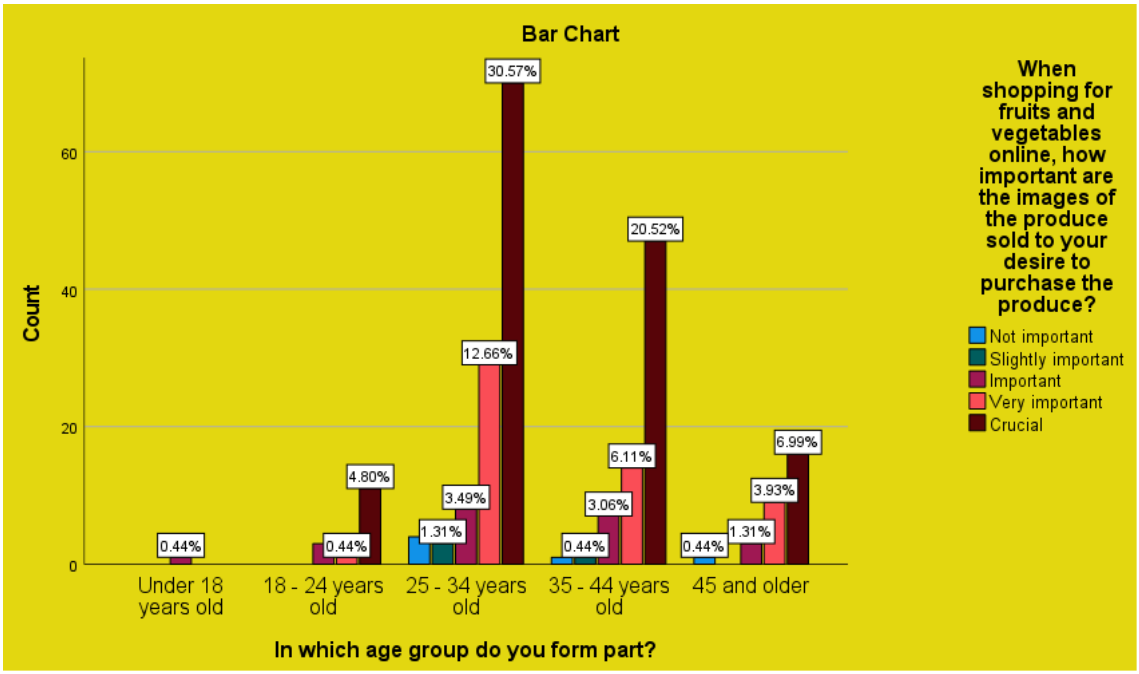

Figure 43: The Importance of Product Images by Age Groups

Respondents' age group versus the importance that images of the fruits or vegetables displayed reflect the actual structure (e.g., size, colour) of the fruits or vegetables respondents will receive after the purchase, on respondents' intention to purchase fresh produce online.

Null hypothesis H_0: There was no association between age group and the importance that images of the fruits or vegetables displayed reflect the actual structure (e.g., size, colour) of the fruits or vegetables respondents will receive after the purchase, on respondents' intention to purchase fresh produce online.

Alternative hypothesis H_1: There existed at least some association between age group and the importance that images of the fruits or vegetables displayed reflect the actual structure (e.g., size, colour) of the fruits or vegetables respondents will receive after the purchase, on respondents' intention to purchase fresh produce online.

Level of significance: 0.10

The observed p-value is: 0.596

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.032[a]	16	.596
Likelihood Ratio	13.175	16	.660
Linear-by-Linear Association	.047	1	.828
N of Valid Cases	229		

Table 19: Chi-Square Test for Age Groups and Realistic Product Images

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Age group and the importance that images of the fruits or vegetables displayed reflect the actual structure (e.g., size, colour) of the fruits or vegetables respondents will receive after the purchase, on respondents' intention to purchase fresh produce online are not associated

Thus, age group does not influence the importance that images of the fruits or vegetables displayed reflect the actual structure (e.g., size, colour) of the fruits or vegetables respondents will receive after the purchase, on respondents' intention to purchase fresh produce online.

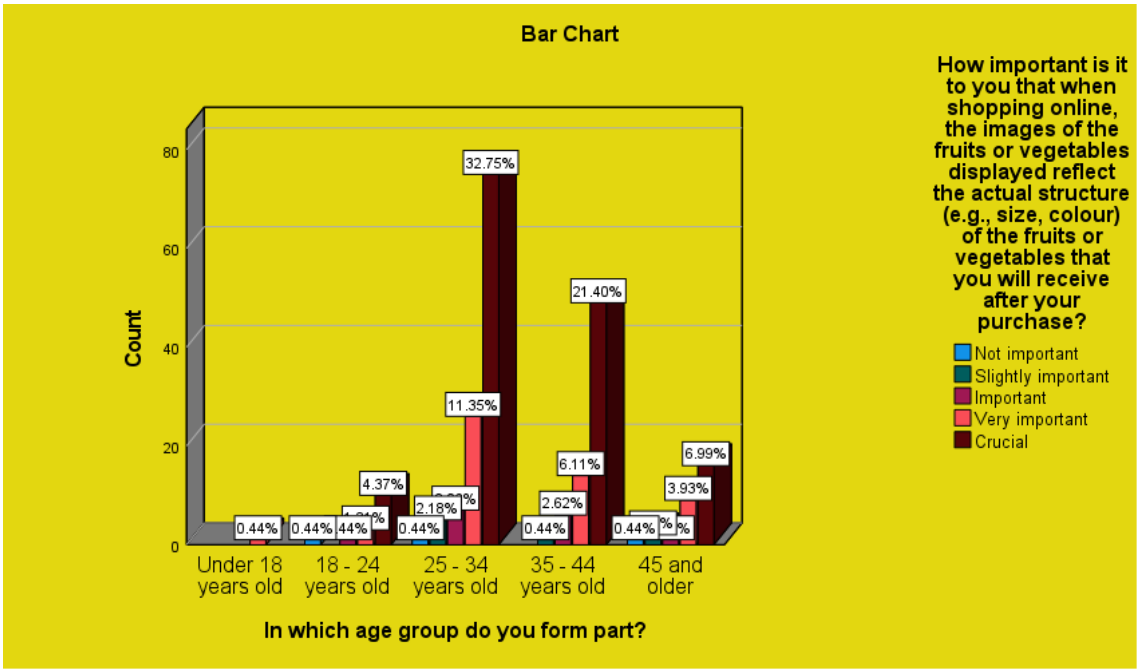

Figure 44: The Importance of Realistic Product Images by Age Groups

4.3.2.2. Content and Description

Respondents' age group versus, while shopping for fruits and vegetables online, the importance that written descriptions of the fresh produce (such as quantity or size) have on respondents' desire to purchase the fresh produce online.

Null hypothesis H_0: There was no association between age group and, while shopping for fruits and vegetables online, the importance that written descriptions of the fresh produce (such as quantity or size) have on respondents' desire to purchase the fresh produce online.

Alternative hypothesis H_1: There existed at least some association between age group and, while shopping for fruits and vegetables online, the importance that written descriptions of the fresh produce (such as quantity or size) have on respondents' desire to purchase the fresh produce online.

Level of significance: 0.10

The observed p-value is: 0.111

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13.567[a]	16	.631
Likelihood Ratio	15.199	16	.510
Linear-by-Linear Association	1.097	1	.295
N of Valid Cases	227		

Table 20: Chi-Square Test for Age Groups and Importance of Written Descriptions

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Age group and, while shopping for fruits and vegetables online, the importance that written descriptions of the fresh produce (such as quantity or size) have on respondents' desire to purchase the fresh produce online are not associated.

Thus, age group does not influence, while shopping for fruits and vegetables online, the importance that written descriptions of the fresh produce (such as quantity or size) have on respondents' desire to purchase the fresh produce online.

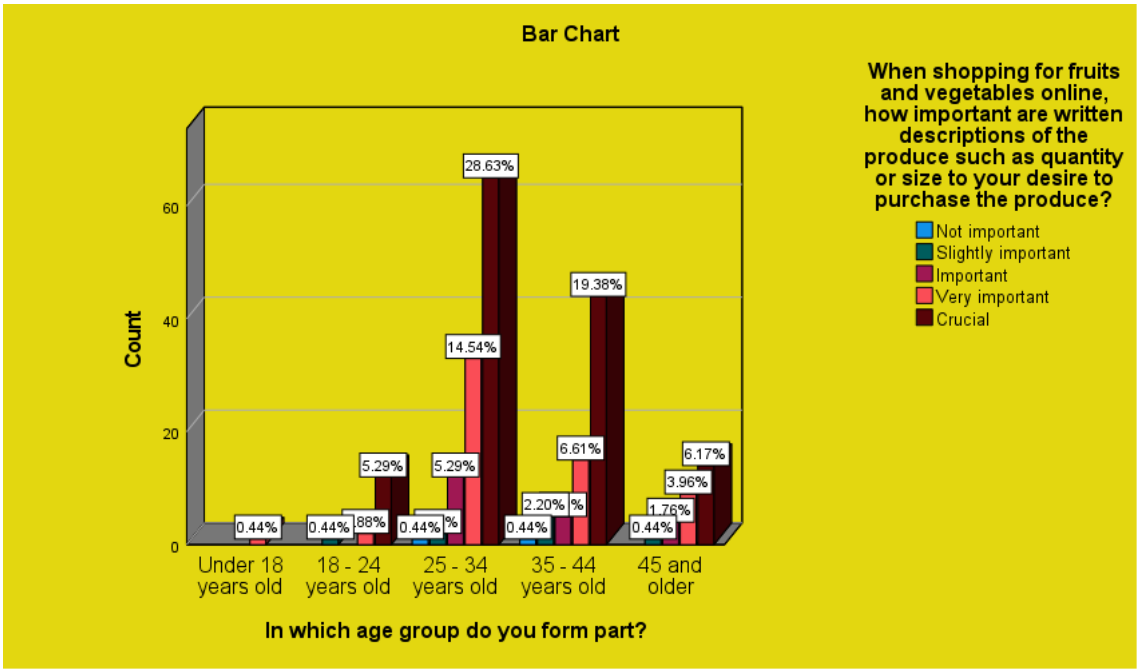

Figure 45: The Importance of Written Descriptions by Age Groups

Respondents' age group versus the importance that the details of the farm(s) where the fresh produce come from are provided online to the respondents' intention to purchase fruits and vegetables online.

Null hypothesis H_0: There was no association between age group and the importance that the details of the farm(s) where the fresh produce come from are provided online, to the respondents' intention to purchase fruits and vegetables online.

Alternative hypothesis H_1: There existed at least some association between age group and the importance that the details of the farm(s) where the fresh produce come from are provided online, to the respondents' intention to purchase fruits and vegetables online.

Level of significance: 0.10

The observed p-value is: 0.540

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.790[a]	16	.540
Likelihood Ratio	14.114	16	.590
Linear-by-Linear Association	.229	1	.632
N of Valid Cases	227		

Table 21: Chi-Square Test for Age Groups and Importance of Farm Details

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Age group and the importance that the details of the farm(s) where the fresh produce come from are provided online to the respondents' intention to purchase fruits and vegetables online are not associated.

Thus, gender does not influence the importance given to farm details being made available online when respondents seek to purchase fresh produce online.

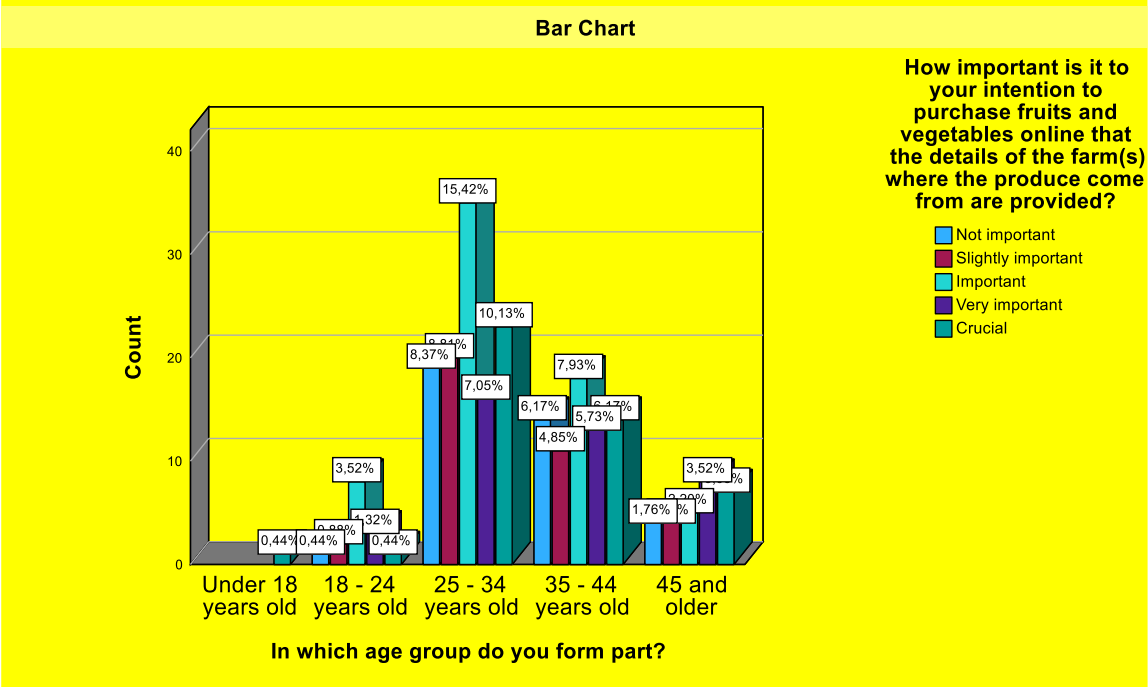

Figure 46: The Importance of Farm Details by Gender

4.3.2.3. Website Aesthetics and Ease of Navigation

Respondents' age group versus, when shopping for fruits and vegetables online, the importance of the visual appeal (e.g., website colour, layout) of the online store to the intention to purchase fresh produce online.

Null hypothesis H_0: There was no association between age group and, when shopping for fruits and vegetables online, the importance of the visual appeal (e.g., website colour, layout) of the online store to the intention to purchase fresh produce online.

Alternative hypothesis H_1: There existed at least some association between age group and, when shopping for fruits and vegetables online, the importance of the visual appeal (e.g., website colour, layout) of the online store to the intention to purchase fresh produce online.

Level of significance: 0.10

The observed p-value is: 0.007

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	33.185[a]	16	.007
Likelihood Ratio	20.644	16	.193
Linear-by-Linear Association	.896	1	.344
N of Valid Cases	222		

Table 22: Chi-Square Test for Age Groups and Visual Appeal Importance Relationship

Observation: The observed p-value was smaller than the level of significance.

Decision: Since the p-value was smaller than the level of significance, the null hypothesis was rejected in favour of the alternative hypothesis.

Conclusion: Age group and, when shopping for fruits and vegetables online, the importance of the visual appeal (e.g., website colour, layout) of the online store to the intention to purchase fresh produce online are strongly associated.

Thus, age group does have an influence on the level of importance website visual appeal has on the intention for respondents to purchase fresh produce online.

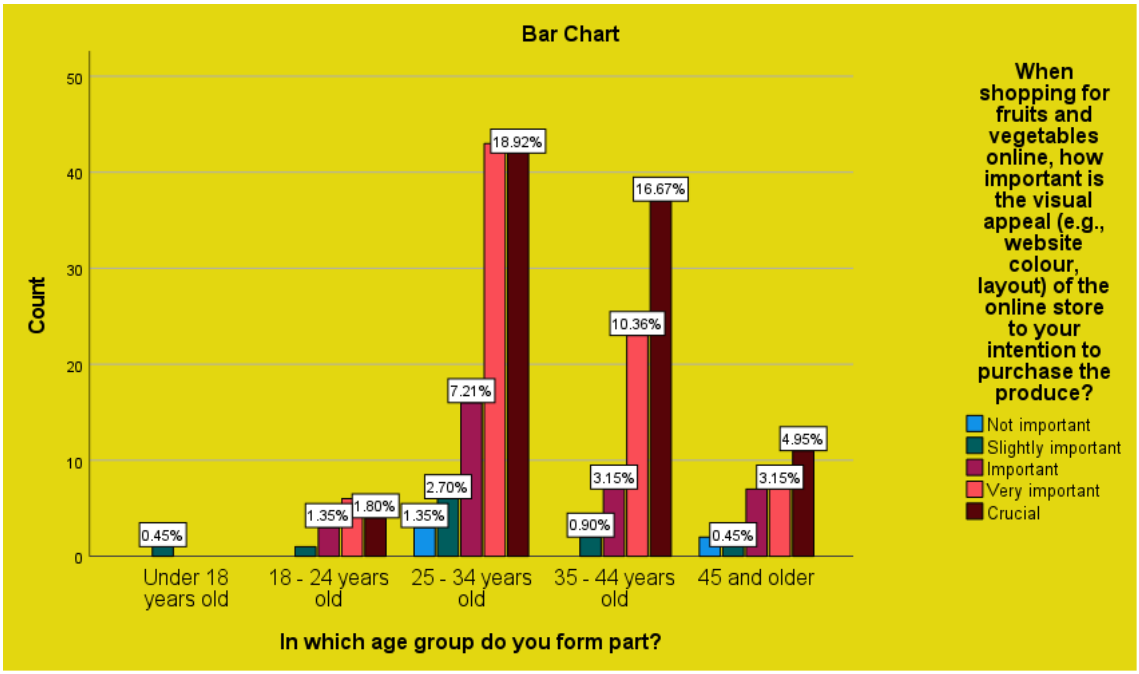

Figure 47: The Importance of Website Visual Appeal by Age Groups

Respondents' age group versus the importance of the ease at which one can navigate through the online store's content to the intention of purchasing fruits and vegetables from the online store.

Null hypothesis H_0: There was no association between respondents' age group and the importance of the ease at which one can navigate through the online store's content to the intention of purchasing fruits and vegetables from the online store.

Alternative hypothesis H_1: There existed at least some association between age group and the importance of the ease at which one can navigate through the online store's content to the intention of purchasing fruits and vegetables from the online store.

Level of significance: 0.10

The observed p-value is: 0.007

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	33.160[a]	16	.007
Likelihood Ratio	22.115	16	.140
Linear-by-Linear Association	.329	1	.566
N of Valid Cases	222		

Table 23: Relationship Test Between Age Group and Online Store Ease of Navigation

Observation: The observed p-value was smaller than the level of significance.

Decision: Since the p-value was smaller than the level of significance, the null hypothesis was rejected in favour of the alternative hypothesis.

Conclusion: Age group and the importance of the ease at which one can navigate through the online store's content to the intention of purchasing fruits and vegetables from the online store are associated.

Thus, age group plays an influential role on the level of importance of the ease at which one can navigate through the online store's content to the intention of purchasing fruits and vegetables from the online store.

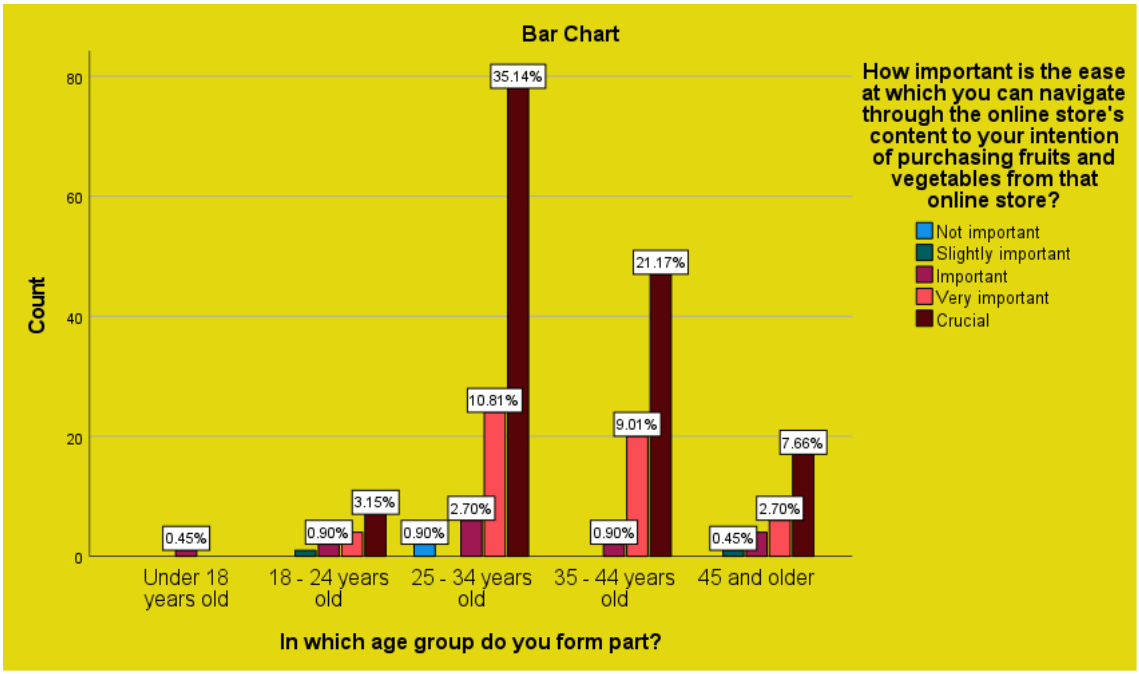

Figure 48: The Importance of Ease of Website Navigation by Age Group

Respondents' age group versus the influence to respondents' purchase intentions of fruits and vegetables online given the online store's website is compatible to the size of one's mobile phone screen.

Null hypothesis H_0: There was no association between age group and the influence to respondents' purchase intentions of fruits and vegetables online given the online store's website is compatible to the size of one's mobile phone screen.

Alternative hypothesis H_1: There existed at least some association between age group and the influence to respondents' purchase intentions of fruits and vegetables online given the online store's website is compatible to the size of one's mobile phone screen.

Level of significance: 0.10

The observed p-value is: 0.003

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	36.300[a]	16	.003
Likelihood Ratio	24.725	16	.075
Linear-by-Linear Association	.005	1	.944
N of Valid Cases	221		

Table 24: Relationship Test Between Mobile Screen Compatibility and Age Group

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Age group and the influence to respondents' purchase intentions of fruits and vegetables online given the online store's website is compatible to the size of one's mobile phone screen.

Thus, age group influences respondents' purchase intentions of fruits and vegetables online given the online store's website is compatible to the size of one's mobile phone screen.

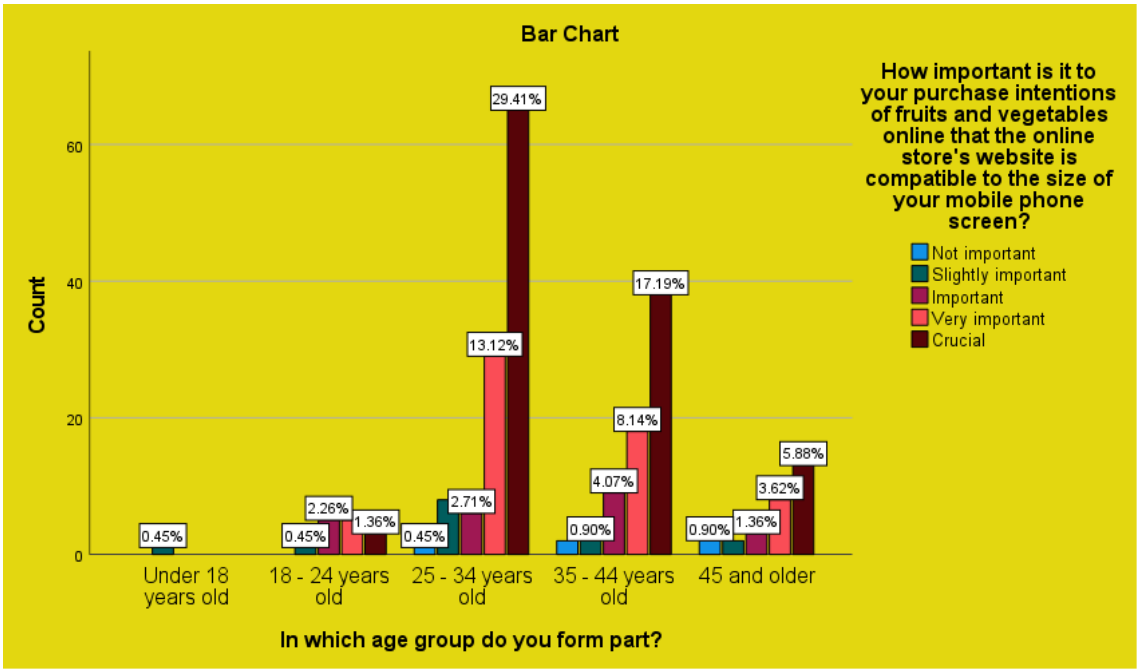

Figure 49: The Importance of Mobile Screen Compatibility by Age Group

Respondents' age group versus the influence to respondents' purchase intentions they can search for specific fruits and vegetables through a search bar on the online store.

Null hypothesis H_0: There was no association between age group and the influence to respondents' purchase intentions they can search for specific fruits and vegetables through a search bar on the online store.

Alternative hypothesis H_1: There existed at least some association between age group and the influence to respondents' purchase intentions they can search for specific fruits and vegetables through a search bar on the online store.

Level of significance: 0.10

The observed p-value is: 0.513

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.153[a]	16	.513
Likelihood Ratio	14.937	16	.529
Linear-by-Linear Association	3.288	1	.070
N of Valid Cases	227		

Table 25: Chi-Square Test for the Relationship Age Group and the Importance of a Search Bar

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Age group and the influence to respondents' purchase intentions they can search for specific fruits and vegetables through a search bar on the online store are not associated.

Thus, age group does not influence the level of importance that searching for fresh produce through a search bar has on respondents' purchase intentions.

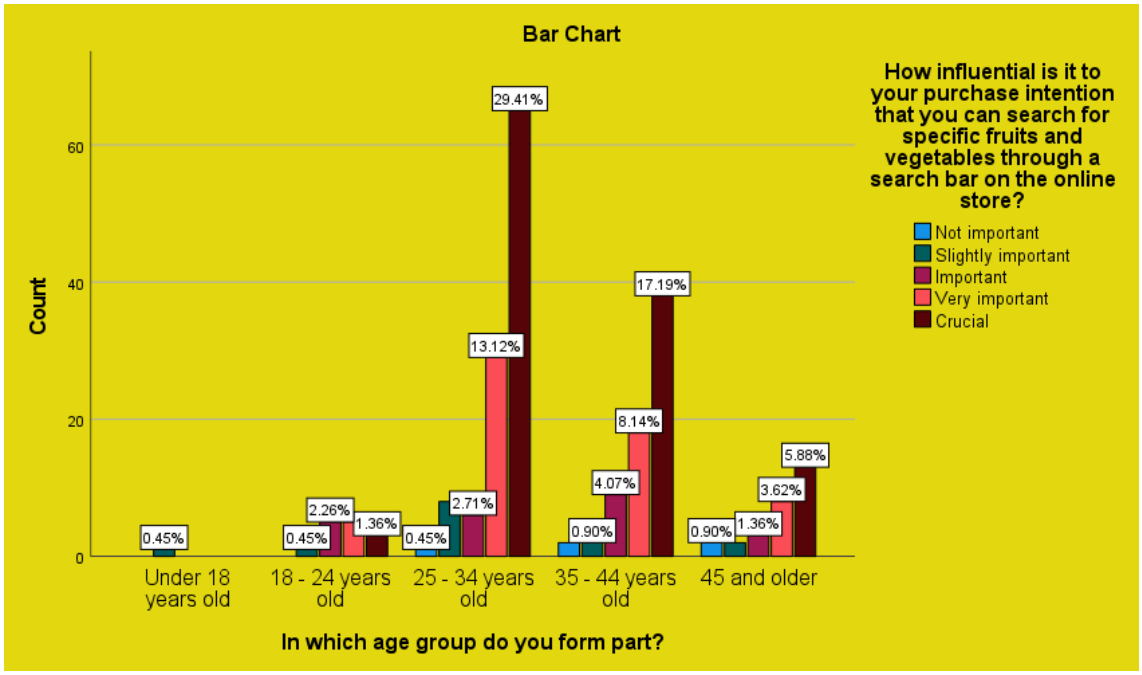

Figure 50: The Importance of Search Bar Feature by Age Group

4.3.2.4. Customer Support

Respondents' age group versus the importance to their purchase intentions of fruits and vegetables online that the online store has information on how you can contact the store for support queries.

Null hypothesis H_0: There was no association between age group and the importance to their purchase intentions of fruits and vegetables online that the online store has information on how you can contact the store for support queries.

Alternative hypothesis H_1: There existed at least some association between age group and the importance to their purchase intentions of fruits and vegetables online that the online store has information on how you can contact the store for support queries.

Level of significance: 0.10

The observed p-value is: 0.017

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	30.261[a]	16	.017
Likelihood Ratio	25.576	16	.060
Linear-by-Linear Association	1.585	1	.208
N of Valid Cases	219		

Table 26: Relationship Test Between Age Group and the Importance of Customer Support Information

Observation: The observed p-value was smaller than the level of significance.

Decision: Since the p-value was smaller than the level of significance, the null hypothesis was rejected in favour of the alternative hypothesis.

Conclusion: Age group and the importance to their purchase intentions of fruits and vegetables online that the online store has information on how you can contact the store for support queries are associated.

Thus, age group has an influence on the level of importance having customer support information on an online store has on their intention to purchase fresh produce online.

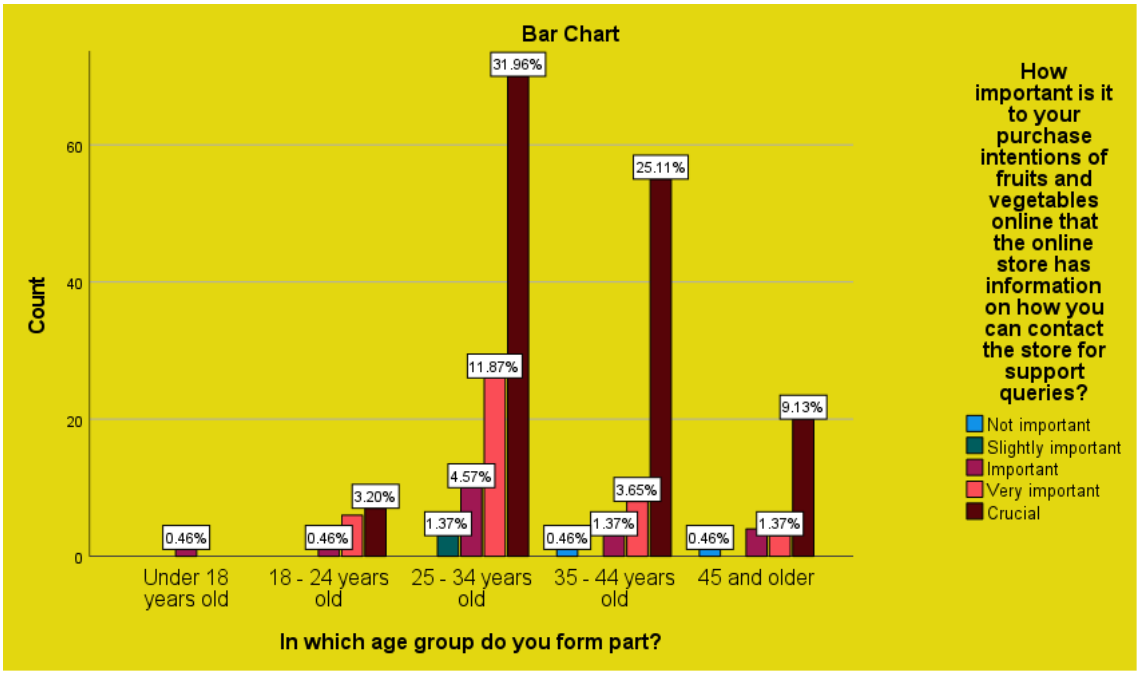

Figure 51: Importance of Having Customer Support Information Based on Age Groups

4.3.2.5. Payment Options

Respondents' age group versus the importance that online stores providing multiple payment methods at checkout has on respondents' purchase intentions for fresh produce online.

Null hypothesis H_0: There was no association between age group and the importance that online stores providing multiple payment methods at checkout has on respondents' purchase intentions for fresh produce online.

Alternative hypothesis H_1: There existed at least some association between age group and the importance that online stores providing multiple payment methods at checkout has on respondents' purchase intentions for fresh produce online.

Level of significance: 0.10

The observed p-value is: < 0.001

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	66.970[a]	16	<0.001
Likelihood Ratio	24.197	16	.085
Linear-by-Linear Association	6.246	1	.012
N of Valid Cases	218		

Table 27: Chi-Square Test for Age Group and Payment Options Availability at Checkout

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was smaller than the level of significance, the null hypothesis was rejected in favour of the alternative hypothesis.

Conclusion: Age group and the importance that online stores providing multiple payment methods at checkout has on respondents' purchase intentions for fresh produce online are strongly associated.

Thus, age group impacts the importance that online stores providing multiple payment methods at checkout has on respondents' purchase intentions for fresh produce online.

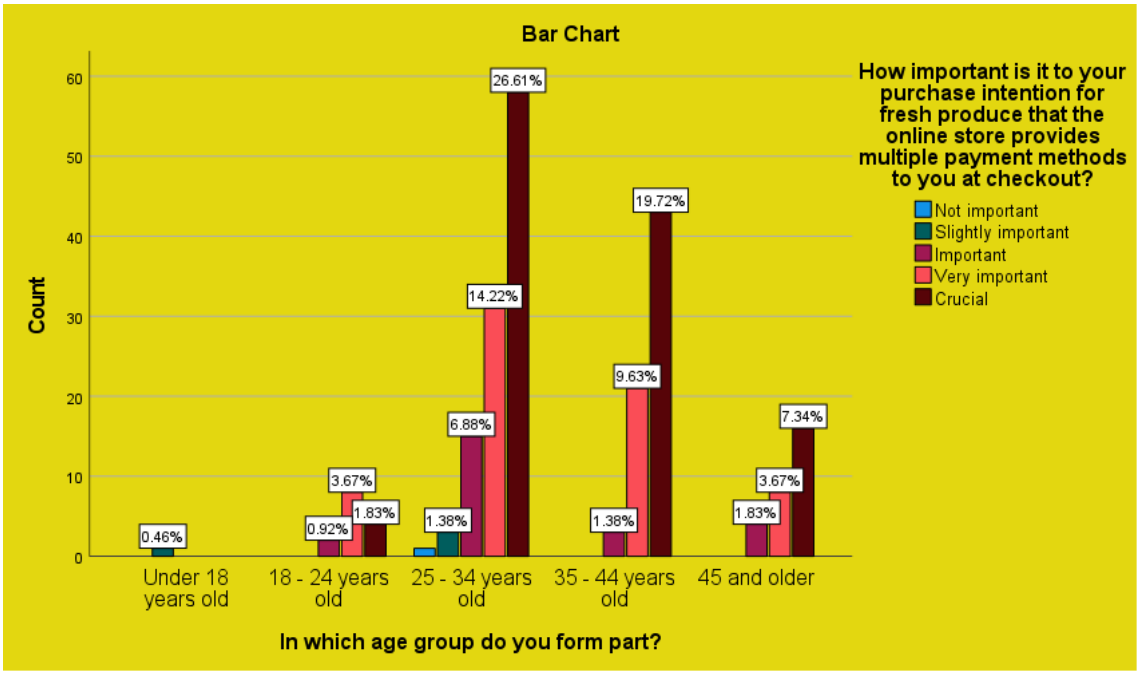

Figure 52: The Importance of Payment Options Availability by Age Group

Respondents' age group versus the importance of the payment gateway being safe and secure to intention of purchasing fruits and vegetables online.

Null hypothesis H_0: There was no association between age group and the importance of the payment gateway being safe and secure to intention of purchasing fruits and vegetables online.

Alternative hypothesis H_1: There existed at least some association between age group and the importance of the payment gateway being safe and secure to intention of purchasing fruits and vegetables online.

Level of significance: 0.10

The observed p-value is: <0.001

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	58.204[a]	16	<0.001
Likelihood Ratio	15.646	16	.478
Linear-by-Linear Association	4.482	1	.034
N of Valid Cases	217		

Table 28: Chi-Square Test for Safe Payment Gateway and Age Group Relationship

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was smaller than the level of significance, the null hypothesis was rejected in favour of the alternative hypothesis.

Conclusion: Age group and the importance of the payment gateway being safe and secure to intention of purchasing fruits and vegetables online are associated.

Thus, age group and the importance of the payment gateway being safe and secure to intention purchasing fruits and vegetables online strongly influence each other.

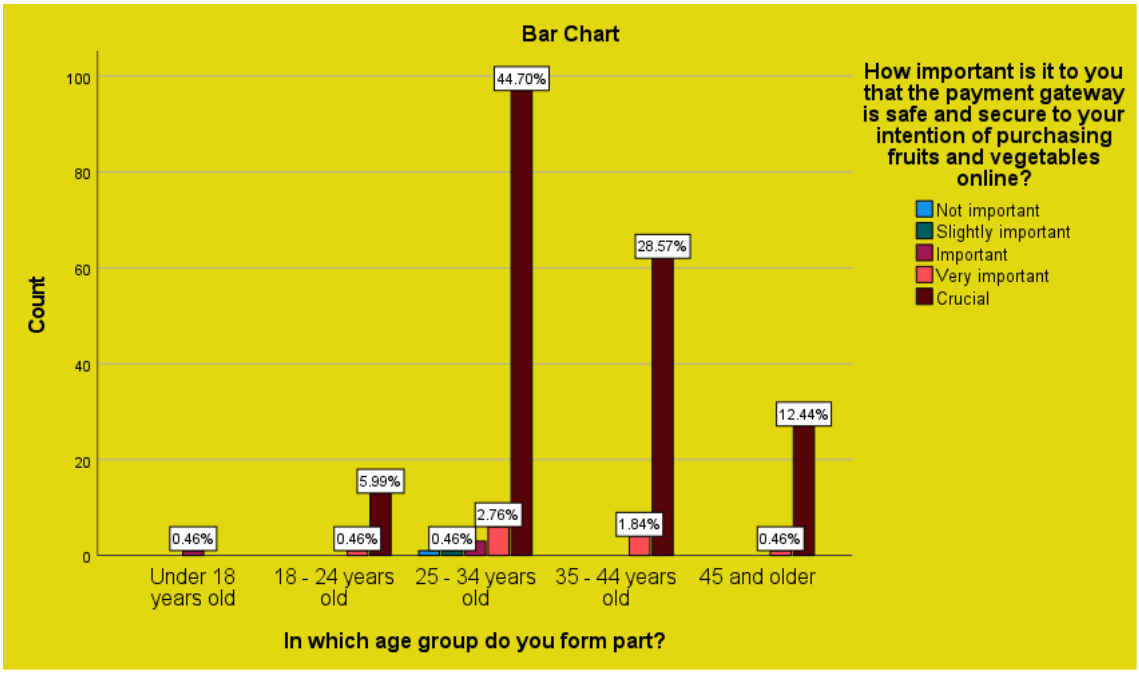

Figure 53: The Importance of Payment Gateway Safety by Age Group

4.3.2.6. Online Prices

Respondents' age group versus the importance of online prices for fruits and vegetables sold online to respondents' intention to purchase the produce online.

Null hypothesis H_0: There was no association between age group and the importance of online prices for fruits and vegetables sold online to respondents' intention to purchase fresh produce online.

Alternative hypothesis H_1: There existed at least some association between age group and the importance of online prices for fruits and vegetables sold online to respondents' intention to purchase fresh produce online.

Level of significance: 0.10

The observed p-value is: 0.218

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	20.045[a]	16	.218
Likelihood Ratio	13.209	16	.657
Linear-by-Linear Association	.641	1	.423
N of Valid Cases	217		

Table 29: Relationship Test Between the Importance of Online Prices and Age Groups

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Age Group and the importance of online prices for fruits and vegetables to intention to purchase the fresh produce online are not associated.

Thus, age group does not influence the importance of online prices for fruits and vegetables has on the intentions to purchase the fresh produce online.

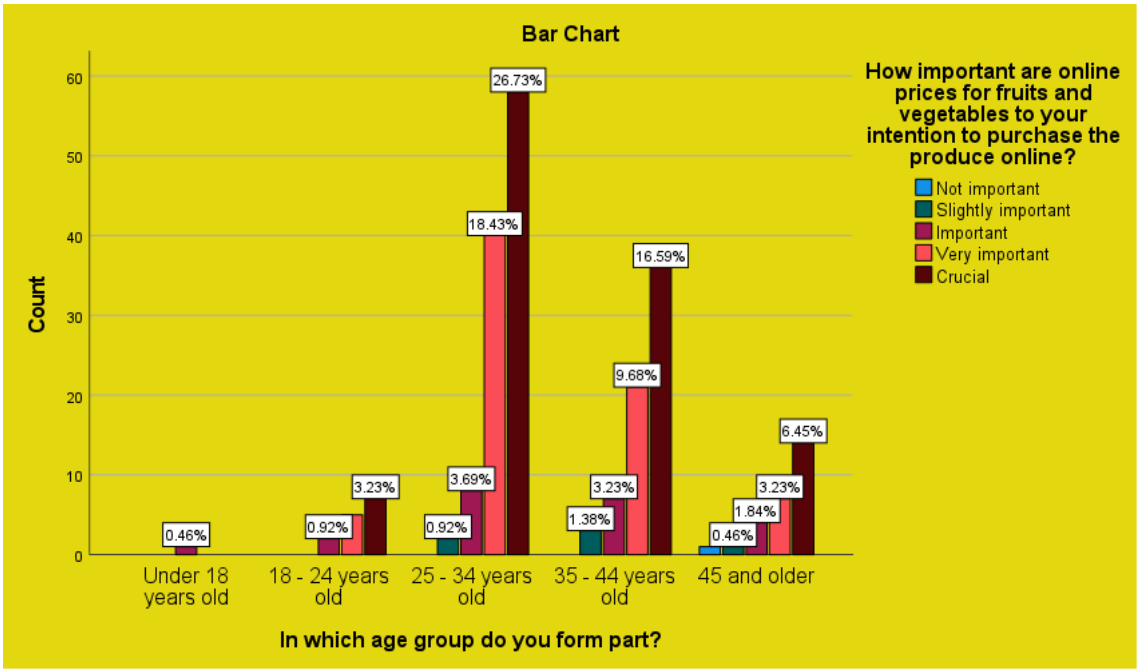

Figure 54: The Importance of Fresh Produce Online Prices by Age Group

Respondent's age group versus the importance of online prices for fruits and vegetables compared to physical store prices to the intention to purchase the produce online.

Null hypothesis H_0: There was no association between age group and the importance of online prices for fruits and vegetables compared to physical store prices for the intention to purchase the produce online.

Alternative hypothesis H_1: There existed at least some association between age group and the importance of online prices for fruits and vegetables compared to physical store prices for the intention to purchase the produce online.

Level of significance: 0.10

The observed p-value is: 0.301

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.400[a]	16	.301
Likelihood Ratio	15.405	16	.495
Linear-by-Linear Association	.016	1	.898
N of Valid Cases	216		

Table 30: Relationship Test between Online Prices vs Store Prices and Age Group

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Age group and the importance of online prices for fruits and vegetables compared to physical store prices to the intention to purchase the produce online are not associated.

Thus, age group does not influence the importance of online prices for fruits and vegetables compared to physical store prices to the intention to purchase the produce online.

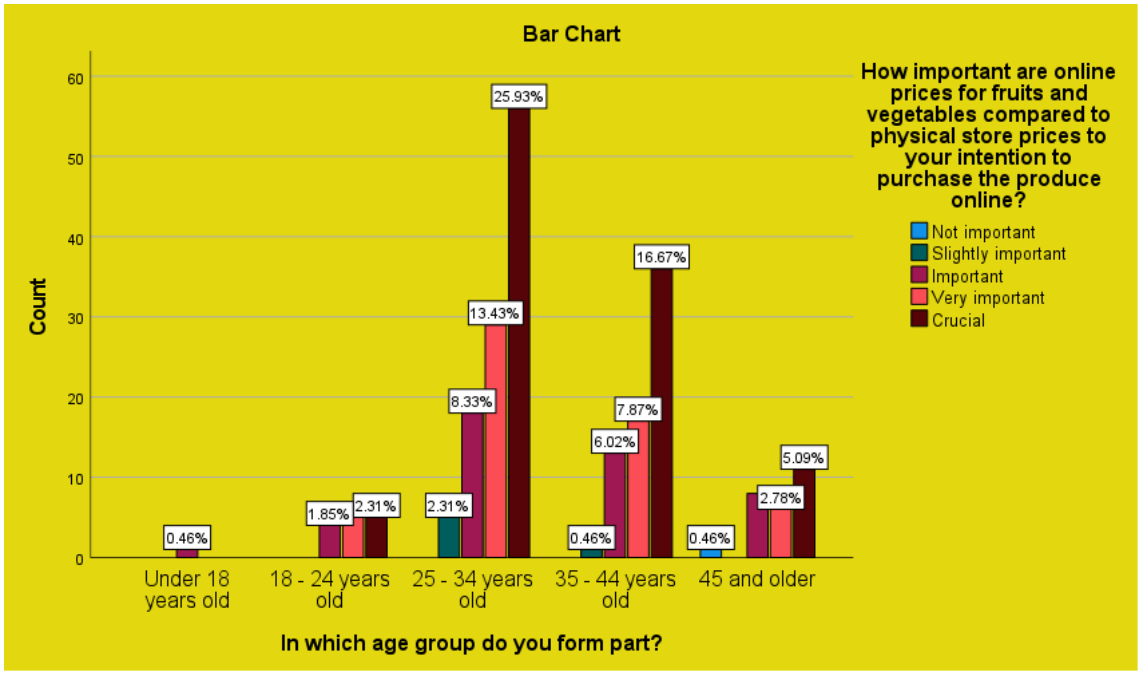

Figure 55: The Importance of Fresh Produce Online Prices by Age Group

4.3.2.7. Word of Mouth

Respondents' age group versus the importance of reading reviews of an online store before purchasing fruits and vegetables from the online store.

Null hypothesis H_0: There was no association between age group and the importance of reading reviews of an online store before purchasing fruits and vegetables from the online store.

Alternative hypothesis H_1: There existed at least some association between gender and the importance of reading reviews of an online store before purchasing fruits and vegetables from the online store.

Level of significance: 0.10

The observed p-value is: 0.519

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.076[a]	16	.519
Likelihood Ratio	15.378	16	.497
Linear-by-Linear Association	.027	1	.869
N of Valid Cases	214		

Table 31: Chi-Square Test for Age Group and the Importance of Online Store Reviews Relationship

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Age group and the importance of reading reviews of an online store before purchasing fruits and vegetables from the online store are not associated.

Thus, age group has no effect on the importance reading reviews of an online store before you purchase fruits and vegetables from the online store.

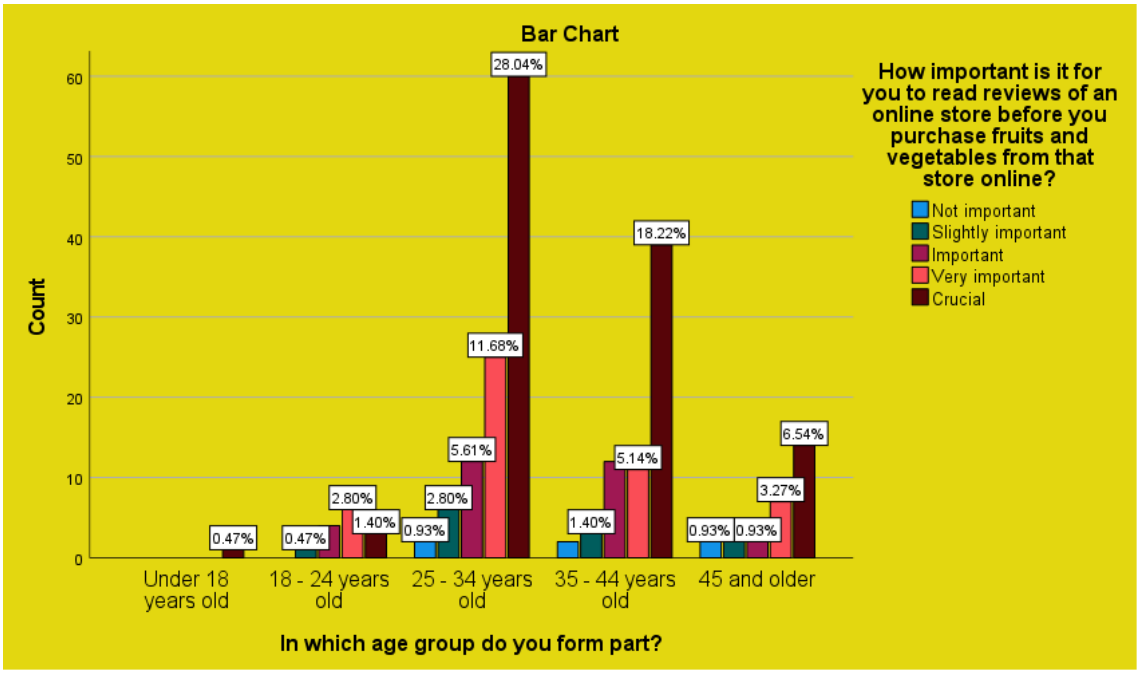

Figure 56: The Importance of Reading Reviews of an Online Store by Age Group

Respondents' age group versus the influence of rating rankings of an online store on the intention to purchase fruits and vegetables from the online store.

Null hypothesis H_0: There was no association between age group and the influence of rating rankings of an online store on the intention to purchase fruits and vegetables from the online store.

Alternative hypothesis H_1: There existed at least some association between age group and the influence of rating rankings of an online store on the intention to purchase fruits and vegetables from the online store.

Level of significance: 0.10

The observed p-value is: 0.086

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	24.170[a]	16	.086
Likelihood Ratio	21.416	16	.163
Linear-by-Linear Association	3.678	1	.055
N of Valid Cases	214		

Table 32: Chi-Square Test for Age Group and Online Store Ratings Relationship

Observation: The observed p-value was smaller than the level of significance.

Decision: Since the p-value was smaller than the level of significance, the null hypothesis was rejected in favour of the alternative hypothesis.

Conclusion: Age group has a significant influence on the influence of rating rankings of an online store with the intention to purchase fruits and vegetables from the online store.

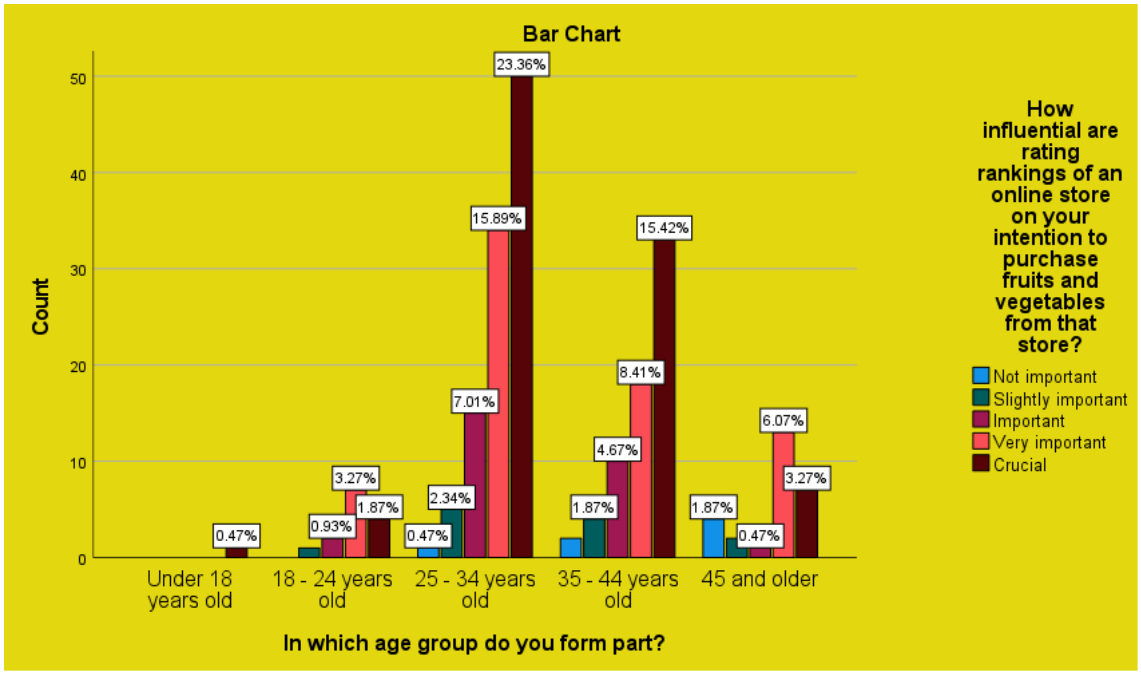

Figure 57: The Importance of Online Store Ratings by Age Group

4.3.2.8. Product Delivery

Respondents' age group versus the preference of whether having fruits and vegetables that are purchased online delivered to their location of choice or collected at collection point.

Null hypothesis H_0: There was no association between age group and the preference of whether having fruits and vegetables that are purchased online delivered to their location of choice or collected at collection point.

Alternative hypothesis H_1: There existed at least some association between age group and the preference of whether having fruits and vegetables that are purchased online delivered to their location of choice or collected at collection point.

Level of significance: 0.10

The observed p-value is: 0.569

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.935[a]	4	.569
Likelihood Ratio	4.633	4	.327
Linear-by-Linear Association	2.002	1	.157
N of Valid Cases	199		

Table 33: Chi-Square Test for Age Group and Delivery Option Preference

Observation: The observed p-value was larger than the level of significance.

Decision: Since the p-value was larger than the level of significance, the null hypothesis could not be rejected in favour of the alternative hypothesis.

Conclusion: Age group and the preference of whether having fruits and vegetables that are purchased online delivered to respondents' location of choice or collected at collection point are not associated.

Thus, age group does not influence whether respondent prefers fruits and vegetables purchased online delivered at their location of choice or collected at a collection point.

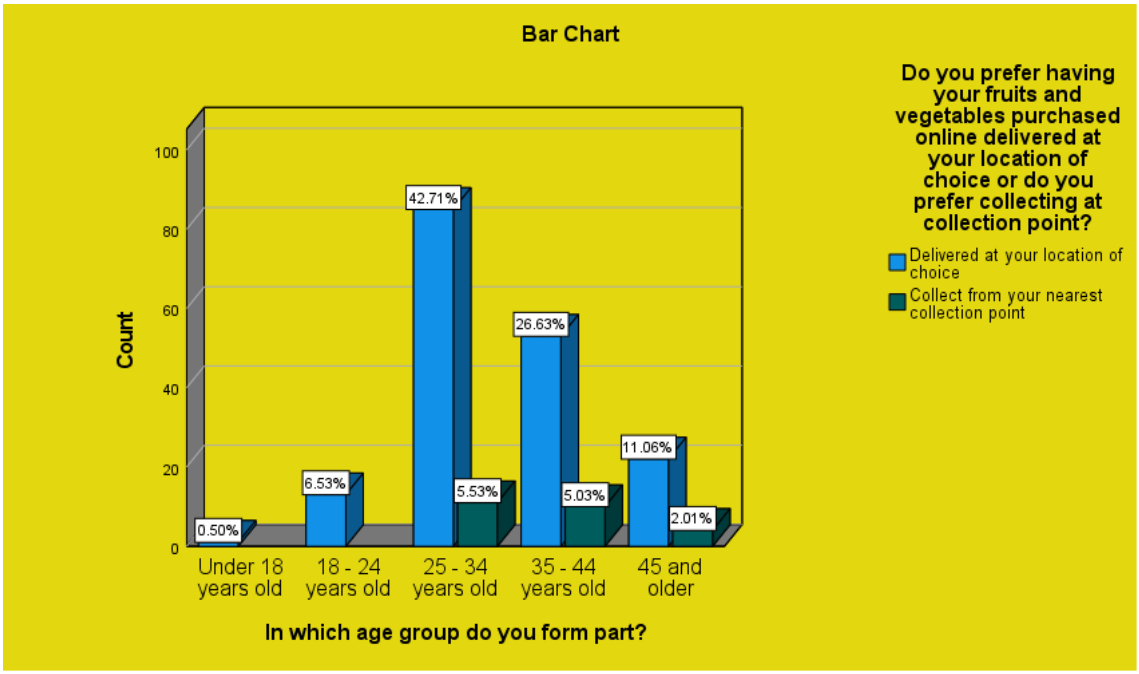

Figure 58: Relationship Test between Age Group and Product Delivery Options

Respondents' age group versus the acceptable time period for fruits and vegetables to be delivered at their location of choice after purchase.

Null hypothesis H_0: There was no association between age group and the acceptable time period for fruits and vegetables to be delivered at their location of choice after purchase.

Alternative hypothesis H_1: There existed at least some association between age group and the acceptable time period for fruits and vegetables to be delivered at their location of choice after purchase.

Level of significance: 0.10

The observed p-value is: <0.001

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	26.931[a]	8	<0.001
Likelihood Ratio	15.193	8	.055
Linear-by-Linear Association	.773	1	.379
N of Valid Cases	214		

Table 34: Chi-Square Test for Age Group and Preferred Delivery Time Period

Observation: The observed p-value was smaller than the level of significance.

Decision: Since the p-value was smaller than the level of significance, the null hypothesis was rejected in favour of the alternative hypothesis.

Conclusion: Age group and the acceptable time period for fruits and vegetables to be delivered at respondents' location of choice after purchase are strongly related.

Thus, age group has a significant influence on the acceptable time period for fruits and vegetables to be delivered at respondents' location of choice after purchase.

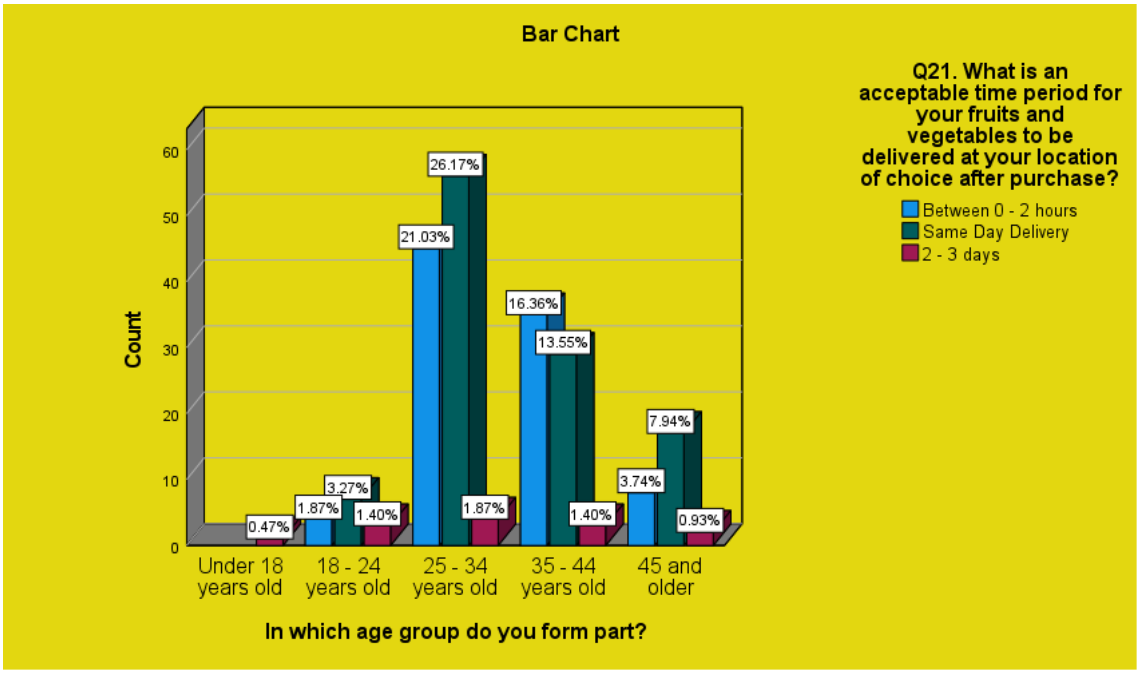

Figure 59: Delivery Time Period of Choice by Age Group

4.4. Section C: Confirmatory Factorial Analysis

This section presents the analysis of determining and confirming the strength of the relationships among the indicators and their respective factors (constructs or components). The indicators are made up from questions in the survey to identify any relationships between them, resulting in factors. Thereafter, Factor Loadings between factors will be determined. The key observation is to understand the resulting hypothesis testing outcomes as to whether the output p-values are significant or not. In this case, the level of significance is the default value of 0.05. A p-value less than the level of significance will show significance (Brown & Moore, 2012).

In addition, there will be a determination of the covariance between pairs of factors and their respective indicators. It is of great interest to understand the strength of the covariance between any two pairs of the factors as it shows the impact a factor has on the other.

Finally, this analysis looks at the practical relationships as seen through the path diagram. The variances, covariances and factor loadings are easily observed on the path diagrams.

4.4.1. Factor Loadings

The following table presents factor to indicator loadings, which show the relationship between factors and indicators. The observed factor to indicator loadings show that there exists strong relationships based on the standardised loadings (Cudeck & O'Dell, 1994). The loadings range from 0.411 to 0.764. The questionable idea is why loadings smaller than the minimum acceptable values (lower than 0.5) were not removed from the system (Cudeck & O'Dell, 1994). The answer is that the model fitness did not require any modifications and so, the model was adequate. This did not require an adjustment.

In view of the testing analysis, all the p-values of all the loadings are highly significant. The p-values are all less than 0.001. This shows the strong relationship between the extracted factors and their respective indicators.

Factor Loadings

Factor	Indicator	Estimate	SE	Z	p	Stand. Estimate
Factor 1	Q6	0.432	0.0665	6.49	< .001	0.500
	Q10	0.611	0.0860	7.11	< .001	0.623
Factor 2	Q12	0.419	0.0831	5.05	< .001	0.411
	Q5	0.495	0.0834	5.94	< .001	0.538

Factor Loadings						
Factor	**Indicator**	**Estimate**	**SE**	**Z**	**p**	**Stand. Estimate**
Factor 3	Q11	0.467	0.0762	6.13	< .001	0.633
	Q13	0.599	0.0666	9.00	< .001	0.764
	Q7	0.382	0.0638	5.99	< .001	0.436

Table 35: Factors and Associated Factor Loading Values

4.4.2. Factor Estimates

Covariance analysis evaluates how the mean values of two random variables move together (Joreskog, 1970). For example, if variable A's values move higher whenever variable B's observations move higher, and the same relationship is found when each variable decreases, these observations are said to have positive covariance (Joreskog, 1970). In this case, the table below contains the bivariate two-way observations of two variables for every consideration. These variables are used to determine the bivariate covariations. They are used to determine correlations and covariances (Cudeck & O'Dell, 1994). These variances and covariances are determined to test significance.

The p-values for the calculated variances and covariances are all less than 0.001, which means that the covariances are highly significant. A good example is the p-value less than 0.001, which shows that, for example, the covariance between factor 1 and factor 2 is highly significant. Similarly, when all other covariances are considered, their p-values are all less than 0.001. See the table below.

Factor Covariance						
		Estimate	**SE**	**Z**	**p**	**Stand. Estimate**
Factor 1	Factor 1	1.000				
	Factor 2	1.126	0.155	7.27	< .001	1.126
	Factor 3	0.860	0.115	7.47	< .001	0.860
Factor 2	Factor 2	1.000				
	Factor 3	1.094	0.158	6.93	< .001	1.094
Factor 3	Factor 3	1.000				

Table 36: Factor Covariances Indicating Relationship between Factors

4.4.3. Model Fit

This section analyses all the questions posed in the research to determine whether the associated answers fit a normal distribution. This is to confirm that the data can be used unchanged for the various analyses.

The table in this section shows the results of a model fit analysis, which produced a Chi-Square statistic of 6.06 with degrees of freedom of 6. The resulting test statistic is observed to be 1.01. This is achieved by dividing the Chi-square value with the degrees of freedom (Alavi et al., 2020). According to test principles, this value does not exceed the Chi-Square critical value, and thus it is not significant (Alavi et al., 2020). This test, however, is supposed to be a non-significant result for the justification of a good model fit. Thus, this result is acceptable due to the fact that the insignificance is due to the observation that the observed p-value of 0.417 is significant, which means a normal distribution model fit (Alavi et al., 2020).

Test for Exact Fit		
χ^2	df	p
6.06	6	0.417

Table 37: Model Fit Test Values

4.4.4. Fit Measures

Fit indices represent how plausible is a model being estimating to the research results. A well-fitting model reduces the discrepancy between the Sigma matrixes (Goretzko et al., 2024). The Fit Measures Test was also performed to determine the legality of the model for the data of this research. A positive outcome means that the research instrument was adequately compiled to achieve significant results for research analysis (Goretzko et al., 2024).

In CFA results, the model fit indices observed values in this test are acceptable (RMSEA = 0.00634), and the good fit values (CFI = 1.000, TLI = 1.000). The higher the CFI and TLI values from the value 0.9, better and more acceptable (Brown & Moore, 2012; Goretzko et al., 2024). Many average variances extracted were smaller than the correlation coefficients of the factors, which shows the somewhat acceptable discriminant validity.

The analysis of this CFA shows that the model fit measures demonstrate a good fit since the CFI is 1.000 and the TLI =1.000. The RMSEA is 0.00634, which is an accepted value. Overall, it is concluded that the model fit measures were all acceptable on both sides of the indices (Brown & Moore, 2012; Goretzko et al., 2024).

			RMSEA 90% CI	
CFI	**TLI**	**RMSEA**	**Lower**	**Upper**
1.000	1.000	0.00634	0.00	0.0863

Table 38: Fit Measures for Research Study Consistency

4.4.5. The Path Diagram

The following path diagram shows the hypothetical statements made regarding the anticipated relationships between different factors (constructs) and between factors and their respective indicators (observed variables). The usual practice is to set the correlation variable between the first of the indicators equal to one (1), while others are correctly determined as estimated parameters (Tavakol & Wetzel, 2020). The table of factor loadings in Section 4.4.1. shows the estimated loadings. The diagram further shows the covariances and correlations of the structure of factors and of factors and indicator (Tavakol & Wetzel, 2020). Furthermore, when taking a more intricate view from a detailed perspective, one notices the covariances structures among both observed variables and extracted factors.

The path diagram carries a two-fold function. On one hand, the diagram presents the latent variables connection to indicator variables and the covariance connections between latent factors (Lleras, 2005). The two respectively represent covariances for latent variables and factor loadings for observed variables and latent variables (Lleras, 2005).

To understand the path diagram below, consider the rectangles, the arrows and the circles seen. Rectangles represent the indicators (observed variables), the arrows represent the resulting relationship (Tavakol & Wetzel, 2020). Circles represent factors (components or constructs). An arrow shows the origin and the resulting target. The arrow originates from the factor (the independent latent variable) and points at the dependent variable. The two classified variables are

referred to as the exogenous and endogenous variables (Tavakol & Wetzel, 2020).

Thus, the arrow points at the endogenous variable. An exogenous variable is assumed to have an effect on the endogenous variable. Consider the case of FC1 in the path diagram, which is the factor contributed to by Q6 and Q10. It was stated earlier in this document that these indicators' loadings are: 0.500 and 0.623. these loadings are highly significant.

The test analysis in the Table 35 shows that their respective p-values are all less than 0.001 for both. This shows that the factor FC1 has a positive and significant impact on all its indicators (Lleras, 2005). Regarding the indicators, the analysis proves how important it is to customers when shopping online that the images of the fruits or vegetables displayed online reflect the actual structure (e.g., size, colour) of the fruits or vegetables that customers will receive after their purchase. In addition, when shopping for fruits and vegetables online, written descriptions of the produce such as quantity or size to as desired to purchase the produce are important.

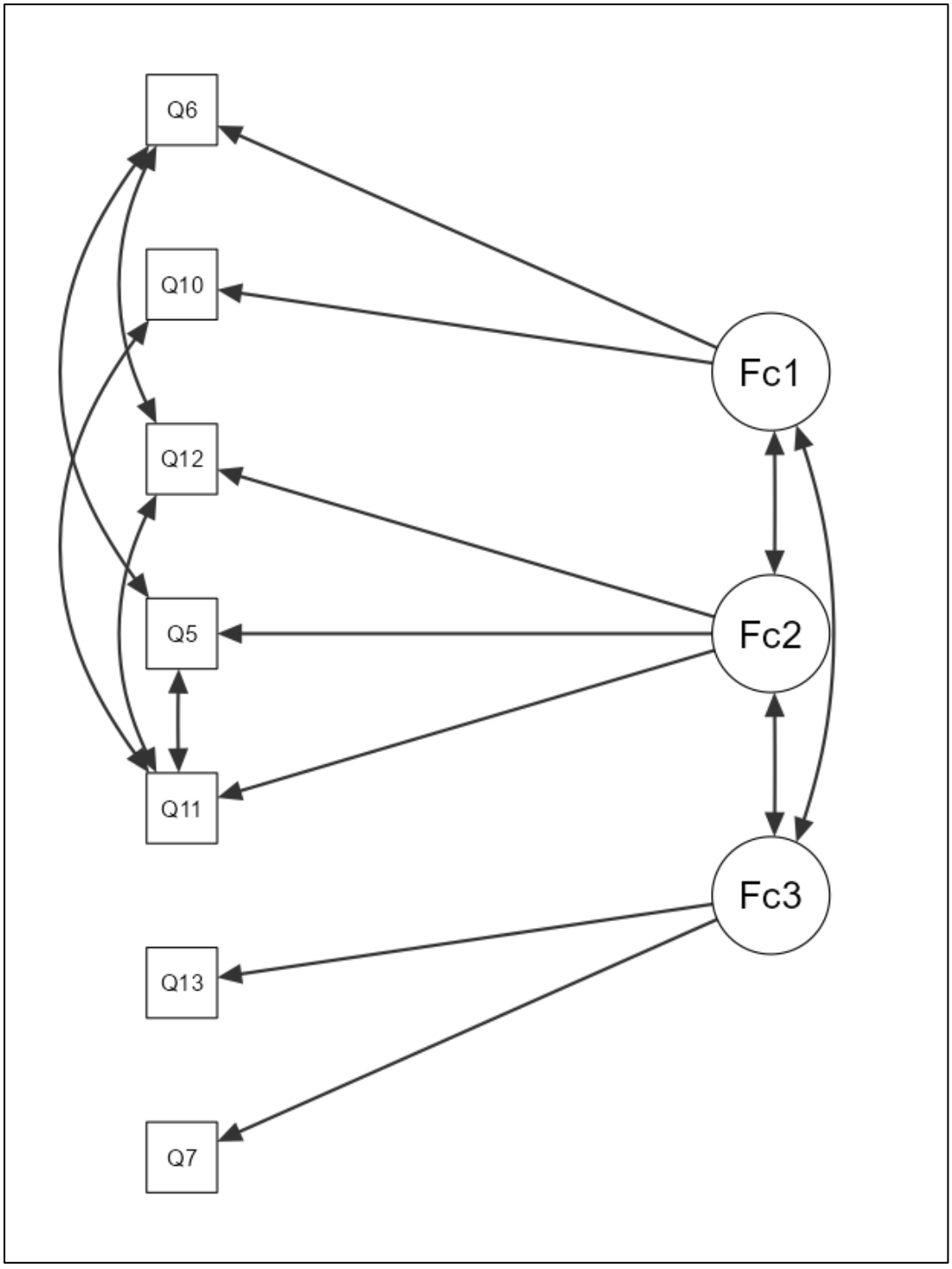

Figure 60: Path Diagrams for the Identified Factors

4.5 Structural Equation Modelling

Structural Equation Modelling also referred to as (SEM) is a technique used to determine the existence of relationships between different latent variables, which have been either identified through Confirmatory Factor Analysis or by the Conceptual Framework of the research study (Anderson & Gerbing, 1988; F. Hair Jr et al., 2014; Fan et al., 2016). The strength of such relationships are observed through indicator loadings and tests performed by either simple calculations or printed in this document as an output (F. Hair Jr et al., 2014).

Therefore, SEM is one of the stages of performing factor analysis and determining the relationship between different latent variables. The determination of such latent variables is determined by a test of hypothesis procedure, which is through probability theory (F. Hair Jr et al., 2014). The rejection criterion is based on a stated level of significance, usually at the value 0.05 or less. Furthermore, the system is made up of tables of outputs and a path diagram. The path diagram shows the connecting relationships between all the indicators involved (F. Hair Jr et al., 2014; Lleras, 2005). In addition, the construct strengths are through connections labelled with covariances or correlations in standardised terms.

From the CFA analysis in the previous section, three factors were generated by the analysis and depicted in the Path Diagram in Figure 60. The factors have been provided official names as follows:

- Fc1: Product and Website Visual Representation (PWV)
- Fc2: Website Visualization and Navigation (WVN)
- Fc3: Website Information Management (WIN)

Models Info	
Estimation Method	ML .
Optimization Method	NLMINB
Number of observations	218
Free parameters	26
Standard errors	Standard
Scaled test	None
Converged	TRUE
Iterations	45
Model	PWV=~Q6+Q10
	WIM=~Q7+Q13
	WVN=~Q5+Q11+Q12
	WVN~PWV+WIM
	Q5~~Q6
	Q6~~Q12

Table 39: The SEM Models Information

4.5.1 Fit Measures

Fit indices represent the plausibility of the model being estimated. A well-fitting model reduces the discrepancy between the Sigma matrix (Anderson & Gerbing, 1988). The fit measures test was performed in Section 4.4.4., so was the legality of the model for the data of this research data. The model fit indices for this SEM analysis are acceptable (RMSEA = 0.045 in Table 41).

It is common that the least acceptable fit measures are in the range of more than or equal to 0.90 for the Comparative fit index. This is also applicable to the observed TLI value (Anderson & Gerbing, 1988; F. Hair Jr et al., 2014; Fan et al., 2016). The analysis of this SEM shows that the model fit measures demonstrate a good fit since the CFI is 0.99 and the TLI =0.97. The RMSEA is 0.045 (F. Hair Jr et al., 2014; Fan et al., 2016).

Overall, it is concluded that the model fit measures were all acceptable on both sides of the indices.

Fit indices				
		95% Confidence Intervals		
SRMR	**RMSEA**	**Lower**	**Upper**	**RMSEA p**
0.030	0.045	0.000	0.095	0.503

Table 40: The Model Fit Indices

User model versus baseline model	
	Model
Comparative Fit Index (CFI)	0.990
Tucker-Lewis Index (TLI)	0.977
Bentler-Bonett Non-normed Fit Index (NNFI)	0.977
Bentler-Bonett Normed Fit Index (NFI)	0.970
Bollen's Relative Fit Index (RFI)	0.930
Bollen's Incremental Fit Index (IFI)	0.991
Relative Noncentrality Index (RNI)	0.990

Table 41: The User Model versus Baseline Model Values

The values observed in Table 42 indicates that the model fit is viable for this SEM analysis for the research data. The minimum value for the model to be accepted is 0.90 for all the measures on the table.

Furthermore, the p-value from the Chi-Square test below is greater than 0.05, this means that the model fit for this SEM analysis is viable for the researcher data.

Model tests			
Label	**X^2**	**df**	**p**
User Model	13.0	9	0.162
Baseline Model	436.4	21	< .001

Table 42: The Overall Chi-Square Tests

4.5.2 Estimates

The p-values indicated in the table shown below are used to decide on whether to reject the null hypothesis, or not. This is regarding the test of hypothesis on the following parameter estimates. The p-values less than 0.05 in this table result in hypothesis rejection. Failure to reject the null means the estimated parameter is approximately to zero.

Parameters estimates										
				95% Confidence Intervals			β 95% Confidence Intervals			
Dep	**Pred**	**Estimate**	**SE**	**Lower**	**Upper**	**β**	**Lower**	**Upper**	**z**	**p**
WVN	PWV	0.952	0.433	0.104	1.80	0.794	0.165	1.423	2.201	0.028
WVN	WIM	0.412	0.473	-0.515	1.34	0.289	-0.353	0.930	0.871	0.384

Table 43: The Parameter Estimates for the SEM Analysis

From the table, it is deducted that PWV positively and significantly impacts on WVN given that the p-value (0.028) is less than 0.05. Therefore, WVN depends on PWV. However, WIM does not contribute positively and significantly to WVN given the p-value (0.384) is greater than 0.05.

The table below provides all measurement models connected to this SEM analysis. The first column presents the latent variables followed by the observed variables that formed the construct. This implies that every latent variable is followed by its observed indicators on the second column. The third column consists of the estimated non-standardised estimates. The most important column is the **β** column, which consists of the standardised estimators, which are the loadings of the constructs by the indicators, showing the strength of the relationship between indicators and the latent variables (Anderson & Gerbing, 1988). The loadings are also referred to as correlations. It is observed that all the

loadings are significant based on the p-values, which are less than 0.001. These p-values signify very high significance (F. Hair Jr et al., 2014; Lleras, 2005).

Measurement model										
				95% Confidence Intervals			β 95% Confidence Intervals			
Latent	**Observed**	**Estimate**	**SE**	**Lower**	**Upper**	**β**	**Lower**	**Upper**	**z**	**p**
PWV	Q6	1.000	0.000	1.000	1.000	0.485	0.358	0.613		
	Q10	1.470	0.263	0.954	1.99	0.642	0.508	0.776	5.59	< .001
WIM	Q7	1.000	0.000	1.000	1.000	0.415	0.284	0.546		
	Q13	1.684	0.342	1.015	2.35	0.781	0.639	0.924	4.93	< .001
WVN	Q5	1.000	0.000	1.000	1.000	0.555	0.445	0.665		
	Q11	1.041	0.144	0.759	1.32	0.730	0.639	0.821	7.23	< .001
	Q12	0.978	0.173	0.639	1.32	0.494	0.376	0.611	5.65	< .001

Table 44: The Measurement Models for the SEM Analysis

The high level of significance is interpreted as that the factors (PWV, WIM, and WVN) positively and significantly influence each of their respective indicators. This means that the research questions posed to understand the influence of these factors were viable. Therefore, the objective of the research was achieved.

4.5.3 Path Model

The path diagram below shows the different segments of the diagram. It consists of three functional sections namely:

- The central most section consisting of the factors,
- The arrows, which consists of the factor loadings,
- The rectangular parts which represent the indicators.

The indicators loadings are printed on the arrows, which show the strengths of bi-relatedness of the factors and indicators. The correlation output shows that the factors are strongly related.

A more individual analysis shows that the observed variables (indicators) loaded significantly on factor with p-values of less than 0.001. This observation applies to all of the indicators.

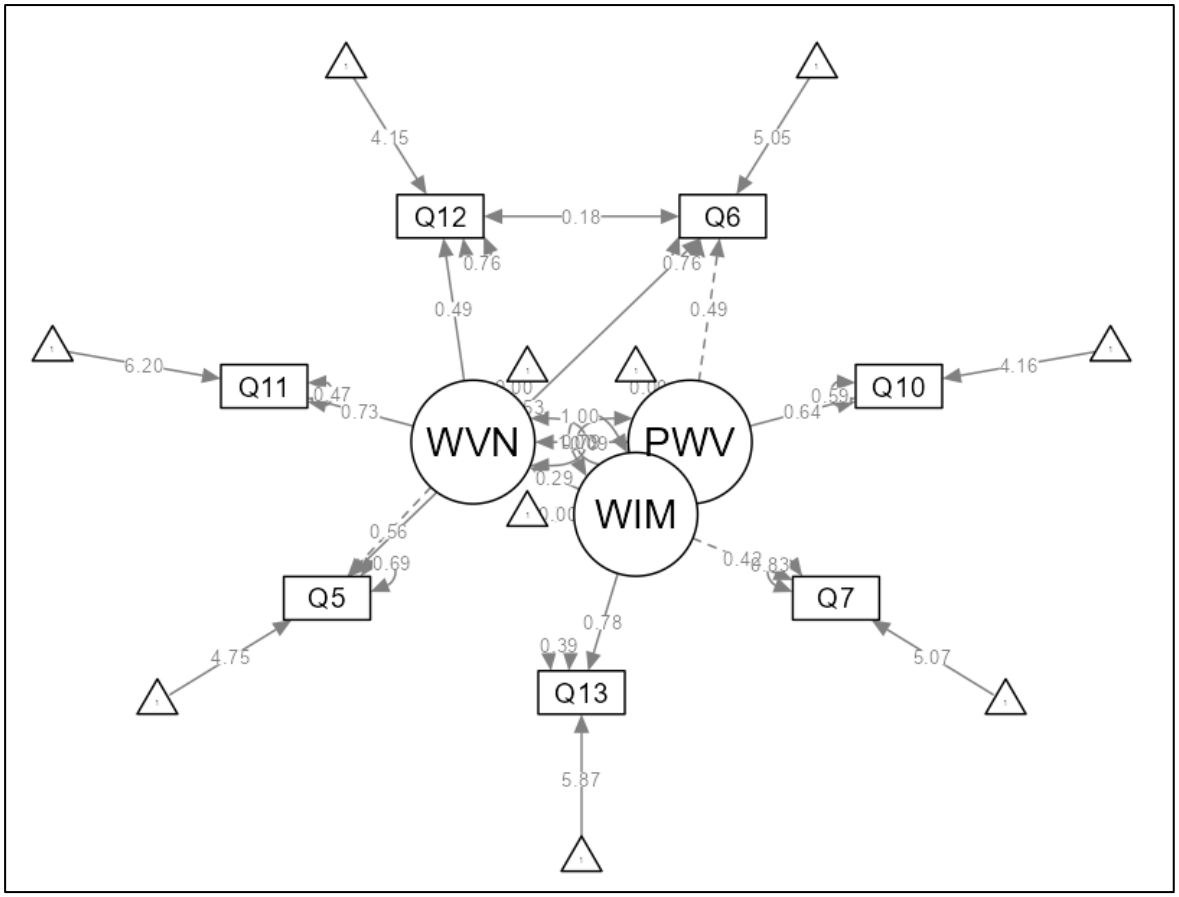

Figure 61: The Path Diagram for Observed Indicators

4.6 Summary of the Results

The various analysis studies conducted on the participants' responses indicate a positive influence by all ecommerce features of this study towards their intention to purchase fresh produce online. The tests have also confirmed that the research instrument was constructed in a consistent manner to achieve the optimal results from participants' responses. The results were in fact shown to fit a normal distribution.

In limited cases, the level of influence is dependent on age group or gender of participants, with the overall level of influence not impacted by those independent variables (age group and gender). Further analysis in the Confirmatory Factorial Analysis section then identified factors with the strongest relationship and how the combined factor view presents the co-importance of ecommerce features. In combination with the SEM analysis, the following factors were determined as critical influencing ecommerce factors: Product and Website Visual Representation, Website Visualization and Navigation, and Website Information Management.

The results observed in this section will be discussed in detail in the following section with the implications it has on developing an Agri-Based Ecommerce platform in South Africa.

CHAPTER 5. DISCUSSION OF THE RESULTS OR FINDINGS

5.1. Introduction

At the inception of this research study, it is indicated that Agriculture is a key industry in South Africa that can drive economic growth in South Africa (Moore, 2021). However, there are many challenges faced by farmers in the country with the research focusing on low margins for producers (Li & Sexton, 2013), as well as long payback periods from wholesalers for produce purchased, affecting farming operations continuity (Fredenburgh, 2015).

Ecommerce technology was then identified as a solution that can alleviate these issues faced by farmers by providing a direct-to-consumer model (Bruyn, 2021). Farmers would be able to control their own produce pricing, while receiving their payments significantly faster than through wholesale sales (Bruyn, 2021). Well-designed ecommerce stores that provide benefits to consumers have a general set of attributes such as website aesthetics to the availability of payment options (Totalwebdesign, 2023). The purpose of this research was then to identify which general ecommerce attributes provides benefits to consumers seeking to purchase fresh produce online. These attributes would then be identified as critical when developing an Agriculture Ecommerce store specifically for farmers and fresh produce consumers.

An online survey was then launched where participants were asked to confirm the level of importance an ecommerce attribute has on their intention to purchase fresh produce online. The results of the survey were shared in Chapter 4. In this chapter, the results will be discussed in the context of the Literature Review. The results will be discussed by attribute in order to confirm which attributes are critical for an Agri ecommerce store.

5.2. Product Presentation

Product presentation is the ecommerce attribute associated with depicting the product being sold online through images showing the size, structure, colour and other factors (Hussain et al., 2018). The hypothesis for this factor is that it has an influential role on consumers when shopping for fresh produce online.

The survey results to the questions associated to Product Presentation indicate that this factor plays a significant role when customers are shopping online for fresh produce. It can be deduced that customers find it essential that the images of the produce sold online needs to depict the actual product size and other physical characteristics. This is in line with general ecommerce expectations with 87.6% of participants in an ecommerce survey by ergonode.com indicating that images of products is integral to their shopping experience (Dropicts, 2023). (Pritesh, 2023) mentioned that visually appealing images has a positive impact on brand reputation and can show a sense of professionalism, and can improve the overall online shopping experience for customers. (Gray, 2023) also mentions that product images in general have a direct impact on product sales online.

Based on the results of this study, it is derived that product images are equally important when it comes to shopping for fresh produce online. The level of importance of this factor does not depend on gender or age. Meaning that all participants, irrespective or age group or gender, find this ecommerce factor influential in their purchase intention of fresh produce online.

Therefore, it is crucial for the success of an Agri ecommerce platform that it contains quality images of produce sold online. Product Presentation will play an influential role in inducing customers to purchase fresh produce online.

5.3. Content and Descriptions

In addition to the product images on an online store, written product descriptions also provide information about the products sold. This includes information such as the price, size, or other descriptive facets of the product. In the Literature Review, this factor is also considered important as it ensure an element of trust to the online platform (Liu et al., 2017). For the case of shopping for fresh produce online, the hypothesis is that content and description plays an influential role to the purchase intentions of consumers when shopping for fresh produce online.

Participants of the survey indicated that written descriptions of produce sold online plays an influential role to their intention to purchase fresh produce online. 85.9% of respondents indicated that this factor is either very important or crucial to their intention to purchase fresh produce online. This is in line with another study where 87% of online shoppers indicated that this factor is influential to their purchase intentions (Mohammad, 2023). (Regan, 2024a) says that effective product descriptions can influence customers to purchase products online. This level of influence also applies when it comes to fresh produce based on the results of this survey.

The factorial analysis also indicated that gender and age group does not influence the importance of product descriptions. However, the survey also sought to test whether providing the details of the farm from which the produce comes would impact purchase intentions. Based on the survey results, a relatively balanced set of results were observed. Participants found it equally important as unimportant to have the farm details as part of the content and description. This is irrespective of gender or age as statistically tested.

In conclusion, it is important to have quality product descriptions on an Agri ecommerce platform to entice customers to purchase fresh produce online. This content can be enhanced by nice-to-have details about the farm that produces the fresh produce.

5.4. Website Aesthetics and Ease of Navigation

The visual appeal of an ecommerce platform can attract customers to an ecommerce store (Delitzas et al., 2023). This also applies to the ability of customers to easily navigate through the various pages and content of the site (Ling & Salvendy, 2006). This study then sought to determine what level of influence these factors have on purchase influence for fresh produce online.

A significant number of survey participants, 92.79%, indicated that online store visual appeal plays an important to crucial role to their intention to purchase fresh produce online. 42.35% of respondents alone found it crucial. This is aligned with a study conducted by (Jinnevall & Kullar, 2022) which showed that 92% of participants preferred purchasing goods from a website with appealing aesthetics. Therefore, the same applies when it comes to developing an Agri ecommerce platform selling fresh produce. It is crucial to ensure the website has visually appealing features as it will significantly influence shoppers' purchase intentions. According to the survey results, website aesthetics is important to women than it is to men. This is in line with (Welnschenk, 2015) that found that women prefer websites that are colourful compared to men.

Age group also plays an influential role on the importance of visual appeal, with 25 to 44 years old rating this factor highly compared to the other age groups. This may be due to the age groups accounting for the most online shoppers in the country (Eden et al., 2021).

Regarding the ease of navigation, 91.4% of participants indicated that this plays an influential role to their intention to purchase fresh produce online. Furthermore, 95.7% indicated having a search bar function to search for specific produce was very important to crucial. 80.9% indicated that it is very important to crucial that the website be mobile responsive, therefore easy to navigate when using a mobile phone. These results indicate how significantly important it is to have an ecommerce site where fresh produce is easy to navigate through by customers.

Website mobile-responsiveness is significantly more important to females than it is for men. Though both genders indicated this to be influential, it significantly

more crucial to women than it is to men according to the survey results. This also applies to age groups, with 25 – 44 year-olds rating this factor higher than other age groups. There would need to be further studies conducted to understand the reason for these differences.

In conclusion, website aesthetics and ease of navigation are crucial to consumers when shopping online for fresh produce. It is important to particularly cater for the age groups 25 – 34 year-olds and 35 – 44 year olds as they are more influenced by the ease of navigation factors than the other age groups. It is essential than an Agri platform be visually appealing and easy to navigate both on computers and mobile phones to drive customers to purchase fresh produce online.

5.5. Online Payment Options

A study by (Hassan & Lee, 2021) found that having popular payments options on a general ecommerce site positively influences user trust and can lead to online transactions. This research study then sought to understand whether the availability of online payment options is influential to purchase intentions for fresh produce.

Based on the results, the availability of payment options at checkout of online stores is essential for the success of an Agri ecommerce platform. It is especially crucial that the payment options are provided by secure payment gateways. 86.7% of survey participants indicated that having payment options available is significantly influential to their intention to purchase fresh produce online, and 91.7% indicated that it is crucial that the payment gateway offering the options be secure. This signifies that having the applicable payment gateway to your online store is extremely critical to drive transactions for fresh produce on an Agri platform. These results are consistent with existing literature such as (Hassan & Lee, 2021) that indicate that ecommerce trust by consumers is strongly influenced by the presence of multiple online payment options.

This research study goes on to show that the importance of payment options is not dependent on gender or age groups. However, age group does play an influential role. The age groups known to shop online the most in South Africa (25

to 34 and 35 to 44 year olds) (Eden et al., 2021) indicated that this factor is crucial to them. However, 18 – 24 year olds, although they find it crucial too, did not find it as crucial as the other age groups.

In conclusion, it is crucial that an Agri ecommerce platform be developed to included multiple online payment options powered by a secure payment gateway to influence consumers to purchase fresh produce online.

5.6. Product Pricing Online

Customers are generally price conscious and conduct pricing research from different shops before making a purchase (Al-Mamun et al., 2014). It is also known that online store prices are not always the same as physical store prices (Kelly & Baker, 2022).

This study then sought to identify whether product pricing of fresh produce sold online, as well as the comparison to physical store prices, have an influential role on purchase intentions of consumers. 50% of the survey participants indicated that it is crucial to them how fresh produce prices differ between online and physical stores. A combined 96.8% found it important to crucial. The same behaviour is experienced for males and females, as well as across all age groups.

Therefore, the prices of the fresh produce sold on an ecommerce platform need to be competitive in comparison to physical store prices to entice fresh produce customers to purchase online rather than in-store.

5.7. Customer Support

Customers have a need for support services when shopping online for assistance with various queries (berg & Shahmehri, 2000). The results of this study indicate that 89% of participants find it essential to have customer support details available when shopping for fresh produce online. The significance of this factor is essential for males and females and across all age groups. According to (Richpanel, 2023), 89% of customers are likely to make another purchase should they experience positive customer experience. Therefore, this is in line with this research's observation that having adequate customer support functions will positively influence customers to make fresh produce purchases online. The customers will feel more trusting of the ecommerce platform (Richpanel, 2023).

Therefore, customer support details need to be available to customers when they are shopping for fresh produce online. Not only should they be present, but also working adequately to provide satisfactory experience to customers to influence them to trust the platform and make fresh produce purchases (Richpanel, 2023).

5.8. Word-of-Mouth: Reviews and Ratings

In the literature review, it was discussed that customers that have had a positive experience when shopping for a product will likely share their experience and this generally has a positive impact on the product's adoption (Marchand et al., 2017).

This study sought to identify whether this also applies when shopping for fresh produce online. The results indicate that participants find it very important or crucial to read online store reviews and rankings before making a purchase online. A combined 77.8% for reading reviews and 78% for rating scores. Although these percentages are high, they are not as high as certain afore-mentioned factors in this chapter. However, a study by (Patwardhan & Cst Dept, 2017) emphasizes the importance of this factor by showing that the more positive feedback (review) an online store receives about its products, the more customers will be inclined to purchase those products.

When it comes to gender, both reviews and rating scores share a similar pattern of importance. However, for rating rankings, age has an influence on how important it is to purchase decisions. The age groups 25 – 34 years old and 35 – 44 years old found it more crucial than very important, while age groups 18 – 24 years old and 45 years and older found it very important more than crucial. This may be due to the fact that the 25 – 44 years old participants make up the majority of ecommerce shoppers in South Africa (Bruyn, 2021). It is important to note however that all age groups ranked this factor highly in terms of its influence on their intentions to purchase fresh produce online.

This research study confirms that it is important that an online store selling fresh produce provides a function for customers to share their review and ratings of the product sold online. The reviews will be able to provide information about the nature of the store (that one may not be aware of) and build trust with the customer base and in turn drive sales of fresh produce (Regan, 2024b). It also contributes positively to Search Engine Optimzation ratings for the store, placing it among the first stores when customers search for reliable fresh produce online stores (Regan, 2024b).

5.9. Product Delivery Options

The final factor to be discussed is Product Delivery for products purchased online. Recall that the study by (Vakulenko et al., 2019) found that last mile delivery has an impact on consumers' perception of an online store. This study then sought to understand which delivery options consumers prefer when shopping for fresh produce online. The study also sought to find out what is the preferable that consumers expect their fresh produce to be delivered.

87.4% of participants prefer their fresh produce order to be delivered to their location of choice while the other 12.6% prefer collecting their order at the nearest location point. For those who prefer delivery to their location, 93.9% prefer same day delivery (with 43% expecting their delivery within two hours from purchase) while 6.1% are willing to wait up to three days for their delivery. These results are supported by a study conducted by (Nguyen et al., 2019) that found that

consumers prefer shorter delivery times than longer ones. The study also found that consumers prefer having a specific time slot for delivery than unknown (Nguyen et al., 2019), which may explain why 43% of participants specifically preferred the within two hours delivery time. This is also supported by (Lobo, 2024) that found that consumers are generally accepting of same day delivery for groceries, with 40% expecting deliveries within two hours.

The behaviour of the results is significantly similar between males and females. However, when it comes to the preferable delivery time, there is a significant difference between age groups. All the age groups except 35-44 year olds prefer waiting for same day delivery than having it delivered specifically within two hours. The 35-44 year old participants prefer specifically within two hours over waiting the entire. There are limited studies that have sought to identify the reason for last mile delivery time preferences by age.

In conclusion, it is crucial for ecommerce platforms selling fresh produce to offer same day delivery services to their consumers, ideally with a specific time period of within two hours. This is to align with consumers' expectation for short and precise delivery time for groceries purchased online (Lobo, 2024).

5.10. CFA and SEM Observations

Recall the Path Diagram (Figure 60) in the previous section. The factor loadings analysis that led to the identification of specific ecommerce attributes that influences the other.

The first observation through Fc1 shows that impact product and website visual representation. This means that the overall visual appeal of the ecommerce site and the product images work together to influence a consumers' purchase intention. Therefore, one would need to invest significantly in ensuring that both the product imagery and website aesthetics are adequately developed so that they concurrently work in influencing a consumer to purchase fresh produce online.

Similarly, with Fc2, the website aesthetics (visual appeal) and how easy it is to navigate through the content of the website, are strongly related. Therefore, it is not enough to have a visually appealing ecommerce platform. It is equally important to ensure that the visual appeal does not negatively impact how easily a consumer can navigate the online store. This means that the images need to be compatible to various screen sizes. Tools such as search bars or product descriptions need to be easily readable across any access platform (desktop, laptop, or mobile phone).

Finally, Fc3 indicates the importance of written descriptions on the website, especially including information on customer support options. This emphasizes the observations in Section 5.3 and 5.7. Written descriptions of the online store and its product content is critical; however, it needs to include customer support information to truly influence a consumer to purchase fresh produce online. Based on the research findings by (Venkatesh et al., 2003; Wahdiniwaty & Esertha, 2019) it provides a perception of trust for the online store to consumers. They have a sense of comfort that should they experience any issues with the customer journey, they know how to raise a query.

The SEM analysis concluded the analysis by looking into the relationship between the factors and it was identified that Product and Website Visual Representation is the most critical combination of ecommerce factors. This means that the visual aesthetics of the ecommerce platform and its products sold are significant when attracting a customer to purchase fresh produce online. The factors have a direct impact on the ability for consumers to navigate through the store and find products. The better the visualization and descriptions, the easier consumers will find it to shop on the Agri ecommerce site. s, the easier consumers will find it to shop on the Agri ecommerce site.

5.11. Conclusion

The purpose of this study was to identify which ecommerce factors should farmers consider when developing an online store to sell their fresh produce. The identified ecommerce factors were then tested as hypotheses to determine which would be influential to consumers' purchase intentions for fresh produce online.

The results and findings of this survey indicate all the ecommerce factors are significantly influential to consumers' purchase intentions for fresh produce, which some factors more influential than others. This means that the IT Artefact in the Affordance Theory model is represented by all the ecommerce factors tested in this study.

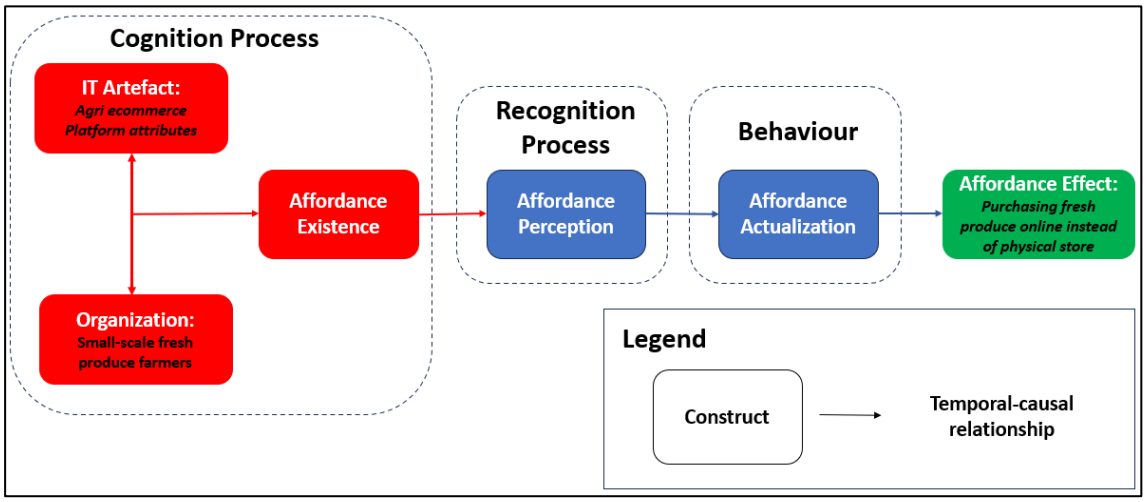

Figure 62: The Affordance Theory Model Applicable to this Study

The findings also show that in some case, the level of influence for certain factors are influenced by age group or gender, meaning that it is important for farmers to consider the demographics of the customer base when developing the ecommerce platform. The findings of the survey also show a willingness for consumers to purchase fresh produce online given the right parameters are present to assure them an ideal customer experience. This means that if implemented well, the use of ecommerce to sell fresh produce can provide farmers with a solution to low margin issues and faster payment time as anticipated at the beginning of this study. A similar outcome which was experienced when a similar solution was implemented in India (Levi et al., 2020).

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS

6.1. Introduction

At the beginning of this research paper, the impact that technology can have in improving South Africa's economy through Agriculture was discussed (Moed, 2018). With Agriculture being a key industry to drive economic growth in the country (Moore, 2021), it was important to explore challenges faced by farmers affecting their ability to expand their operations. Two challenges mainly faced by small scale farmers were identified and explored. Small scale farmers generally face low and unstable income (Abokyi et al., 2020). This challenge affects the profitability capability of these farmers and their ability to sustain farming operations (Li & Sexton, 2013). Furthermore, in addition to farmers not being able to control their desired selling prices, there are no legal time limits by which they must be paid for produce sold to retailers (Fredenburgh, 2015). Therefore, farmers are exposed to long payment terms that can reach 120 days (Fredenburgh, 2015).

Agriculture Ecommerce technology was then identified as a potential solution to offset these challenges faced by farmers. This is due to the value proposition of farmers selling their produce directly to consumers while controlling their selling prices and payback period (Bruyn, 2021) compared to the wholesale market. It can also assist with expanding their market reach geographically (Bruyn, 2021). This led the research to its objective of identifying which ecommerce properties influence consumers to purchase fresh produce online to drive online sales for farmers (Soegoto & Nugraha, 2020; Wahdiniwaty & Esertha, 2019). To guide the research, the important attributes of an online marketplace were explored and various features ranging from website aesthetics to customer support features were identified (AbdAlameer, 2014; DesignRush, 2019; Jennings, 2000; Totalwebdesign, 2023). Then these features became the basis for the hypotheses tests to identify which of these features were influential when it comes to the sale of fresh produce specifically.

An online survey was created allowing participants to rank how important each of these features were to their purchase intentions of fresh produce online. More than 250 participants responded to the survey and the results were analyzed to identify the important features as well as determine relationships between gender, age, and between the features themselves. The results were discussed extensively in the previous section and the outcome according to the research objective will be discussed in the next section.

6.2. Conclusions regarding research question

The research question for this research study in Chapter 1 is as follows:

“Which ecommerce properties influence fresh produce consumers to purchase fruits and vegetables online?”

Based on the findings of the research results, the following ecommerce features influence consumers to purchase fresh produce online:

- Product Presentation
- Website Content and Quality of Product Descriptions
- Website Aesthetics and Ease of Navigation
- Secure Payment Options
- Product Pricing
- Customer Support
- Word of Mouth (Reviews and Ratings)
- Product Delivery Options (Last Mile Delivery)

Therefore, for an Agriculture Ecommerce to be developed in South Africa in such a way that it influences consumers to purchase fresh produce, and therefore allow farmers to have more control over their ability to sell produce to this base, it needs to have all the features listed above. These features need to be adequately developed so that they work in an excellent manner as these features play a crucial role on consumers’ decision process to purchase fresh produce online.

This is a similar outcome found in studies conducted in Indonesia and China by (Wahdiniwaty & Esertha, 2019), (Soegoto & Nugraha, 2020) and (Li et al., 2020), that identified that Agri-based marketplaces are an influential technology tool in Agribusiness, and that features such as product listing, ease of product accessibility, payments methods, and logistics service quality influenced the willingness for consumers to purchase fresh produce online.

The research findings have assisted in contributing to the significant research gap of consumer Agri Ecommerce research in South Africa and in Africa. Various similar research have focused on the adoption of these platforms by farmers (Cloete & Doens, 2008; Schulze Schwering et al., 2022) while research focusing on consumer adoption have been external to South Africa (Li et al., 2020; Soegoto & Nugraha, 2020; Wahdiniwaty & Esertha, 2019). This research has now detailed which ecommerce factors need to be addressed when developing an Agri-Based Ecommerce platform in South Africa.

6.3. Recommendations

The research study has identified which ecommerce features and Agri Ecommerce platform needs to have to influence consumers to purchase fresh produce online. Farmers, especially small-scale farmers that seek to employ a direct-to-consumer model, need to ensure that software developers that develop their ecommerce store are adequately experienced in developing these features.

As observed in this study, all these ecommerce features play a critical influencing role, therefore, the developers cannot compromise on any factor. Especially, the features associated with website aesthetics (including products aesthetics), descriptions, and ease of navigation. These are the critical components where consumers usually have the first point of contact with the online store. These features need to convince the consumers at first glance that they can indeed make a purchase on the online store. The other features then support the purchase journey of the consumers. There are various software providers such as Shopify and Magento that offer ready-made templates that farmers or developers can use to create an online store with these features already

developed (BigCommerce, 2024). It is a matter of updating the templates with fresh produce related content.

In terms of the last mile delivery aspect, farmers can partner with food delivery providers such as Uber Eats, or Mapa to assist with same day deliveries.

However, developing an excellent ecommerce site can prove costly (Keenan, 2023), especially given the number of features involved that need to be adequately developed (BigCommerce, 2024). In fact, the study by (Schulze Schwering et al., 2022) showed that small-scale farmers are generally unable to afford the implementation of digital technology tools such as this. Therefore, it is recommended that the Department of Agriculture of South Africa be responsible for developing such a marketplace on behalf of farmers, as it was in India by the state government (Levi et al., 2020), or fund individual farmers with a proven track record of business operations (or other valid criteria) to develop their business' specific online store.

6.4. Suggestions for further research

There are various opportunities to expand on the outcome of this research study. This research focused on the purchase of fresh produce. However, some farmers also sell meat, or live animals at auctions for example. Given fresh produce and animal-based products are significantly different, it presents an opportunity to identify which ecommerce factors are influential for animal-based products.

The survey was targeted to residents residing in Gauteng given it is the most populated province in the country. However, there are eight other provinces in the country. It is therefore suggested that this study be conducted for residents of the other provinces to identify whether there is a difference in outcome. Furthermore, this study applied to the South African population. It can be expanded to other countries, especially considering countries that may not have the technological facilities available in South Africa.

The study outcome indicated which factors are important for an Agri-based Ecommerce platform. There is an opportunity however to expand the research per factor. For example, when it comes to website aesthetics, a study can be conducted to analyze which colours are generally associated with such a platform. Regarding secure payment options, a study can be conducted to identify which payments options would be preferable over the others when it comes to purchase fresh produce online. Another example would be the type of support channels which would be ideal for fresh produce, say WhatsApp preferable to email.

The study also focused on independent variables being age and gender. There are other consumer segmentation factors such as consumers' income bracket that can be researched further to identify any preference or association differences.

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APPENDIX A: Participant Information Sheet



Dear Sir / Madam,

My name is Stallone Siakam. I am a Masters student in Digital Business at the University of the Witwatersrand, Johannesburg. My supervisor is Prof. Adheesh Budree. I am conducting a research study to understand which ecommerce factors have an influence on shopping intentions for fresh produce (fruits and vegetables) consumers.

I am inviting you to take part in answering this questionnaire. If you decide to take part, it will take approximately 15 – 20 minutes to complete the questionnaire. In this questionnaire, I will need to ask for some personal information about you, including your gender and age.

If you decide to take part in the research study, it should be because you want to volunteer. You do not have to take part. You can stop responding to the questionnaire at any time. You do not have to answer any questions if you do not want to.

The risks for this research study are no more than what happens in everyday life. The questions posed are simply to gauge which factors are the most important to you when shopping for fresh produce online.

This research study will be written up as a research report. The report will be available on the university library website. If you would like to receive a summary of this report, I will be happy to send it to you.

If you have any questions during or afterwards about this research study, feel free to contact me on the details listed below. If you have any concerns or complaints about the ethical procedures of this research study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), Telephone +27(0) 11 717 1408, Email hrecnon-medical@wits.ac.za.

Yours sincerely,

Researcher: Stallone Siakam, 2409827@students.wits.ac.za

Supervisor: Prof Adheesh Budree, adheesh.budree@wits.ac.za

APPENDIX B: Consent Form

Ecommerce Factors Influencing Adoption of Fresh Produce Consumers in South Africa

Dear Participant,

By proceeding to completing the online survey, you are agreeing to participate in the research project and the following:

- The research study was explained to me. I understand what this study is about.
- I volunteer to take part in the study.
- I agree that data collected from my responses will be used to conduct data analysis and interpretation for academic purposes.
- I agree that my participation will remain anonymous (my name or other identifying data will not be collected in this research)
- I agree that other researchers may use the information I provide in the online survey (depending on their own ethics clearance being obtained)

APPENDIX C: Research Instrument

Introduction
In which province of South Africa do you reside in? Gauteng Limpopo Mpumalanga Northern Cape KwaZulu-Natal Western Cape Eastern Cape North West Free State Are you male or female? Male Female Which age group do you form part of? 18 - 24 years old 24 - 34 years old 35 - 44 years old Have you every purchased a product online before? Yes No If you selected "No", please share why not? The next section of the questionnaire will seek to understand how important stated ecommerce factors are to your decision to purchasing a product online. Please use the scoring scale below to answer the questions: 1: Not Important 2: Slightly Important 3: Important 4: Very Important 5: Crucial
Product Presentation
1. When shopping for fruits and vegetables online, how important are the images of the produce sold to your desire to purchase the produce? 1 2 3 4 5 2. How important is it to you that the images online reflect the actual structure (size, colour) of the fruits or vegetables that you will receive? 1 2 3 4 5
Content and Description
3. When shopping for fruits and vegetables online, how important are written descriptions of the produce such as quantity or size to your desire to purchase the produce? 1 2 3 4 5

4. How important is it to your intention to purchase fruits and vegetables online that the details of the farm(s) where the produce come from are provided?

1 2 3 4 5

Website Aesthetics and Ease of Navigation

5. How influential is to your purchase intention that you can search for specific fruits and vegetables through a search bar on the online store?

1 2 3 4 5

6. How important is the ease at which you can navigate through the online store's content to your intention of purchasing fruits and vegetables from that store?

1 2 3 4 5

7. How important is it to your purchase intentions of fruits and vegetables online that the online store's website is compatible to the size of your mobile phone screen?

1 2 3 4 5

8. How important is it to your purchase intentions of fruits and vegetables online that the online store's website is compatible to the size of your mobile phone screen?

1 2 3 4 5

Customer Support

9. How important is it to your purchase intentions of fruits and vegetables online that the online store has information on how you can the store for support queries?

1 2 3 4 5

Payment Options

10. How important is it to your purchase intention for fresh produce that the online store provides multiple payment methods to you at checkout?

1 2 3 4 5

11. How important is it to you that the payment gateway is safe and secure to your intention of purchasing fruits and vegetables online?

1 2 3 4 5

Pricing

12. How important are online prices for fruits and vegetables to your intention to purchase the produce online?

1 2 3 4 5

13. How important are online prices for fruits and vegetables compared to physical store prices to your intention to purchase the produce online?

1 2 3 4 5

14. How important are online prices for fruits and vegetables compared to other online store prices to your intention to purchase the produce online?

1 2 3 4 5

Word of Mouth

15. How important is it for you to read reviews of an online store before you purchase fruits and vegetables from that store online?

1 2 3 4 5

16. How influential are rating rankings of an online store on your intention to purchase fruits and vegetables from that store?

1 2 3 4 5

Product Delivery
17. Do you prefer having your fruits and vegetables purchased online delivered at your location of choice or do you prefer collecting at collection point? Delivered to location of choice Collection Point 18. What is an acceptable delivery time for your fruits and vegetables to be delivered at your location of choice after purchase? Between 0 - 2 hours Same Day 2 - 3 days
You have reached the conclusion of this questionnaire. Thank you for your participation to this research study.